Library and Information Technology: In Pursuit of Excellence

Seminar Papers

XXXVIII All India Library Conference

Utkal University, Bhubaneswar

November 21-24, 1992

Editors

C P Vashishth

O P Sharma

A P Gakhar

Dev Raj Singh

INDIAN LIBRARY ASSOCIATION

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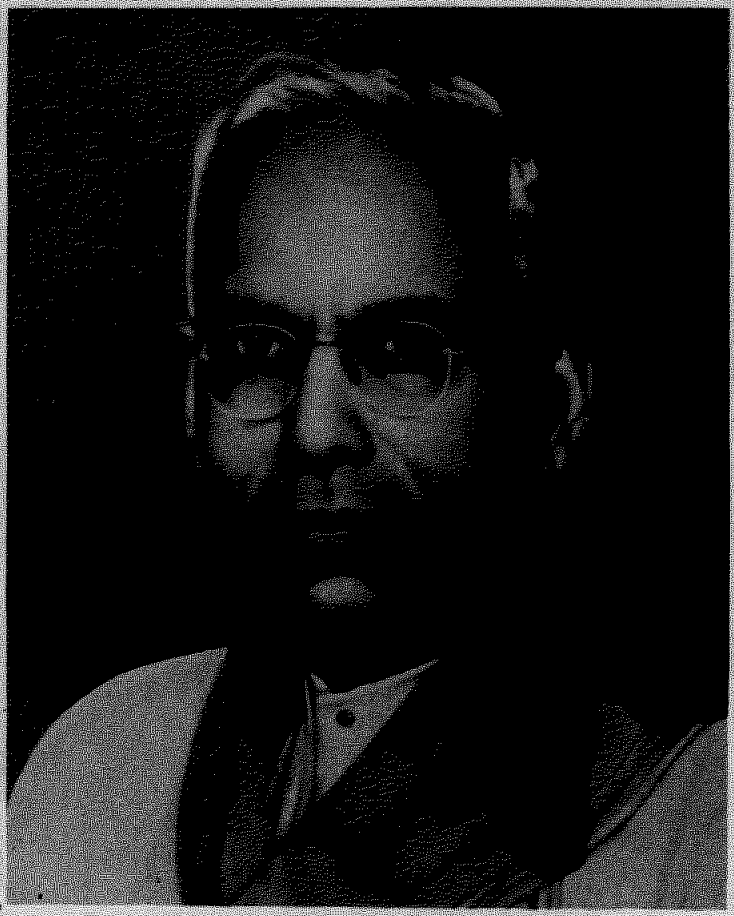
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OUR SALUTATIONS TO

THE FATHER OF LIBRARY SCIENCE IN INDIA

on his 101st Birthday



Dr Shiyali Ramamrita Ranganathan, MA, LT, FLA, D Litt

(9th August 1892–27 September 1972)

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FOREWORD

There is a visible impact of new Information Technology (IT) on the functioning of our library and information (L&I) centres. During the last 5 years more and more L&I centres in India have started making use of the *state-of-the-art* of new IT. Computers have found their way in L&I centres in a big way. They are being used for a number of routine and housekeeping jobs. The prediction that 'Computers will spell a total end of library profession' has come to be false. Infact their application in various L&I operations has enhanced the efficiency level. The retrieval of information is much faster and that too with accuracy. It is really very heartening to note that our L&I centres have been able to achieve moderate degree of success in using and exploiting the new IT to the best of their advantage. Credit for this remarkable change entirely goes to a handful of governmental and non-governmental agencies/organisations for successfully inculcating and spreading the computer culture amongst the L&I centres and bringing change in their outlook in such a short time.

The computers and related IT have been in use for over two decades in the countries of West. This has made them leaders in the field. They have fully exploited its use in L&I environment. The application of computers in handling routine and repetitive jobs not only saves labour and time, it also speeds up the operation, increases productivity and contributes to efficiency in terms of recall and precision parameters.

The Information Revolution is rapidly widening the scope of application of IT with promise of ensuring timely access to relevant information to the users of all levels on one hand and on the other enhancing the productivity in information work and services. The specialised L&I centres, whose concern is to provide information services rather than automation of their housekeeping activities, are using microcomputers in stand alone and in network configuration. Computerisation of bibliographic records facilitates in interlinking of resources with other local, regional, national and international L&I centres to form a network. The availability of current as well as retrospect bibliographic databases on CD-ROMs and online catalogues, networking and the downloading facilities have accelerated the pace of computerisation in larger L&I centres. India has made a little late start, but our L&I centres are picking up very fast. If this trend continues, within next five years we will have a completely new story to tell.

With a view to sensitizing the L&I personnel, the Indian Library Association in collaboration with National Information System for Science and Technology (NISSAT), Deptt of Scientific & Industrial Research has been organising a number of workshops and training courses in the Application of Computers to L&I Activities in different parts of India. These Workshops and Training Courses have provided a good amount of exposure to the participants. Many of these participants have started using computer in their L&I centres. The themes of annual seminars organised by ILA during its annual conferences too have provided opportunity to the L&I personnel to discuss and debate the application of computers for achieving excellence in L&I services. The theme of the XXXVIII All India Library Conference: "Library and Information Technology: In Pursuit of Excellence" is yet another milestone in this direction.

This volume of pre-conference papers contains 43 significant contributions of the professionals on the whole array of topics ranging from "Library and Information services: Impact of Information Technology", "New and Innovative Measures", "Automation and Computerisation", "Database Activities", "Creation and Conversion of Bibliographic Records", "Bibliographic Records Format", "Library Software(s)", "Information Retrieval Systems", "Access to National/International Databases", "National Information Systems Networks", "Developments in Information Industry", "Data Communication Facilities", "CD-ROM Technology", to "Human Resource Development". The treatment of the topics amply demonstrates the interest and keenness of the professionals in the subject and gives a true picture of their thinking and involvement.

It is hoped that the issues arising out of the theme in each area will be thoroughly deliberated upon during the technical sessions. The experts and professionals will discuss the subject in its totality with objectivity and arrive at useful recommendations for shaping future course of action on the part of L&I managers.

Delhi
November 15, 1992

C P Vashishth
President
Indian Library Association

IMPACT OF NEW INFORMATION TECHNOLOGY IN DEVELOPMENT OF LIBRARIES AND SERVICES

S S PAWAR*

1 INTRODUCTION

Technology opens doors though no one is actually compelled to enter. However, new technologies which encompass computer, setellite and telecommunication technologies seem to be the key that has opened an infinite number of different door, the key to national autonomy and credibility even to power, with the convergence of computers and telecommunication technology. During the last couple of years the university libraries and other institutional libraries in India are coming under the impact of information technology. During the last two decades efforts have been directed to consolidate the library infrastructure and several initiatives taken. The information sector has made rapid strides in the recent past to emerge as leading component of the national economy of developed countries. Information technology is now a dominant factor of production.

2 INFORMATION TECHNOLOGY: AN OVERVIEW

Information technology is the latest buzzward in the information era. The way of communicating available information from the various sources to end users are among the major challenges of our times. Today information cannot only be stored, retrieved, disseminated in enormous quantities but also at phenomenal speeds. New technology opens an unprecedented opportunity in the way information is stored, retrieved and manipulated. The main features of recent developments in information technology can be summed up as fellows:

- Increased computer power leading to speedier and cheaper computer processing.
- Cheaper data storage for example (optical storage media).
- Digitization of information–text, graphics, photographs, speech, sound video, etc.
- Better data transfer between different systems and media.

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- Improved telecommunication, such as ISDN with greatly increased capacity for data transmission.
- Decreased size of equipment.
- Increased reliability of hardware and software.

These have led to the development of international, national and local online systems, automated library systems, public access catalogues, the electronic journal, Electronic mail systems, CD-ROM, optical digital disks, etc.

21 COMPUTER TECHNOLOGY

Computer technology has undergone tremendous changes both in its hardware and processing capabilities. Computers are already being used for library operations. The arrival of microcomputers has revolutionised information management in speed, effectiveness, efficiency that were previously unthinkable.

The impact of computers has permeated all sectors of librarianship and information retrieval. In India, among the developing countries in the Asian region, we have good libraries, documentation centres and specialized libraries attached to universities, government departments, research centres and commercial undertakings (public and private). By now there are nearly 170 university libraries including IITs, 150 engineering colleges and an equal number of medical colleges, 500 social science research institutions with good libraries and 1000 libraries attached to scientific establishments and around 600 government departmental libraries in India.

22 STORAGE TECHNOLOGY

The advancement in storage technologies has a significant effect in information handling. The technology of digital storage is one of the most rapidly changing sectors of micro-electronics. The storage technologies include magnetic storage like: tape/disc storage, Floppy discs, Winchester and removable hard discs, optical storage like compact discs (CD), video disc, CD-Rom (compact-disc read only memory), technology has revolutionised the information and publishing fields.

Recent developments in optical storage technology have provided a cheap storage medium for information. Compact discs are type of digital optical disc which are 12 cms in diameter. Compact discs are the result of co-operation between philips (optical storage technology) and Sony (error correction coding) which started in 1979 and led to a commercial production of the compact audio disc in 1983.

A 12 cm CD-ROM disc contains approximately 8 Billion Bits burnt into a 5 km tract. This disc can store 550,000,000 bytes of information. The CD-ROM disc is, therefore, an excellent storage medium and can be used together with widely available low cost micro or personal computers to provide relatively powerful distributed storage and processing devices, which are not dependent on telecommunication systems.

23 TELECOMMUNICATION TECHNOLOGY

Telecommunication is concerned with the transfer of data over distances by means of communication links where communication between large number of information sources is desired. In India, the telecommunications scenario has brought radical changes for database information network services. Several steps have been undertaken to evolve systems that would offer voicedata and Video services through a mix satellite links, microwave links and fiberoptic cables in high capacity range and satellite links. However, several long range initiatives have been taken by the various libraries/ organisations in India for data and information network services, such as: INFLIBNET, CALIBNET/DELNET, CSIRNET and CD-ROM, etc.

3 INFLIBNET

(Information and Library Network): It is a computer communication network of university libraries and bibliographical information centres set up by the UGC (India). This project is a major national effort to improve capability in information transfer and access that provide support to scholarship, learning, research and academic pursuits. It is a co-operative network and will contribute to pooling, sharing and optimisation of resource facilities and services of libraries in various universities. It is a major programme towards modernisation of libraries in India. In this programme, 150 university libraries, 50 post graduate centres/autonomous colleges and 200 libraries of R & D institution are covered.

4 CALIBENT

CALIBNET is envisaged as a metropolitan network linking some 38 libraries in Calcutta metropolitan area. This network application to be supported are electronic mail, file transfer, remote log-on and databases and document access. The functions to be automated by the participating libraries are: cataloguing, serial control, acquisition and fund accounting, circulation and local user services of current awareness, SDI, Union catalogue, partial databases and access to national and international network.

41 CSIRNET

The Council of Scientific and Industrial Research of India had planned

to set up a computer communication network for exchange of information among its 40 old laboratories during the 8th Plan (1990-95) and the MESI Bombay has undertaken the feasibility study for the same. This network aims at helping online database services on different subjects, like leather technology, food technology, neutral products, chemistry, radio physics and medicinal plants.

42 VIDEOTEX AND TELETEXT

Basically vidextex and view data are interactive systems for transmitting text and graphic stored in computer database via the telephone network for display on television screen Teletext is a Pseudo-interactive information retrieval system using one way telecommunication line to carry digitally enclosed textual, graphic or computer readable information.

43 ELECTRONIC MAIL (E-MAIL)

A relatively new form of communication is electronic mail. It provides a semiformal method of direct communication which can be extremely useful in that it is quick and relatively cheap. The term "E-mail" covers the transfer to digital message from one computer terminal to another.

In addition to above, some others specialized telecommunication networks such as: DESINET, ERNET, VIDYANET, BHELNET, OILNET, are in various stages of operation.

5 OVERALL IMPACT OF INFORMATION TECHNOLOGY

The developments in the use of computers for the storage and retrieval of information and in use of telecommunication networks and packet switching services to transmit data over long distances, now offer exciting possibilities to improve information services. "Every reader his book", "Every book its reader" and "Save the time to the reader", are three of the basic laws of Library Science laid down several decades ago by Ranganathan. Since those days, the headlining information has changed dramatically yet the basic principles underlying a library services remain unchanged. Information technology can be properly harnessed, than the prospects for the future are promising. By appreciating the pitfalls inherent in the new technology age, a sure and safe path can be trodden towards the goal of access to information to all.

6 NEED NEW BREED OF LIBRARY PROFESSIONAL FOR DEVELOPMENT OF LIBRARY SERVICES

The utilisation of national information for the development of a strong nation depends on the knowledge and skill of the professionals who handle information. The library professional no longer remains as traditional librarian,

who just establishes a contact between the users and the documents. The complicated information requirements of the present information society demand expertise, knowledge and competence in information handling among the library professionals. But the library methods have failed to cope up with the increasing complicated needs of the present information handling among the library professionals.

INFORMATION TECHNOLOGY VIS-A-VIS TECHNICAL PROCESSING

K C SAHOO*

1 INTRODUCTION

During stone age, a nation used to be considered as powerful if its people were physically strong. Such nations used to dominate the weaker ones. In the second phase, the nations with better agricultural potentiality were considered strong. In the third phase, the strength of a nation was measured in terms of its industrial advancement. The industrially advanced countries had their sway over those which were backward in industry. Now the situation has changed altogether. A nation is considered more powerful today if it is well informed. More informed a nation, more powerful it is. Today's society is, infact, an information society and thus we have entered into the information age.

11 APPLICATION OF TECHNOLOGY

The progress from stone age to information age has been possible because of the application of technology. Technology is a generic term and may be used as printing technology, trade technology, industrial technology, information technology, etc. As a whole, the term technology refers to the sum of the ways in which a social group provide themselves with the material objects of their civilization. It is felt that the impact of technology has passed through the evolutionary processes. But the rate of impact is felt maximum in between the industrial society and the information society. Now, the whole activities of the human life is entirely controlled by the supreme power of technology which in fact has changed the way of life of the human society. Technology has left its impression at each point of development of human life.

2 LIBRARY TECHNOLOGY

Library, being an important component of human activity and development, has failed to keep itself free from the supreme power of technology. Through the evolutionary process, it is changing very fast in its structure and function. There appears five major developments in the field of technology which have revolutionised the present day library system to

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a great deal. Those are computer, storage media, telematics, reprography and micrographics, and audio-visual aids. Innovations in computer and telecommunication technology have resulted in major changes in basic library operations. Interactive video, home computing, video cassette, hybrid satellite transmission, cable, video disk and electronic miniaturisation are among current technological developments that could either expand or significantly diminish the social role of libraries.

21 TECHNICAL PROCESSING

Technical processing is behind-the-screen activities, *i.e.,* green room functions. The library users have no direct access to these activities, but these activities really help in providing effective library services to the users. Classification and cataloguing of books, preparation of indexes and abstracts of the journal articles, construction of thesauruses are the important activities coming under these technical processing.

211 Automated Document Classification

DRTC, Bangalore has conducted several experiments on automated document classification basing on the DOC-finder* system designed by Dr S R Ranganathan and reached the conclusion that computer can be applied in classifying the documents. Attempts have also been made for automating the classification procedure by the use of factor analysis–a mathematical technique for deriving classification categories for a set of documents. Here, the class number is determined on the basis of the words contained in the documents and the documents can be ordered into classes on the basis of similarities or differences in vocabulary. A computer programme prepares the document-erm matrix (*i.e.,* a rectangular array of quantities) for input to the factor analysis programme. The incidence of a term and association among terms are then computed. Finally, the classification categories are derived on the basis of this study. Other mathematical techniques for deriving class numbers include clump theory, latent structure analysis and discrimination analysis.

TIFR Library at Bombay is maintaining a computerised classified catalogue where entries are arranged according to the *UDC* scheme. The class number is being used for online search. It is a fact that the application of computer in classifying the documents is not so wide and universal as we find its use in other technical processes of the library. Rather, attempts have already been made to use different classification schemes as a query

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* A special purpose computerised document searching aid to establish one–one correspondence between the specific need of a specialist at the moment and the documents recorded in the memory of the DOC-finder.

language in a typical retrieval system in which the user interacts directly with the computer-stored document reference file.

212 Automated Cataloguing

In case of card catalogue, the problems of substantial space consumption, purchasing of expensive cabinets and supporting furniture, labour-intensive and time consuming catalogue maintenance routines are greatly intensified by changes in cataloguing rules affecting the choice and form of entries and limited convenience and retrieval capabilities.

These problems, if not eradicated, can at least be minimised by the replacement of card catalogue with online Catalogues. In order to save time and to reduce the cost associated with descriptive cataloguing copy *i.e.,* descriptive cataloguing information prepared by other large library systems, especially the Library of Congress (LC). Automation of descriptive cataloguing, however, depends on availability of such cataloguing copy in computer processible form. In late 1960s, LC developed the MARC format for communication of bibliographic data on magnetic tape and began distributing machine-readable catalogue through its MARC distributing service.

As an alternative to computer printed or typist catalogue, computer output microfilm (COM) catalogues have been widely implemented by libraries and library systems since the early 1970s (The first library application–a computer produced catalogues was reported in 1967 by the Lockheed Technical Information Centre). A number of service bureaux, book jobbers, bibliographic utilities and other commercial database vendors have developed software to produce COM catalogue from library-supplied data, thereby eliminating the need for inhouse COM recorders and customised programming.

Compared to paper-based book catalogues, COM catalogues offer several advantages, most important being economy of production, durability, and compactness. In addition to saving space and automating file maintenance, online catalogue permits remote access by authorised person equipped with compatible terminals, and they can support information retrieval operations–such as keyword searching of titles and series names–which are not conveniently possible with traditional card or book form catalogues.

Since mid 1980s online catalogues implementations have been dominated by integrated library system which combine database management and catalogue access capabilities with circulation control, acquisitions, serial control and such other operations.

Among the newest and most widely publicised approaches to online catalogues implementations, a growing number of vendors offer public access catalogue systems which employ CD-ROM storage technology. Example in IMPACT system for Auto Graphics. Updated by periodic replacement in the manner of book form catalogues, such CD-ROM catalogues are increasingly mentioned as an alternative to COM for union catalogues and similar implementations.

213 *Indexing/Abstracting*

An index is an effective retrieval tool. It provides various access points through which a user can identify the documents of his interest. Indexing is a technique of preparing an index. It is a method of document representation, the ultimate aim of which is to provide access to the users through the descriptions used. Index terms are arranged in a more searchable order which involves a definite syntax and orthography. Because of these characteristics, indexing is described as a language, more or so, an artificial language. Indexing language may be available in a preferred for adoption in any information retrieval system. A scheme of classification is a readymade language. Similarly, a thesaurus is also a readymade indexing language.

Keyward indexes like KWIC, KWAC, etc, are some of the simple and most widely used forms of machine generated indexes.

Computerization in preparing index has made it possible to avoid unreasonable delay in compilation and publication of indexes. Development in micrographics has made it possible to convert the computer printed or typist indexes into microforms (COM). Technology has made it possible to develop powerful printers through which such highly minituarised microforms can be read without much problem. Storage device through its high density random access memory and optical devices have made it possible for its online access through networks. Besides the general bibliographic databases, the development of Expert Systems which seek to store all the knowledge of experts in some specialist are such as medical diagnosis, so as to make it generally available, has helped to expand the range of applications to which computers can usually be applied.

3 GENERAL IMPACT OF NEW TECHNOLOGY

The area of technical processing may be changed most significantly by new technologies. The advent of microprocessors has introduced library automation at an affordable price for smaller libraries. Resource sharing and networking are greatly facilitated by the use of microprocessors to interface with larger systems or to provide subject access. Distinctions between the types of networks may become less clear, and we may start to

see bridges between the two types. With the increased availability of software packages which "prompt" the users with indexing techniques, some libraries may wish to catalogue and index collections at both the analytic and monographic levels, using both information and library networks.

However, there are many constraints on the diffusion of a new technology which include technical, economic, marketing priorities, copy-right, government regulations and personal attitudes. Such problems must be debated and, as far as possible, resolved. While some critics say that technology does destroy jobs, on the other hand, it does create new jobs, in providing new area of opportunities with jobs within them. For example, the provision of specialist banks of information that can be accessed by telephone, writing of software which has generated jobs for many.

4 CONCLUSION

Technology is a strong force, but it is not an independent agent. Technology provides librarians with a range of tools which help to achieve our goals of improved services to users. The effect of microcomputers in libraries has been and will continue to be a widespread redefinition of library services and user expectation, which will become ever more tied to a need for development of existing staff and to changes in the requisite minimum skills for the professional library degree. The micro-computer environment for both hardware and software has changed radically in last few years, offering expanding opportunities for library automation but making it difficult for information professional to keep up. Microcomputer will both enhance the traditional role of library as a depository of books and make the development of new roles possible. If librarians do not provide competent services and impress their users as being conversant with existing technology, they will lose both credibility and clientele. Many will bypass the library altogether and find the information themselves or do without it. Some also fear that the role of the information intermediary will disappear. At this transition period, continuing education, inservice and on-the-job training and retraining and close coordination of training workshops through University Computer Centres or similar resources are all critical to keeping abreast of the rapidly evolving technology and its library applications.

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LIBRARY AND INFORMATION SERVICES: IMPACT OF INFORMATION TECHNOLOGY

Ms J J SHISHOO*

1 INTRODUCTION

The evolution of information system and its tremendous growth has run parallel with the evolution of civilization and is perhaps a highly significant index of the growth of civilization. It is fascinating to observe the long journey from the primitive systems of communication through body and sign languages, followed by the verbal systems of dialects and speech leading to invention of alphabets and writings, paper and printing and culminating in the present ultimate of telecommunications and electronics. The on-going explosion in the techniques of storage and preservation of information, its continuous updating and revision; the comparative instant access, search and retrieval of the up-to-date information on many given subject have all combined to raise a discussion on the future shape and role of the libraries and librarians so much so that there are quite a few redoubtables who have started casting a doubt whether there would be a justification left for the very existence and continuance of the current library systems.

The emergence of printing has made information and knowledge user friendly. The advent of library science together with growth of information laid emphasis on evaluation of techniques for quicker access and retrieval of information stored in the libraries. Coupled with the emergence of trained professional librarians, a congenial setting for establishing large libraries as store house of books and information was created. Even so, the stored information was comparatively easy to organise and manipulate with the basic techniques of cataloguing and indexing.

11 TECHNOLOGICAL REVOLUTION

The World War II put tremendous pressures all round. Major scientific discoveries and inventions were made notably in the fields of electronics, and the time lag between discoveries/inventions and their practical applications got drastically reduced. The discoveries and inventions in the various branches of science and technologies were phenomenal and new branches of scientific knowledge emerged and grew. The modern technology

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age was in full cry. There was a virtual chain reaction in growth of knowledge and information and it became virtually impossible to keep track of the new information being thrown up and the discoveries and inventions being made. On one hand the need for avoiding costly duplication of scientific research and effect was keenly felt and on the other there was an equally keen need to have instant access to the newest additions to technology and information being made on an almost daily basis. The size and volume of the available information itself posed tremendous problems in the field of quick search, access and retrieval. it was therefore inevitable that newer tools and techniques of information technology came to be invented and fashioned to help keep floating in the veritable deluge of information and to keep pace with the constant outpourings of latest additions to the oceans of information. A rationality and coherence had to be fashioned in these conditions which were reaching almost chaotic proportions.

The alternative before the libraries as information centres was either to brace up and undergo tremendous technological changes in order to digest and manage the gushing flow of information or to perish let go of their role as information centres.

2 PHOTO FILMING

Early on, in response to the destructions being caused to library archives and private collections by the War, the photofilming process emerged in the field of information storage brining in its wake economy in costs of copying, distribution and file-up-date. The speed of information recording and retrieval went up and pressure on storage space also considerably eased in the libraries.

3 COMPUTER OUPUT MICROFORM

The advent of computer technology saw microfilms being produced with the help of computer. Microfilm or microfisch was produced from a machine readable tape. This has been yet another tool used by libraries to cope up with the new challenges for dissemination and storage of information.

4 USE OF ELECTRONIC MEDIA

In the field of information technology the computers made their direct entrance in 1960 when chemical titles emerged as a sample issue, thanks to the Chemical Abstract Science journal. MARC1 and MARC2 made their appearances in 1960 and 1965 respectively as the outcome of a feasibility study report of computerising various library operations in the Library of Congress of the United States of America. These have also helped in bibliographic control and information transfer. With the passing of years

several major libraries and information organisations have resorted to computerising many of their activities.

The fast expanding capabilities of computers spurred by developments in sophisticated data storage facilities have led to rapid development of "computerised Information Systems". The computer is used not only as a tool for data processing but also for data storage and quick data retrieval. The generation of broad databases and the revolution ushered in by the electronic communication technology have made it possible and feasible to have information networks locally, nationally, regionally and ultimately globally.

41 ELECTRONIC DATABASES

Library services and Database and information on retrieval are the most important components of any efficient information service. The recent developments in these are touched upon in the following paras.

Electronically, two main database systems, complementary to each other in some respects and mutually competitive in other ways hold the stage at present. There can be categorised as offline systems and online systems.

411 Offline System

The offline system comprises databases stored on magnetic media accessible through computer retrieval/search programmes. In some aspects resembling the oriented media, the database content is a stand alone database *i.e.,* it is connected neither to any other database nor amenable to automatic update. The database *per se* is with the user and a collection of such databases could in some significant points resemble the traditional libraries being 'electronic books'.

The latest form in which databases are appearing in the offline system is the Compact DiscRead Only Memory (CD-ROM). These small 4.72 inches diameter discs can store up to 660 megabytes of information or roughly about 200,000 pages of texts. CD-ROM technology is in the process of further refinement. The CD-ROM's capacity gives the database producers the ability to put whole of online database on one disc alone. It's random access and free text capability has the same amazing features as of the online database. This is in contrast with linear or straight line access of traditional printed materials. Could it be that in future the libraries may be mostly a collection of these CD-ROM discs stored in a couple of cup-boards and the equipment required to scan display and read the disc? Its tremendous strong capacity and random access has prompted "Medline" in medicine, 'Lexis' in Law, 'Popline' in demography, CD-ROM, Atlas: DeLarme Mapping Systems to store their databases on this Compact DiscsRead only memory.

412 Online System

Unlike offline systems, the database in an online system is capable of being continuously reviewed and updated. This type of database is not with the user though large organizational users like Government or intelligence agencies could and do have in-house systems. This type of database can be had access to by a user on a pay-as-you-use basis. The user and the database could be as apart as continents–the user obtaining access via a network using the software available with the online service.

For searching and for retrieval of the required type of information on an online system use is made of a computer and on occasions this may involve scanning of hundreds of databases. Online access bases may be used by intermediaries like librarians, information scientists, information brokers acting on behalf of their clients/users or as increasingly happening by the users themselves directly. One of the basic functions of the online service is to make available a variety of specialized databases by processing the records within and to prepare indexes called inverted files, on standard phrases used in selected fields and on the key words in usage in those fields. These inverted files act as indexes for database search.

42 GATEWAY SERVICES

Systems, known as "gateways", have introduced a further refinement for the online customers who by subscribing to one service can get access through that service to many other services. This roughly resembles the current practice of a reader getting a book from a library of which he is not a member through the interlibrary lending service arrangements made by the library of which he is a member. Thus, there is an intelligent interface through gateway between the non-expert user and a variety of different databases mounted on different host computers using a multi drive question and answer system determining in which of the many databases can lie the information needed by the user.

421 Technological Gatekeeper

Gatekeeper technology is a great innovation achieved in information handling. Gatekeeper acts as an intermediary in an organization acting as a catalyst who filters in the information received from formal and informal channels through external networks to the domestic information seekers. Thus he plays a central role in the international transfer of informating technology. People have started realising that Information technology will derive its benefits from more effective information management.

5 FUTURE SCENARIO

Here let us take a pause from the survey of the electronic merchandise

in the information technology market and try to have a look at the shape of libraries in the context of the growth of this technology.

Libraries as information centres may in future well be a network of different host databases owned by different bodies maintained by a third party managing access to the information pool. In such a set- up, (*i*) what would be a book, and (*ii*) what would be the structure of a future library?

To a large extent the answers to the above questions would depend upon what functions or tasks a library could assign to itself for performance. For a small specialised research centre it may well be just an accessing/ printing set-up linked to a commercial database. For the user in this situation the library would have been replaced by the small off-loading computer set up. The case of libraries mounting commercial databases or those offering services of providing access to multiple databases as well as offering sufficient search routine. Very likely the electronic reference tools with their advantage over paper printed tools would gain greater acceptance and usage as compared to printed paper books. The electronic reference data has the advantage of being capable of continuous up-dating which is especially valuable for directory type of information. The electronic tools also greatly enhance search capabilities by providing many more access points economically. For example, biographical files maintained electronically can be searched not only on names or parts of names but on the basis of biographical details of the subject covered, such as, profession, educational qualifications, vital data like dates of birth and death, place of birth, titles of books authored and so on.

One can envisage the emergence and growth of electronic journals especially in highly specialised fields comprising inter-disciplinary research areas where the community to be reached would be too small to support a journal in printed form. Even in India currently we have a couple of news magazine on video cassettes and educational aids available on audio/video cassettes. Terminals in offices and home would be in use to search for information as well as to receive information from libraries affording access to on or offline databases. This would encourage bringing forth and converting to more and more machine readable databases, both primary and secondary, coinciding with a period of wholesale conversion from card catalogue to online catalogues. Subject cataloguing would have increased importance as electronic catalogues would make it economical to have multiple access points.

Paradoxically, while there have been wide speculations about paperless books as a fallout of the machine readable texts, the advent of desk top publishing seems to have lent a new life to books or at least report writings.

In the last decade we have witnessed widespread use of word processors and incidentally text retrieval software.

Presently, we are caught in the flux of the 'new Information age'. 'Library' needs to play an active role and be a partner to the information seeker. Most of the present libraries may need to off-load their tonnes collected with great difficulty over the years and replace the empty book shelves with computer terminals linked to central databases. 'Book in any form can be stored as electronic data. This can be transmitted to any other destination either online or offline and a virtual book reconstructed once again when anybody wants to refer to it. What would be termed as a library? The host databases? The Networking and Accessing system?

6 IMPACT OF TECHNOLOGY

In conclusion, it cannot be gain-said that the revolution in information technology will keep the library movement and information sources untouched or unmarked. There is bound to be a drastic impact on the structure and functioning of the libraries as traditionally known in the years to come as they adopt themselves to the fast turnover of information. A note of caution needs to be sounded here. Although one of the roles of the libraries is to provide information it would be wrong to treat libraries, data banks or information brokers as synonymous. Although libraries may have to increasingly engage themselves in the business of providing information electronically, it would be wrong to envisage libraries in future as mere peddlers of information. They may have to peddle information to remain viable but this would be far from their only function. This is especially true in relation to the highly populated countries belonging to third world where the need for knowledge in general is much more than the need for instant information. Briefly we may try to envisage the impact of the growth of technology on libraries as under:

61 SPACE

Valuable space may be saved by storing scientific and technological information electrically. Most of the literature in the field may be stored on CD-ROM discs or floppy discs and their future variants which may be accessed electronically. In such a limited form, special library may very well comprise a single cabin housing a computer which may provide information through terminals housed in the library itself or places of use which may very well be outside the library premises. This would be very much true in case of special libraries catering solely to the information needs of an organization or an industry.

62 STORAGE

A large number of books and journals dealing, mainly with scientific and technological data would land themselves to electronic storage and therefore the need for stack area and its furniture would very much be compressed. Even the nature of items of furniture may change. The disc may be stored in the specially designed cabinets and replace the catalogue cabinets.

63 READING ROOM

More and more readers may discontinue to avail of reading room facilities and switch over their private terminals or the terminals provided by the library to its readers. More readers can have access at the same time to the same information stored electronically instead of having to wait for the return of a book to the library by a borrower. Readers would also have access to reference material without visiting the library.

7 ACCESS TO INFORMATION

With access code given to readers they can have access to computer in library for 24 hours of the day through their terminals. Much of the paper work in requisitioning books/periodicals would be obviated and the time lag between demand and supply of the information asked for would be drastically reduced.

The inter-library loan and its mechanism would have been replaced by network arrangement and the easy access to databases through gateways.

The load of obsolescence on the resource of a library would get reduced to an appreciable extent due to constant updating of database in the library. Thus, weeding out of obsolete books/periodicals would be much faster.

8 MANPOWER

Manpower requirement may undergo a significant quantitative and qualitative change. Demand for skilled personnel, trained in computer and electronic technology would be more. It would require a detailed study to work out whether there would be a net saving or cost over run on manpower as a result.

Because of 'Networking' and 'gateways' there can be resource sharing which will avoid duplication of resources in a library resulting in promptness and efficiency of retrieval and better management of manpower.

91 COST-EFFECTIVENESS AND PROPRIETARY RIGHT

The cost of preservation of electronically stored information would

be comparatively much less than the present. The technology of electronic data storage, and retrieval of the information thus stored may create problems of copyright and payment of royalties. This will require a detailed study to find out a solution so as to preserve the proprietary rights of the author. In fact, this problem has already emerged in the wake of widespread use of photo copying machines in offices and libraries. In the realm of special libraries the individual libraries may be relieved of the task of preparing information packages, bibliographies, abstracts, etc; since these would be available commercially and economically for the brokers and vendors for online service.

92 LOCATION OF THE LIBRARY AND TELECOMMUNICATION SYSTEM

It may also not be necessary to locate the library in large metropolitan centres as access to these stored information material could be had electronically. This, of course, would call far a vast improvement in the quality of telecommunication system through which access is to be had to the computer located distances or even continents apart.

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LIBRARY AND INFORMATION SERVICES: IMPACT OF NEW TECHNOLOGY

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1 INTRODUCTION

Driven by computers, satellites, laser beams and optic fibres, the information juggernaut is hurtling triumphantly towards the 21st century. Whereas the Industrial Revolution took nearly two centuries to run its course, the Information Revolution has done the job in just three decades. This has given rise, not surprisingly, to a new mythology of the Information Society, where "Information Technology" *per se* is being presented as the new saviour of the mankind, opening new vistas for the liberation of human spirit from the bondage of dull routine and the drudgery of mass production. Alvin Toffler argues that new information technologies would lead to all round "de-massification" of production processes, organizational structures, culture and leisure. Individual computer terminals, networked to office consoles or massive databases would enable people to work from their homes, and choose their own working hours[1].

The world of Library and Information Science could not remain immune to this technological onslaught and is witnessing sea changes. The stage has come when traditional type of library is fast becoming obsolete and meaningless, incapable of coping with the mass of knowledge. Magnetic and optical storage of Information, Compact Disc-Read Only Memory (CD-ROM) technology, computerised database and On-line information retrieval have brought all the art treasures of the world at the door-steps of Libraries. Electronic mail and Voice mail have tied libraries close together even as they disperse geographically. Global networks can move data at speeds of 1.8 kilobytes per second, 50,000 pages of manuscript with each tick of clock. Data transmission speeds, now in development, will move the entire contents of the Library of Congress in just four minutes. Nueral networks, the technological surprise going to jump out of the information jack-in-box, will mimic human thought patterns, giving machines the ability, for example, to "mine" data, making independent decisions as they brrow through layers of vast data bases[2].

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2 THE GENESIS OF INFORMATION TECHNOLOGY

The "growth" and "development" of information technology has been preceded by information explosion. The end of World War II witnessed exponential growth in the publishing rates. The urgent need to cope with "information explosion" and to employ suitable means to handle information work was a major force in the introduction and application of computer and communication technologies so as to meet the user's specific information needs from varied information sources pin-pointedly, expeditiously and exhaustively. Information handling techniques and their working methods, manual or semi-manual, means and ways used in the past for recording, processing, retrieving and disseminating information were no longer adequate to meet the quantum of information to be handled and hence needed to be replaced by or complemented by computer based systems. The need for automation or application of information technology became all the more urgent in the face of serious resourcecrunch and escalating cost of publications.

"The escalating cost of goods and services, the steady and rapid increase in the amount of materials to be purchased, processed and stored against the deepening budget and space problems, the demand for service from a growing user population and the availability of new types of materials which can not be treated by conventional methods led to the breakdown of the established operations and created a necessity to look for new approaches to management and organizational set-up[3]. New Information Technology provided a way out.

21 INFORMATION TECHNOLOGY: COMPONENTS AND APPLICATION

The armada of Information Technologies driving new structures and other changes is formidable. It has three key components.

1 New ways to store information compactly and cheaply photographic micro forms of various kinds, magnetic storages on tapes and discs, optical storage and video discs.

2 New mechanism to manipulate, scan and store records.

3 New facilities for cheap and rapid transmission of information over long distances-telecommunication systems and networks.

3 DEVELOPMENTS IN STORAGE MEDIA

Revolution in storage media has been led by Computers. The introduction of data processing equipments and procedures into library operation began around 1935 in the United States. The University of Texas Library introduced

a circulation system using punched cards. Highly advanced circulation system was installed at Montclair, New Jersey, Public Library in 1941. Most of the attempts to utilize computers that originated in Libraries were concerned with implementing an acquisition system or a circulation system for lending books or the creation of catalogue cards. A study by a panel of experts under the auspices of US Library of Congress reported in 1964 the feasibility of automation of its bibliographic processes and envisaged access to the contents through computer consoles. The MARC project that followed established a standard format for exchange of bibliographic information in machine readable form. Interest in machanized information retrieval has led to research in new indexing techniques. New classification systems, the sequence constructions, statistical analysis of language to create abstracts automatically and improvement in concordances are examples of the variety of subjects studied. The most widely used techniques for indexing by computer, is the KWIC (Keyword–in context Index). Advances in information processing technology have brought attempts to automate the process of classification. A number of mathematical techniques and "Expert System" are being used for analysis of a document contents into a number of subjects. Within the past five years, increasing emphasis has been placed on machine analysis of the syntax and semantics of natural language.

The establishment of various large databases, which are mounted on large computers by online host has had a significant impact on the effectiveness and efficiency of the retrieval of information. As library catalogues and indexes are becoming automatically searchable, networks offering access to mechanically readable collections nationwide are coming into being. Automatic information retrieval services have placed the resources of central data banks at the disposal of any one with a personal computer, giving, thus, a tremendous boost to resource sharing. In 1974, the libraries of Yale, Columbia and the Harvard University and the New York public library formed the Research Libraries Group (RLG) and went for a common technical system in 1978 naming it Research Library Information Network (RLIN). By 1983 RLG had 15 members institutions and 12 million records in its data base. The Washington Library Network (WLN) in 1983 served 95 libraries on the Pacific Northwest. The University of Toronto Library Automation System (UTLAS), a Canadian based online bibliographic vendor, in 1983 had contracts with 1800 libraries for products and service and had some 6.5 million records in its database. Online searching of external databases has become a significant and integral part of any information department leading to frequent interface with external source of information and feeding of external intelligence into the organisation. Public and academic libraries more interested in the use of such databases for answering queries

for information have been vitally affected in their way of handling the queries and supply of current awareness services. Inhouse databases, incorporating bibliographic references and other information, offering a range of searching facilities from a variety of combination of search terms and logic are coming up rapidly. Some of the large turn-key system suppliers have begun to offer modules which support the maintenance and searching of database of community information.

Computerization of various library house keeping systems has led to offering of additional services and functions. Statistics regarding various operations, for example, are often a by-product of a computerized system. Within an organisation it is having a significant impact on communication and co-operation between branches, sites and departments eliminating duplication in record creation filing and storage and make it easier to establish and monitor responsibility for specific record management.

31 MICROFORM

A microform may be defined as a document in reduced format. Originally used in libraries to reproduce unique or rare items. More recently, original publications have begun to appear in microform. There are essentially four types of microforms.

32 MICROFILM

The oldest and most widely known, consist of a cellulose acetate base to which sliver bromide emulsion has been applied. It is exposed, developed and fixed using standard, photographic process.

33 MICROCARD

It is a contact photographic format of a master negative. A brief catalogue entry appears at the top of the card in normal size. From 60 to 80 pages of an average sized book are reproduced on the lower portion of card.

34 MICROFISCHE

It is similar to the micro card in format except that it is on a transparent base created as a positive contact print from a master negative.

35 MICROPRINT CARD

It is produced by phototype photolithography, using a high-glass paper and special drying inks.

Most commercial publications in microform consist of massive collection of material representing a subject, a period of time, or a geographic area rather than single bibliographic items. A set of *Collier's Encyclopedia* can be reduced to a small fraction of its present size and its information stored in computer memory. Such bulky publications as *Census of India* are now readily available on microfische.

Microform is a suitable medium to lessen the problems occurring due to documentation inflation. It helps to store in a very compact form and enables faster retrieval on a low cost. Publications such as indexing and abstracting journals are being rapidly replaced by this media. About 30% of the total scientific journals are available in microforms. The advent of digitizers has facilitated their transmission over distances. The use of microforms has provided a new job for working librarians in the analysis, planning, implementation and maintenance of the system. Enormous amount of information put in condensed and handy from e g microfiches, etc can be transported economically and speedily from one part to any part of the world with the use of communication networks. Since this medium helps dissemination of information to the user's desk, the users have begun to prefer the information to be accessible to them at their work spots.

4 OPTICAL LASER DISCS

Although magnetic media have proved faithful and reliable, there has always been a search for media with higher storage capacities. One of the major new media to enter the market place is the optical or laser disc which offers high storage capacities. Optical or laser discs are discs that are coated with a material in which laser can make marks. These marks then reflect laser light information encoded as marks is read by directing a laser on to the surface and detecting the. reflected light. There are a number of different kinds of optical or laser disks such as read only, write only, or eraseable and analogue or digital. The read only digital disc, in the form of CD-ROM is useful for storing video images and can hold digital data by converting it to analogue data. CD-ROM provides a new medium for the mass production and distribution of information. Its peculiar feature lies in the extraordinary storage capacity. A single compact disc of the 120mm can store over 500 megabytes comparable to the storage capability of 1500 floppy disc or the equivalent of 2,00,000 pages of text. The information stored in sealed environment that is very durable and relatively insensitive to dust or scoraches is retrieved through micro computers connected to CD-ROM drive through a controller interface board.

CD-ROM allows access to information under local in-house control and independent of online and telecommunication services. A CD-ROM disc can scan easily, marked to any location and can be used repeatedly allowing unlimited excess to information without increasing cost. The stored information can, if the user wishes be accessed interactively, in a friendly and human manner, steering his way to desired information using an exciting & entertaining procedure. The removal of high cost of purchasing, privacy of searching, accessibility in remote locations, where

telecommunication nodes are not available, optical discs can be seen as a medium that will encourage searching by the end user.

5 DEVELOPMENT IN COMMUNICATION MEDIA

No discussion of technology pertinent to the field of information storage and retrieval would be complete without considering the role of communication. Retrieval at a distance of digital and graphic information pre-supposes the availability of inter-connected communication network. Data communication systems, linked to computers have made it possible to process information and transmit data to any location instantaneously. In addition the convergence of computers and telecommunication has improved the technology of both contributing areas, and offered new means of communications and data storage such as Electronic Mail, Electronic journal and Video-tex document delivery, online search and networking are mainly possible due to these new facilities for rapid and cheap transmission of information.

6 DOCUMENT DELIVERY SERVICES

The ready access to the millions of surrogate references in the online bibliographic databases has led to the increased demand for access to the document themselves. Lockheed's DIALOG has initiated DIALOG ORDER, a document delivery system which permits the customers of DIALOG index and abstract database to use their terminals to order the full text of documents. A delivery service embracing books, serial and photocopies has been developed by OCLC.

61 VIDEOTEX

Videotex system transmits text or graphics stored in computer database via the telephone network for display on a television screen connected via an electronic interface with full interactive facility. Over 120 public libraries in Britain provide prestal terminal for public user as a means of providing community information[4]. Videotex based community information has forced librarians to re-evaluate and re-design the databases and files that they maintain of community information. Libraries can make their catalogue and other databases available through a videotex interface.

62 TELETEXT

Teletext is a non interactive form of Videotex and is designed for the general public and mass communication. It is broadcast, received and displayed by a teletext set, which is an adapted television receiver. The data is stored as frames and a ped on television set allows the user to select a specific frame. The best known services in UK are BBC's CEEFAX

and independent TV's ORACLE, both of which transmit information of wide public interest. The medium of Teletext is suited to real time information transmission. Public application areas include financial services and electronic publication.

63 ELECTRONIC MAIL

Electronic mail is a message service using electronics and telecommunications to deliver hard or soft copy information. It is usually based on a computer controlled network and the message is transmitted via the electronic signals after being created in a word processor or computer system. The mail can be stored, revised, incorporated into other documents and passed on with comments with relative ease. Libraries are beginning to investigate the potential of electronic mail. Abstracts and Indexes of titles which aim to indicate the subject approach of a paper are available direct from an electronic database that can be interrogated and searched. Request of Inter-Library Loan has been greatly facilitated with the arrival of Electronic Mail.

64 FACSIMILE TRANSMISSION

Fax is a means of transmitting a copy of a page of text or graphics to a remote location via telecommunication links. It has been boosted by the adoption of methods of data compression made possible by compact, reliable and inexpensive electronics. Fax is one possible technology for electronics document delivery. For example, the British Library Document Supply Centre is using fax for document delivery. Thus the use of telecommunications in conjunction with computers have made it possible to process information and to transmit it to any location instantaneously.

7 INFORMATION TECHNOLOGY : IMPACT

The technological revolution is far from over. We are firmly locked into a cycle of technologies driving further technology. The introduction and application of these modern means have elevated the modern day library to a very high pedestal, improving and altering its image functions and services to a revolutionary extent. Modern librarianship rejects collecting information as an end in itself. The focus now is on dissemination. The reliance on local holdings for meeting user's information needs has given way to extensive use of outside services. Devices for "home information delivery" are becoming operative. The technological transformation facilitates the provision of innovative library service to the patrons outside the physical plant of a library. The online networking system makes reality of the long aspired resource sharing schemes, cooperative acquisition schemes, co-operative cataloguing and what not. The status report prepared by NISSAT

on bibliographical information processing in India, indicates that there are about 21 organizations in India itself offering computerized bibliographical information service. New information technology has opened up new opportunities, possibilities and area of choice for organizational rearrangements. The computerized acquisition system has eased the burden for pre-order checking by providing automatic generation of orders, checking of duplicate purchase orders and follow-up action can also be taken automatically. It has speeded up the acquisition, processing work by eliminating a large amount of repetitive and time consuming work. The added entries and the confusion and the controversy inherent in this work has been successfully over come. Machine readable catalogue is easy to manipulate as it can be searched online and from which a variety of outputs are possible.

The most profound impact of the application of Information Technology has been in the area of reference service. The number of librarians who flee to stacks in the face of a reference query is diminishing with the arrival of computer terminals. Online retrieval of national and international databanks has placed the entire universe of knowledge at the disposal of a library. Increased speed of access to both retrospective and current scientific and technological data through ability to interact with the computer terminal at constantly decreasing cost had made a distinct mark on the research and development activities of researchers by consolidating and synthesising the scientific information on a very large scale. New Information Technology has revolutionized the reference service. Development of computer based SDI. (Selected Dissemination of Information) which searches reference databases such as chemical abstracts taps and matches "profiles" of request with stored references to Journal articles provides the users required references in no time. A number of library subject oriented printed indexes and abstracts are being replaced or supplemented by online access to machine readable version of the same publications. Simply by dialling a telephone number, a terminal in a library is connected with one of the several telecommunication networks to the service agency's computer. Through a simple identification a searcher specifies which database on the computer is to be searched and then proceeds through interactive dialogue to retrieve pertinent citation. Online fultext databases containing not just citations to documents but the entire text of documents themselves are available to user on their workstation. The practical advantages that online indexing and abstracting databases have over their printed counterpart are currency of information and flexibility of searching. Subject orientation, covering material pertinent to a particular discipline, in some cases narrowly defined has been primary focus of the computerized bibliographic storage

and retrieval system.

Competitive acquisitions, based on the assumptions that bigger is better are being replaced by co-operative acquisitions. Libraries are choosing to borrow rather than purchase. Online bibliographic databases are having a significant effect on collection development policy. The longstanding tradition of the inter-library loan is being vastly expended through the use of computer produced union catalogues, online catalogue, data communication, facsimile transmission and computer message switching. Compiling a machine readable database, representing monograph holding of number of libraries in a standard format has greatly facilitated the identification and exact location of a document. Telefacsimmile transmission is on its ways to become something of a technological dianasour in this respect, resulting in deduction of expenses of each participating institution and at the same time providing better overall services to all library clientele. Another response to development in the delivery of information is the emergence of corporate information manager. As information choice becomes more complex and consequences of choice are obvious, organisations with large information related budget are developing information management roles. Librarians are in a favourable position to compete for such role as well.

Yet another impact of information technology is the trend towards expension of fee-based services. With increased cost, greater automation and associated capital incentives, new sources of revenue are necessary to sustain more costly but far more effective services. Users are becoming accustomed to having. This is leading for extensive commercialization of library services.

Technological development poses two additional challenges to the professional information community. One is the development of a comprehensive standardisation programme for library and related information processing system and operations. The other is the development of updated and forward looking curricular materials and methods for information professional and potential users.

8 LIMITATIONS

While computers or terminals can be found in most large libraries or many small ones, traditional library operations have not been substantially altered. The speed, manner and success with which libraries will utilize new systems are uncertain and depend on solutions to operational and philosophical problems. Some of the factors responsible for lopsided applications of new information technology can be summed up as follows:

81 ATTITUDES

Librarian's attitude about automation, user, planning and change are critical elements affecting the use of existing technologies. For many years librarians reacted negatively to any system which altered the existing order of library. Librarians attitude about new techno-logy use are due for re-examination and re-formulation for the successful application of technologies.

82 ECONOMICS

The financial constraints which prevent librarians from thinking about new emerging demands of the users are real, particularly for the third world countries.

83 USER-CHARGES

The introduction of modern technology, online bibliographic information retrieval systems and their associated out of pocket cost has raised the issue of user fee. It needs to be resolved amicably for the proper use and implementation of new technology.

84 LACK OF TRAINED STAFF

In countries like India there is a distinct lack of trained staff to handle the new systems. It definitely hampers the utilization of modern means to a great extent.

91 CONCLUSION

The technological revolution has altered the library ecology. It has alerted the user to more than the individual library holds, creating opportunities and mechanism for rescue operations. Librarians are emerging from the catalogue closet stopping the revolution about the record keeping axis and taking charge of the information revolution. The development of regional, national and international networks is affecting the planning, policy and library functions. Substitutions of non-print forms for distribution for paper dominated systems, and shift from near total reliance on local holdings for answering user's needs to extensive use of outside services for accessing larger, remote sources of information are two most visible side effects. These in turn are leading to substantial changes in the structure of libraries, revenue bases for operations and competencies required of library professionals and user. Electronic means of transmissions, coupled with magnetic and storage of larger files has enabled in lowering the unit cost, managing ever increasing volumes of information and increasing its effective use. The image of future involves a number of databases available on different computer system and accessible through a variety of different users. The librarians of future will be able to sit at a workstation and call

up library catalogue, bibliography databases and other internal system. They will be able to create document via word processing and communicate with other libraries thorough electronic mail. Teleconferencing and videophones will avoid need for expensive travels. Although many of the components of the scenario are possible already, there remains much work to be done before all system can be effectively interconnected and integrated.

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DIGITIZING LIBRARIES WITH TODAY'S INFORMATION TECHNOLOGY

Ms B S SWAROOP RANI*

1 INTRODUCTION

It is no news to the librarians that libraries are experiencing an information revolution–that is, a rapid and thorough transformation of the ways in which information is generated, transmitted, controlled and employed. Not all libraries take to the technology as ducks to water, but the systems are no longer strangers to us or thought simply to be a fad. Not all libraries have been able to afford state-of-the art installations. Indeed, the process of tooling-up is a slow, costly and sometimes risky one that promises to take years in any library. However, innovations in Information technology are making librarians change their outlook in terms of electronic media.

2 INFORMATION TECHNOLOGY

Developments in Information Technology came as spinoffs from research work during the second world war. Vannevar Bush was perhaps the earliest to conjure up a futuristic scenario in his paper "As we may think" in the *Atlantic Monthly*. He conceived 'Memex' as an automated desk-top information system from which one could access information by manipulating a few keys. At that time the slow and mammoth first generation computer was emerging. Since then, several compact systems of storing information–useful for libraries were devised.

The new information technology brings four elements together.

(*a*) Storing information in vast amount.

(*b*) Process that information to logical procedure.

(*c*) Display such information in multiple formate.

(*d*) Transfer information to multiple receivers.

The data storage technology brought out the photographic microforms of various kinds–magnetic storage media on tapes and optical storage media into the libraries. It is certain that librarians will use what the converging technologies will ensure mixed media applications in growing

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profusion. Examples are electronic video, electronic photographics, print photographics, etc.

21 ADVANCES IN INFORMATION TECHNOLOGY

A new approach in data storage and retrieval is to carry in Information which is light is the "Bee Card" which is in IC memory card offering convenience, versatility and economy that makes cassette tapes and floppy discs obsolete. Somewhere further down the technological road is the use of holography-an electronically squeezed in information storage process that can fit the large libraries of data into the space of a table top.

211 *Electronic notebook*

Today's desktop computers are turning into the user's electronic notebook providing "network connection". The present trend in this field indicates that in the future, the central core will be an electronic book, having details in a relational database. It would provide access to other databases through electronic mail and compound document transfer.

Slapped on everything from cartridges to shrink wrap warranties the word 'revolutionary' is a commonplace level in the computer world. GRiDpad is a new first portable. Note Book computer (4½ pounds) which can be used like a notebook. It's small and light enough to cradle in one arm and write with the other hand. There is no keyboard. However, a keyboard (4 pound) when added becomes a laptop computer. For nearly 20 years computer designers have tried to match the Dream of Alan Key's 'Dynabook'–a portable, powerful, User-friendly computer. Although the GriDpad is not it, it brings the millennium a lot closer.

212 *Sony's Electronic Book alias the Data Discman*

How is it a book? One can load into it a tiny 3.5 CD-ROM which may have the Encyclopeadia Britannica (A-M) on it, and reach and browse through entries in seconds on its LCD. One can scan on phrases, text ideas.

The 'electronic book' title Sony gave is a bit more ambitious: it would be a replacement for the book. For that the current product is more of an intermediate step. A true 'Book of the future' would look like a book of today–thin, flat with a full-size paper-white high-resolution screen that look like text printed on paper.

214 *Multimedia*

In that future technophiles dream of one would buy massive libraries

on CD, load them into the 'Book' and read by page, without feeling any differences. Except that one presses button to turn the page, and of a new book, another button brings up the menu and so on.

The present version already has much more than one would expect of a book; multi-media capability. The school children in 2001 will just carry one slim Book with them, which with one hot key will let them jump back from chase to chemistry when the teacher brings to work towards the back row.

Newspapers are being circulated on floppies. A Madras based company has introduced floppy news. The circulation began recently. The bulletine is 360 KB of information which is equal to 200 A4 size pages of printed matter. The news is updated uptill 7 in the morning and compiled from UNI and 15 newspapers. The floppy is handed over to the subscribers everyday and 6 days in week except Sundays. Sunday news is clubbed together with Monday's news. Teledata charges Rs 450/- a month. The company recently opened offices in Bombay and Bangalore and has plans to open one at Delhi too.

The discovery of transistor lead to micro electronics. The central feature of micro electronics is the development of micro processor. The advent of micro-processor led to four different trends in information.

The discovery of transistor led to micro electronics. The central feature of micro electronics is the development of micro processor. The advent of micro-processor led to four different trends in information.

Process Design:

(*a*) Bit Slicing

(*b*) Micros

(*c*) Multi-processor systems

(*d*) Personal computer.

The arrival of PC at lower costs has become important for libraries for its heading towards personal information system. Today micro-computers offer the desktops and laptops which are getting smaller, running longer on batteries, challenging the older ones and is the most existing advancements in computer technology.

Another use of the micro computer is beginning to emerge that of telecommunications and access to remote systems to conduct research in large computerized databases. In its most familiar form this kind of work enables individuals to call up national or international databanks and download

relevant computerized citations, abstracts, or full articles, straight to their own microcomputer memory media–be it floppy diskettes, hard disks/ cards, or removable mass storage devices like backup tapes or interchange cable, hard disks. In just minutes massive amount of data can be directly captured as straight ASCII files through telecom software with the increasing sophistication of the capture software. It is possible to customize searching strategies and have the microcomputer itself call up the mainframe, execute a search, and log itself off the machine, saving the entire transaction to some form of machine memory.

The computer and its communication circulate links to other computer terminals which constitute on integral Information machine. It is known as telematics and Telematics has upset libraries in storing and transmitting information. The present trend is leading to closer connections between computing technologies and data communication facilities constituting the converging complex called informatics.

The Telecommunication technology has made the dissemination of information quicker and online access to databases from any part of the world has become possible. The dissemination services are

Bearer services	*Value added services*
Circuit switched Data Network (CSDN)	Electronic Mail
Packet (PSDN)	Videotex
Integrated services Digital Network (ISDN)	Voice Mail
	Video Conferencing
	Audiotex
	Audio conferencing

215 *Electronic Mail*

Electronic mail system allows two or more subscribers to communicate with each other using electrically transmitted text messages from any standard alphanumeric terminal, including personal computers (PC's), interpersonal communication across time barriers. It can also be used for point to multipoint communication.

216 *Videotex*

Videotex has been defined as a system for the widespread dissemination of textual and graphic information by wholly electronic means for display on low cost terminals under the selective control of the recipient using control procedures easily understood by the users.

217 *Video Conferencing*

Full motion video conferencing facility with audio graphic functions is planned to be offered from specially equipped studio. The facility could avail 64 Kb/s to 2 Mb/s data rate in steps of 64 kb/s, equivalent to a voice channel. There are three main constituents.

(1) Special hardware/software features with E-10B exchanges.

(2) Up to 2 Mb/s end links connecting Exchanges with studio.

(3) Studio.

218 *Audiotex*

This facility is similar to videotex except that it is available on a normal telephone network. In the USA, it is popularly known as '900' service. It can be used to interactively access stored, voice information in a variety of fields.

3 RECENT DEVELOPMENTS

In existence for five years now the Media lab was created by a nucleus of people who are involved in intensive research directed towards the interface between human-beings and technology. The wizards of the media lab conjure of futuristic prototypes that could change the way we handle information.

–MIPS (Million instructions per second) and storage have become inconsequential because gigabits per second are speeds that people just can't comprehend (in 1 gigabit, one can get a year of the Wall Street Journal in 1 second).

–Symbolic-encoded data will change the whole picture. We may even be able to integrate visual face-to-face communication in a new type of E-mail called video mail that will help one to send and receive video messages on the computer system.

–Narrow casting the opposite of Broad-casting is going to change the way we transmit and receive electronic information. Narrowcasting could be defined as the production of dedicated electronic information and the communication of that data to only users who have specified it as their particular interest for instance the system could direct information housing to do in the atomic energy to scientists at BARC has requested that subject as their specific interest.

–Someday one will be able to call anyone in the world and talk–regardless of the language the other person speaks. The following three technologies

are needed for this.

–The Automatic Speech Recognition (ASR)

–Language translation

–Speech synthesis.

All this exists today, but not nearly in sufficiently advanced form. The impact will be another major step in achieving the 'Global Village' envisioned by Marshall Meluhan in 1968 and help the librarians have no language barrier problem.

4 TRANSITION

A transition to the new age is being witnessed which is breaking the old constraining bonds of limited access to maximum access. It enables individuals to call up national or international databanks and download relevant computerized citations, abstract or even a full article. Straight to their own microcomputer memory media. In just minutes massive amount of data can be directly captured as straight ASCII files through telecommunication software. With the increasing sophistication of the capture software it is possible to customize searching strategies and have the microcomputer itself call up the mainframe, execute a search, and log itself off the machine saving the entire transaction to some form of machine memory.

5 CONCLUSION

Although, widespread need for all information on screen is a good omen for users in India, a period of adjustment is necessary to get over the 'I like the Old Cookie' Syndrome.

With greater increase of computers a widening gap between what we want and what we really need–Users generally complain about the wide gap between the information they get and information they want. The unpalatable fact is we have never given serious thought in the first instance, to determine what we really need. What we really need is a sound material requirement system backed up by a dependable procurement process which will minimise in course of time many constraints.

What is the library's appropriate role in the electronic information era? What is the library to be in the electronic age? A museum of the printed word? Or a switch board for electronic information transactions? Or a list of both. What ever the libraries are going to be, ultimately the success of it will be judged in terms of how well it performs its expected task in direct comparison with other systems that perform similar task.

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INFORMATION RESOURCE MANAGEMENT: A CHALLENGE

Mrs ALLY SORNAM*

1 INTRODUCTION

There is a shift from industrial economy to information economy in the later part of 20th Century where information is the capital resource. Information processing has become the primary business. The power of information is such that the high technology nations invest on information society for their economic growth.

Electronics, Computers and Communication have changed the face of information society. Information technology is now able to create new products and processe that can be used independently. One can see a sudden growth of online database industry since 1960's. The advent of mass produced integrated circuit micro chips enabled compact communication terminals. Changes in attitude were equally important to this changed atmosphere.

2 INFORMATION MARKET: CHANGING SCENARIO

The number of scientific conferences have increased fourfold in twenty years. The annual growth rate for the number of periodicals has crossed beyond one's imagination. More than 25 years back it was estimated that a new article appeared in a medical journal every 25 seconds. Today it would take a medical researcher almost 55 Centuries to read all the 1988 output of biomedical, clinical and research articles.

Equally spectacular growth can be seen in online information retrieval market. Today more than 2000 commercial databases are offered by more than 200 hosts. They are going at a rate of 8 million per annum. The Computer Hardware Marketing is expanding on equal status. A fascination for information is seen every where. Both government and private sectors pour vast amount of money in generating, processing, retrieving, evaluating refining, packaging and marketing the information. The emergence of the techno-intellectual elite has already led into the twenty first Century.

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3 NEED FOR INFORMATION RESOURCES MANAGEMENT

What is IRM? The effective and efficient co-ordination of information from internal and external sources. The components of IRM may be considered as follows:

(*a*) Information Resources: Identifying and assessing the internal and external resources.

(*b*) Technology: Methods for storing, retrieving and distributing information on a local network basis.

(*c*) Management: Strategic planning for human resource management, accounting, budgeting and marketing.

More manpower is employed to collect, store and retrieve information than it was ever before. The 'Computerate' and 'informationally literate' end users are multidimensionally growing. Information professionals who label themselves as 'Information Scientists' should realise their role as 'bonafide managers' of information resource. Today information is a resource–'a tradable commodity' nobody denies the fact that information is essential for problem solving, that it is the basis for innovation and a resource which costs money and a value. In a commercial environment information people have to put forward a claim that information is a resource that can be exploited to increase profitability and maintain competitiveness.

4 WHO IS RESPONSIBLE FOR INFORMATION RESOURCE MANAGEMENT?

The growing complexity of organisational structure and the impact of computers and communication technologies have brought a new awareness among the Information Managers. Information Management is completely dependent on people–people to design the system, people to run the operation and people to update everything.

Management of Information is not concerned simply with documents, messages and data but with entire apparatus of information handling. Such information handling skills are scattered among information scientists, librarians, data processing personnel and system designers. Information technology is also similarly dispersed with the advent of Micro Computers. But Information Management requires an understanding of information flow. Computer education alone is not enough to manage Information Resources. In this context, the Librarians have a potential role to play as Information Managers. As Toffer told the present generation is entering a third wave of civilization ie, information revolution. The present computer

society with its sophisticated operation skills for information dissemination poses serious threat to Librarians of traditional/conventional library operations. The library activities comprise organisation, storage, retrieval, manipulation and synthesis, communication and disposal. The new technology has changed the conventional methods. Typing machines and Type settings gave way to word processors and integral printing; filing cabinets are replaced by magnetic and video storage. Instead of card index software retrieves informations. To face this situation we need a new breed of library personnel say information managers. A Modern Information Manager is expected to know managerial techniques like planning, decision making, interpersonal skills and career management techniques.

5 HOW TO ACCOMPLISH THIS TASK?

This can be possible by the following:

(*a*) Regular re-education and retraining of Library Professionals.

(*b*) involvement in cross-boundary projects.

(*c*) rapport with fellow information professionals.

Library and Information Science educators should realise the need for training their students to effectively employ and manage the tools offered by the new information technology. Traditional Library schools should expand and modify their curriculum so that they are developing information managers and not just bibliographers.

The Schools of Library and Information Science should develop more co-operative programme with government and industries for the effective transfer of technology.

The Librarians must come out of the closet. Library profession is a link to traditional information techniques and concepts of modern technology thus making the new high technology even more effective. Librarians must establish rapport with fellow information professionals in the computer, publishing, engineering and management fields.

6 WHAT NEXT?

The prospect of electronic publishing and a paperless society appear as a threat and challenge. The library professional should respond to this challenging speed. It is a sad truth that information technology displaces job opportunities. But any new technology will create the same problem. In actual sense, Information Technology creates new jobs. However, the new jobs require new skills. This we must acquire to face the future challenges.

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INFORMATION TECHNOLOGY AND LIBRARIES: A FUTURE FOR DISTANT LEARNERS

KAILASH CHANDRA DAS*

1 LIBRARY SYSTEM AND DISTANT LEARNERS

The library system in the open learning/distance education mode is relevant from the stand point of learning theory and requirements. An open university employs different instructional methods compared to a conventional university. Since most of the instruction is imparted through distance rather than face-to-face communication, well-tested and scientifically developed pedagogy of distance education is employed. Now-a-days throughout the world many different computerised information systems are available which are of relevance to the organisation of learning resources in an open learning system.

With the probable expansion of distance and open learning, there would be the need for a base from where students can be served. Part of this service may well be the need to provide dial up computing facilities for information and to run educational programmes and learning aids. The library can provide a centre which is able to support such material and a focus for this type of learning requirement. Although much of the access will be directly between user and software, with the network controlling the flow of data, a centre which provides support both electronically and on a personal basis and is available for long hours will be wanted.

2 INFORMATION TECHNOLOGY AND LIBRARIES

The effects of information technology on distant education will be felt at two principal levels, first in the way the library delivers information and secondly, in methods and modes of student study. Three disciplines are involved in information technology: Computer technology, Communications, and Information. Communications and computer technology are growing so close together and are so mutually influential that it is going to be difficult to consider them as separate entities.

21 MICROCOMPUTER AND LIBRARIES

Pratt (1984) has described the literature on microcomputer use in

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libraries as being "a mile wide and an inch deep". It is clear that the microcomputer has very quickly become a standard and nearly ubiquitous part of the repertoire of tools for use in libraries. It is equally apparent that librarians are still in an era of discovery with regard to microcomputers exploring their uses and limitations, and accepting them into libraries with a mixture of enthusiasm and caution. Microcomputers have been used in libraries in a wide variety of ways, most of which fall into three major categories (*i*) provision of microcomputer hardware and/or software for public use, (*ii*) use of microcomputers as intelligent intermediaries to larger systems, and (*iii*) use of microcomputers as stand-alone systems for supporting library functions. A microcomputer accompanied by appropriate communications hardware and software has become the preferred tool for online retrieval from commercial database services. A microcomputer running specialized communications software is now the standard means for accessing bibliographic utility databases. As a result of the size and number of many library records, advances in microcomputer storage devices have been especially important to the development of microcomputer-based programmes for libraries. A very important recent development is the wide spread use of Optical disc systems which allow for very high capacity storage, making it possible to design library microcomputer systems that access fairly large databases of full MARC records. The microcomputer, properly integrated into present library operations, will make it possible to do more in terms of processing materials, providing services, accounting for use of funds and evaluating the effectiveness of activities. Microcomputers will have impact on the library environment physically and philosophically and will profoundly change the nature of education for the profession of librarianship.

22 CHANGING INFORMATION TECHNOLOGY AND SCHOLARLY COMMUNICATIONS

Advances in telecommunication technology have created the posibility of electronic transmission of voice, data and video information from one location to another. Similarly, the use of facsimile transmission is now developing rapidly with the introduction of high quality sub-minute transmission. As a result a large collection of bibliographic data on variety of computer systems throughout the world can be easily accessed from a terminal in the library or information centre. The 'Online database access' is the interactive process of directly accessing and interrogating computer based systems for access to information. The user through this process narrows down the search to the information required.

23 INTER LENDING

Library networks are dependent on cheap and efficient telecommuni-

cations to provide services. The introduction of digital exchanges and high capacity fibre optic cables for telephone systems by all the large operators, will in the long term provide easier communication links for those wishing to exchange data. Telephones have been converted to digital operation and the same wires are being used for telephone, telex, facsimile and data transmission traffic with fibre optics and satellites employed as carriers. Information can be stored on microforms or optical disc and can be despatched anywhere by express post or by facsimile transmission.

24 DELIVERY OF LEARNING MATERIALS

As information technology expands the range of delivery systems available to students and the role of educational technology will become increasingly central to the learning process, with its greatest impact in the areas of open and part time study.

Delivery systems for learning materials will be strongly influenced by the new technologies. The application of computer aided learning and instruction has been limited by the cost, availability of machines and lack of suitable software. Microcomputers have allowed the production of relatively cheap learning systems, which have so far been used most extensively in commercial and industrial training. Their use for teaching and learning in higher education, will increase developing from the use of computers to teach in the areas of information technology. The growth of expert systems and computer aided guidance techniques will be used as more sophisticated displays become widely available, and consequently cheaper and as authoring languages for programme development become more wide-spread.

3 INFORMATION STORAGE AND RETRIEVAL

Startling advances have been registered also in the capabilities of the physical devices which store information. The first electronic computers were capable of storing only a few numbers. At the present time, devices are being designed that are capable of storing a trillion characters of information. The growth in capacity of storage technology is such that one should soon be able to store library-sized quantities of information in cost effective manner.

31 CD-ROM

Optical technology has opened up a new method of data storage and retrieval for libraries. The CD-ROM, or simple known as the 'compact disc' technology is likely to be a major factor in storing information. The small disc stores and reads information from a peripheral device attached to a personal computer. The key feature of the CD-ROM medium are: a

large storage capacity; usable in a computer based information delivery system; a read only medium and mass produced economically.

32 VIDEO DISC

The capacity of the discs vary, depending on type and form. For example, a video disc is ideal for pictures and graphics. Initial work with video discs indicates that 10 billion bits or approximately 1 billion characters of information may be stored on a single disc. Work is currently under way to increase the capacity of a single video disc to 10 billion characters. A combined video discs and microcomputer system does offer improved facility for preservation of and improved access to conventional library collections, materials, catalogues, etc. The use of tape-slide and similar materials produced in any quantities will be transferred to video disc format which will become the standard method of presenting pictures and text, where necessary the addition of a microcomputer link for self paced instruction, using programmed learning and question/answer techniques.

33 CD-I (COMPACT DISC—INTERACTIVE)

The CD-I, which is similar to CD-ROM, but has the advantage of storing not only text, but video and audio as well. The catch to all of these forms is that distinctive players and/or microcomputers are needed for each.

34 OPTICAL DISC

The optical disc, printed and ready by a laser beam is now a commercially viable product. A 12 inch optical disc can store up to one million standard catalog card records. The disc is accessed via a standard microcomputer, although there are other methods of access, such as a video player.

35 HOLOGRAPHIC DEVICES

Another approach for information storage consists in using holographic devices. A hologram is a picture showing a three dimensional object. Holographic storage of information is safe. The hologram is also capable of huge quantities of storage. It has been stated that a single 4 by 6 inch piece of film can hold up to 20,000 individual holograms or 20 million characters of information.

4 FUTURE DIRECTIONS IN INFORMATION RETRIEVAL

Various new developments are expected to affect the information retrieval world. Paperless electronic systems may be created which will offer a wide variety of individually tailored information services to the users. Such systems could include many facilities that are not yet currently available, including natural language recognition, graphics processing, speech

recognition, and inexpensive point to point communications. The new technologies included special processing "Chips", microprocessors, Optical character readers, Optical memories, and micrographic devices. One may expect that new theoretical developments could in time be coupled to the new technologies, leading to the implementation of flexible, new user support systems capable of controlling many different file processing activities. Sooner or later, the conventional information processing systems may be replaced by "Paperless" systems in which machine-readable entities are processed instead of hard-copy products, and all information flow operations are carried out electronically.

5 TELEREFERENCE

Telereference is made up of Teletext, Videotex and Cable Television. The systems are related because the message is read from the typical television set.

51 TELETEXT

Teletext is the generic term for transmission of pages of information as digitised signal, either through lines or through broadcast medium. It allows the distributor to send a limited amount of information directly to the user's television set. A hand-held decoder is employed to turn the menu of what is available and to, subsequently, turn to the pages which have the data. The system has the advantage of being relatively easy to use, and equally low priced.

52 VIDEOTEX

Videotex is essentially a communication system which provides information in both text and graphic forms, usually displayed on a modified television set or a suitable computer terminal. Access is possible via ordinary phone line or other communication lines. A catalogue of various documents in a library will be searchable on a videotex system. Aside from the basic technological differences, which are many, the primary advantage of videotex over teletext is that the system is interactive for one way only. The user can both receive and send messages.

6 ISSUES AND PROBLEMS

The availability of open and distance learning centred on traditional teaching institution, will have long reaching effects on the distribution of resources within each institution. The provision of rooms and plant for group teaching becomes less critical and there is a need for additional self learning facilities and private study areas together with better communications. Students can learn at their own place and in their own way.

The library will need to anticipate the application of information technology, and to examine how the community it serves can be given the widest possible access within the resources available. The main task for the authority is to chalk out the strategies to make the best use of the new technologies and to exploit it for the good of the institution.

The development of open learning education areas and their associated information system requires at different levels within the educational world and also suitable resource allocation. In most distance educational institutions, it is disappointing to find that they do not possess the capabilities for use of the library information system nor do they have the attributes mentioned above. The development of information system to support distant learning requires an appropriate educational climate, funding, highly qualified staff and also an exchange of ideas from the world of librarianship and information science, computing, education and psychology.

7· CONCLUSION

The variety of educational experiences that distance education can provide and the creativity as well as the flexibility inherent in it are bound to be smothered in the process. All information technologies are frightfully expensive, need special skills to handle, result in reduction of jobs and have a high rate of obsolescence. Many users of information and library services in the academic environment do not understand the range of source and services available to them. Unless librarians of initiatives in the handling and dissemination of information come forward many opportunities to gain from the benefits of information technology will be lost. To maintain the library therefore needs to introduce, test and evaluate new services and facilities, just before the demand is felt by the users.

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NEW AND INNOVATIVE MEASURES IN SPECIAL LIBRARIES

RAVINDER KUMAR SHARMA*

1 INTRODUCTION

It is rightly said that 'putting knowledge to work' can be used as guiding slogan of special librarianship. This idea has been experienced with the changing attitudes to research. Rapid growth in scientific, technical and commercial knowledge communicated in the form of articles in periodicals and reports is responsible to switch over to special library to solve the problems. Perhaps, this different kind of literature, by its format and quantity, brought a new dimension to the situation.

If we go to historical aspects, we find that special libraries appeared when industrialization took place. And by forming "Special Library Association" (SLA) a new form of library "Special Library" had appeared on the American scene in the year 1909. This enabled thousands of libraries call themselves special libraries with the signification of their difference from the three other major forms of libraries–the school libraries, college and university library, and the public libraries. This resulted in emergence of concept of special library.

The socioeconomic development of a nation depends on such libraries because they communicate information and keep the scientists abreast with the latest information and thus help in research and development activities of the organisation to which it is attached. The generation of new technology and ploughing it back for producing still newer technology has been an unending activity of these organisations and they seek the help of such libraries in their endeavour".

11 WHERE WERE WE

Conventional library techniques proved unequal to the task of handling new type of literature. Secondary publications such as abstracts and reviews were therefore invented to provide an answer to the problem, and offered much improved facility for bibliographic control and widened the horizon of information retrieval.

Traditional methods of library arrangements subject cataloguing and

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information retrieval and dissemination were not adequate to cope with the vast inflow of information seekers and the increasingly specialized needs of the users. The fact that a library can no longer even come to know, much less acquire everything that is useful to its clientele further aggravates the problem caused by the so-called information explosion. Scientists, and others voiced their fears that the flood of information would soon lead to a situation where it would be cheaper and easier to rediscover a fact in the laboratory then to retrieve it in literature. In the past and even at present libraries have been adopting the traditional systems to achieve their objectives. Some classification schemes DDC, UDC, LC, BBC, CC, etc. were devised and used by libraries for organizing literature and shelf arrangement.

- Traditional librarians mainly help users from their own collection and from other libraries through Interlibrary Loan (ILL).
- All the levels of function like acquiring materials, organizing materials, disseminating information and materials from the library were the significant characteristics of the traditional special library. And most of the inhouse jobs in the library were handled manually with old techniques.
- Furthermore, there was a lack of norms for proper planning, staff, space and equipments requirements in most of the libraries.
- No doubt, these limitations have made librarian handicapped to meet the challenge of changing social needs of the present users. It is a difficult task to locate all the relevant information, procure it and make it available to those who needed it. But if the research and development activities are to be kept alive the communication of all the relevant information to the user in the shortest possible time will have to be ensured. In Indian conditions it is done manually with the help of traditional tools. This results in a wide gap between what is available and what is being provided to the users. And this gap is becoming wider and wider everyday. To tide over the situation and keep the researcher uptodate with information about the development in his field of specialization, and to enhance productivity, efficiency of the library staff, the use of information technology especially computer for in-house as well as information communication is a must.

12 WHERE ARE WE NOW?

This being the situation, particularly the special libraries have to cope up with the problem of ever growing literature and to give better service to

the clientele in their research and development efforts. Start has also been made and in some quarters there has been a good progress. We know that libraries and librarians are involved in a rapid transformation from being keepers of knowledge to brokers of information. Now, question arises how is it?

2 INTRODUCTION OF MODERN TECHNOLOGIES

Ben, Heirs and Gorden, Pehrson have said that the brain of any organisation can be defined as its information storage and retrieval system, which is fed by the computers, the archive and the memories of the individual brains within the organisation. Hence, the library ought to be the hub of the system. And if superior technologies are applied with the potential to replace the existing one and influence our work culture, definitely there will a dramatic improvements in the range, quality and amount of service in the libraries.

21 USE OF INFORMATION TECHNOLOGY

Information technology is a combination of computing, data communication and document reproduction technologies. These technologies help in generating information with an unstoppable momentum. The developments in the computer and communication technologies helped widely and become much more efficient. The computers are useful for storage of data in large quantities and its subsequent manipulation. Use of data communication technology offers means for communication of information across the world with the development of online bibliographic or library networks growing as national and international ventures connecting library collections and databases. Through the use of document reproduction technologies one can reproduce and supply hard copy of the document globally.

22 COMPUTER APPLICATION

There are three pre-requisites for computerisation of a library. Firstly, that there should a computer (hardware); secondly, that there should be a software to make the computer work; and thirdly, there should be a well trained and qualified manpower to get the best out of the available hardware and software.

Computers have been used as means for organizing information retrieval system either for batch searching or online and also for various tasks such as listing of items, ordering procedures, loan control and for the production of indexes based on keywords. Boolean strategy can be applied as tool for

taking out specified unwanted material from the response. Whereas conventional indexes do not possess this facility. Today, user-friendly software packages are available, which are capable to handle library operations efficiently and effectively. CDS/ISIS Mini Micro is a very versatile package for creation of bibliographic databases. With high indexing capabilities, it works as an efficient tool for information storage and retrieval.

The readymade software packages for different library operations are available commercially. There are several software houses and vendors specializing in library and information software development in our country. Considering the number of libraries there is a vast scope for library and information software market in the country. Important library packages have been developed by various agencies namely Indo-Informatics (ASLIS), Wipro (WILISYS) (WILIMAX)-LIB (HOUSE-KEEPING) (WILITRAX-IRX), Minafax (ARCHIVES), Info-Tach (LIBSYS) with data operating systems and system software utilized.

The higher end micros (of IBM-PC/ACT type) available in the Indian market are capable of meeting both the functional and financial requirements of majority of the libraries. It is also understood that licence has been issued for indigenous manufacture of Micro-VAX II, a 32 bit micro by DEC which is completely code compatible with VAX 11/780 systems. Several Indian companies are also offering 32 bit micro systems based on standard processors like Motorola 68020, Intel 80386, with standard operating systems like UNIX. With such healthy developments in the Indian market, it is sure that hardware will not at all be a problem for library automation.

23 ON LINE ACCESS FACILITIES TO DATABASES

The application of on-line technology to library functions and services is highly significant. Special libraries have always had data bases; they are, after all, one of the library's on primary tools. What we must know as how to improve on the process of storing and retrieving information that is already there. International cooperative efforts of the organisations like ICSU, IFLA, FID, UNESCO, ISO, etc. in advancing communication technology are worth to notice. IFLA created a worldwide scheme known as universal bibliographic control (UBC) for the exchange of bibliographic information for all publications. Western world has created a large number of bibliographic and textual databases which are available for online access. Most of the major disciplines are covered by these online databases. MEDLINE, INSPEC, LCMARC, POPLINE, NTIS, RLIN, OCLC, AGRICOLA are worth to name.

3 COMPUTING INFRASTRUCTURE AND NETWORK DEVELOPMENT

Many of present day networks, bibliographic or other type, are online networks and use computers–large and small-telecom links though cables as well as satellite channels. The well-known library networks like OCLC (1967), RLIN (1978), WLN (1972) can be taken as excellent examples of successful online networks. These developments have encouraged the Indian library professionals also to think of organizing online library network. Some of such networks are NICNET of NIC, INDONET of CME Ltd, VIKRAM of the Deptt. of Telecommunication, SAILNET of the Steel Authority of India, INFLIBNET of UGC, and RABMN (Remote Area Business Message Network) of Deptt. of telecommunications.

31 BIBLIOGRAPHIC DATA FORMATS

Efforts are being made to formulate by common consent, the codes for standard practices in the areas of computer technology and its application. The purpose of a bibliographic exchange format is to promote the free flow of information by facilitating the exchange of bibliographic records created in one database to another in machine readable form. The pioneering efforts in this direction were made by the US Library of Congress, by developing MARC, IFLA by developing UNIMARC, UNESCO by developing CCF. The American National Standard Institute (ANSI) and International Standard Organisation (ISO) have also promulgated the standard structure for data records to be used for the exchange of bibliographic data in machine readable form by producing ANSI: 13z39.2, ISO: 2709 respectively. Bureau of Indian Standards (BSI) earlier named as ISI has already laid down some standards in the area of computer technology and its applications in information work.

4 NEW TECHNOLOGY OF CD-ROM

This precious technology is only seven-year old. It is no wonder that libraries lead the market place in CD-ROM product acceptance. The optical disc storage device has emerged as a challenge to the earlier information storage retrieval activities, and electronic publishing. At present it holds a great promise for information storage and retrieval process, specially for library activities and came into existence as an alternative to magnetic tape. In 1985 the audio disc was developed as an information storage device for computers known as CD-ROM (Compact-Disc-Read only Memory). It has longer life (100 years projected by Sony Corporation) in comparison to conventional media. CD-ROM's physical format is defined by a standard, established by 'Philips' and 'Sony'.

The CD-ROM system comprises:

- PC with 640KB colour monitor, single floppy drive (5.25" or 3.5") hard disc option.

  CD-ROM drive for loading and running the disc.
- retrieval software for accessing data on CD-ROM disc supplied with CD-ROM data base.
- CD-ROM disc (4.75").

Its features indicate CD-ROM has several advantages like:

- erasing and overwriting are not possible.
- high density storage, an entire file of 2,50,000 records can be stored in one disc ie, more than 2,20,000 pages
- it is highly durable as the drive head will not touch the plate for running and retrieval.
- easily transportable.
- drives can be attached to PCs.
- CD-ROM can be attached to a personal computer.
- data highly secured.

5 REMOVAL OF FACTORS RESPONSIBLE FOR NON IMPLEMENTATION OF INFORMATION TECHNOLOGY (IT)

51 LACK OF COMPETENCE AND SPECIALIZATION

The professional knowledge and competence can only be achieved by the theoretical knowledge backed with practical experience.

52 LACK OF TRAINING IN THE USE OF MODERN TECHNOLOGICAL GADGETS

This requires special skills and knowledge in the use of different technological gadgets such as computer terminals, off and online searching, inland and foreign databases, use of electronic copiers, similar other facilities made available in libraries/information centres. Reliable knowledge and skills would be possible by knowing more and more about

- online access to foreign databases though formulation of queries and search strategies.
- mechanism to access information through machine readable catalogues within the library.

53 CHOICE OF HARDWARE AND SOFTWARE

The choice of the hardware, software and manpower will have to be on rational basis so that optimum efficiency and economy are ensured. The need for a particular type of computer, software and manpower will have to be related to the category of the library. These should have possibilities of future expendability and upgrading the configuration of the hardware.

54 FEAR CHANGE AND LACK OF COMPUTER CULTURE

The information crisis can be tackled only if new technology is forced in use. Certain developments in library user access, from paper society to paperless society, sophisticated presentation of information will pressurize us very soon for technological breakthrough by shifting from old to new technologies not only for present but for future's technology.

6 HUMAN RESOURCES

Effective operation of the various components of services requires that specialists of the different kinds such as library and information scientists, subject specialists with an orientation in information science, system designers, managers, translators, reprographers and others should be available. The need for professionally qualified personnel to manage and run library effectively and efficiently was duly recognized in this country and consequently library science training programmes had been started at several places much before independence. Formal library education was initiated in India for the first time in 1911. Significant impetus to these attempts was given by late Dr S R Ranganathan who introduced library science teaching at the post-graduate level at Madras, Banaras and Delhi Universities. Initially library science courses were part time courses known as Diploma courses in library science. These were subsequently converted into full time degree courses.

The post-independence period infused new dynamism in all spheres. This situation resulted in establishing schools, colleges, universities, laboratories, industries and spreading knowledge in masses. Libraries were not exception to this phenomenon. Establishment of hundreds of libraries at different levels throughout the country, necessitated library science training facilities on a large scale.

Specialized courses in documentation/information science are offered by INSDOC, New Delhi. and Documentation Research and Training Centre (DRTC), Bangalore. The two-year course offers comprehension instruction in all aspects of information science, with particular emphasis on the practical side.

Short-term specialized programmes in Information services extending over 2-4 weeks are being organised by the various institutions or associations such as SENDOC (Hyderabad), INSDOC (New Delhi), DRTC (Bangalore), ILA (Delhi), IASLIC (Calcutta).

It would be relevant to mention here that UNESCO under the UNISIST as well as NATIS programmes has been giving particular attention for the development of manpower for library and information work for the past several years by providing assistance to the member states in various ways such as sending experts/consultants, giving fellowships or scholarships, establishing library schools and documentation centres, etc.

7 CONCLUSION

It can beeasily concluded that there is certainly an urgent need to develop more facilities for developing manpower for libraries. Our manpower needs should be based on the functions to be performed in various libraries. Technology is not self implementing. Its utility depends upon the skills and knowledge of the people who direct, operate and maintain it. Nency Melin Nelson rightly suggests that *familiarity reduces stress* as the better one knows a reference tool, the more one feels in control when helping a patron use it. Similarly, we should take control of the situation with the skill as well as through fearless application of new technologies.

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NEW INFORMATION TECHNOLOGIES FOR INCREASING ACCESS TO AGRICULTURAL INFORMATION

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1 INTRODUCTION

The process of research and development in agriculture heavily depends on the extent of information access. As a consequence the technologies related to information processing and dissemination have become significant aspects in the agricultural development activities also. The emergence of a plethora of information technologies in the recent past has revolutionised the ways and means of dissemination of agricultural information. We have reached a point where it has become practically difficult to provide information to the library users without exploiting the capabilities of new information technologies.

2 INFORMATION POWER IN AGRICULTURE

In agriculture, the power of information is a relatively recent phenomenon. In early 19th century, agriculture relied on manpower, followed by horse power in the later part of the century. In 1920 and beyond mechanical power boosted the productivity. By 1945 spectacular gain in agricultural production was achieved through the use of science power and the modern agricultural production heavily relies on information power.

3 EMERGENCE OF INFORMATION TECHNOLOGIES

The past two decades have witnessed an unprecedented emergence of modern technologies related to the process of information storage, processing and transmission. Among them, computer may possibly be the most spectacular technological invention widely used now. Many new electronic technologies that go well beyond the computer are appearing in quick succession. These technologies have the potential to change radically the information dissemination process and will induce significant transformation in agricultural information access.

Agricultural libraries and information centres all over the world are increasingly passing on to technology-based information dissemination to

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organise inhouse information for making it accessible to the users and to access external databases for additional information.

4 ROLE OF COMPUTERS

The advent of computers in the library and information activities has revolutionised the methods and has increased the effectiveness of information dissemination process manifold.

In libraries, computers were originally used for house keeping repetitive functions. Now they are being used to process, corelate and provide information of a multi-dimensional nature so fast and efficiently which was not possible by manual methods.

5 COMPACT DISC

Laser technology has opened the way to the most exciting new medium–the compact disc–for information storage and dissemination.

In India, CD-ROM has not yet become very popular, but ICRISAT, Hyderabad has set up a CD-ROM based agricultural information service. ARIC of Indian Council of Agricultural Research at New Delhi is also providing information service based on CD-ROM.

6 LOCAL AREA NETWORKING

Local Area Networking (LAN) is a network specially designed to interconnect data communicating devices ranging from microcomputers to mainframes within a relatively limited geographical area.

LAN can be used to link a variety of different communication devices in a building an environment enabling them to communicate with one another and to share resources such as printers, magnetic storage systems, etc.

Tomorrow's library and information system could be an LAN with a few micro computers, shared printers, common file storage, etc. having direct link with national and international databases through telecommunication network.

7 VIDEO CASSETTE

Video cassette has become the most widely accepted audio-visual product which has been increasingly used for information display and for conducting training programmes. It certainly finds a significant place in the agricultural information dissemination process especially in extension activities.

Interactive Video Disc (IVD) is yet another product which is composed of a computer and a laser disc. The optical laser disc is used to store visual

images, sounds and text just as a videotape.

8 FULL TEXT LASER DISC

It deals with text in digitised form. The system includes a microcomputer with an operating system, a 20 megabyte hard disc, a laser disc player, a black box serving as the interconnecting device, a computer monitor and a video monitor. The 12 inch laser disc can contain approximately 2 million characters of text.

This is certainly a significant technological invention that could be effectively used for increasing information access in agriculture by creating full text databases for back-up information services in addition to the bibliographical services.

91 COMPUTER AIDED TELECOMMUNICATION TECHNOLOGIES

Recent developments in the integration of computer and communication technologies in meaningful combination provide tremendous potentiality for increasing information access in agriculture.

Presently, the telecommunication technology has so advanced that international communication is possible from any point on the globe. Of course, there are serious limitations for the developing countries that require long range planning to overcome.

92 VIDEOTEX

Videotex is a computer aided telecommunication system intended to transmit text or graphics stored in a computer database for display on television screen via ordinary telephone line. It makes the data stored in a central computer system accessible to the users through their home television set through the telecommunication line. The system is easy to use, low cost and intended to be user-friendly.

Current application of videotex in the libraries are mainly for two purposes.

- to provide community information; and
- to supply bibliographical information.

Many libraries in the western countries using videotex have regarded it as a means of building up community information files. Many bibliographical data centres like ESA–IRS, DIMDI, etc., have developed easily usable videotex interface to help the users.

93 TELETEXT

Teletext is a non-interactive form of videotex, designed for general and

mass communication. Unlike interactive videotex, teletext is broadcast, received and displayed by a teletext set which is essentially an adopted television receiver.

94 ELECTRONIC MAIL

In a multi-user computer system, communication can be possible via telephone line by using an electronic software package. The message is transmitted as electronic signals and is received on a video display unit or on a local printer. The facility for electronic mail offers faster communication among libraries and data centres across the world.

95 FACSIMILE SERVICES

Facsimile transmission service is a means of faithful transmission of an original document via satellite links to remote locations. It can scan and transmit complete letters and produce paper copies of letters and messages for the recipient.

Fax is one possible technology for electronic delivery of documents from the library and information centres to the needy users. For instance, the document supply centre of British Library is supplying copies of documents using fax services.

96 ELECTRONIC JOURNALS

Electronic journals can be in a variety of forms, but one central characteristic is the use of electronic network communication as an aid in preparing, submitting and referring papers and other activities associated with the compilation of electronic journals.

97 EXPERT SYSTEMS

Artificial intelligence is being heralded as one of the breakthroughs in computer users that will drastically change the information dissemination process. The most practical application of artificial intelligence is an expert system.

The Expert System (ES) is a computer programme designed to reason like a human expert in a given situation. It can solve problems in a way similar to that of a human expert and communicate the decision or conclusion with blinding speed.

The development of Expert System coupled with increasing availability of low cost computers provide new potential for dissemination of expert knowledge in a digestible form direct to the users. The technique is now extensively used in many areas like medical diagnosis, commercial accounting and increasingly in agricultural research, extension and farming activities.

98 ACCESS TO ONLINE DATABASES

The computer aided telecommunication facilities enable the library and information centres to provide information from any data centre cutting across geographical boundaries. As a result, several national and international networks have become easily accessible. These online networks make available a large number of online databases existing elsewhere in the world to the users of any library at a single unit. For example, agricultural researchers in India can gain easy access to the databases available at FAO, Rome or NAL, USA through computer terminals via telecommunication lines.

991 *Future Scenario*

Increasing use of new information technologies are changing the ways information is provided in the libraries. Computerised databases are now replacing their printed equivalents as sources of information. For *eg.,* a researcher wishing to obtain some information may begin with an expert system that will lead to relevant articles. The bibliographical details as well as the text of the articles could be found on a connected CD-ROM automatically and will be displayed on a monitor or printed out.

The information technologies now in use and being developed are exciting because they enable us to provide services in ways not even thought of few years ago. The role of the librarian is being transformed into a mediator in the information transfer process. He would be mainly concentrating on assessing, edition and providing analytical and evaluative input for research.

992 *Conclusion*

Modern agricultural research requires digestion of large amount of information for solving complex issues and hence the agricultural library and information centres in the developing countries like India have to concentrate more on using latest information technologies for speedier and timely information dissemination. But the increasing use of information technology involves more initial investment, but in the long run it will pay dividend in the efficiency of services.

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ADOPTION OF COMMON COMMUNICATION FORMAT FOR A LEGAL BIBLIOGRAPHIC INFORMATION SYSTEM: AN EXPERIENCE AT THE NATIONAL LAW SCHOOL OF INDIA UNIVERSITY

C U NAVALGUND*
N S HARINARAYANA*

0 INTRODUCTION

Libraries are transforming themselves into information centres more rapidly than ever before. Information centres have a challenging task of identifying, collecting, analyzing, consolidating and disseminating the information to the information aspirants. But various factors make this work very complex. However, a bird's eye view of the library history shows that libraries are innovating constantly ways and means to cope up with the challenges whenever they arise. Designing of classification systems and cataloguing rules, development of subject headings and thesaurus, inventing various methods of indexing systems, and utilizing the existing technologies are all evidence for the fact that the library scientists are always responding to the pulse of the situation. The challenges of the modern libraries/ information centres are so complex that, now it has been an accepted fact that libraries cannot wholly depend on traditional tools alone. It is basically because the traditional tools don't provide greater flexibility during retrieval. Further, number of access points for bibliographic items are limited in traditional tools. Fortunately, the technology has come to the rescue of the information centres. Modern gadgets can be effectively used to solve few problems faced by the information centres. Not withstanding the pressures, libraries and information centres–big or small–acquiring less expensive but powerful micro-computers for their house-keeping as well as information storage and retrieval activities. Experiments are on to design and develop information systems in various disciplines.

This article highlights the efforts made at the National Law School of India University in designing a legal bibliographic information system.

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1 NATURE OF LEGAL MATERIALS, USERS AND THEIR NEEDS

One need not emphasis that designing of a system requires the knowledge of the nature of documents, users and their needs. Here, an attempt has been made to present these factors in a nutshell.

A law library contains highly specialised materials. One requires special skill to handle them. Basically, legal material consists of statutory law and reports of decided cases. Both these types of legal materials relate to the "authority" and "precedent" respectively. Hence, most of the information seekers would like to scan these materials. "The term statutory law is more inclusive than is generally considered by the term in popular parlance for it includes not only legislative enactment but constitutions, treaties, court rules, interstate compacts, municipal ordinances, and administrative rules and regulations".[1]

Any law library has to be well equipped with regard to these two basic materials. These materials may equip the reader not only with what the law is but also help him understand that in a complicated society with complex ways, he may have to take recourse to such secondary materials as text books, reference books and articles. For a university library these materials may have to be in abundance, but in addition such a library has to contain materials in allied fields such as history, political science, anthropology, sociology and economics and also in comparative law.

Following are some of the typical characteristics of legal information needed by the users:

- More factual oriented.
- Requires high degree of relevance.
- Current as well as retrospective information carry equal weightage.
- While providing information like acts rules, cases etc, the information should be given exactly as to the wording and even punctuation, capitalization and other details.

The following categories of users are benefitted by a legal information system:

- Lawyers and Judges (Law practitioners).
- Law teachers and students.

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1 Erwin C Surrency, Benjamin Feld and Joseph Crea, A guide to Legal Research 7 (1959) Oceana Publications, Inc, New York).

- Policy makers in the Governments.
- Law administrative machineries of the Government.
- Researchers and scientists in law and allied fields.

It is but difficult to develop and design a comprehensive system which satisfy all the needs. Further, such designing of an information system can't be an individual's or an institution's tasks. It is a giant project to be considered by the group of institutions and/or Government. However, the basic work like designing and developing a small bibliographic information system may be taken up by institutions. These systems can later be amalgamated to form a basis for a larger system like at national or regional levels provided standarised methods is used by these institutions. This approach, ie, bottom-upward method of designing an information system has few advantages, though it has got some disadvantages as well. The most important advantage is that it is easy and feasible approach to start up a project in a smaller scale and then to expand it exploiting the benefit of the experience gained during the initial stages. With this view, the NLSIU started creating a bibliographic database of its holding as an initial experiment.

2 NATIONAL LAW SCHOOL OF INDIA UNIVERSITY

The continuous deteriorating standards of legal education and practice in the country made the Bar Council of India to think serious to establish a model institute of its own to achieve excellence in legal education and higher standards of legal research and professional training in the country. The initiative of the Bar Council of India and the Karnataka State Bar Council and the positive support of the Government of Karnataka gave the project the required fillip during the early 80's. The NLSI Ordinance 1986 (Karnataka Ordinance 1 of 1986)–establishing the NLSIU as a full-fledged University at Bangalore. Subsequently, the National Law School of India Act 1986 (Karnataka Act 22 of 1986) was passed by the State Legislature replacing the Ordinance. The State Government, through its notification dated 27th August 1987, declared 29th August 1987 as the appointed day for the formal establishment of the University.

21 OBJECTIVES OF THE SCHOOL

The objectives of the school are not limited to preparing conscientious and competent members of the profession, though that remains its basic mandate. The school is expected to advance and disseminate knowledge of law and legal processes in the context of nation development. The University aims to develop in the student a sense of responsibility to serve society by developing socially relevant skills and approaches, legal services delivery

systems and law reform measures.

22 LAW SCHOOL LIBRARY

Keeping in view the aims and objectives of the Law University, the library has been planned and is being developed by a team of qualified professional library staff guided by the Library advisory committee. It has acquired essential documents and books, reference volumes, periodicals, reports, bare Acts, journals, etc. The library has at present two PC/ATs along with a dot matrix printer. These are now being used for computerising the housekeeping as well as information storage and retrieval activities.

As the automation project has to be started in the Law School library from the scratch, the library decided to procure a software which

- is flexible so as to allow the library to tune it to its needs;
- supports primarily for information storage and retrieval and other activities of the library;
- has been in-use in other libraries so that the law library can have the benefit of other libraries experience; and
- is user-friendly.

Finally, the library procured a legal version of CDS/ISIS package (Version 2.32). Apart from this, the library has also procured legal versions of general purpose softwares like dbase–IV, Wordstar, etc.

3 DESIGNING OF DATABASE

The law library decided to set-up a database which should be amenable for future expansion and/or modification. Further, keeping in view of the developments in information networking in India, the format should allow for electronic exchange of information at later stages. So, after having discussions with few experts in the field, the library decided to adopt CCF for its database. Though the CCF is intended primarily as an exchange format, it can also be used as a basis for bibliographic storage and retrieval systems. There are basically two advantages in this. Firstly, anyone devising a new system needs some assistance and, by consulting a document like the CCF document, may benefit from the thought that has gone into similar systems in the past. Secondly, anyone basing a system on an exchange format will find it easier to exchange data in future if the need or the opportunity arises. However, the Law School library doesn't claim that its database format adheres completely to CCF for various reasons discussed elsewhere in this article. As the format is still at experimental stage, the library may change it as and when required.

4 COMMON COMMUNICATION FORMAT (CCF)

Communication through electronic gadgets always requires some standardization. Otherwise, it is not usually possible to export records/ information in processing format out of one system and import them directly into another. By using a common exchange format, each system can convert the data in its processing format into a format suitable for export and import of data. This eliminates the need to make conversions between each and every pair of systems since each system need to design only one conversion between its format and the exchange format and back again in order to be able to exchange records with any other system. All these necessitated to have a Common Communication Format or CCF. As a result, CCF has been prepared with the support of Unesco, within the framework of the General Information Programme, by the Ad hoc group on the Establishment of a Common Communication Format. The chief purpose of the format is to provide a detailed and structured method for recording a number of mandatory and optional data elements in a computer-readable bibliographic record for exchange purposes between two or more computer-based systems.

5 STRUCTURE OF THE DATABASE

Using the guidelines of CCF, the NLSIU library created database for its holdings. However, certain modifications in the format have made for one or more of the following reasons:

- To avoid redundant data entry;
- To make data entry easier and faster;
- To avoid unnecessary data entry (Unnecessary from the point of view of NLSIU's needs);
- To suit the local requirements of the NLSIU library; and
- In few cases, CDS/ISIS doesn't have the facility to adopt the features prescribed by CCF.

Following are the Data Elements used in the NLISU database:

Field Tag	*Name*
1	Accession Number
15	Bibliographic Level
22	Data Entry Date
40	Language of the Item
50	Physical Medium
60	Type of Material

Field Tag	Name
100	ISBN
200	Title
260	Edition
300	Statement of Responsibility
310	Corporate Body
320	Name of the Meeting
400	Place & Publisher
440	Date of Publication
460	Physical Description
465	Price and Binding
480	Series & Stat. Responsibility
490	Part Statement
500	Note (Extra Information)
530	Content's Note
610	Classification Notation
620	Subject Descriptors
700	Number of Copies
710	Added Entry–Author II
730	Added Entry–Author III
740	Added Entry–Collaborator I
750	Added Entry–Collaborator II
760	Added Entry–Collaborator III
770	Added Entry–Collaborator IV
780	Added Entry–Collaborator V
790	Added Entry–Collaborator VI
800	Added Entry–Series Editor I
810	Added Entry–Series Editor II
820	Key Words
830	Number of authors
840	Source
850	Bill No & Date

One can notice from the above list that, the fields 22 to 620 are the data elements prescribed by CCF. To simplify the task, the NLISU database has used the same field tags as that of CCF, though it was not absolutely necessary. Further, strictly speaking the fields 710-790 should have been included in field 300 itself as repeatable subfields. But, NLISU is using the

database for printing catalogue cards also. As it is impossible to have an access to a particular occurrence of a particular field,[1] there was no alternative but to declare the fields 710-790 as separate fields so that one can easily generate added entries.

Main entries

340.534
BUH Buhler, G Tr.
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While developing the display format for catalogue entries, one has to test for number of conditions using 'if–fi' loop. But, the maximum number of lines a display format contain in Ver 2.3 of CDS/ISIS is only 50 lines of 80 characters each. To be precise, it is just 4K. But, it is just impossible to accommodate and test all the conditions within 4K. So, certain sacrifices had to be made. For example, the CCF lists more than 85 role codes in the field 300. But the display format used by NLISU database can identify only five codes. However, it is said that in version 3.0 of CDS/ISIS one can have up to 32K in display format provided one has expanded memory facility.

The indentation command [eg, v10 (10,10)] works only with the fields and subfields. It doesn't work with literals. But in a catalogue card, the continuation lines have to be printed either at the first or second indent line depending on the situation. It is impossible to predict where exactly the literals like comma, semicolon, etc will appear on the card. If literals were to begin as the first character of a new line, then it would have

appeared in first column of the new line and thus resulting in the spoiling of the catalogue format. This problem was solved, of course, by an indirect method, using Ref function.

6 CONCLUSION AND FUTURE PLANS

Though complete adherence to CCF may be difficult, perhaps unwarranted also, there are several advantages in adopting it. Network communication among libraries/information centres is in the offing. So, it is but important that libraries adopt some standards such as CCF. One may even say that it is a ripe time for library associations and experts to guide the libraries in these matters.

The National Law School of India University Library has started the automation project with the creation of database for books. However, later it is proposed to create another database for journals and journal articles. Further, more importantly, different 'case law' databases in various fields of law will be designed. As at present there is no computerised 'case law' database in our country, it is hoped that the efforts of the Law School library will be very useful to legal professionals.

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APPLICATION OF COMPUTERS IN DIFFERENT AREAS OF UNIVERSITY LIBRARIES

GOLAM AMBIA*

1 INTRODUCTION

The increasing complexity of the Government and business operation puts a premium on the efficiency and effectiveness and thereby necessitates the use of more modern tools and techniques. The computer is one such modern tool which could be effectively used in administration, commerce, industry and education. The use of computer has been steadily increasing in science and technology. Most of the advanced countries of the world have made much advances in this respect. India has also made a start in this respect in the field of Industry and business besides science and technology. In India we have not been able to capitalize the utility of computers compared to the Western Countries, due to various constraints such as indigenous development of chips, import restriction and prices. However, there is growing awareness among the people about the utility of computers.

In India, University Libraries are growing day by day in terms of their books, and journals and readers. If we use computer in the University Libraries many problems can be solved. The time is approaching when more and more libraries will be forced to turn to computers in order to provide more efficient, effective and satisfactory services to their patrons because computers make possible better utilization of personnel and a wider and more flexible range of services.

2 AUTOMATION IN LIBRARIES

The term library automation refers to the processing of certain routine clerical functions in the library with the assistance of computers or other mechanized semi-automatic equipment. Automation can relieve the library staff from many routine, administrative or clerical functions. Automation includes mechanization of various processes and their operation as well as the use of machines, equipment, tools, ie, all sort of mechanical devices, automatic machines, electronic equipments and also systems. In libraries, automation or mechanization is playing a vital role these days.

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3 APPLICATION OF COMPUTERS TO LIBRARY AND INFORMATION SERVICES

Following are the various aspects of Library and Information Services which can be computerized or mechanized or automated.

31 ACQUISITION WORK

(*i*) Ordering
(*ii*) Preparation of order slips or cards.
(*iii*) Sending orders to vendor(s).
(*iv*) Updating the record file ie, documents or order receipt work.
(*v*) Verification of books with order file and invoices.
(*vi*) Print-outs of received documents and non-supplied documents, maintenance of accounts.
(*vii*) Income, expenditure and balance of allocated funds.
(*viii*) Budget control.

32 CATALOGUING

(*i*) Printing of catalogue cards.
(*ii*) Preparation of authority file/subject heading list.
(*iii*) Preparation of shelf list.
(*iv*) List of catalogued items.
(*v*) Centralized and cooperative cataloguing.
(*vi*) List of holdings.

33 MAINTENANCE

Vigilance in stacks and reading rooms with short circuit television, miscreants tearing pages from books can be detected. Electronic thief detector can be used to control unissued books.

34 CIRCULATION CONTROL

(*i*) Registration of members.
(*ii*) Issuance of library/borrower cards.
(*iii*) Charging of documents.
(*iv*) Discharging of documents.
(*v*) Reminders of overdues.
(*vi*) Maintenance of Statistics.

35 SERIAL CONTROL

(*i*) Ordering work.

(*ii*) Registration work.

(*iii*) Updating the record file.

(*iv*) Reminders to vendors/publishers.

(*v*) Binding List.

(*vi*) List of holdings.

36 DOCUMENTATION AND INFORMATION RETRIEVAL

(*i*) Indexing of micro and macro documents.

(*ii*) Preparation of Thesaurus.

(*iii*) Compilation of union catalogues.

(*iv*) Bibliographical work.

(*v*) Searching and printouts of reply of queries.

37 STOCK VERIFICATION

Preparation of accession list of all documents in the library, printout of list of accession number of documents missing, printout of list of missing documents after key punching bibliographical details of all missing documents and feeding the input into computer system.

COMPUTER CULTURE AND COMMUNICATION NETWORK OF LIBRARIES IN INDIA

BAMAN PARIDA*

INTRODUCTION

The modern information technology has brought a revolution in various operations of libraries and information centres. Since 1960's libraries and bibliographical information centres are using technology in general and computers in particular to automate a wide range of administrative, public and technical services. Now the library world is being acclimatised in computer environment for acquisition of documents, serials control, circulation control, indexing and abstracting, compilation work, technical processing. Thus, computer has gained the capability to cover important operations of the libraries and information centres with great speed and accuracy like super human.

1 COMPUTER CULTURE

The rapid developments in the field of science and technology and constant relay research in various subject fields led to the enormous growth of literature and ultimately posed intricate problems for various types of libraries. After the two world wars the post industrial society and scientific community witnessed the information explosion and realised the importance of computers and also utilised them for immediate availability of information more exhaustively and pinpointedly in spite of vast magnitude and wide range of information. Thus, for last two decades computer technology has transformed and substantially improved bibliographic control of documents through the information and library network. Further, computerization has relieved the pressure of workload in libraries and information centres. Therefore, it would be more appropriate to regard this as computer revolution and in somewhat dramatic terms as *'Computer Culture'*. Now the social and cultural effects of computers are fully realised and computers have pointed the way to an automated information society, through local, regional, national and international communication networks.

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11 EVOLUTION OF COMPUTERS

Computers can be identified basing on their computing power and generations. The development of electronic computer technology is the fundamental process that started in the early 1940s and which is accelerating now in the 1990s towards more advanced systems and technologies. During this period several stages have been identified in the development of computer technology and systems and these stages are known as 'generations'. Four generations have already been identified so far and the race is in the fifth generation.

The First Generation Computers developed during 1950s were characterised by the use of vaccum tube in electronic circuits as one of the principal components. They were physically very large and utilised punched card oriented slow input/output devices and low level symbolic language for programming. They were used for pay roll processing and record keeping applications (Example: IMB 650 and UNIVAC 1).

The Second Generation of Computers made during early 1960s was based on a newly invented electronic device known as the transistor which produced flows of electrons within specially treated crystalline structure such as silicon. They utilised magnetic cone as internal memory and tape oriented faster input/output devices for increasing main storage memory. They used higher level programming languages such as FORTRAN and COBOL. They functioned with increased speed and more reliability (Example: IBM 1401 and CDC 1604).

The Third Generation of Computers emerged in late 1960s and developed through 1970s, were based on solid state electronics using integrated circuits and having magnetic core and solid state main storage. They had smaller size, better performance and reliability. They were of more flexibility with disk oriented input/output devices. they were used to higher level programming languages, remote processing and time sharing through communication. They were used for on-line processing such as airline reservation systems (Example: IBM 360, NCR 395, Burroughs B 6500).

The Fourth Generation of Computers developed during the late 1970s and early 1980s had the unique features of the advent of microprocessor and microcomputers increased shortage capacity and speed of operation, greater versatility of I/O devices, use of large scale integration techniques to produce silicon chips, modular design and compatibility; availability of sophisticated programmes for specialised applications; internal memory based mostly of semiconductor devices rather than on magnetic cones.

The Fifth Generation of computer systems is now a matter of speculation

and under experimentation. The computers are supposed to be based on increasingly sophisticated electronic and artificial intelligence. They would have a natural language interface using knowledge Information Processing Systems and problem solving software. They are supposed to have capabilities of reasoning which are normally associated with human intelligence techniques characterizing voice recognition, speech synthesis, image processing, etc.

2 COMPUTER NETWORKS

The various computers can be grouped into different classes basing on their computing power such as super computers, main frame computers, minicomputers, microcomputers and personal computers. The super computer systems are very costly and are required by large corporations and government agencies for maintaining large databases and complex calculation capabilities. The main frame computers can process large amount of data at very high speed and support many input, output and auxiliary shortage devices. They have multiuser facilities so that they can support large network of terminals and remote job entry stations. The mini computers have the same type of capabilities as main frames but contain smaller primary memories and are less powerful than mainframe computers. Microcomputers are the smalles t, cheapest and commonly used computer systems. They have micro-processors with integrated circuit systems which control the sequence of operations both arithmetic and logical and store data and instructions. The personal computers (PC) are basically microcomputers used for personal applications of individuals with a wide range of capabilities. They are now very popular due to their low price, simple operating processes, reliable and efficient services.

A set of computers connected through communication lines forms a computer network. The data stored in a particular computer system in the network can be searched using any other computer belonging to the same network. Thus, computer networks are generally used for resource sharing among different organizations. The computer networks are of two types such as (*a*) Local Area Networks (LANS) and (*b*) Wide Area Networks (WANS). In a network system computers are located geographically at places so that they are very useful for resource sharing in libraries and information centres. A local area network (LAN) contributes to library services in different ways either the library is a node on a network which runs throughout the parent organization or the LAN operates within the library itself.

3 COMPUTER-BASED LIBRARY SYSTEMS

In early 1960s developed countries began to experiment with the use of

computer in library and information processing activities. Mainly, these systems were batch oriented and used punched cards as data input media. These systems did not yield expected results because the computer technology of the period was in its infancy and was inadequate to provide satisfactory solutions to the problems of the libraries and information centres. In early 1970s libraries made proper use of computer in various library operations and launched local systems successfully due to availability of improved computer technology and collaboration between libraries and computer specialists.

In 1970s computer based systems brought a revolutionary change in library co-operation and resource sharing as a result several library networks like OCLC (On line Computer Library Centre) came into existence. By mid seventies, organizations such as the US Library of Medicine, the Lockheed Missiles corporation and the Systems Development Corporation had started to offer online searching from remote terminals, from a variety of machine readable databases. In late 1970s many libraries started acquiring minicomputers and developed their in house computer based library systems for accessing bibliographic files remotely located. In 1980s the availability of micro-computers accelerated the computing facilities and were used as intelligent terminals being linked to remotely located main frame systems. Also microcomputers are now being used in small libraries to control a variety of functions such as the creation of local databases, acquisitions and serial controls circulation control cataloguing and catalogue card production, subject indexing, online catalogue, etc. During 1980s, the provision of 'packaged' hardware and software systems has come into practice and also gained popularity for information storage and retrieval processes and reference network of the libraries and bibliographical information centres.

4 TELECOMMUNICATIONS AND DATA NETWORKS

Telecommunications encompasse the electronic transmission of voice, data and video information from one location to another. The telecommunication technology during past two decades has been essential factors in the speedy growth of computer based library systems such as the use of centralised cataloguing and online search services. As a result a large collection fo bibliographic data on variety of computer systems throughout the world can easily be accessed from a terminal in the library or information centre. The terminals in various libraries and information centres can be linked to either a local computer system or to one or more remote computer systems for data transmission. A data network consists of host computer systems and remote terminals linked by a number of telecommunication channels. It is designed to minimise or eliminate the

disadvantages in using public switched telephone network for carrying digital information and to reduce costs. It also facilitates the inter library resource sharing networks. Other new telecommunication technologies like electronic mail and telex systems are very useful in liter-library lending networks. Thus, the use of telecommunication equipment plays a vital role in the Local Area Network (LAN).

A telecommunication network is a netlike combination of transmission of lines consisting of short or long distance transmission lines and nodes or switching points or exchanges. A network has mainly two components: (*a*) Exchange or Switch and (*b*) Transmission medium, interconnecting the Switches. All the lines interconnecting several exchanges, not dedicated to any subscriber but can be used by all subscribers when required, are known as 'Trunks'.

All the users (subscribers) of a network are assigned a unique address known as number. Thus the telecommunications network comprises telephone network, telex network and data network. Generally these networks can be divided in to two categories such as (1) Public Network and (2) Private Network. The Public Networks are operated and maintained by Government or Government agencies with some exceptions. Any person or organization can become a member or user of public network by paying necessary installation charges. The Private Networks are established by organizations for their own private use and usually owned by multinational organizations for interconnecting their offices or information units in different countries and cities.

5 ONLINE DATABASE ACCESS AND NETWORKS

The 'Online Database Access' is the interactive process of directly accessing and interrogating computer based systems for access to information. The range of information stored being very wide, the user (member/ subscriber) through this interactive process narrows down the search to the information required. The online access to computer database is performed using personal computers or workstations, that possess a keyboard and screen and a communication capability to establish a link to a database desired by the user. Such communication links may take the following forms:

(*a*) A direct dialled links via the public switched Telephone Network;

(*b*) A link via Packet Switched Public Data Network.

(*c*) Access via a leased circuit.

(*d*) Access via Local Area Network (for local databases).

Considering the multiplicity of databases a long felt-need to have a common command language for all the databases (where possible to make searches by users over multiple databases easier) came to reality when the National Information Standards Association of USA made some of the commands. Several basic types of standards have been established to facilitate comprehension and transfer of bibliographic data by the national and international bodies like the Library of Congress (LC), the American Library Association (ALA), the Network Advisory Committee (NAC), the American National Standards Institute (ANSI), the International Standards Organization (ISO), the International Federation of Library Associations (IFLA), the UNESCO, the Universal Bibliographic Control (UBC), etc. The first established and largest of the networks is the Online Computer Library Centre (OCLC), headquartered in Dublin, Ohio in 1967. Under the dynamic leadership of library automation pioneer Mr Frederick Kilgour, its Online shared cataloguing system first became available within the state in 1971.

6 INDIA'S PARTICIPATION IN INTERNATIONAL DATABASE ACTIVITIES

India has all along been an active participant in international initiatives promoted by the UNO such as INIS, AGRIS, FSTA, etc. The Agricultural Research Information Centre (ARIC) of Indian Council of Agricultural Research (ICAR) has been the national input centre for AGRIS. The ARIC has contributed thousands of items from crores of periodicals to the AGRIS database. It maintains SDI profiles and also provides retrospective search services on request. In 1970 the Bhaba Atomic Research Centre, Bombay started INIS operations in India and it acts as the national input centre on nuclear science and related areas originated from India. The Central Food Technological and Research Institute (CFTRI), Mysore has participated in compilation of FSTA database with close collaboration of International Food Information Service (IFIS), U.K. Thus, India's participation in international ventures leads to (*i*) development of comprehensive information system at the local level; (*ii*) promoting better dissemination of information at the local level; (*iii*) over coming local language barriers; (*iv*) decentralization of input preparation; (*v*) transfer of software for input preparation, local processing, information retrieval and related information technology; (*vi*) acquisition of international compilation instead of inputs; (*vii*) building up primary collections and required infrastructure for abstracting, indexing and computer handling at the central processing unit. Therefore, the Indian database producers should actively participate in international activities.

7 ONLINE ACCESS TO REMOTE DATA CENTRES IN INDIA

In India it would not be economically viable and operationally feasible to get all required databases on magnetic or optical media. At the same time it is necessary to provide information support services to scientists and technologists in India at par with those available in developed countries. Therefore, several attempts and experiments have already been made for online access to various remote data centres like DIALOG, and ORBIT. However, NISSAT has taken up the establishment of online search facilities on permanent basis in India. As per the scheme following five regional NISSAT Access Centres to International Data Centres (NACID) have been established:

(1) Indian National Scientific Documentation Centre (INSDOC), New Delhi.

(2) National Chemical Laboratory (NCL), Pune.

(3) National Aeronautical Laboratory (NAL), Bangalore.

(4) Central Leather Research Institute (NLRI), Madras.

(5) Indian Association of Cultivation of Science (IACS), Calcutta.

These NACID Centres operate by using normal Public Switched Telephone Network (PSTN) lines, local VSNL PAD (Packet Assembler Diassembler) and the international gateway facilities created by the Videsh Sanchar Nigam Ltd (VSNL), Bombay. The centres are having telex lines with message communication terminals (MCT) as standby. The centres will also provide SDI services on such databases for which the demand may not be sufficient to justify their installation in Indian Networks.

8 DATABASES ON MAGNETIC MEDIA AND CD-ROM

The use of databases on magnetic media was started in India in 1978. INSDOC, New Delhi, for the first time initiated SDI Services as an NISSAT project on Chemical Abstracts (CA) and INSPEC databases using CAN/SID software and the IBM370 system of IIT, Madras. In 1983, the University Grants Commission, India set up the National Centre for Science Information (NCSI) at the Indian Institute of Science, Bangalore. The NCSI provides SDI services based on CA, INSPEC, BIOSIS, GEOREF and MATHFILE, primarily to users in Universities. The R & D Centre on Iron and Steel (DCIS) of Steel Authority of India Limited (SAIL) has been running an information retrieval service based on METADEX and MATERIALS BUSINESS FILE databases since 1980 and 1986 respectively using indigenous software. The NIC-ICMR Centre on Biomedicals was set up for

implementation of the MEDLARS database programme in India in 1987.

Computerized databases on CD-ROM have very significant use in a developing country like India because of the following useful advantages:

(*i*) The telecommunication system is not fully reliable which ultimately constrains the development of online systems involving huge databases and query retrieval traffic. But CD-ROM offers the possibility of installation of databases at user sites obviating the need for communication over long distances;

(*ii*) The CD-ROM databases come with retrieval package; and

(*iii*) The use of CD-ROM requires inexpensive hardware such as CD-drive. Also PC as a processor which is within the reach of many information centres. Further CD-ROM is suitable to Indian environment. However this technology is not widely used in India due to lack of appreciation of its power or it might be the hesitation to invest in a technological option which is yet to stabilise in the world market.

INSDOC has started subscribing to Science Citation Index on CD-ROM since 1988. The National Institute of Oceanography has received abstracts on aquatic sciences databases on CD-ROM under a UNESO project. The NIC-ICMR Centre on Biomedicals is getting databases on CD-ROM. NISSAT has established CR-ROM Information Centre at the National Aeronautical Laboratory (NAL), Bangalore in 1988. Now LISA on CD-ROM is available in different centres.

91 ELECTRONIC MAIL SYSTEM AND SIRNET

Electronic mail (E-Mail) is a popular and rapidly expanding form of communication that enables scientists and engineers to exchange electronically created messages over computer communication networks. E-MAIL systems permit a user scientist to send messages to a specific individual or to a group of individuals or to every one connected to the network. Messages are entered as text files via a computer terminal or a personal computer (PC) that is connected to the network.

SIRNET is a computer communication network for the CSIR laboratories in India. SIRNET is the acronym for the Scientific and Industrial Research Network. At present SIRNET has only two mail nodes and eleven user nodes. Its one mail node is now functioning at INSDOC, Delhi known as *CSIRD*, and another mail node known as *CSIRB* located at INSDOC Regional Centre, Bangalore is providing linkage to user nodes of southern region. SIRNET will have another mail node at INSDOC Regional Centre, Calcutta. In future its nodes will be layered as: (*a*) user nodes, (*b*) laboratory

nodes; (*c*) city nodes and (*d*) backbone nodes. All these backbone nodes will be connected to the international networks like UUNET (Unix User Network). ERNET (Education and Research in Computer Networking). ERNET (Education and Research in Computer Networking) set up by Department of Electronics, Government of India, is linked to different nodes of SIRNET. The mail node CSIRD is directly connected to Department of Electronics mail server Vikram which acts as the clearning node in Delhi for ERNET. Similarly the node namely *Shakti* at the National Centre for Software Technology (NCST) Bombay acts as a national clearning node for all ERNET city nodes. The present ERNET main city nodes are *Shiva* of IIT, Madras, *Vigyan* of Indian Institute of Science and Bangalore and *Vikram* of DOE, Delhi. These city nodes dial up to *Shakti* two or three times a day and collect/deposit mail. The national telephone network used for this purpose is known as Public Switched Telephone Network (PSTN) in the internationally standardized term. The mail server *Shakti* at NCST, Bombay is well connected to the international network UUNET in the USA and in Europe and to many other networks. Thus, from SIRNET one is able to send mail to any network anywhere in the world.

911 *User Node Setup*

For setting up a user Node, the INSDOC, New Delhi recommends the requirement of following equipments:

(*a*) A PC-XT or PC-AT computer.
(*b*) A stand-alone modern with error correction facility at 1200 bps.
(*c*) A dial-up line to start with, and
(*d*) PROCOMM software (A communication software package that runs under MSDOS).

912 *Mode Node Setup*

The equipments required for a Mail Node are as follows:

(*a*) A PC AT-80386 UNIX machine with IMB RAM, 40 MB hard disk, 1.2 KB floppy disk, RS 232C port and parallel port.
(*b*) A stand alone modern with error correcting facility at 12000 bps.
(*c*) A dial up line with STD facility, and
(*d*) Provision of Basic Networking Software (UUCP) with Standard UNIX package to communicate with other Unix-System.

Thus, INSDOC, New Delhi has developed expertise in establishing E-Mail facilities and it offers to set-up USER NODES or MAIL NODES for Electronic Mail in CSIR laboratories and institutions with the help of

Networking team of SIRNET. Also many CSIR organizations may already have some of the required equipments. INSDOC is able to extend its support at different levels depending upon the requirements. Further, INSDOC has published and circulated SIRNET Electronic Mail System User Manual for this purpose and also made provision for training of personnel at the time of setting up and opertionalising the node.

92 CONCLUSION

The computer culture is a great concern of the modern information society all over the globe. So it is well predicted by the NISSAT adviser, Dr. A. Lahiri, that as a vast majority of the population especially those in developing countries have not yet reaped the benefits from the rapid advances in technology the information technology revolution would continue through this decade in the field of automated information storage and retrieval systems through computer communication networks. The trend in the use of computers at home and conduct office/library/information centre work from remote locations will get momentum. While computerized online and offline database services will be increasingly used by professionals, business and industries and services like travel and tourism, banking, etc. public databanks and videotex services for daily use information, may be available in all major cities. It is hoped that during Eighth Five Year Plan the computerized information retrieval systems will flourish in the most of the heading libraries and information centres of India.

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COMPUTERISATION OF GAUHATI UNIVERSITY LIBRARY

Mrs BINA MEDHI LAHKAR*

0 INTRODUCTION

A university library assists the university in research and advancement of knowledge, besides supplementing the materials for different academic programmes. The Gauhati University located in the State Capital of Assam, is the pioneer and oldest university in North-East India.

The University has six faculties viz Arts, Science, Commerce, Law, Medical Sciences and Engineering. PG courses of the first four faculties are conducted in the university. Some of the colleges affiliated to the university also conduct PG course. All PG courses in Medical Sciences and Engineering are conducted by respective colleges. In the university there are 13 departments in Science faculty, 21 departments in Arts faculty, 2 in Commerce and one in Law faculty. Almost all departments have their M Phil and PhD courses besides PG courses. The university is contributing a lot in the academic development of entire Northern region in general and Assam in particular.

1 GAUHATI UNIVERSITY LIBRARY

The Gauhati University Library named after the famous orientalist Prof K K Handiqui was established in 1948. It has acquired a huge collection of books and other materials. The Library acquires a good number of books every year and subscribes regularly to a number of journals of both national and international repute. The present situation of the library collection in GU Library is as follows:

1	Books	233680
2	Current periodicals	
	Science	282
	Arts	92
3	Back volumes of periodicals	31605
4	Thesis and dissertation	4870
5	Reports	4365
6	Maps	306
7	Bulletins	288

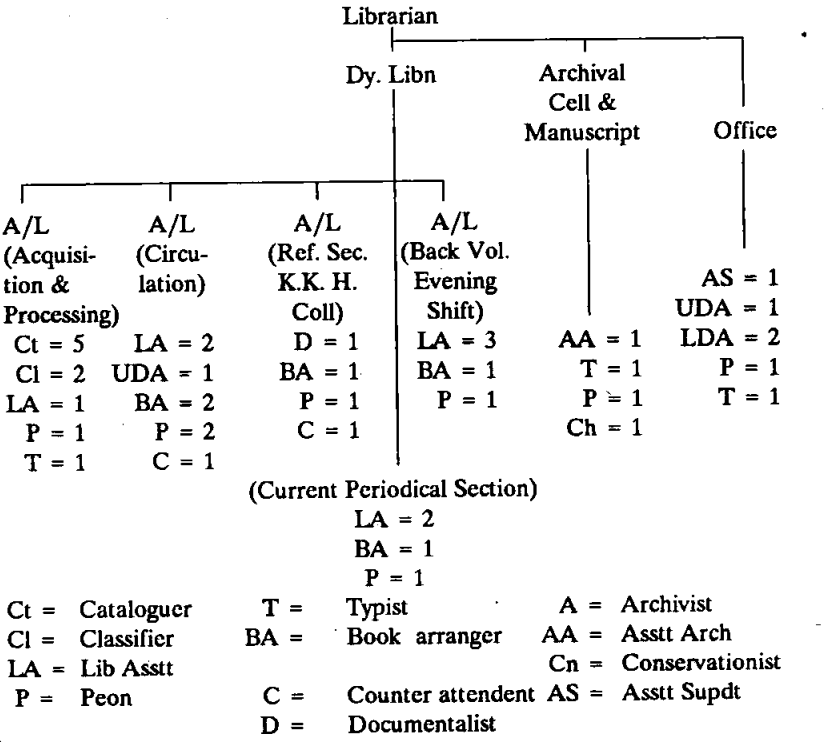
*Cataloguer, K K Handique Library, Gauhati University, Guwahati-781 014.

8	Newspapers	22
9	Popular journals	46
10	Manuscript	4000
11	Prof K K Handiqui Corner (Donated by him)	7593

Besides, the library is getting regularly some publications free of cost from different sources which are not accessioned and are not shown in the list above.

11 STAFF STRUCTURE

As mentioned, there are 68 library personel in K K Handiqui Library comprising both technical and non-technical staff. Each section is supervised by a senior staff. The staff structure is presently as follows:



13 LIBRARY MEMBERS

Membership increases every year. With the limited number of staff it is difficult to provide satisfactory service. The membership breakup is follows:

Teachers	758
Research Scholars	927
Students	3200
Officers	562
University Staff	359

There are casual readers also visiting library from different areas as the collection in the library is found to be most useful by these readers. These casual readers too have to be served with the existing staff.

Considering all the factors for upgrading library service standard and satisfaction of the demands of the readers, Computerization of library operations and services is the only solution. Sooner the library changes to computerization, better it will be.

2 COMPUTER APPLICATION IN LIBRARY

Advantages of automation are enormous. It enables libraries to place their collocation at the immediate disposal to its clients pinpointedly. After the establishment of the electronic system, the sphere of library activities are growing significantly to fulfil readers' demands. Libraries in the west have mostly solved the problems encountered through computerization. We can take a lesson from their experience and start using computers in the library.

There are various factors to be considered while introducing computerised library system at the initial staff. Few of them have been discussed here in the context of K K Handiqui Library.

211 *Fund*

The existing fund position of Gauhati University as also of K K Handiqui Library is not sound to go in for computerization. The budget estimates for the financial year 1992-93 for K K Handiqui Library are as follows:

Budget estimates for 1992-93
(Non-plan Budget)

	Rs (thousand)
Salaries	1634
Newspapers/Journals	30
Books & Binding	50
Catalogue Card	8
Printing & Stationery	20
Telephone & Postage	3
K K Handiqui Spl Collection	12
Maintenance of Zerox	25
Other charges	8
Total	1790

During the VIII Plan, the UGC under revised allocation has allotted an amount of Rs 20 lakh under 1st priority schemes for books and journals during 1992-93. The university plan budget for the library is as follows:

Head of account	Estimates for 1992-93
	(Rs in thousand)
1 UGC Grant Books & Journals (general)	417
Books (for library only)	267
2 Grants from Assam Govt (development Grant)	
Books & Journals (general)	1700
3 Matching share of both scheme Extension of library building	100

Additional funds will have to be provided if computerization is thought of. Organization like NEC, UGC and some semi-govt undertakings may be approached for providing fund for the purpose, if the University is not in a position to allocate the needed money from its our resources.

212 *Place for installing computer*

Extension work of existing library building is now in progress and there will be no problem for the K K Handiqui Library to make room to install computer in its building. It will be better to select computer's location in ground floor with required air-conditioned facilities, as most of the library sections are connected with readers in ground floor. Management of all services would be possible simultaneously by computerized control.

213 *Human Resources*

Human resources are one of the most important practical factor to work with the computer system. The K K Handiqui Library is also not an exemption. Persons employed to manage, operate and maintain the system are expected to have good technical knowledge to handle it. So, staff is needed to be initiated in the processes of computer system. Training is required to the staff who are appointed to handle the automated system. Library staff having required qualification, who will be using the computer system should be trained apart from detailed training to a limited staff at various levels.

214 *Hardware & Software*

With regard to selection of hardware and software, it is better to take suggestions from computer experts. Reputed company(s) with better post sale service facilities should be preferred while selecting a hardware. Advice may be sought from UGC, NISSAT and INSDOC for selection of software purchase in the library. Library personnel with computer back-

ground have also to be approached for selection of a software in the Library.

3 INSTALLATION OF COMPUTER SYSTEM IN K K HANDIQUI LIBRARY

A proposal for installation of computer in K K Handiqui Library has already been prepared by the Library and placed before the Library Committee in April 1992. Proposal comprised 4 basic points (1), fund, (2) training of staff, (3) accommodation for the computer system, (4) Types of computer to be installed.

The Library Committee consisting of the VC of the University, Treasurer, Deans of faculties of Science and Arts and some of the faculty members discussed the proposal in detail and resolved to computerize the Library. The Vice-Chancellor has assured to look into the matter for getting necessary funds for implementation of the proposal.

The Library Committee has resolved to depute two library personnel (one junior and one senior) to undergo training in Computer application in libraries in any of the organisations in India viz, INSDOC or DRTC. The library committee has also resolved to construct one separate air-conditioned room attached to the existing building to house the computer system.

Considering the fact that, selection of computer hardware and software is entirely the business of computer experts and library experts, the committee has requested the G U authorities to approach such expert(s) for suggesting appropriate hardware and software for the library.

4 CONCLUSION & SUGGESTIONS

It can be safely concluded that:

1 Computerization in library operations and services is very much essential in the present context specially in the days when library is becoming really a workhouse for the different academic programmes in the University.

2 Providing comparatively better library service is possible through the application of computers.

3 In future there is every possibility to save library funds.

4 The K K Handiqui Library has to show the way of modernization of its services in order to create proper library atmosphere in this region.

5 Young library scientists working in different capacities in the University library should be properly trained for handling computer in their day to day works. A computer environment is a must for upgrading library service standard.

6 There are different organizations, private or public who have their budgeted provision for providing funds for social work and if the University approaches properly, there is every hope of getting funds from such organisations.

7 Increased number of stock, membership and extensive and intensive study of the subjects demands efficiency of services and it is possible through computerizing library operations.

8 The time is ripe now for the Gauhati University in various aspects for introducing computers in its Library.

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COMPUTERIZATION OF BIBLIOGRAPHIC RECORDS: A JNU EXPERIMENT

JITENDRA VARMA*
Mrs NEENA KAPOOR**

0 INTRODUCTION

Jawaharlal Nehru University Library was established in the year 1969 in Vigyan Bhawan Annexe. It was shifted to JNU Campus (Old Campus) in the year 1970. *Colon Classification* Ed 6 was introduced with some modifications provided in the *'Preview'* written by Dr S R Ranganathan and Unit Card System in cataloguing following *CCC* Ed 5. All the fields which are present in AACR1–were introduced by suitably amending *CCC* format of Main entry.

Developments in the field of information retrieval and computerization were felt by the JNU Library in 1980s and that is the reason that some of the officers of the Library were sent for training in the School of Computer and Systems Sciences of the University. This proved to be a good initiation.

Development in mini-computer technology ushered a new era in Computer application in large and medium libraries in developing countries. JNU library was not an exception. It opted for purchasing a mini-computer and suitable software. Soon after the release of *AACR-2* in 1988 the library decided to adopt it.

1 COMPUTERIZATION EXPERIMENT

The major problem for library computerization in developing countries like India is the cost of computer as machine and the cost of the software package. The cost of software has tended to rise at least 10% annually while in the case of the hardware it is decreasing at much faster rate. Another major problem is that only a few software packages are truly portable. Hence, one has to take into consideration the cost of the hardware

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if the same (software) is not already available to the library. MINISIS package has been made available free of cost to the non-profit institutions in developing countries by IDRC, Canada. Although it is quite a sophisticated package which has proved its worth at several installations around the world, it requires a HP 3000 mini-computer system. JNU Library opted for H P 3000 mini-computer system as MINISIS software was to be installed free of cost by IDRC. The MINISIS (mini-computer-based information system) facilitates manipulation of information not usually amenable to traditional data processing techniques–information in which data is organised into fields and records of varying lengths. It is interactive, and controls most of user functions through interactive management. It is able to provide user dialogue in different languages and data distribution and its programming is of international standard format. Security system controls processor and data base access. It has capability of SDI service.

MINISIS is a member of the ISIS (Integrated Set of Information Systems) family of information systems. The ISIS systems were developed to permit the handling of bibliographic data using large mainframe computer. Minisis fills the same need, but operates on smaller, less expensive mini-computers. It is a completely new design and exploits advances in software and hardware design. Minisis supports variable length fields and subfields which may repeat or not exist at all. Minisis is based on rational database theory. Its practical application allows databases to be defined as selected parts of large databases, selected parts of larger records, or combinations of databases and records. The MINISIS design, based on rational algebra has resulted in a system in which problems are solved in constituent fashion, making the systems easily understood. Combined with the SPL (Special Programming Language) Language features and a modular programming approach, this has yielded a system that is reliable and capable of fast implementation.

Hewlett Packward 3000/XE computer system had been installed in JNU Library. It has 4 Megabyte RM, 571 and 81 Megabyte hard disks, 4 terminals, one console and a printer. The software package MINISIS was installed by IDRC in the month of June 1989. Training for computer operations was also conducted by IDRC for some of the Library staff.

The catalogue of a library is the most important record of the library collection. A good catalogue enables both users and library staff to utilize the library resources effectively. The cataloguing requires both professional skill as well as clerical skill–priority of computer application was first given to the cataloguing of books. Previously cataloguing was being done on the guidelines of classified catalogue code with some local variations. For

computer application it was decided to adopt *AACR-2*, so that in future it would be helpful for networking purpose. During July to October 1989, different sample data sheets were prepared and tested. Data input sheets using CCF (Common Communication Format) fields were prepared.

For processing of different documents in JNU Library, content designation of input sheet is based on CCF pattern and data description is based on AACR-2 rules. Input sheets of books, thesis and serials were framed according to their relevant fields. The databases of books, periodicals and thesis are separate because all the fields required for them are not common eg, serials holdings, periodicity and its numbering and date are important fields of the database of serials while these are not required for books and thesis. In case of thesis, the name of the supervisor, year of award; school and centre is needed which is not relevant for books and serials. The fields and subfields with tag numbers are provided in input sheets. These input sheets have been revised from time to time eg, the "Tracing field" has been replaced by the field "Added Entries". These input sheets are filled by the cataloguers and then the data is transferred in the computer by the Data Entry Operator.

Databases include all the required fields and subfields, may be repeatable or not with specific length eg, The field like name of persons has subfields like surname and forename, while the field LC Subject Heading does not have any subfield. The length of the field accession number is only 10.

Besides cataloguing of books, thesis and serials, separate databases for entering periodical literature and serials subscription have also been framed.

Although computerization of cataloguing is being done since last three years, there is no direct access to computer for retrieval due to the scarcity of computer terminals. Therefore the card catalogue is used for information retrieval. The outputs of various documents are taken from the computer in different formats along with indexes. The output of document in the form of which Main Entry in 5"x3" size is being generated in the computer is taken from the computer and the multiple copies are obtained by Xeroxing on 4 in 1 card. This print format of card form is generated according to the rules of *AACR-2* and it is compatible with LC catalogue.

An inbuilt facility has been created by which title of the record is being checked for duplication with the existing database. This helps us in inputting a duplicate record with only changed Accession Number and Book Number.

Separate databases are created for social science, science and the humanities divisions.

In case of serials, two databases have been framed, one is for Main Entry and second for shelf cards. The full data description is given in the Main Entry database. This data is copied in other database which is meant for shelf cards.

The outputs of books, thesis and serials are taken in different format along with indexes. One of the important print formats of books is *Monthly List of Books* ie, *Grant Suchi* and the list of periodical articles is *Suchika.*

Bibliographical information of periodical literature is another major computerised service which is provided by the Documentation Section.

2 JNU LIBRARY DATABASES

This size of the bibliographic records in the database is as follows:

1	Books	16793
2	Serials	35879
3	Manuscripts including thesis & dissertations	667
4	Periodical literature	
	1 Current w.e.f 1990	28127
	2 Retrospective–India & World Affairs	30000
5	JNU database of Devinsa project	5400
6	Serials subscribed in Delhi libraries	9000
	Total	1,25,864

3 OUTPUTS

(*i*) *Granthi Suchi*–Title wise listing of books added in the library is brought out from Database (Books) on fortnightly basis. The list is arranged according to broad subject heading, whose codes are fed in the record to get the print out. *Granth Suchi* is in two parts viz, Science and Social Science.

(*ii*) *Annual Granth Suchi*–Title wise listing of books added is yearly

arranged by broad subjects as in Granth Suchi. Author index is given in the end. This also is in two parts viz, Science & Social Science.

(*iii*) *Shodh-Prabandh Suchi*–In it the Dissertation/Thesis written by JNU scholars are listed. The list is arranged according to School/Centre and thesis and dissertations. The list is arranged by scholar under thesis or dissertation. Broad Subject index and supervisor's index is appended.

(*iv*) *Suchika*–Suchika is brought out on monthly basis. This is a listing of articles and important Press clippings indexed in a month scanning approximately a thousand learned periodicals of Social Science and 4 Indian Newspapers. The list is arranged Subject/Area wise under author. This is also a computer output taken from Database–(periodical literature).

(*v*) *India and World Affairs*–JNU Library took a project of publishing India and World Affairs–A bibliography wef 1947 onwards in 4 volumes. For this data collected by the Documentation section of ISIS and JNU was fed as a separate database, 2 volumes are already published.

(*vi*) *List of subscribed serials in Delhi libraries*–JNU Library did a project to compile a list of serials subscribed in Delhi libraries, sponsored by NISSAT and DELNET funded by DST. For this a separate database of 9000 items was created. The following listings have been produced:

1 Alphabetical listing of all libraries.

2 Social Science libraries–list of journals subscribed.

3 Physical Science libraries–list of journals subscribed.

4 Medical Science libraries–list of journals subscribed.

5 Agricultural Science libraries–list of journals subscribed.

Retrospective data entry work of 1500 periodicals and 1000 serials has been completed. The data generated has a magnitude of 40,000 records. Recataloging of old books is also on. Recataloging of such books which need to be shifted from one sequence to another is also under way. Library has not yet dispensed with the conventional card catalogue. The catalogue of new books wef January 1, 1990 stands separated.

4 FUTURE PLANS

The library has sent a proposal for purchase of extra terminals. Our

future plans include.

1 Computerization of membership work.

2 Computerization of charging system.

3 Retrospective cataloging.

The above, can be achieved only, if more terminals and manpower provided.

CREATING DATABASE ON GEOLOGY USING CDS/ISIS

D K NAG*
DEB SIKHA CHATTERJEE*

0 INTRODUCTION

India has a legacy of mining activity from time immemorial. There are also sporadic records of geological activity in the first half of the nineteenth century. However, systematic geological activities began in Indian subcontinent with the inception of Geological Survey India (GSI) in 1851 at Calcutta. Besides Indian subcontinent, the GSI officers had also to do work in outlying areas like Burma, Persia & Afghanistan and frequent expeditions into various parts of the Himalayas, the Pamirs and Tibet. Now GSI has evolved as one of the largest national surveys in the world, employing about 2,800 scientists and 15,000 supporting staff based in 33 operational centres spread over the country. It has played a vital role in the economic development of the country through discovery of new mineral resources. GSI has provided a sound database and mineral base

In the country. Since its inception, GSI has paid special attention to disseminate geological information gathered during field and laboratory investigation through an array of publications.

1 OBJECTIVE

For over a century almost the entire geologic literature of the Indian subcontinent and outlying areas was published by GSI through a series of publications which greatly influenced the development of geological science in this region. These papers are immensely valuable and helpful for critical appraisal on the historical development of the geological sciences in this part of Asia.

The prime publications are: (*a*) Memoirs (1856); (*b*) Palaeontological India (1861); (*c*) Records in 9 parts (1868); (*d*) Indian Minerals (1947); (*e*) Bulletin in 3 Series (1950); (*f*) Miscellaneous Publications; (*g*) Special Publications (1980); (*h*) Catalogue series (1982); (*i*) Manual Series (1983).

It has been considered desirable to develop a computerised bibliographic database (named GSIPUB) of GSI's own published contributions from

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1851 onward to facilitate efficient storage and quick retrieval of geologic information and to produce a computerised printout of the list of GSI publications.

2 SYSTEM CONFIGURATION

Microcomputer/PC based system using commercially available database management systems (DBMS) has emerged as an effective and efficient means of storing, managing, analysing, displaying and retrieving information. The GSI Central Library is equipped with a Personal Computer of 8088 microprocessor with 640 KB memory, 40 MB hard disk, MS-DOS operation system and one Dot metrix printer. It has been decided to create the database using CDS/ISIS ver 2.3 software developed by Unesco. It is a menu-driven Generalized Information Storage and Retrieval system designed specifically for the computerised management of structure non-numerical database.

3 DATABASE STRUCTURE

In designing the database following two basic points are considered: to select the field to be included and to identify the key fields for sorting and searching. Data elements selected for GSIPUB database are:

(*a*) *Author:* The name of the persons responsible for the intellectual content of the work. It is a repeatable and searchable field.

(*b*) *Title of article:* The title that is found on the title page of the item.

(*c*) *Title of serial:* The abbreviated name of the serial as found in the Serial Authority File maintained in the Library. This is a searchable field.

(*d*) *Part statement:* This field is used to enter information relating to series, volume, part, number, fascicules, memoir, pagination and year of publication of an article under each subfield. Series, Volume, Number, Part, Fascicules and Memoir Subfields are searchable fields.

(*e*) *Keywords:* This field is used to enter descriptors selected from GeoRef Thesaurus to describe the main subject of the item. Geographic descriptors are also selected. It is a searchable field.

4 DEFINING DATABASE

The database structure should be defined by delineating the characteristics of the record structure and its contents. It involves following steps: Field Definition Table (FDT), Data Entry Worksheet, Display Format and Field Select Table (FST).

41 FIELD DEFINITION TABLE (FDI)

The FDT defines the fields which may be present in the records of the GSIPUB database and their characteristics like tag–a unique numeric value identifying the field, field name; field length; field type *i.e.*, alphanumeric, numeric, alphabetic, pattern, etc, Repeatability; and subfields; S-Series, V-Volume, N-Number P-Part, F-Fascicules, M-Memoir, Y-Year, G-Page, L-Plate and I-Illustrations are used.

Field Definition Table (FDT) Database: GSIPUB

Tag	*Name*	*Len*	*Type*	*Rep*	*Delimiters/Pattern*
— 300	Author	220	*	R	
— 200	Title of Article	220	*		
— 201	Title of Serial	220	*		
— 490	Part statement	60	*		SVNPFMYGLI
— 620	Keywords	220	*		

42 DATA ENTRY WORKSHEET

One page data entry worksheet has been created to enter records of the database. This screen worksheet has the same name as the database and is open automatically selected when one accesses the database.

43 DISPLAY FORMAT

Used primarily for displaying records on the screen or printing records on the printer. The format has the same name as the database and is automatically selected when one accesses the database.

Database Name: GSIPUB *Format Name: GSIPUB*

V300(0,4)+|,|/MDL,V200(4,0),MPL,V201,XI,MDL,V490/" Keywords: ", MDL, V620

44 FIELD SELECT TABLE (FST)

Used primarily to define the fields of the database to be made searchable through the inverted file. The Table also defines criteria for extracting one or more data elements from a master file record for a particular process like, to create inverted file entries, to sort records in the desired sequence before producing a printed report, or to reformat records during an import or export operation. This Table has the same name as the database.

Database Name: GSIPUB FST for Inverted file FST Name: GSIPUB

ID	*IT*	*Data extraction format*
— 300	0	(V 300/)
— 201	0	V201
— 490	0	"Ser", V490^S
— 490	0	"Vol", V490^V
— 490	0	"No", V490^N
— 490	0	"Pt", V490^P
— 490	0	"Fas", V490^F
— 490	0	"Mem", V490^M
— 620	2	V620

5 CREATING DATABASE

The input sheet format for inputting the record into the GSIPUB database has been designed following the tags given in Common Communication Format (CCF) issued by Unesco. CCF provides a common method for structuring a bibliographic record so that such records could be freely exchanged among different information systems. The rules for describing the content and form of the fields are based on the second edition of the Anglo-American Cataloguing Rules (AACR2). The concept of main entry, as understood by AACR2, has not been implemented in these rules.

Subject indexing of each record allows the user seeking information on a specific subject to retrieve all the relevant records of the database. The indexing terms are selected from GeoRef Thesaurus of American Geological Institute.

Filled in input sheet is used to enter information of the record into the screen data entry worksheet of the database by accessing ISISENT menu. The Master File Number (MFN) is a unique number and is automatically assigned sequentially to each record entered in the database. The database now has over 6,300 records.

51 INVERTED FILE CREATION

CDS/ISIS allows an unlimited number of access points by selecting fields and subfields for each record through the creation of a special field called the Inverted file. The searchable elements for the database is defined by means of FST which contains the fields to be inverted and indexing technique to be used for each fields.

Out of the five indexing techniques available, we have used indexing technique) for the fields V300, V201 and subfields V490^S, V490^V, V490^N, V490^P, V490^F and V490^M to build term from the first 30 characters. Indexing technique 2 is used for field V620 to build an element from each indexing term enclosed in triangular brackets< >.

52 SEARCHING DATABASE

The inverted file contains all terms which may be used as access points during retrieval of a record and all those access points are collected in the dictionary which can be displayed to select terms for searching and retrieval of records. Two or more search terms may be combined by using search operators OR, AND and NOT which indicate the intended relationship between the terms. When the formulation of a search is not possible independent from the contents of the Inverted file, an alternate search method called free text searching is carried out.

6 PRINTING DATABASE

Out of a query/selected range of records/whole database can be printed, sorted by any combination of fields and subfields. The fields by which the records are sorted may be used as heading in printing.

One of the main objectives of the GSIPUB database is to produce computerised print out of the *List of GSI Publications* to replace the manually composed version now available. For this purpose, first the records are sorted by the name of the Serial then by Volume/Series, Part/Number, Memoir/Fascicules (as applicable to a particular Serial title) and finally by author.

An ASCII text file is produced on the hard disk for the whole database using report generator programme ISISPRT. This report is readable under word processing software. For spelling check, we import the file in the normal format of WordStar 2000. All the detected spelling errors are corrected in the database file using internal dictionary of WordStar and minor editing like subscript, superscript, boldface, italic characters, etc. is carried out.

This edited text file of the database is now processed in Desk Top Publishing (DTP) system to produce high quality printed output. The DTP system in our Department consists of one PC/AT with 2MB memory, one EGA monitor, 20MB hard disk, one Mouse, one Scanner and one Laser printers. Soft ware like Ventura Publisher (Professional Extension) Ver 3.0, Windows Ver 3.0, Scan Gallery Ver 3.0, Paintbrush and WordStar 2000 are used.

Page description language Ventura is a computer programme that defines exactly how the characters and other typographic elements are to be laid out on the printed page and the screen itself gives an accurate image of the document. The page design and formatting specifications of the file is stored as a 'style sheet'. This style sheet includes a range of descriptors for the main typographic elements–Primary heading, Secondary heading, Article title and Authors, etc.–together with specification for the font, point size, alignment and spacing that each element will use. Scientific symbol like α, β, ϕ etc., equations, if any, can easily be inserted. The final version of the edited and formatted file is printed using laser printer of 300 dpi resolution to produce camera ready master copy of the publication.

7 CONCLUSIONS

PC/Microcomputer based hardware system in conjunction with software of database management system provide an excellent opportunity to develop efficient and effective information storage and retrieval system in a library. CDS/ISIS, one of the best text based management systems, is now available through NISSAT (DISIR) New Delhi and can be used to develop bibliographic database. The use of DTP system enhances the quality of the printed output of database and allows to publish frequently updated material (current) and there is no need to hold a large stock of printed material, instead one can publish on demand.

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ANNEXURE-I

INDIAN MINERALS

Vol 1, No. 1, 1947

Anon

The Indian Coalfields' Committee. 9-12.
Keywords: Coal; India; Economic geology; Report.

Anon

The Mineral wealth of India. 3-8.
Keywords: Economic geology; India.

Anon

The utilisation of the mineral springs of India. 31-32.
Keywords: Hydrology; Springs; India

Coates J

Petroleum in India; 13-21.
Keywords: India; Economic geology; Petroleum.

Crookshank H

Emeralds in Mewar. 22-27.
Keywords: Minerals; Ring silicates; Emeralds; Rajasthan; Mewar.

Crookshank H

Zawar silver-lead-zinc mines. 22-27.
Keywords : Rajasthan; Zawar; Silver ores; Lead-zinc deposits; Economic geology.

Director, GSI

Mineral production of India during 1944. 33-44.
Keywords: India; Economic geology; Mineral resources.

CREATION & CONVERSION OF BIBLIOGRAPHIC RECORDS OF MONOGRAPHS AND DEVELOPMENT OF CATALOGUE MANAGEMENT SOFTWARE AT NSL

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R K VERMA*

0 INTRODUCTION

Retrospective conversion of manual records into machine readable form has assumed much importance as a result of the realisation of the need to resource sharing. The reasons for these are manifold including exponential growth of collections which double every 10-15 years. Every year the libraries hold a decreasing amount of World's stock of scholarly information while there is a 10% growth rate in amount of scholarly material generated. Increase in costs, and shrinking budgets have forced cut in material acquisition. New technologies are being introduced including Online Public Access Catalogues (OPAC) to provide greater access to the collections and services. Apart from the need to create a machine readable database for multiple uses such as Circulation and Public Access Catalogue, some libraries have also utilised this opportunity to clean up the inconsistencies in their catalogue that have occurred as a result of decades of changing cataloging rules, reversals in library policies, procedures and authority control work.

The results of shared and cooperative cataloguing are clearly visible in the world, when we consider the role of major bibliographic utilities such as Online Computer Library Centres (OCLC), Research Libraries Information Network (RLIN) & Washington Library Network (WLN). In Indian also, steps are being initiated for achieving these goals though not on the same scale. The major project in the offing, Information & Library Network (INFLIBNET) is going to connect over 200 libraries and major information centres all over India. Efforts are also on to connect libraries in various metropolitan cities. These include Delhi Libraries Network

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(DELNET), Calcutta Libraries Network (CALIBNET), and Madras Libraries Network (MALIBNET), etc. In achieving the ultimate goal of cooperative cataloguing in computer environment the first and foremost step is to create and convert the manual data into machine readable form. As part of its library automation activities, National Science Library (NSL) INSDOC, has undertaken this project. The various problems and issues involved in the project are discussed. The main features of a software package developed by NSL for catalogue management are highlighted. Some of the future developments visualised in this field are also touched upon.

1 NATIONAL SCIENCE LIBRARY (NSL)

NSL–an integral part of INSDOC is a major resource library for science and technology information. At present, NSL has over 1,30,000 volumes in its collection and receives about 3400 periodicals every year. The collection of 65,000 books and monographs cover various branches of Science and Technology and include 28,000 Russian books. The Library has one of best collections in the field of Documentation, Library and Computer Science. INSDOC started its library automation project in July 1990. The project for retrospective conversion was taken up on a priority basis and at present more than 45,000 records have been converted into machine readable form.

2 RETROSPECTIVE CONVERSION–PLANNING AND IMPLEMENTATION

The following aspects were taken into account while planning retrospective and current catalogue conversion.

21 SELECTION OF MANUAL DATA FOR CONVERSION

One of the crucial tasks before taking up retrospective conversion project is to determine which set of manual records to be used for conversion and what proportion of the collection to convert and in what order. Some of the basic considerations in this context would be, (*a*) utility and applications of the Library's machine readable database; (*b*) selection of crucial data elements for inclusion in machine readable record; (*c*) choosing the source records for conversion *e.g.,* shelf list, accession register or catalogue cards; & (*d*) need for verification from actual source items, etc.

211 *Data Capture*

Shelflist cards arranged alphabetically were used as the source for manual data. The problems encountered were–incomplete data *e.g.,* non-provision of keywords, multiple volumes data & poor readability, etc. Keywords were provided from the titles as far as possible.

212 *Data Preparation*

No specific manual worksheets were designed. However, detailed guidelines for data entry in *AACR2* format along with suitable examples were prepared. Data entry operators were provided on the job informal training for data input. Only in very rare cases were the actual source items (books) verified. It is worthwhile to mention that data entry for recent additions to the library is done only once, at the stage of acquisition. This data integration saves time and efforts otherwise required for reinputting the same data. However, in this process certain fields need to be edited and verified at the cataloguing stage.

22 BYPRODUCTS

The conversion or manual data into machine readable (cataloguing data) is to be created keeping in view the various byproducts that could be generated from the database. These are OPAC, printed version of the data such as 'Recent Additions' and generation of Catalogue Cards. These require some of the additional data elements not found in source records. For example "OPAC database" and "Recent Additions" require additional data elements like *Document type, Code* (subject), etc. The details of all the data elements are shown in the database structure in *Appendix I.*

23 EXCHANGEABILITY OF DATA

The utility of database created should be such as to allow for merging and sharing with other sources under the networking environment in future. This implies that a standard exchange format be adopted. The provision of certain fields has to be made keeping in view the standard format. In NSL, *Common Communication Format (CCF)* has been adopted which requires provision for certain codes in the database. For instance Rolecode pertaining to Authors, Title indicator, Publisher indicator, etc. have been included in the database structure. While adopting the standard format, another point worth mentioning is that mandatory fields as required by *CCF* must be provided including its sub-fields even if the data is not available in certain cases. This will ensure consistency of the same when the records are exchanged in future. Further, the data elements to be included may be categorised as follows.

231 *Traditional Access Points*

These include Author's name(s), Corporate Authors name(s), Series name(s), Title keywords, Subject headings etc. Accuracy & completeness is crucial in these fields.

232 *Unique Item Bibliographic Identifiers*

These fields are used to identify information that may be useful in specifically identifying a work and in distinguishing different editions of the same work. Edition statement and imprint are covered under this category.

233 *Coded Categorising Information*

This is unique to machine readable data in contrast to manual records. They are used to serve as a basis for various search qualifiers in Online Catalogues. They are fixed field elements. For example Doctype field represent various types of monographs. In NSL 's' represents simple books, 'c' for conference proceedings, 'l' for multi-lingual and 'p' for pamphlets. Despite its enormous potential in retrospective conversion, there are few difficulties also. These fields are often incomplete in source records. A library will have to examine these fields quite consistently and may have to add appropriate data rather frequently in order to ensure accuracy and completeness.

234 *Standard Control Numbers*

Though these are not types of information relevant to library users, they are often crucial in library automation projects. For example Accession number, ISBN and ISSN.

235 *Peripheral Information*

These elements do not have an obvious value to library user and the library staff. Physical dimensions, pages, etc. fall under this category.

236 *CCF Fields*

These include various codes *viz.,* Rolecode, Title indicator, etc., as defined in the *CCF guidelines.* The provision of the same has to be made in the structure to make the database exchangeable.

24 LOCAL VARIATIONS

Certain practices adopted by the libraries are peculiar and specific to their own system. For example, the number and type of categories used for identifying the particular collection of library. In NSL, the category 'D' before the class number indicates Documentation and Information Technology books, and 'R'–for Reference books etc. Similarly all libraries may not be following the same level of *AACR2* & within one scheme of classification say *UDC*, there may be some local variations in treating particular form of material *eg,* all the bibliographies may be kept together or placed under

the specific subjects. Another point of variation is whether to use an authority file and within an organisation there may be inconsistencies of their use in the past. All these deserve special attention since provision has to be made for these elements in the database structure.

241 *Status of Records*

The records which have been accumulated for more than 40 years, reflected varied practices of cataloging rules, inconsistencies in rendering information, use of local variations/practices from time to time. Though 100% accuracy in all the fields cannot be claimed, there is a tendency towards completeness of records. The accuracy however is very important in crucial fields as mentioned earlier and care was taken to achieve this goal.

25 RECORD VERIFICATION AND EDITING

While entering the data there are possibilities of typographical errors, incomplete data, inappropriate data in certain fields due to misinterpretation of data fields, etc. Experience shows that neglect of quality control during a conversion can lead to a great many problems and to a very expensive cleanup later, when the database is put to a definite use. However, all the fields may not be equally important in this context. A few crucial fields such as all access points, coded categorising information, control and standard numbers may be verified and edited. The same may be done either online or offline. Though both the methods have relative merits and demerits, the online method has one of the strongest features *ie,* its interactive nature which obviates the need for additional steps required in the offline method.

In NSL, online mode of data verification and editing was adopted shifting the main responsibility on the cataloguer. The authors are of the opinion that in case no additional editorial staff for conversion is provided then, this option becomes economical and advantageous.

3 SOFTWARE DEVELOPMENT

Among the various functions of library *viz,* Acquisition, Circulation, Cataloguing, Search and Retrieval, and Serials control, etc, the users are mainly concerned with Public Access Catalogue. This is the function which links the user's requirements to the library materials on the shelves. Keeping this in view an attempt was made to develop a software using runtime version of dBase IV which could provide the facilities for creating and maintaining the database and also search and retrieval by various options. It was also the intention to keep it as simple as possible in terms of user's friendliness, and commands using options. The software can handle up to 50,000 records and is suitable for small and medium libraries. It runs

under MS-DOS environment and is a stand-alone package. Hardware/ software requirements are PC-XT or above; Hard disk capacity and RAM depending on the size of library. The main features of the package are described in *Fig 1.*

CATMAN QUERY

1 RECENT ADDITIONS

2 COMPLETE CATALOGUE
QUIT TO OS

Fig. 1

31 CATALOGUE QUERY

The software is divided into two main modules *viz,* Catalogue Quary & Catalogue Administration (*Fig. 1 & 3*). Catalogue Query is basically meant for users of the Library. The main menu under this module displays RECENT ADDITIONS (RA) and COMPLETE CATALOGUE (CC). RA pertains to the records for no. of books recently (say last one month) received in the library and CC contains the records of books received more than one month back. RA & CC sub menus have various options for searching such as author, title, class no., publisher etc. However BROWSE facility which displays records alphabetically titlewise is available only under RA option (*Fig. 2*).

Recent Additions	*Complete Catalogue*
Search by...	Search by...
Keyword/Subject Heading	Keyword/Subject Heading
Title	Title
Author	Author
Publisher	Publisher
Class No.	Class No.
Accession No.	Accession No.
Browse	Return to Previous Menu
Return to Previous Menu	Quit to OS
Quit to OS	

Fig 2

While formulating the query the care has to be taken whether initial characters are required to be matched or any part of the heading (in all options), since CC menu permits only the former case while RA allows the latter possibility. To provide an additional help, the catalogue card rendered according to *AACR2* may be displayed on the screen as pop up window by press of a key and under class number option the main headings under broad *Universal Decimal Classification (UDC)* numbers could also be viewed to facilitate browsing under a particular subject field.

32 CATALOGUE ADMINISTRATION

This module contains the various facilities for database creation, its maintenance, automatic indexing and data management in addition to the search and retrieval facilities under RA & CC as available in the Catman Query module (*Fig. 3*).

CATMAN ADMINISTRATION

1 RECENT ADDITIONS

2 COMPLETE CATALOGUE

3 DATABASE MAINTENANCE

4 DATA MANAGEMENT

5 APPEND CATALOGUE

6 QUIT TO OS

Fig 3

It also allows appending of database in RA or CC from decentralised inputting and also the automatic transferring of RA records to CC records (APPEND CATALOGUE) as shown in *Fig 4.*

DATABASE MAINTENANCE

ACTIVATE DATABASE

ACTIVATE INDEX

INDEX DATABASE

APPEND DATABASE

Fig 4

Data Management option allows adding, editing, browsing, switching among various records and deleting of records as required. The records could be arranged conveniently in one of three ways *viz* natural order, accession nos. wise or title wise by using the option ACTIVATE INDEX.

Currently, work is on to integrate Catalogue Management Software with other library functions such as Acquisition, Circulation, OPAC, Serials control, etc. To enable the data to be used online the database is also being ported on to the Unix environment.

DATA MANAGEMENT

ADD RECORD

EDIT RECORD

DELETE RECORD

PACK

LIST RECORDS

DISPLAY RECORD

NEXT RECORD

PREVIOUS RECORD

TOP RECORD

BOTTTOM RECORD

RETURN

Fig 5

4 FUTURE DEVELOPMENTS

While continuing efforts are being made to generate machine readable records, the advancements in data capture and data preparation are also gaining momentum. In this context, the role of Optical Character Recognition (OCR) is worth mentioning. This technology could be used to transfer data directly from the actual source items (books) into the machine readable form. This will of course require lot of restructuring and rearrangement of data. The strongest advantage of the method would be its accuracy as the same will be a true copy of the source record. The other areas having potential scope for development are integration of all library functions, provision of bibliographic utilities type services at the shared nominal costs. On the other hand there is a need to standardise and have common agreement for interpretation of various data elements which fall under the domain of descriptive cataloguing, forming the foundation block. In order to facilitate data matching it should be made mandatory for the publishers, particularly the Indian publishers to provide ISBN/ISSN in all of their publications.

APPENDIX-1

Database Structure

Field	Field Name	Type	Width	Dec	Index
1	ENTRYDT	Numeric	8		N
2	AUTLNAME	Character	20		N
3	AUTFNAME	Character	18		N
4	ROLECD1	Numeric	3		N
5	AUTLNAME2	Character	20		N
6	AUTFNAME2	Character	18		N
7	ROLECD2	Numeric	3		N
8	AUTLNAME3	Character	20		N
9	AUTFNAME3	Character	18		N
10	ROLECD3	Numeric	3		N
11	TITIND	Numeric	2		N
12	TITLE	Character	120		N
13	NOVOL	Numeric	3		N
14	PLACCONF	Character	30		N
15	NO-OF-CONF	Character	5		N
16	DATECONF	Numeric	8		N
17	SECTITLE	Character	120		N
18	SPONSOR	Character	100		N
19	DOCTYPE	Character	1		N
20	TITRESP	Character	75		N
21	EDITION	Character	20		N
22	EDNRESP	Character	60		N
23	PLACEPUB	Character	30		N
24	PUBLISHER	Character	40		N
25	PUBYRIND	Numeric	2		N
26	DATEPUB	Numeric	8		N
27	PRELPGS	Character	7		N
28	NOPGS	Character	8		N
29	ILLUS	Logical	1		N

Field	Field Name	Type	Width	Dec	Index
30	REF	Logical	1		N
31	BIBL	Logical	1		N
32	DIMNH	Numeric	2		N
33	DIMNW	Numeric	2		N
34	ACMPMATL	Character	20		N
35	SERINAME	Character	60		N
36	SERINO	Character	8		N
37	SERINAME2	Character	60		N
38	SERINO2	Character	8		N
39	ISBN	Character	13		N
40	ISBNVL	Logical	1		N
41	ISSN	Character	9		N
42	ACCNO	Numeric	8		N
43	CATEGORY	Character	1		N
44	CLASSNO	Character	30		N
45	BOOKNO	Character	8		N
46	KW1	Character	50		N
47	KW2	Character	50		N
48	KW3	Character	50		N
49	LANG	Character	3		N
	Total		1157		

DATABASE ACTIVITIES IN SCIENCE AND TECHNOLOGY IN INDIA: A CRITICAL STUDY

N C HUGAR*

0 INTRODUCTION

In the fast developing world information or data is treated as a "POWER". This information is hence considered as the most powerful resources like men, material and money. In any research work, the pre-requisite is to collect all the available information relating to research areas of study. Information is essentially required commodity in any kind of research activity, only because of its immense value in forming the policy and decision making. Therefore, it is essential that those who 'have' information should share it with those who 'have not'. Thus information plays a vital role in all kinds of human activity and is an important factor for the overall progress and development of society.

1 INFORMATION GENERATION

Information is the product of one's own idea or knowledge through experience or experiments conducted either in laboratory or out side. This is reported or recorded in many formats such as current periodicals, conference proceedings, books, reports, patents, theses etc. Every day, every second the new information is pouring in, due to continuous ongoing creative research work throughout the world. The information especially in Scientific and Technical field is tremendous. Because of this constant information flow, the present world is passing through the revolution of information growth or the "information explosion".

11 INFORMATION GENERATORS

Who generates this information? Usually it is the expert community in all fields who does it. This expert community conducts studies or research and their results form the new information which is reported or recorded in many formats for the future use, study and for the next generation. Such recorded information triggers an application for the betterment of society or further research elsewhere. This leads to overall progress of the mankind. This type of activity may be conducted by an individual or group of individuals attached to specialised research institutions and organisations. In India,

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scientific and technical information is generated or produced by various specialised research institutions and organisations such as CSIR and DRDO laboratories, IITs, Public and Private Research Centers and higher educational institutions.

2 BIBLIOGRAPHICAL CONTROL

Information is not only generated or produced in abundance, but also available for use in several formats and on electronic media. In this world of information explosion, an information seeker or researcher finds it much difficult to identify and access the information of his/her choice when he/she needs.

In order to help needy information seeker, an effective mechanism for bibliographical control is utmost necessary to organise all recorded information in a systematic manner. This idea of bibliographical control has given rise to several secondary and tertiary sources such as abstracting indexing journals, reviews, etc. To help their own clientele, library and information centres have started bringing out documentation list, subject bibliographies and providing current awareness services. The bibliographical control basically aims at knowing what information is available and where, secondly to reduce the time of literature survey and lastly to avoid the duplication of work. This supports resource sharing and helps in exchanging data and networking of computerised database.

3 DATABASE ACTIVITIES IN INDIA

Database is nothing but a set of records on any subject and in any formats, which may be bibliographical, numerical and textual references and are stored electronically with a mechanism to retrieve as and when required and allow to update or delete records at any time.

New innovations in computer and communication technologies have made revolutionary changes in the field of data communication and its transfer. These new emerging technologies have made impact on libraries and information centrers of many countries. They have started creating computerised databases on various subjects and linking them, to access information at fingertips as and when needed, even from the remote corner.

The need of creating computerised databases and interlinking them with developed countries is also very much felt in Indian specialised libraries and information centrers. In this context, India is making much efforts in designing and developing various databases in general and on Science and Technology in particular. NISSAT under Department of Science and Technology is actively supporting the design and development of

Computerised databases at national and sectoral levels by assisting with softwares, hardwares and personnel training. DST has identified some institutes/organisations to create a specific databases for the regional, national use and for bilateral exchange with international information systems.

The application of computers in Indian libraries has already started. Some are in the process of adopting computers in their libraries. The NISSAT has distributed more than 700 CDS/ISIS package to Government and nonprofit-making organisations/institutions in India. It is assumed that many libraries are in the process of designing and developing databases in their specific fields.

4 SCOPE OF THE STUDY

This study covers primarily the database (See Appendix I) listed in the "Directory of Science and Technology Information Systems" brought out by the Department of Science and Technology during October 1990. Further, certain other databases are also included in this study. The information about such databases was collected personally or through professional contacts. Annual reports, news letters, journal articles have also been consulted. This study is confined to the computerised databases in science and technology in India. Manual type of databases and those produced by private and commercial organisations are excluded from the study. The coverage of the study is not comprehensive in nature, but gives an overview of the database activities going on presently in India. The main objective is to study the most frequently occurring characteristics and salient features of existing databases, to give some idea to those who are in the process of designing and developing new computerised databases in the field of their interest.

5 METHOD USED

A check list of 12 criteria (Appendix II) was made to collect salient features of the selected databases. The important criteria were: name of the institution/organisation, database name, subject area, documents covered, geographical coverage, software and hardware used, number of records held, search techniques, services, rendered, by products, updation of database and link with international databases. All the particulars about each database, covered by the study, were collected and tabulated.

6 OBSERVATIONS MADE

(1) Fifty research institutions, Government organisations/Departments, IITs, spread all over India, are having 83 computerised, databases in

Sciences and Technology. INSDOC, New Delhi, contributed more to Indian computerised databases on Science and Technology.

(2) New Delhi has 34 databases hence it can be called as capital of Indian databases. Bangalore took second place with 13 database.

(3) Subjects covered can be grouped as follows:

(*a*) Bibliographical databases	77
Non-bibliographical databases	6
	83
(*b*) Pure Science:	
Physical Sciences	14
Biological Sciences	1
(*c*) Applied Science, Engg & Tech	
Med and Agri Sciences	62
(*d*) Standards/Patents/Equipments/R & D Profiles	6
Total	83
(*e*) Agricultural Sciences:	
Basic Science	14
Engg and Technology	49
Medicine and Biotechnology	8
Others	6
	83

(4) Coverage of records in the databases can be viewed as below:

National coverage Databases	42
International coverage	37
Local coverage	3
	83

(5) Fifteen of these databases are associated with international database and some are accessed to online services also.

(6) It is important to note that out of the national coverage databases about half of them were developed with CDS/ISIS software and 37 out of the 83 databases under study. Dbase and Fortron softwares are in use next to CDS/ISIS in creating the databases.

(7) Most of the databases are medium sized using IBM compatible PC/AT or XT (41 out of 83), 5 mini computers and remaining use other type of computers.

The above observations have some messages too, for those who would like to design and develop new databases, they are:

(*a*) Using CDS/ISIS will help in exchanging of data from other databases which could be a first step towards networking.

(*b*) If CDS/ISIS is chosen, it is advisable to confine to common communication format (CCF) tag numbers and data elements which helps in networking.

(*c*) One can make a modest beginning even with a PC/XT or AT without waiting for mini or mainframe computers, with freely distributed CDS/ISIS software package by NISSAT of DST.

From this study, it is found that so far the databases created are the library holdings mainly, or on a specific area of interest, with a small user group of the respective institution. There are few larger databases like Indian Science Abstract, NUCSSI, etc but still several areas which go unrepresented in the so far created databases are:

(1) Govt. Reports (Annual, Scientific & Technical) of Central, State and Local bodies.

(2) Master's degree and PhD theses submitted to various educational institutions in India.

(3) Standards/Patents literature.

(4) Medical science literature.

(5) Comprehensive technological literature including conference proceedings.

(6) Who is who in Science and Technology in India.

(7) Ongoing project in India along with foreign collaborators.

7 CONCLUSION

This paper is a small step towards long journey. It is written at a time when INFLIBNET is being actively considered, there are lessons to be learnt from the last experience. Although this study is not an exhaustive but only an overview of the present situation, confining only to to the field of Science and Technology, it has implications in other areas too. Perhaps it is incorrect to look at Science and Technology, without considering social, political, and economic angles. In these days of interdisciplinary research realisation is a healthy attitude. Databases covered here are the drops that are going to make an ocean. It is hoped that when such databases are created and linked, every information put into use, every reader will get his/her information, every information will get its reader, reader time will be saved, that holds the key to the every growing world of information. In short, it would be possible to provide the right information to the right user, at the right time.

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APPENDIX-I

Names of Institutes and Organizations with Computerised Databases

S.No	Name of Institute/ Organisation, Place	Name of Database
1	Bhabha Automic Research Centre, Bombay	(*a*) BARC Book Catalog (BARC-BK)
		(*b*) BARC Conference Proceeding Catalogue (BARC-CP)
		(*c*) International Nuclear Information System (INIS)
2	Bose Institute, Calcutta	Biotechnology Information System (BTIS)
3	Bureau of Indian Standards, New Delhi	Manaka-Sandarbhika(MS)
4	Central Building Research Institute, Roorkee	(*a*) Current Projects Bibliographical Data-base (CPBIB)
5	Central Drug Research Institute, Lucknow	National Information Centre for Drugs and Pharmaceuticals (NICDAP)
6	Central Food Technological Research Institute, Mysore	(*a*) Food Science and Technology Abstract (FSTA)
		(*b*) Food Technology Abstracts (FTA)
7	Central Glass and Ceramic Research Institute, Calcutta	Glass and Ceramics (CGCRI)
8	Central Leather Research Institute, Madras	Leather and Allied Industries (NICLAI)
9	Central Tobacco Research Institute, Rajahmundry (AP)	Tobacco Database File (TDBFILE)
10	Central Machine Tools Institute, Bangalore	National Information Centre for Machine and Production Engineering (NICMAP)
11	Central Water Commission, New Delhi	(*a*) ABS CWC
		(*b*) Books
		(*c*) Journals
		(*d*) Bibliography
12	Central Water and Power Research Station Pune	Water and Power Information System (WAPIS)
13	Defence Scientific	(*a*) DRDO-Online Catalogue

S.No	Name of Institute/ Organisation, Place	Name of Database
	Documentation Centre, New Delhi	(DRDO-OC) (*b*) DRDO-Translation Bank (DRDO-TB)
14	Department of Biotechnology, New Delhi	Biotechnology Information System (BTIS)
15	Department of Environment, New Delhi	Environmental Information System (ENUIS)
16	Department of Science and Techlonogy	(*a*) Equipment Database (EDB) (*b*) Publications Database (PDB) (*c*) R and D Projects Database (RDPDB) (*d*) Science and Technology Information Systems (STIS) (*e*) Technology Database (TDB)
17	Directorate General of Health Services, New Delhi	AIDS
18	Geological Society of Indian, Bangalore	(*a*) Current Research on Indian Res (SANCHAYA) (*b*) Indian Geology (INDGEOL) (*c*) Society Publications (GEOIND)
19	ICMR-NIC Centre for Biomedical Information, New Delhi	Neurology, Cancer, TB and Bibliographic Database (NCTB BDB)
20	Indian Council of Agricultural Research, New Delhi	(*a*) Current Research Project Information System (CRPIS) (*b*) Indian National Agricultural Bibliography (INAB)
21	Indian Council of Medical Research, New Delhi	Integrated Research Information System (IRIS)
22	Indian Institute of Technology, Bombay	Faculty Publications (SHODAK)
23	Indian Institute of Technology, Madras	PhD Theses (THESE)
24	Indian Jute Industries Research Institute, Calcutta	Productivity Index Analysis (PI)

S.No	Name of Institute/ Organisation, Place	Name of Database
25	Indian Library Association, Delhi	Directory of Indian Libraries (NALANDA)
26	Indian Meteorological Department, New Delhi	Meteorology and Atmospheric Science (MAS)
27	Indian National Scientific Documentation Centre, New Delhi	(*a*) Current Contents of Indian Journals
		(*b*) Database of Indian Patents
		(*c*) Database on Conference Proceedings
		(*d*) Directory of Indian Science and Technology Periodicals
		(*e*) National Index of Translations
		(*f*) National Union Catalogue of Scientific Serials in India (NUCSSI)
		(*g*) Polymer Science Database (PSD)
		(*h*) Materials Science Bibliographic Database (MSBDB)
28	Information Centre for Aeronautics (NAL), Bangalore	Indian Aerospace Abstracts (IAA)
29	Indian Space Research Organisation (SAC), Ahmedabad	Space Application Centre Library Information System (SACLIS)
30	ISRO, Sriharikota	Space Science and Technology, (ROGER)
31	Industrial Toxicology Research Centre, Lucknow	(*a*) Databank on Toxic Chemical (DABTOC)
		(*b*) Abstracts of Current Literature on Toxicology (ACLIT)
32	NICHEM-NCL, Pune	Union Catalogue of Current Periodicals in Pune Library/Information Centres (UNICAT)
33	National Council for Cement and Building Materials, New Delhi	Cement and Building Materials Database (NCB)
34	National Environmental Research Institute, Nagpur	Documentation of Acquired Documents (DOCAD)
35	National Information Centre for Crystallography, Madras	Crystallography

S.No	Name of Institute/ Organisation, Place	Name of Database
36	National Information Centre for Textile and Allied Subjects (ATIRA), Ahmedabad	Textile Information Condensed (TEXINCON)
37	National institute of Foundry and Forge Technology, Ranchi	Foundry Technology (to be named)
38	National Institute of Immunology, New Delhi	Biotechnology patents (BP)
39	National Institute of Oceanography, Donapaula, Goa	Oceanography (OCEANLINE)
40	National Metallurgical Laboratory, Jamshedpur	Metallurgy and Materials Science (CASLIB)
41	National Physical Laboratory, New Delhi	Library Acquisitions Data base (LAD)
42	Physical Research Laboratory, Ahmedabad	Physical Sciences (READFAST)
43	National Centre for Bibliometrics-INSDOC, New Delhi	Science Citation Index
44	National Centre for Science Information IISc, Bangalore	(*a*) CSIR Research Output (*b*) Current Awareness Service in Science (*c*) Indian Experts in Biotechnology (*d*) Research Profile Database (Biological Sciences) (*e*) Research Profile Database (Chemistry) (*f*) Research Profile Database (Mathematics) (*g*) Research Profiles Database (Geology) (*h*) Research Profile Database–Physics, Elect and Electronic Engg and Comp Science
45	National Chemical Laboratory, Pune	(*a*) Indian Chemical Patents Abstracts (ICPA) (*b*) Library Information System (LIS)
46	Publications and Information Directorate, New Delhi	Medical and Aromatic Plants Abstracts (MAPA)

S.No	Name of Institute/ Organisation, Place	Name of Database
47	Raman Research Institute, Bangalore	Library Database (LDB)
48	Sir Padampat Research Centre, Kota	Information Services in Synthetic Fibers (CPD AND PB)
49	Tata Energy Research Institute, New Delhi	(*a*) Abstracts in Selected Solar Energy Technology (ASSET) (*b*) Global Warming Database (GLOBWARM) (*c*) Indian Energy Literature (INDEL)
50	The Patent Office, Calcutta	Information Service in Patents (ISP)

APPENDIX II NAMES OF INSTITUTES AND ORGANISATIONS WITH COMPUTERISED DATABASES ON SCIENCE AND TECHNOLOGY IN INDIA

Sl. No.	Name of Institute/ Organisation and Place	Name of Database	Subjects covered	Documents covered and year	Area covered	Soft-ware used	Hard-ware used	No. of Records	Search Method by	Service Rendered to users	Print pro-ducts	DB up-date	Link with Intl DB/ ONLINE Access
1	Bhabha Atomic Research Centre, Bombay	(a) BARC Book Catalogue	Nuclear Science & Engg	Books (1957)	Nat	FORT-RON	Prime-450	80000	Author Title Subject	(800) Free to Lib members	—	D	
		(b) BARC Conf Proc Catalog	-do-	Journals (1957)	Nat	-do-	-do-	1800	-do-	-do- (800)	—	D	
		(c) Intl Nuclear Inf System (INIS)	-do-	All litera-ture on Nuclear Science (1976)	Int	-do-	-do-	100000	Key-words	-do- (250)	SDI Servi-ces	M	Linked to Intl Data-base INIS Bilateral arrangement
2	Bose Institute, Calcutta	Biotechno-logy Inf System (BTIS)	Biotech-nology Genetics	All litera-ture on Genetic Engineering	Int	-do-	MIC RO-VAY II	10000	Key-words	Free	—	—	
3	Bureau of Indian Standards, New Delhi	Manaka Sandar-bhika	Stand-ards	Standards (1981)	Int	COBOL	MV 400	20000	Country and Class	Priced (200)	Monthly addition Std world over	M	
4	Central Building Research Institute, Roorkee	(a)Current Project Biblio-graphical Database	Build-ing Engg Material	Books, Journals, Conf Proc Articles (1960)	Nat	CDS/ ISIS	IBM/ PC/ AT	409	Boolean logic Terms Enduser Direct	Free on Demand (200)	—	A	
		(b)Publica-tions Index (PUBLIN)	Build-ing Engg. Archi-tecture Plann-ing	Published papers, Seminar papers, Research Reports, Monographs (1947)	Nat	-do-	-do-	3000	-do-	-do- (200)		A	

FACILITIES TO ACCESS INTERNATIONAL DATABASES IN DELHI LIBRARIES: A SURVEY

SUNIL KUMAR*

1 INTRODUCTION

Online searching of international databases is of recent origin in Indian libraries. The exponential growth of literature in the field of Science and Technology has forced the R & D scientists to know regarding almost all the developments in their specialised areas of research. In order to cater to the needs of researchers in shortest possible time many libraries have started providing online access facilities to international databases for wide coverage of the topic in terms of period and sources covered.

2. ADVANTAGES OF ONLINE ACCESS

Although online access to international databases costs considerably more, it is gaining popularity due to the following advantages:[1]

(*i*) The user is an *active participant* and can instantly adopt his request to the reality of what is actually in the reference file–perhaps very different from what he expects–and also readily recovers from errors of query formulation. This freedom of search leads to a situation in which a whole database can easily be searched and then if necessary re-searched (which in the case of conventional searching of a large number of index volumes or card catalogues requires more than average determination and stamina).

(*ii*) Easy and rapid access to an extremely wide range of indexes/databases, many of which may not be locally available. This may also include access to recent references during the time-gap prior to the availability of published index volumes.

(*iii*) Databases searchable online often offer a far greater number of access points than the corresponding printed index. For instance, an indexed database may be equipped with an average of 10 index terms per item. All may be used as online search keys while only 4 may be used in the printed version.

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(*iv*) More than one database can be searched simultaneously using a single query formulation.

3 THE SURVEY

A survey was carried out to assess the facilities available to access international databases in libraries of Delhi. All major libraries of Delhi were enquired either personally or through phone calls regarding the availability of this facility. Eleven libraries responded positively. These libraries were later on approached personally with the structured questionnaire (*Appendix A*) for gathering data to know the following:

(*i*) Online access facilities;

(*ii*) Most frequently accessed databases;

(*iii*) Hardware used;

(*iv*) Communication software used;

(*v*) Services provided and their costs; etc.

4 RESULTS

(*i*) *Types of Libraries:* All the libraries having online access to international databases support are R & D institutions except American Center Library and British Council Division (*Appendix B*). This may be due to the need of nascent information and availability of sufficient financial support.

(*ii*) *Hardware available:* All the libraries surveyed are using different make of micro computers. The wide range of makes include IBM, Unicomp, DCM, BUSYBEE, Zenith, Wipro, HCL, etc. In case of the printer, although there is a wide range, ESPON seems to be the leader having 5 installations. The other makes having one installation each are HP, L & T, HCL, TVSE, etc. All the libraries are using 'Multitech' modern as the device that connects the micro computer and the telephone line. The modern translates the digital messages of the computer into voice signals to be transmitted over the telephone lines and vice-versa.

(*iii*) *Communication Software:* It brings the computer terminal into a dialogue mode with the host computer of international databases. Eight libraries are using PROCOM Communication software for this purpose, whereas CROSS TALK, DIALOG LINK and PC-PLUS Communication softwares are being used by 4, 3 and 1 libraries respectively.

(*iv*) *Online facilities:* DIALOG is the most common online vendor in libraries of Delhi having agreement with 10 libraries. Some libraries are having more than one vendor. The other online vendor/ facilities are EASYNET, FT-PROFILE, Microbial Strain Data Network (MSDN), STN International, etc. The most frequently accessed databases are INSPEC, MEDLINE, WPI, CAB abstract, COMPENDEX, CA Search, etc. *Appendix C* gives details fo frequently accessed databases. Subject was identified using the directory.[2]

(*v*) *Services & Cost:* Online searching of international databases are done only on demand by all the libraries and the service is provided to specific users groups in their respective libraries. Many of the libraries do not charge for the online search, but some institutes like INSDOC, do charge for the search on actual cost of services. In such cases the service is open to all. Online searches are always done by qualified and experienced library staff.

(*vi*) *Problems:* The users were asked to specify whether or not they had any problem to access any online databases. Most of the libraries responded that they usually face problems which are solved by them and sometimes take the help of specialists. The major problems as mentioned by the users relate to:

– Getting connection to online host; and

– Search strategy for precision of the search.

5 CONCLUSION

As the online access to international databases is gaining momentum it is highly desirable to have specially designed training courses on search strategy in online. The cost of services is also so high that it is difficult for a researcher to access. Hence steps should be taken to reduce the cost. One viable alternative step could be to develop indigenous databases and join the DIALOG or other such vendor, so that the foreign exchange earned through the search made to these databases can help to reduce the cost of search to international databases.

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APPENDIX A

Facilities to Access International Databases in Delhi Libraries: A Survey

Dear Sir/Madam,

Please answer the following questions relating to facilities available to access international databases in your library. The investigator shall be evergrateful to you for your cooperation. (You may put cross mark (X) at the appropriate place).

1 Name of the Organisation _____

2 Contact Person _____

3 Address _____ Telephone No. _____

4 Online access facilities: _____

_____ EASYNET _____ DIALOG

_____ OTHER (Please specify) _____

5 Most frequently accessed databases (Please list):

6 Hardware facilities:

(*a*) Make and model of micro-computer used: _____

(*b*) Make and model of printer used: _____

(*c*) Make and model of MODEM used: _____

7 Communication software used:

_____ CROSS TALK _____ DIALOG LINK

_____ MIRROR _____ PC-TALK

_____ OTHER (Please specify) _____

8 Services:

_____ On demand

_____ In anticipation

9 Search facility provided to:

_____ All users _____ Only staff

_____ Only specific group of users (Please specify) _____

10 Do you charge for online search? _____ Yes _ No _____

_____

11 If yes, please give the structure of cost: _____

_____

12 Do you provide online search training facility to your staff?

_____ Yes No _____

13 Have you ever had problem in online search? Yes_____ No ___

If yes, please specify the problem: _____

_____

_____

14 How do you solve problems in online search?

_____ Ask specialists _____ Colleagues

_____ Ask colleagues in other libraries.

15 Any other information:

THANKS FOR YOUR COOPERATION

APPENDIX B

Name & Address of Library	*Access Facility*
1 American Center Library 24, Kasturba Gandhi Marg New Delhi-110 001.	DIALOG
2 British Council Division 17, Kasturba Gandhi Marg New Delhi-110 001.	FT-PROFILE
3 Centre for Biotechnology JNU, New Delhi-110 067	DIALOG
4 Defence Science Information & Documentation Centre Metcalf House Delhi-110 054.	DIALOG
5. Indian National Scientific Documentation Centre 14, Satsang Vihar Marg New Delhi-110 067.	DIALOG, EASYNET, STN International
6 Indian Oil Corporation Ltd. Scope Complex, Core-2 Lodi Colony, New Delhi-110 003.	DIALOG
7 National Informaties Centre CGO Complex, Lodi Road, New Delhi-110 003.	DIALOG
8 National Institute of Immunology Saheed Jeet Singh Marg New Delhi-110 003.	DIALOG MSDN
9 Ranbaxy Laboratories Ltd. A-1, Phase I, Okhla New Delhi-110 020.	DIALOG, STN Int
10 Sri Ram Institute for Industrial Research University Road Delhi-110 007.	DIALOG
11 Tata Energy Research Institute 9, Jor Bagh New Delhi 110 003.	DIALOG

APPENDIX C

Frequently Accessed On-line Databases and Their Subjects

Databases	*Subjects*
APILIT (American Petroleum Institute Lit)	Petroleum including petroleum refining, petrochemicals, storage and transpiration of petroleum and its products.
CA Search	Chemistry and allied fields.
CAB Abstract	Agriculture and allied subjects.
CAS React	Chemical Reaction & Synthetic Organic Chemistry.
CANCER Line	Cancer including chemotherapy, immunotherapy, radiotherapy & surgery.
COMPENDEX (Computerised Engineering Index)	Engineering and related areas including aerospace engineering, etc.
EMBASE (Excerpta Medical)	Medical sciences and related fields such as anatomy, anthropology, embryology, anesthesiology, etc.
Energy Line	Energy including electric power, transmission, storage, fuel production, industrial transportation and residential consumption.
Environ Line	Environmental science including air pollution, chemical, biological contamination and ecology.
INSPEC	Physics, electronics, computer, etc.
MEDLINE	Worldwide biomedical literature.
Management Contents	Management related topics including accounting, advertising, banking, etc.
SCI Search	Interdisciplinary, including acoustics aeronautics, agriculture, anatomy, biology, etc.
Toxline	Toxicology including drug chemistry, environmental pollution, pesticides, pharmacology, etc.
World Patent Index	Patents in various fields: Pharmaceuticals, agriculture technology, etc.

PROBLEMS OF AUTOMATION AND COMPUTERIZATION OF LIBRARY INFORMATION SYSTEMS

P.N DWIVEDI*

0 INTRODUCTION

In the local area networking category, at least seven areas of difficulty may be identified. Availability of computer processing time has been a problem for numerous library projects, the lack of priority given by computer centre to the development of library software has been another complaint, and a third is the lack of control by the library over decision regarding continuation of a project.

Attitudes of computer centre personnel may also be a source of trouble. Ignorance of libraries routines and their operations has frequently led to an assumption that the problems to be solved are simple or trivial, or at best, to the glib conclusion by systems analysts and programmes that they understand both the problems and their solutions.

Fifth problem, the high rate of turnover in systems analysts and programmers was noted by the Washington University School of Medicine Library in connection with its book catalog project.

1 SUPPLIERS

At least five types of problems can be identified in this category. The first is the failure of suppliers to deliver the necessary equipment. A second more common problem is the failure of suppliers to deliver the required software (ie, the programmes and related documentation), either on time or at all.

A third familiar problem is inadequate service response, which plagued most the projects using paper-tape machines and still troubles most libraries using automatic typewriters. It also seems clear that some machines, used in library automation projects are simply poor machines, either poorly engineered or poorly built.

Finally, and probably most common of all, the software supplied may be faulty, a problem which usually gets solved one way or another, but

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which may fatally disrupt the time schedule or the planned budget projects of all sizes.

2 LIBRARY STAFF

Perhaps the most serious problem originating with the library staff itself is the failure to distinguish legitimate research and experimentation from operational improvements or to provide separate funds for research. Some of the developments in library automation have been funded by grants (usually given to initiate expected operational improvements, not for research) but most have been funded from the operating budgets of individual libraries.

Library staff has also created by failing to agree on the desired characteristics of the final product of system. As might be imagined, cooperative projects and networks have been particularly vulnerable to this view.

Libraries were unaccustomed to defining their data processing requirement and quantitatively or with precision–both absolutely indispensable to the computer environment. Few library users understood the relationship between the system specifications and functional results, and fewer still under stood the significance of performance specifications.

3 POOR PLANNING

Some of the problems that have troubled library automation projects are not the sole province of any one of the above groups of people, but may originate with any or all of them. The first category of such problems may be thought of generally as poor planning. There are many valid reasons to begin an automated system; to do something better, or faster, or less expensively or to do something that can no longer be done effectively by manual systems, or to provide a new service, provided of source that the resources are available to pay for it. But many projects have been started, not for any of these reasons but because of pressure from the institution administration to "be modern" or "automate the library" to keep up with the journals of the library world, to promote a personnel reputation, or simply because somebody on the library staff is gadget-happy and needs a new toy.

One other problem in the planning category should be mentioned. Occasionally the planning for a system is based on the existence of "soft" money ie, money from grants or one–time gifts or appropriations or the assumption that such money will be available to the funds the project in

the future. This is both appropriate and desirable if the project is developmental or experimental, and designed either to terminate when the funds run out or to continue operating with identified, regularly budgeted funds.

4 POOR DESIGN

The actual design of many systems also falls pray to wishful thinking and unwarranted assumption, for example, that acquisitions data can be reused, without major changes, for catalogue cards, or that serials are regular and predictable enough that irregular serials will not be a major problem. System designs may also fail to provide for editing procedures, as in the Florida Atlantic book catalogue project.

A second problem associated with the design stage is prior choice of hardware. The machinery chosen may be satisfactory for the functions it was originally designed to perform, but unsuitable for use in another context. Equipment designed for intermittent use may fail when used in a high-volume, production environment, Software may also be misused.

Occasionally, too, a particular design or approach becomes a favourite not of a particular person but of a large number of libraries, in short, a fad. If the system design is basically a good one, such as the terminal-oriented circulation system, every one profits; if the system design is basically bad, such as the arrival card serial control system, every one suffers. The proof against this problem, of course is conscientious inquiry into actual results achieved by similar systems.

5 POOR IMPLEMENTATION

Once systems reach the implementation phase, most of the problems will have already been encountered, but some projects still falter at this stage. A common fault is that those charged with the implementation, whether librarians, system people, or administrativ staff, fail to take human element and human values sufficiently into account. Unless it is made clear to all staff members affected by the new system that the goal is better service or more assistance to them in their work, resistance is almost inevitable. Throughout design and implementation, documentation of the system and all procedures must also be produced, and some library systems have come to grief on this matter alone. A system may be implemented and working well, but if knowledge of the system is partly or fully in some key person's head and that person leaves or his services are otherwise lost, the solution of subsequent problems may be difficult if not impossible. All systems change, or at least should change, since any library is growing and the requirements imposed on the system consequently

differ. If documentation is faulty, changing the system may be a major problem, even in some instances enough to cause its abandonment.

Any catalogue of woe such as the foregoing is naturally depressing, and inevitably runs the risk of seeming overdrawn. Fortunately there have been many systems that avoid most if not all of the problems cited, and the successes probably out number the failures. To cite these in the interest of "balance", however, would be contrary to the purpose of this paper and at any rate no one expects a paper on pathology to conclude with examples of healthy patients. Library automation is basically healthy, despite the problems mentioned, but it will be more so when all of those involved can discuss, openly and candidly, the difficulties and even the failures that all sooner or later experience.

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ROLE OF CURRENT CONTENTS ON DISKETTE (CCOD) IN LIBRARY INFORMATION SYSTEM

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R K WALIA**

1 INTRODUCTION

Tremendous progress in various fields of science and technology has resulted into what is popularly known as Information Explosion. A professional who wants to keep himself abreast with the latest developments in his field/subject of specialization or the area of his interest looks for the latest information through various information sources, the Current Contents is one of them. The Current Contents Service gives information about the most Current bibliographic data from large number of science and social science publications.

It is almost impossible to get relevant information immediately with the manual methods of operations. Moreover, a small part of information documents is utilized, because scientists want to use only that information which can be retrieved quickly and with utmost ease. In order to provide prompt and relevant information services to the users, computers are being used in the library due to their fast speed, accuracy and mass storage capability. The Current Contents on Diskette (CCOD), which is a computerized form of Printed Current Contents is preferred due to its fast, accurate, multiple search and other facilities.

2 SYSTEM REQUIREMENTS

The CCOD can be used on IBM PC/XT or PC/AT or 100% IBM compatible micro-computer or an NEC 9801 micro-computer with the following minimum configurations

– MS-DOS version 2.0 or higher

– 640 KB RAM

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– One 3½" or 5½" high density floppy drive

– A hard disk with at least 6 MB space available for loading an issue.

The CCOD can also be used in micro computer based local area network.

3 FEATURES OF CCOD

Each CCOD issue contains the same journal contents data included in its corresponding Printed Current Contents issue. From May, 1991 the Current Contents on Diskette are supplied with abstract and hence are called Current Contents on Diskette with Abstracts. Each CCOD issue also includes Current Book Contents, which cover the new books.

The following editions of Current Contents on Diskette are available:

– Life Sciences

– Agriculture, Biology and Environment Sciences

– Physical, Chemical and Earth Sciences

– Clinical Medicine

In CCOD issue, journals are grouped by disciplines such as Chemistry, Physiology, etc. and all books are kept under the discipline Current Book Contents. In the issue, disciplines are arranged alphabetically with Current Book Contents as the first entry. Publications are arranged in alphabetical order within each discipline.

31 BROWSING

The Current Contents on Diskette can be browsed ie, displayed or viewed or scanned in the following three modes

(*i*) Browsing CCOD issue

(*ii*) Browsing by discipline

(*iii*) Browsing by source title

32 BROWSING CCOD ISSUE

By selecting browsing CCOD issue, the contents page of first publication is displayed and to move between the articles or between the different publications the following control keys can be used.

Control Key		*Function*
Dn-Arrow	–	Go to next article
Up-Arrow	–	Go to previous article

PgUp	–	Go to next page
PgDn	–	Go to previous page
Ctrl-PgUp	–	Go to next publication
Ctrl-PgDn	–	Go to previous publication
Ctrl-End	–	Go to last publication
Ctrl-Home	–	Go to first publication
Esc	–	Return to browsing menu.

33 BROWSING BY DISCIPLINE

On selecting Browsing by Discipline, list of disciplines covered in current issue is displayed. To move between the disciplines use Up-arrow, Down-arrow, PgUp or PgDn keys. In order to move to specific position in a discipline-list, type one or more initial letter(s) and press Enter Key. As the discipline of interest is highlighted, press enter key. The first publication in this discipline is displayed, use the above control keys to move between articles, publications or disciplines.

34 BROWSING BY SOURCE TITLE/JOURNAL

On selecting browsing by source title, list of all source titles/journals covered in current issue is displayed. You can move between the source titles using Up-arrow, Down-arrow, PgUp or PgDn keys. In order to move to specific position in source title list, type one or more initial letter(s) and press enter key. As the source title of interest is highlighted press enter key. The first publication in this source title is displayed, use the above control keys to move between articles, publications or disciplines.

35 SEARCHING

The search in CCOD is made in the form of a query, which consists of field selection and a search statement. The results of search queries are returned in few seconds and search can be made on the following fields.

Field	*Contents*
1 Basic:	Article's title, author assigned keywords list, or key words plus field.
2 Title:	Article's title only.
3 Author/editor:	Article's authors and book's editors.
4 Address:	Reprint author address.
5 Source:	The title of journals or books.

6 GA/Book Page: The genuine article number of journal or the B number of book, also the first page number of article.

7 Discipline: Discipline or Current Book Contents.

8 Document: type of document eg, letter, editorial, article, etc.

9 Language: Article's language or book's language.

10 Set number: The combined result of previous search queries.

Each search query is assigned a unique number. As soon as the query is entered, the number of records which satisfy the query are displayed as Hits (number of records) eg, the following query.

Query	Hits	Field	Search Statement
1	10	BASIC	LIBRARY

will search for the word LIBRARY appearing either in article's title, author assigned key words list, or the key words plus field, and shows that there are 10 records that satisfy the query, which can be viewed.

The default field in a query statement in Basic. In order to search for a different field, first change the field. Fields list can be displayed by pressing Alt-F key. To select a field for query, highlight the field and press enter key. The search terms can be combined by using boolean/logical operators (NOT, AND and OR). For each field selection CCOD has a dictionary of searchable items in the current issue, which can be displayed by pressing Alt-D key. To select a dictionary term, highlight the term and press enter key. The same search queries can be executed for different issues. To achieve this, number of search queries are saved in a file called Search Profile, which can be updated and deleted from time to time.

The Search Conventions are

* The search in CCOD is made in upper case only.
* The truncation symbol (*) can be used anywhere in the word stem, thus making search wider eg, CHLOR* (searches for all the words which starts with CHLOR).
* In case of multiple words in a search statement the CCOD searches for the exact match.
* The boolean operators can be used to make relationship between multiple search terms, for which the order of precedence is, NOT, AND and OR.
* The set number field can be used to combine the results of previously

executed queries.

* The THRU operator is available for set number search eg, 1 TRU 4 is equivalent to 1 or 2 or 3 or 4.

* The author name is entered as last name followed by comma and one, two or three initials with no space between the elements and no period following initials eg, *FREDE RICKSON, L.

36 VIEWING

The search results can be displayed by pressing function key F5 or from the article menu. The entire contents page of highlighted article can be displayed when viewing the search results or in browse mode.

The search result can be displayed in the following two formats:

1 Full Record–which includes Author, Title, Source, Pages, Keyboard, Keyboard+ (Significant word), GA/Book N. (GA number of journals or B number for Book), Discipline, Document, Language, Address (reprint Author Address), Editor (for book only), ISBN (for book only) and Publisher.

2 Author-Title–One line display of article's first author and title.

37 PIC ARTICLES

When the results of search query are displayed/viewed or the CC issue is browsed, one can choose the articles of one's choice using the Personal Interest Checklist (PIC) articles facility, which can later be printed or exported to text file.

38 ARTICLES

Genuine Article (GA) is ISI's fast document delivery service. GA articles list can be created when the result of query are displayed or when the CC issue is browsed. Only article and not the books can be added in GA Articles list, which can later be printed from Print GA order or exported to text file.

391 *Request-A-Print*

Using Request-A-Print option the reprint of article can be directly requested from the reprint author. Request-A-Print list of article can be created when the results of query are displayed or when the CC issue is browsed, which can be printed from Print Request-A-Print option.

392 *Printing*

All or selected articles can be printed. First display the Content page/

First page of article list you want to print. The records can be printed in the following three different formats.

1 Bibliographic–which includes articles authors, title and source (including volume, page and year)

2 Full Record–which includes Author, Title, Source, Pages, keyboard, Keyboard+ (Significant word), GA/Book No (GA number of journals or B number for Book), Discipline, Document, Language, Address (reprint Author Address), Editor (for book only), ISBN (for book only) and Publisher.

3 Full+Abstract–Which includes full record and abstract.

393 *Exporting*

The CCOD records can be exported into various different formats to use in different file management and word processing programs. The CCOD records can be exported into the following different formats:

1 Bibliographic–which includes articles, authors, title and source (including volume, page and year)

2 Full Record–which includes Author, Title, Source, Pages, Keyboard, Keyboard+ (Significant word), GA/Book No (GA number of journals or B number for Book), Discipline, Document, Language, Address (reprint Author Address), Editor (for book only), ISBN (for book only) and Publisher.

3 Full+Abstract–which includes full record and abstract

4 R-A-P/Comma delineated–Fields are separated by commas, contents of each field are enclosed in quotation mark and record ends with carriage return.

5 DIALOG-Medline–MEDLINE database format

6 NLM-Medline–NLM-Medline database format

7 Sci-Mate–Sci-Mate format

8 Pro-Cite–Pro-Cite format

9 Reference Manager–Reference manager format.

394 *Journal Coverage*

CCOD is provided in four different editions, each edition covers a group of related disciplines. The approximate number of journals covered

at present under each edition are as follows

Edition	*Total No of Journals*
Agriculture Biology and Environment Sciences	930
Life Sciences	1,230
Physical, Chemical and Earth Sciences	820
Clinical Medicine	890

395 *CCOD Comparison with Printed Current Contents*

The following information is not available in CCOD:

1 Subscription information,

2 Subheading regarding language, such as articles and abstracts in English.

3 Special subheading such as FASEB Journal–formerly Federation Proceedings.

4 Section headings such as correspondence and original articles.

The following differences are in data representation:

1 Author first name do not appear in CCOD, only initials. If there are two or more initials, they are not separated by spaces or periods.

2 CCOD does not use question marks, mathematical equality or inequality signs, subscripts, superscripts, stars, Greek letters and other scientific or mathematical notations.

396 *Limitations*

In CCOD each issue has to be searched separately ie, if a user has to search more than one issue, he will have to open each issue and then search, which is a time consuming process. However, the search profile can be made for the users and the CCOD issue can be searched accordingly.

397 *User Response*

The University of Horticulture and Forestry, Solan (Satyanand Stokes Library) was subscribing for printed Current Contents (Agriculture, Biology & Environmental Sciences) before January 1991 and the readers were used to consult the same. From January 1991 to December 1991 the

CCOD and Printed Current Contents both were subscribed in order to see the feasibility of CCOD. During the year, it was observed that initially users were reluctant to use CCOD because they were not familiar with the use of computers. With the introduction of few training programmes and by providing guidance to individuals the response for the use of CCOD increased rapidly, due to its various features and ease of operation. From January 1992 the UHF library has been subscribing to only CCOD.

4 CONCLUSIONS

With the rapid advancement of science and technology the modern library is not merely a store house of information but the main aim of the library is to provide right information with much ease and in minimum possible time. The CCOD plays a vital role in achieving the above mentioned goals.

The CCOD, interactive menu driven package provides almost all the facilities to its users for searching the latest information (Current Contents). The on-line help feature and use of function keys made CCOD more user-friendly. Viewing/Browsing CCOD by discipline wise, source title wise and searching on various fields are its distinctive features. The Genuine Article (ISI's fast document delivery service) and Request-A-Print (request a reprint of an article directly from the reprint author) are the added features of CCOD.

The CCOD provides immediate, fast, accurate and to-the-point search facilities of latest information (Current Contents), which is the need of the hour.

SOFTWARE FOR INDIAN LIBRARIES

M K MOHANDAS*
K C SHET**

0 INTRODUCTION

Computers have pervaded every walks of life. Some of the third world countries have successfully implemented informatics in varied sphere of human activities. But computerization in these countries has not maintained an even pace now as it had no anticipated effect in certain instances. The differences in the way various countries implemented their policies are believed to be the disparity of situation.

The fundamental obstacles that has held back the quick progress of the developing countries in the field of library automation is attributed to the phenomenon called "Technological dependence". In other words, developing countries have been "devised" by the industrialized nation to suit their specific needs. The inability to modify or innovate or adopt such techniques has perpetuated the phenomenon of dependence. The pull and pressure of developing economy not withstanding, certain countries proved that Informatics is not just prerogative of industrialized nations. Experiences show that development is unavoidable when backed by initiative and appropriate technology.

In this paper, we are highlighting the library automation software packages and the problems associated in using them. We also proposed new software package features for the Indian libraries to take a quantum jump into the 21st century.

2 SURVEY OF LIBRARY PACKAGES

The following packages are available an Indian market which are of specialised nature designed for library operations.

21 LIBMAN

It is a user friendly package designed for small and medium libraries. The menu driven packages incorporate the functional features of automatic

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retrieval data files, handling 60,000 books and periodicals, double level access, details of members, listing of fines and loan register facilities. The double level access information comprises : restricted one for members and unrestricted one for libraries. It has been developed by Ms Kasbah System, Madras. It is used under MS DOS environment.

22 WILISYS

It is a user friendly package developed by M/s Wipro Computers Limited, Bangalore, for library compterisation. It consists of two major components.

(*a*) WILIMAX : WIPRO library management system

(*b*) WILITRAX: WIPRO Abstracts System (Bibliographic search).

Both these packages are developed in 'C' language using UNIEFY Relations Data Base Management Systems for data storage. A judicious combination of fixed and variable length fields has been made for optimum utilisation of the available resources and a speedy retrieval. The package is aimed at computerisation of different activities such as library housekeeping operations, information retrieval etc, concerning books and periodicals by dividing into different modules.

23 UNILIB

M/s Hindustan Computer Ltd., Bangalore have developed a library management software package for medium/large size libraries which runs under UNIX/XENIX environment. It is one of the most comprehensive library management packages as claimed by the developer. This package is fully integrated multiuser and easy to operate and is Menu driven package. It ensures maximum productivity, minimum data entry requirement, efficient search and query facilities. It has two level security features ensuring privacy to each user and library staff.

It appears that the package is a little costlier than other packages.

44 CDS/ISIS

CDS/ISIS (Computerised Documentation Service/Integrated Set of Information Systems) is generalised information storage and retrieval (ISR) system for the management of structured textual databases. It can maintain and manage structures non numerical database especially bibliographic databases. The software is developed by UNESCO and is made available free of cost to Institutions in developing countries, under a licence agreement. The packages can be run on IBM-PC, PC/XT or compatible micros under MS DOS operating system. CDS/ISIS is also available for PDP–11 and Micro Vax-11 systems. For IBM-PC compatible micros, the package needs

256 KB Ram, two floppy diskette drives. The software is a user-friendly and once database is designed the system may be used by any person having little computer experience. The software is versatile in performing the following functions.

(*i*) Defining the databases containing user selected data elements.

(*ii*) Entering new records, modification, correction or deletion of existing records.

(*iii*) Automatic creation of fast access files, such as index files or inverted files.

(*iv*) Retrieval of records from a database using simple or complex Boolean expressions.

(*v*) Display of records according to user defined formats.

(*vi*) Sorting of records retrieved in desired sequences.

(*vii*) Printing records in user defined print formats.

(*viii*) Exchange on merging of records of two or more databases that are in compatible formats.

It is a menu driven, and having powerful search language software.

25 GOLDEN LIBRA

Golden libra aids in Library management and runs on IBM PC/XT compatibles. It keeps track of subscription, storage and retrieval of books/ periodicals. The programme generates reports on various matters such as over-due periodicals, list of magazines and books (code wise, location wise, subject wise) and reports to publishers and members for non-receipt of periodicals and books. Golden libra has also been provided with a stock module to give the status of stocks at a given periodicity, including the valuation of books. The system has been field tested at the British Council and American Libraries.

26 ARCHIVES

This library management system maintains vender file, maintain accession register, periodical registers and maintains issue and return of books/ periodicals. It also keeps track of budgetary control, generate revenue accounts statement. This is developed by M/s Minafax Electronic System, Bombay to perfectly suit the needs of any size and type of library centers. It is the first integrated computer system which covers all the functions of library management as claimed by the developers. It runs on PC, PC/XT, PC/AT under MS DOS environment.

27 LIBRARIAN

This library management software is perhaps the cheapest package available in the market, developed by M/s Mudra Electronics, New Delhi. This package helps in all spheres of activities of library such as receipt and issue of books, check the availability and quantity of books, search the books by title or the author, list the over-due books, or trace the borrower and other various counter functions and member assistances. It can handle 5,000 transactions per day, accommodate 10,000 members and 1,50,000 books data. It can be operated under Local Area Network.

In addition to the above packages, the general purpose relational database management system packages, such as dBASE III plus, dBASE IV, Foxbase, Softbase, Clipper, NELCO, SCI-MATE, etc can also be used for the development of library routines under MS DOS environment. The unified package can be used to develop library features under UNIX environment. Also there are highly powerful packages such as FOCUS, ORACLE, etc.

3 HOW GOOD IS INDIAN SOFTWARE

In spite of several vendors developing and supplying software packages there is no standardization in library packages. Thus it immediately calls for a statutory body to come out with guidelines for standardization of library packages.

Another big bottleneck for the software developer is the piracy. While the piracy is restraining the indigenous software industries in making them effective, it is also important to evaluate whether they are (at all) technically capable of giving an equal quality when compared with imported packages.

It is our experience that most of the software companies in India do not have any standard software at all, baring a few dedicated top ones. This itself has created a lot of confusion and hesitancy in the minds of librarians. Many software houses advertise that they "have certain packages" for library available with them. But when you get in touch with these software houses they say that they will "develop" it for us. Naturally, it takes several months to implement the library automation.

Once the software is developed and ready for sale, developers, find a stiumbling block in terms of investment. As a result, the end product will be a more or less, packet of a few floppies with negligible or no documentation. Unless there are several qualitative library packages at cheaper rates and easily available in market, the library automation is bound to be slow.

4 PROBLEMS IN AVAILABLE LIBRARY SOFTWARES

There are several problems in Indian library software, which have retarded the progress of Indian library automation. Some of these are highlighted hereunder

(*i*) The cost of software seems to be high. This problem has several other inter–related parameters such as number of packages sold by the company and commitment by the developer towards the packages.

(*ii*) Software portability: There are very few software packages portable from one environment to the another environment. This will frustrate the effort on the part of user.

(*iii*) Software purchase: It appears Indian user is reluctant to pay anything for software. He easily gets a package pirated through one of his known computer centres. Thus, the developer is deprived of his revenue. This ultimately effects entire software industry.

(*iv*) Standardization: A statutory body needs to be formulated to look into the standardization of library software package.

(*v*) Shortage of Manpower availability: This needs training of library staff in maintaining computerised library management.

(*vi*) Funding: Liberal funding is needed for library automation by the Government/management.

5 DESIRABLE FEATURES FOR LIBRARY SOFTWARE

The following are the features envisaged in the new library software packages.

(*i*) Portability: The software must be to run in any standard computer hardware or environment;

(*ii*) The package must have efficient search routine; in other words, searching a record among 75,000 records should take minimum time.

(*iii*) Restriction on field length, number of fields, number of records, number of books, etc, must be reduced as far as possible.

(*iv*) Search or sort on abridged notation of field is desirable.

(*v*) It is desirable to have variable size record so that overall storage requirement is kept minimum (such a feature does not exist in dBASE III Plus but is available in CDS/ISIS).

(*vi*) Menu driven packages are desirable. This should also have hierarchical menus, user-friendly, context based help menu, scroll of menus, etc. It should take minimum learning time to use the package.

(*vii*) Privacy/Security: The records and files must have sufficient security features in various levels for the smooth functioning of library objectives.

6 CONCLUSION

This paper surveys the availability of specialised library management packages in the Indian market. As any survey suffers from any omission and commission, this survey is not exceptional. However, efforts are being made to include all the latest software. The desirable features for the new library package are outlined. It is hoped that the Indian library software will become a catalyst in automating most of our library and information centres.

The INFLIBNET project proposes to link libraries and information centres in all universities, colleges, institutes of national importance and research laboratories. It provides better access to bibliographic information. It shifts reliance of users from local collection to region, national and international collection and vice versa to optimize information resource utilisation through resource sharing and to facilitate scientific communication effectively. The Indian library software may provide a firm foundation to realise the objective of INFLIBNET.

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SOFTWARE FOR LOCAL DOCUMENTATION LIST IN MUL

Mrs A A VAISHNAV*
N G BAPAT**

0 INTRODUCTION

"Information service is a service provided by...a library which draws the attention to information possessed in the library....in anticipation of demands; this is done by preparing and circulating news sheets, literature surveys, reading lists, abstracts, particulars of articles in current periodicals, etc."[1]

A combination of serval factors have resulted in the growing awareness of the importance of information. There are now many potential users wanting to have access to information. The growth in the amount of published information is fast enough of itself to justify the growing awareness of the need for information services to act as a clearing house, switching centres or technological gatekeepers for rest of the population. To provide information to one and all there is a need for providing information services.

1 INFORMATION SERVICES

Generally, the users of information want to keep themselves abreast of current information up to a fair degree, want to have specific information in their field of investigation or want almost all relevant information on a subject or brief but complete picture of recent developments of a related subject or a subject in which user was not very much interested or which did not come within the area of his main interest. As a result of this he is not quite current with the subject. Hence in such a situation, he expects to have in a communication system a device which will help him in quickly catching up with the subject.

To meet these information needs of 'users', a modern library has to think of following information services.

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1 Current awareness service

2 Condensation service

3 Repackaging

4 Reference Service

5 Evaluation service

6 Back-up service

7 Location service

11 LOCATION SERVICE

The service which shows the place of a document on shelves or elsewhere in which required material can be found either from location mark in a catalogue entry or from a bibliography, is known as location service. It can be provided by following methods:

1 Indexes

2 Bibliographies

3 Catalogues

4 Local Documentation List.

111 *Local Documentation List*

The Local Documentation List is reasonably quick method of informing a large number of clientele of the contents of journals books received in the library. This list is generally arranged alphabetically with broad subject headings. The periodicity can be monthly or weekly.

2 LOCAL DOCUMENTATION LIST (LDL) OF MUL

Marathwada University Library (MUL) established its Documentation Unit (DU) during the year 1976 for locating the microdocuments.

The Assistant Librarian of reference section, along with two professional assistants is responsible to bring out *Local Documentation List* for the humanities, social science and the science periodicals. It covers current learned journals, popular magazines, and newspapers subscribed by the Library, giving full bibliographic details of the article.

Almost all current periodicals received in the library are scanned by the staff of the unit. The articles are marked out for inclusion in the LDL. Entry of each article selected is prepared on 8" × 5" slip with full bibliographic details ie, author, title of the article, title of journal, volume number, date of publication and page number.

The entries are classified according to *DDC 17th ed.* and broad subject headings generally three in number are assigned to each entry. The assigned subject headings to each entry are compatible with *Sear's list of Subject Headings, Biological Abstract, Chemical Abstracts, Physical Abstracts*, etc. Each entry is assigned Sr No 1, 2, 3,..... and so on.

The arrangement of LDL is according to *DDC* for main subjects. Under each main subject the entries are arranged alphabetically by broad subject headings, within the same subject headings, entries are further arranged alphabetically by author, title, etc for the convenience of the users, eg

---

Botany

Germination

104, Givilberg, A. and Horwitz, M. Germination Behaviour of Solenium nigrum seeds.

J Expt Bot. 135 (153); April, 1984; p 588-90.

The subject index is also prepared with the broad subject headings. Each subject term assigned to the article is noted on the slip and corresponding serial number of the article is given to this term for easy location of the information in the list of articles. This index is arranged alphabetically by subject headings eg

Argonomy	186
Birds	135
Fermentation	69
Germination	104
Holography	163
Oceanography	83, 84
Soybean	95

The serial number against each term indicates the serial number of the article in the documentation list.

List of journals indexed and subject contents of the documentation list are also given for the benefit of the users and are also arranged alphabetically, viz,

List of Journals indexed

1 *Annals of Botany.* 56(3) May, 1984.
2 *Journal of Experimental Botany.* 135(153), April, 1984.
3 *New Scientist.* May 10, 17, 1984.

Subject Contents

1 Agriculture

2 Botany

3 Chemistry

4 Energy

5 Mathematics

6 Zoology.

The parts-list of journals indexed, list of articles, subject index and subject contents are sent to typing unit for preparing stencils. The prepared stencils are checked and cyclostyled. Finally the LDL is checked and arranged in the following order:

1 List of journals index

2 Subject contents.

3 Subject index.

4 List of articles.

After arranging the pages, they are stitched together. These cyclostyled lists are circulated in the university departments as well as in local colleges as a location as well as current content list.

3 NEED FOR COMPUTERIZATION OF LDL IN MUL

While verifying the records as well as after an interview with the librarian it was learnt that LDL has become irregular feature due to shortage of staff, increase in backlog of material standing unprocessed for unidentified reasons and existence of bugs in the system, making it clear that MUL needs an aid to process its operations speedily, accurately and economically without any demand for additional staff. Under these circumstances computer is the only answer to solve these problems.

In spite of the availability of national/international databases, the ability to access remote online search via telecommunication network, "..... the need for processing local internal information remains... especially in university and research libraries."[2]

"Though the ready-made software packages are available, they are designed either for specific purpose of the library or for specific machine they are not much useful to all libraries."[3]

Marathwada University is having computer infrastructure, the Zeus-386 hardware, a multi-user system with OS UNIX. The authors of the paper decided to use available menu-driven, user friendly software package for MUL for minimizing time lag and cost for providing information to users.

31 OBJECTIVES

The software was developed with a view–

1 To create the database, correction and addition in the database.

2 To get local documentation list.

32 METHODOLOGY

Computerization of LDL was divided into 2 steps–*Step No. 1 : Creation of document profile:*

Bibliographic information of all articles appeared in current periodicals was noted and analysed for assigning subject headings, which can be used as a base for preparing monthly documentation list and for providing CAS, SDI and RSS.

Step No. 2: Printing the Output:

The output printing was done for printing Local Documentation List.

33 FILE MANAGEMENT

For the purpose of each step computer programme in BASIC language was developed and through such programmes necessary data files were created for storing bibliographic information of the micro-documents. The data was given as an input at the time of execution of the programme.

Computer application system was divided into two types of files ie, (*a*) Data files and (*b*) Programme files.

(*a*) *Data Files:* Data file is created for storing necessary information of the documents.

Two data files were created: (1) Current doc and (2) Master doc. Both current doc as well as master doc are with block length 500 and record length 500. In each record there are 16 fields as shown in Table No. 1. These fields are the constant information relating to each microdocument. The current doc is appended up to one month, thereafter by taking LDL, it is merged in matter doc and again for next month current doc is created.

Table 1
Table showing the fields, their types and field length in current doc and master doc

Fields	Field type	Field Length
Keywords (up to 7)	Alphanumeric	25 each
Author/s (up to 2)	Alphanumeric	20 each
Title (3 lines)	Alphanumeric	75 per line
Name of journal	Alphanumeric	20
Year of publication	Alphanumeric	04
Volume & Issue No.	Alphanumeric	08
Pages	Alphanumeric	08
Date of entry	Alphanumeric	10
Serial Number	Numeric	04

(*b*) *Programme files:* Programme files contain instructions to the computer. The programmes can be classified as–*1. MUL.BAS:* This programme is a main programme and call the external subroutine modules for execution as per the given option.

2 DOC.BAS: This programme was prepared for the implementation of first step. With the use of this program current doc–the current document profile can be created, appended and updated. In each record the bibliographic information relating to the document is stored.

3 LDL.BAS: This programme is prepared for printing the LDL by providing list of articles in periodicals with their bibliographic details along with keywords. The output is enclosed in *Appendix-A.*

In short the software for LDL in MUL is menu driven and works as shown in the figure.

4 CONCLUSION

The software prepared was tested and found that LDL can be prepared with adequate information and in a presentable form.

The software being user friendly, the LDL can be prepared by the library staff without any formal knowledge of computer. Moreover the LDL can be prepared timely and accurately without any demand for additional staff. It is hoped that the use of the software will make LDL in MUL a regular feature and can be distributed to the users and researchers of the Library as well as other libraries.

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3 KUMAR (P S G). Computerization of Indian Libraries. Delhi, B R Publications, 1987; p 296.

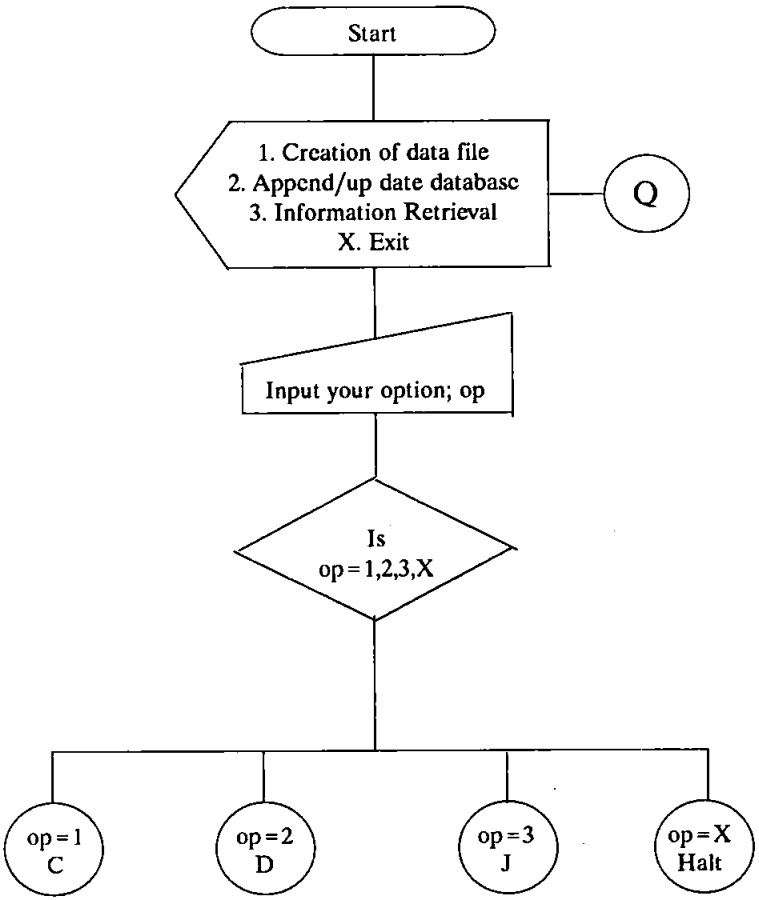
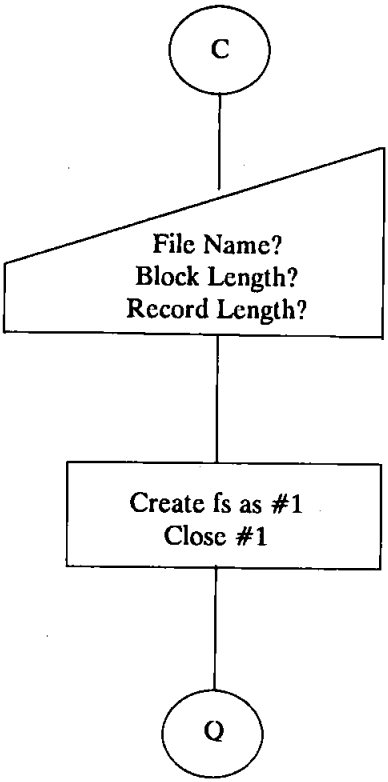
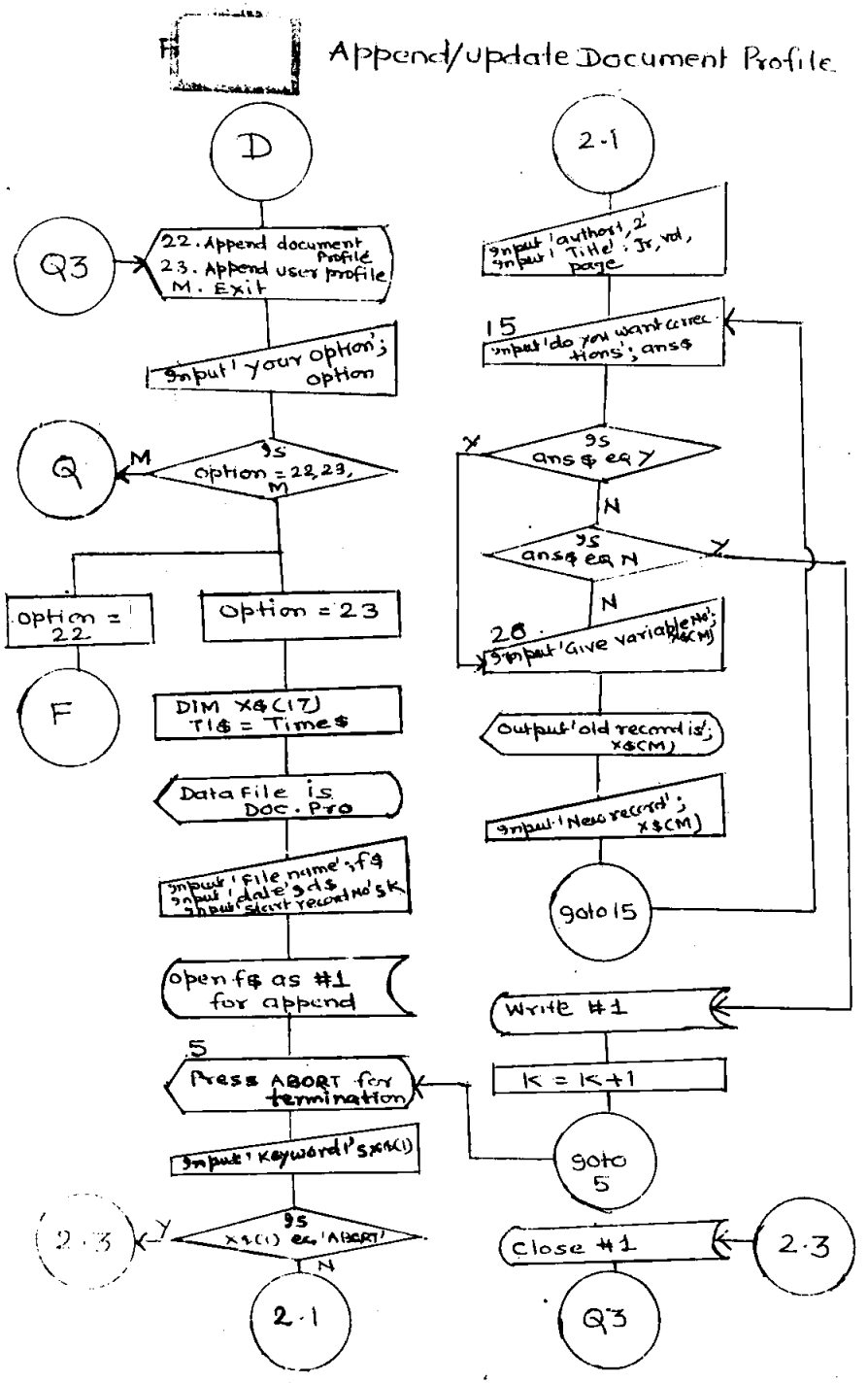


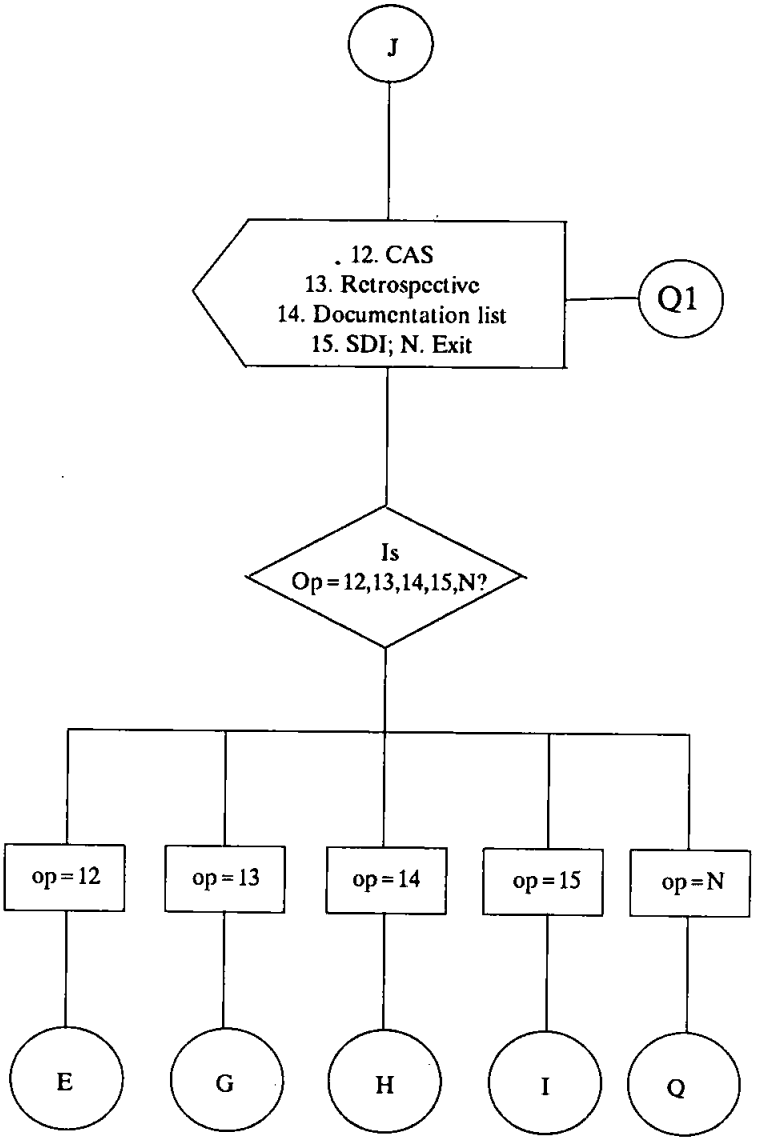
Fig. 1 Flow chart showing working of computerised Information Service System



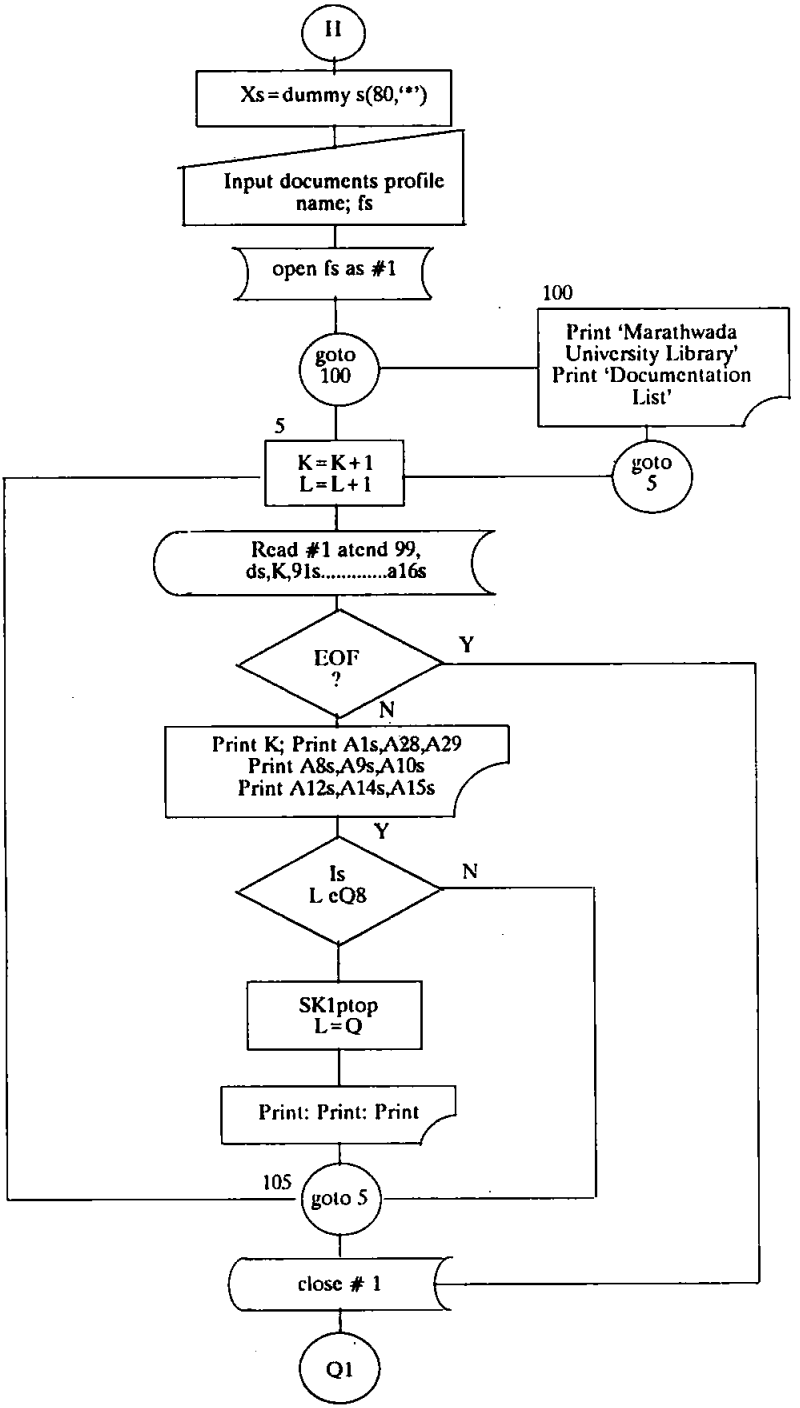
Creation of Database

Append/Update Document Profile





Information Retrieval System


II
Xs=dummy s(80,'*')
Input documents profile name; fs
open fs as #1
100
goto 100
Print 'Marathwada University Library'
Print 'Documentation List'
5
K=K+1
L=L+1
goto 5
Read #1 atend 99, ds,K,91s.....a16s
EOF ?
Y
N
Print K; Print A1s,A28,A29
Print A8s,A9s,A10s
Print A12s,A14s,A15s
Y
Is L eQ8
N
SK1ptop
L=Q
Print: Print: Print
105
goto 5
close # 1
Q1

APPENDIX-A

Marathwada University Library
Documentation List

1 Zoology Helminthology Trematoda
Kechemir N. Theron A.
Dynamics of the Intramolluscan Larval Development ofSchistosoma Haematobiu: Replication of Daughter Sporocysts and Cercarial Production
Jr. of Helminthology 1989 63(1) 1-5

2 Zoology Helminthology Cestoda
Brooks D.R. Deardrff T.L. Rhinebothrium Devancyi N.Sp. (tucestoda-Tetraphyllidea) & Echinocephalus Overstreeti Dearddrff & KO. 1983 (Nematoda: Gnathostmatidae) in Thorny Back Ray Urogymmus Asperrimus from Enewetak Atoll with Phyllogenic Analysis of B Jr. of Parasitology 1988 74(3) 459-465

3 Zoology Helminthology Nematoda
Brooks D.R. Deardorff T.L.
Rhinebothrium Devancyi N. Sp. (Eucestoda-Tetraphyllidea) & Echinocephalus Overstreeti Deardorff & KO. 1983 (Nematoda: Gnathostomatidae) in Theorny Back Ray Urogymmus Asperrimus from Enewetak Atoll with Phyllogenic Analysis of Jr. of Parasitology 1988 74(3) 459-465

4 Zoology Helminthology Cestoda
Dronen N.O. And others
Some Parasitic Helminths from American Oystercatcher Haematopus Palliatus Temminck from the Texas Gulf Coast & Common Pied Oystercatcher H. Ostralegus Linnaeus from New Zeland Including Dildotaenia Latovarium N. Gen. & N. SP. (Cest Jr. of Parasitology 1988 74(5) 564-567

5 Zoology Helminthology Cestoda
Gardner S.L. And Others
Echinococcus Vogeli Rausch & Bernstein 1972 from the Paca Cuniculus Paca L. (Rodentia: Dasyproctidae) in the Departmento De Santa Cruz Bolivia
Jr. of Parasitology 1988 74(3) 399-402

6 Zoology Helminthology Cestoda
Kumazava H. Yagyu K.
Rostellar Gross Anatomy and the Ultrastructure and the Histochemical Characterization of the Rostellar Tegument Related Structure in Hymenolepis Nana
Int. Jr. of Parasitolo 1988 18(6) 739-746

7 Zoology Helminthology Cestoda
Pawlowki I.D.
Observation on the Possible Origin Formation and Structure of Calcarius Corpuscles in Taeniid Cestodes
Parasitology Research 1988 74(3) 293-296

8 Zoology Helminthology Cestoda
Rees F.G.
The Muscle Nervous & Execretary System of the Plerocercoid of Callitetrarhy Gracilis (Rud 1919) (Pintner 1931) (Cestoda: Trypanorhyncha) from Bermuda Fishes
Parasitology 1988 96(2) 337-351

9 Zoology Helminthology Cestoda
Sawada I.
Further Studies on Cestodes of Japanese Bats with Descriptions of Three New Species of the New Genus Vampirolepis (Cestoda: Hymenolepididae)
Zoological Science 1987 4(4) 721-729

10 Zoology Helminthology Cestoda
Schmidt G.D. and Others
Cloacotaeniella Tringae N. Gen. N. SP (Cestdidea: Hymenolepididae) from A Red Shanks Tringatotanus (Charadriformes) in Israael
Jr. of Parasitology 1988 74(5) 888-869

11 Zoology Helminthology Cestoda
Schmidt G.D. Wertheim G.
Inermicapsifer Beveridgei N.Sp. (CestoDidea; Anoplocephalidae) from Provavia Capensis (Hyracoidea) in Israel with Notes on Two Species of Hymenolepis
Jr. of Parasitology 1988 74(3) 487-488

12 Zoology Helminthology Cestoda
Horii Y and others
Leukocyte Accumulation in Sparganosis: Further Characterisation of an Esinophil Chemotactic Factor of the Plerocercoid of Spirometra Erinacei
Jr. of Helminthology 1989 63(1) 6-12

13 Zoology Helminthology Cestoda
Kumar D. and Others
Comparative Evaluation of various Immunodiagnostic Tests for the Diagnosis of Taenia Solium Cysticercosis in Pigs Using Fractionated Antigens
Jr. of Helminthology 1989 63(1) 13-17

14 Zoology Helminthology Nematoda
Adedeji S.O.
Synergistic Effect of Migrating Ascaris Larvae and Escherichia Coli in Piglets
Jr. of Helminthology 1989 63(1) 19-24

15 Zoology Helminthology Cestoda
Van Der Vorst E and Others
Hymenolepis Murissylvatici: Humoral Response in Intestinal Larvages Larvages of the Mouse
Jr. of Helminthology 1989 63(1) 25-31

16 Zoology Helminthology Cestoda
Robinson R.D. and Others
Survey of Intestinal Helminths of Well cared Dogs in Jamaica and their Potential Public Health Significance
Jr. of Helminthology 1989 63(1) 32-38

17 Zoology Helminthology Cestoda
Irshadullah M. and Others
Observations on the Suitability and Importance of the Domestic Intermediate Hosts of Echinococcus Granulosus
Jr. of Helminthology 1989 63(1) 39-45

18 Zoology Helminthology Nematoda
Van Aken D. and Others
Mammomonogamus Laryngeus (Railliet 1988) Infections in Cattle from Sri Lanka
Jr. of Helminthology 1989 63(1) 47-52

19 Zoology Helminthology Nematoda
Griffin Christi
Oswaldocruzia Filiformis (Nematoda: Trichostrongyloidea) in Frogs (Rana Temporaria) from Three Locations in Ireland
Jr. of Helminthology 1989 63(1) 53-62

20 Zoology Helminthology Trematoda
Kearn G.C. and Others
An in Vitro Study of the Forcible Ejection of the Metacercaria of the Strigeid Digenean Apatemon (Australapatemon) Minor Yamaguti 1933 by Rapid Inward Expansion of the Cystwall
Jr. of Helminthology 1989 63(1) 63-71

THE USE OF INFORMATION TECHNOLOGY IN THE LIBRARIES OF MEDICAL, DENTAL AND ENGINEERING COLLEGES OF MANGALORE UNIVERSITY

A K BARADOL*

1 INTRODUCTION

The libraries and information centres have been using the different tools to provide service to the clients. The information technology includes the use of communication technology. Now-a-days the information technology is applied in every sphere of activities. It has influenced many fields like offices, the industries and many other organizations including the libraries and information centres. It has an important role to play in social transformation. Pitroda says, "Information technology has changed significantly in the past 20 years. The world of mouth got changed to print media and then to electronic media. The merger of communication and computer technologies has given an impetus to an entirely new thinking in organising, structuring, transmitting, manipulating and messaging information to derive a variety of outputs."[1] The data transfer from place to place through the information networks has become a reality. The communication technology has largely facilitated the improvements in the information dissemination. To quote Parthasarathy, "The rapid strides in telecommunication technology facilitated numerous services-transfer of digital information, data networks, value added data services, local and wide area networks, fax, telex, teletex, videotex, and so on. When computers are linked by telecommunication network (Computer-Mediated Communication), it gives a new dimension to information handling, processing, transfer and evaluation, resource sharing and online searching and retrieval".[2]

2 MEANING

The information technology is a very wide concept. Its use is found in variety of services and activities. Many people have felt that it includes various new technologies. To quote Zorkoczy "information technology" aids synonymous with 'the new technology'–the use of micro processor-based machines: micro computers, automated equipment, word processors

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and the like".[3] The information technology (IT) includes communication technologies, tele-communication, data communication, artificial intelligence, Electronic Publishing, Desk Top Publishing (DTP), Tele-conferencing, E-Mail, Chip Technology, Compact Disks, etc. To quote Haravu, "The need to store and process large volumes of information efficiently, and the need to make it available at those points where it is required, when it is required, has led to the development of new media, products, and services. Most of these products and services are the result of technological advances in electronics, materials science, computers and telecommunications. The spectacular growth in computing hardware, advances in software, the development of high density magnetic and optical storage media, and developments in computer-communication systems have been dubbed as the Information Technology (IT) revolution. Apart from activities and equipments connected with the use of micro processor based machines the plain paper copies or xeroxing machines are also included in the information technology. To quote Bedi, "Information technology is a generic term used to denote all activities connected with computer based processing, storage, and transfer of information. It involves computers, electronic media, satellites, telecommunications and reprography".[5]

3 NEED

Concerted effort are on to adopt the information technology in all spheres of activities. As long as these were not available the libraries were managing the processing of information and rendering the information services manually or with the help of the existing devices. The use of information technology is necessary to render more effective and efficient information services. To quote Rajasekharan, "The role of information technology is to improve the overall efficiency of library and information services in catering to the information needs of the users. The basic concept in the use of information technology is nothing but to free the librarians from routine jobs. The time thus saved could be used for more intellectual involvement in meeting the users information needs."[6] To save the time of the staff of the libraries and information centres the information technology is needed.

The information technology has brought the people of the globe nearer. Although application of the information technology is only about 20 years old it has revolutionized the information services. The computers are applied for various purposes. To quote Krishan Kumar, "A social revolution is taking place which is making it possible for information to be made available to the farthest corners of the globe. While the bibliographical sources may not be directly available to a user, still he can have access to information".[7] The universal availability of publications is difficult to achieve. Even the

universal availability of bibliographies was also a difficult task. But with the availability of information technology the universal availability of bibliographies has become a reality. The application of information technology is needed in all types of libraries. Any library or information centre is not self-sufficient. It will have to depend on other libraries or information centres or databases for the information requirement. Hence, the online information networks are necessary. The online information retrieval is very expensive. It is generally argued that any technological advancements will make the things/services cheaper. In fact it is not always true. The users and librarians want to have the required information always with them. By online information retrieval it is not possible. Whereas by the Compact Disk Read Only Memory (CD-ROM) database it is possible to some extent. Hence, it is necessary to have as many CD-ROM databases as possible.

4 THE USE OF INFORMATION TECHNOLOGY IN COLLEGE LIBRARIES

The Mangalore University was established in September 1980. A few colleges coming under the jurisdiction of Mangalore University were already there in existence. Up to September 1980 these were under the jurisdiction of University of Mysore. The Mangalore University is one of the youngest universities in the country. The University consists of, besides 19 post-graduate departments on the campus, 82 colleges of arts, science and commerce, etc. Out of these the number of medical, dental and engineering colleges is 12. The use of information technology in these institutions is presented in the Table.

41 USE OF COMPUTERS

The Table shows that out of total 12 colleges only five college libraries are using the computers for the different purposes. Out of four engineering colleges only three are using the computers. Out of the two medical colleges only one is using the computers for different housekeeping operations.

The Kasturba Medical College (KMC) Library Manipal, has computerised the serials control. It also provides the computerised SDI services for four staff members. The Manipal Institute of Technology (MIT) has a Local Area Network (LAN) facility at the institute. The MIT, Library has computerised the serials control. The library has a terminal. The MIT Library also is in the process of computerising the entire catalogue of the Library. The bibliographical information of documents is available in the machine readable form. The ABSM College of Dental Sciences (ABSMCDS) Library is also computerising the catalogue. The ABSMCDS has a Local

Use of Information Technology in the College Libraries

Sl No	Name of the College	Year of Est	CD-ROM	Use of Computer	Plain paper copier
1	Kasturba Medical College, Manipal	1952	Yes	Yes	Yes
2	Kasturba Medical College, Mangalore	1953	–	–	Yes
3	SDM College of Ayurveda, Udupi.	1958	–	–	–
4	Fr Muller's Homoeopathic Medical College, Mangalore	1985	–	–	–
5	SDM College of Naturopathy and Yogic Science, Ujire	1989	–	–	–
6	AB Shetty Memorial College of Dental Science, Mangalore	1985	Yes	Yes	–
7	KVG Dental College, Sullia	1991	–	–	–
8	Yenepoya Dental College, Mangalore	1992	–	–	–
9	Manipal Institute of Technology, Manipal	1957	–	Yes	Yes
10	Karnataka Regional Engineering College, Surathkal	1960	–	Yes	Yes
11	KVG College of Engineering, Sullia	1986	–	–	–
12	NMAM Institute of Technology, Nitte	1986	–	Yes	–

Area Network (LAN) facility. The NMAM Institute of Technology Library is using the computer for the acquisition of books.

42 CD-ROM

It can be observed from the Table that out of 12 college libraries only 2 (two) have the CD-ROM databases. The Kasturba Medical College Library, Manipal has 30 CD-ROM disks. The use of CD-ROM databases is free for the staff of the college where as an hourly fee is charged from the students to meet out the cost of the service. The ABSM College of Dental Science also has acquired a CD-ROM drive and the CD-ROM disks. The use of the CD-ROM is still in the initial stage.

43 PLAIN PAPER COPIERS

Out of the 12 college libraries only 4 have got the plain paper copiers of xerox machines. Although there is a need for xerox machines it can be met with by the services available at the private sectors.

5 CONCLUSION

In conclusion it can be said that the information technology which was so far used only by the libraries in developed countries has entered the developing countries and more specially the libraries of professional colleges in India. The Indian libraries will not be able to afford the costly access to foreign databases through online information retrieval. Hence, a number of organizations are importing these databases on CD-ROM. It is a duplication of resources. As it is yet a beginning period the situation needs to be watched for some more time. By the turn of the twentieth century the information technology will be widely used in India. Many of the proposed library networks will be operational. A few networks which have just begun like INFLIBNET will be functional. A number of libraries would have gone in for automation and will use the information technology extensively to provide a variety of services.

The situation which is existing at present in the college of Mangalore University is also existing in many of the professional colleges coming under the jurisdiction of other universities at other places in India. If the colleges want to be more effective and achieve speed and comprehensiveness they will have to use the Information Technology (IT) extensively. The IT has a tremendous impact on the utility of the information at large. After studying the existing situations the following suggestions are provided:

1 All the professional college libraries should computerise the catalogue and also should use the computers for the other activities in the libraries like serials control, acquisition and circulation.

2 The colleges must procure the CD-ROM drive and the CD-ROM databases available in their subject fields.

3 The charge for the use of CD-ROM databases should be uniform in all the colleges.

4 The E-Mail and FAX facilities should also be made available by the colleges to the libraries.

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ADOPTION OF COMMON COMMUNICATION FORMAT FOR A LEGAL BIBLIOGRAPHIC INFORMATION SYSTEM: AN EXPERIENCE AT THE NATIONAL LAW SCHOOL OF INDIA UNIVERSITY

C U NAVALGUND*
N S HARINARAYANA*

0 INTRODUCTION

Libraries are transforming themselves into information centres more rapidly than ever before. Information centres have a challenging task of identifying, collecting, analyzing, consolidating and disseminating the information to the information aspirants. But various factors make this work very complex. However, a bird's eye view of the library history shows that libraries are innovating constantly ways and means to cope up with the challenges whenever they arise. Designing of classification systems and cataloguing rules, development of subject headings and thesaurus, inventing various methods of indexing systems, and utilizing the existing technologies are all evidence for the fact that the library scientists are always responding to the pulse of the situation. The challenges of the modern libraries/ information centres are so complex that, now it has been an accepted fact that libraries cannot wholly depend on traditional tools alone. It is basically because the traditional tools don't provide greater flexibility during retrieval. Further, number of access points for bibliographic items are limited in traditional tools. Fortunately, the technology has come to the rescue of the information centres. Modern gadgets can be effectively used to solve few problems faced by the information centres. Not withstanding the pressures, libraries and information centres–big or small–acquiring less expensive but powerful micro-computers for their house-keeping as well as information storage and retrieval activities. Experiments are on to design and develop information systems in various disciplines.

This article highlights the efforts made at the National Law School of India University in designing a legal bibliographic information system.

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1 NATURE OF LEGAL MATERIALS, USERS AND THEIR NEEDS

One need not emphasis that designing of a system requires the knowledge of the nature of documents, users and their needs. Here, an attempt has been made to present these factors in a nutshell.

A law library contains highly specialised materials. One requires special skill to handle them. Basically, legal material consists of statutory law and reports of decided cases. Both these types of legal materials relate to the "authority" and "precedent" respectively. Hence, most of the information seekers would like to scan these materials. "The term statutory law is more inclusive than is generally considered by the term in popular parlance for it includes not only legislative enactment but constitutions, treaties, court rules, interstate compacts, municipal ordinances, and administrative rules and regulations".[1]

Any law library has to be well equipped with regard to these two basic materials. These materials may equip the reader not only with what the law is but also help him understand that in a complicated society with complex ways, he may have to take recourse to such secondary materials as text books, reference books and articles. For a university library these materials may have to be in abundance, but in addition such a library has to contain materials in allied fields such as history, political science, anthropology, sociology and economics and also in comparative law.

Following are some of the typical characteristics of legal information needed by the users:

- More factual oriented.
- Requires high degree of relevance.
- Current as well as retrospective information carry equal weightage.
- While providing information like acts rules, cases etc, the information should be given exactly as to the wording and even punctuation, capitalization and other details.

The following categories of users are benefitted by a legal information system:

- Lawyers and Judges (Law practitioners).
- Law teachers and students.

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1 Erwin C Surrency, Benjamin Feld and Joseph Crea, A guide to Legal Research 7 (1959) Oceana Publications, Inc, New York).

- Policy makers in the Governments.
- Law administrative machineries of the Government.
- Researchers and scientists in law and allied fields.

It is but difficult to develop and design a comprehensive system which satisfy all the needs. Further, such designing of an information system can't be an individual's or an institution's tasks. It is a giant project to be considered by the group of institutions and/or Government. However, the basic work like designing and developing a small bibliographic information system may be taken up by institutions. These systems can later be amalgamated to form a basis for a larger system like at national or regional levels provided standarised methods is used by these institutions. This approach, ie, bottom-upward method of designing an information system has few advantages, though it has got some disadvantages as well. The most important advantage is that it is easy and feasible approach to start up a project in a smaller scale and then to expand it exploiting the benefit of the experience gained during the initial stages. With this view, the NLSIU started creating a bibliographic database of its holding as an initial experiment.

2 NATIONAL LAW SCHOOL OF INDIA UNIVERSITY

The continuous deteriorating standards of legal education and practice in the country made the Bar Council of India to think serious to establish a model institute of its own to achieve excellence in legal education and higher standards of legal research and professional training in the country. The initiative of the Bar Council of India and the Karnataka State Bar Council and the positive support of the Government of Karnataka gave the project the required fillip during the early 80's. The NLSI Ordinance 1986 (Karnataka Ordinance 1 of 1986)–establishing the NLSIU as a full-fledged University at Bangalore. Subsequently, the National Law School of India Act 1986 (Karnataka Act 22 of 1986) was passed by the State Legislature replacing the Ordinance. The State Government, through its notification dated 27th August 1987, declared 29th August 1987 as the appointed day for the formal establishment of the University.

21 OBJECTIVES OF THE SCHOOL

The objectives of the school are not limited to preparing conscientious and competent members of the profession, though that remains its basic mandate. The school is expected to advance and disseminate knowledge of law and legal processes in the context of nation development. The University aims to develop in the student a sense of responsibility to serve society by developing socially relevant skills and approaches, legal services delivery

systems and law reform measures.

22 LAW SCHOOL LIBRARY

Keeping in view the aims and objectives of the Law University, the library has been planned and is being developed by a team of qualified professional library staff guided by the Library advisory committee. It has acquired essential documents and books, reference volumes, periodicals, reports, bare Acts, journals, etc. The library has at present two PC/ATs along with a dot matrix printer. These are now being used for computerising the housekeeping as well as information storage and retrieval activities.

As the automation project has to be started in the Law School library from the scratch, the library decided to procure a software which

- is flexible so as to allow the library to tune it to its needs;
- supports primarily for information storage and retrieval and other activities of the library;
- has been in-use in other libraries so that the law library can have the benefit of other libraries experience; and
- is user-friendly.

Finally, the library procured a legal version of CDS/ISIS package (Version 2.32). Apart from this, the library has also procured legal versions of general purpose softwares like dbase–IV, Wordstar, etc.

3 DESIGNING OF DATABASE

The law library decided to set-up a database which should be amenable for future expansion and/or modification. Further, keeping in view of the developments in information networking in India, the format should allow for electronic exchange of information at later stages. So, after having discussions with few experts in the field, the library decided to adopt CCF for its database. Though the CCF is intended primarily as an exchange format, it can also be used as a basis for bibliographic storage and retrieval systems. There are basically two advantages in this. Firstly, anyone devising a new system needs some assistance and, by consulting a document like the CCF document, may benefit from the thought that has gone into similar systems in the past. Secondly, anyone basing a system on an exchange format will find it easier to exchange data in future if the need or the opportunity arises. However, the Law School library doesn't claim that its database format adheres completely to CCF for various reasons discussed elsewhere in this article. As the format is still at experimental stage, the library may change it as and when required.

4 COMMON COMMUNICATION FORMAT (CCF)

Communication through electronic gadgets always requires some standardization. Otherwise, it is not usually possible to export records/ information in processing format out of one system and import them directly into another. By using a common exchange format, each system can convert the data in its processing format into a format suitable for export and import of data. This eliminates the need to make conversions between each and every pair of systems since each system need to design only one conversion between its format and the exchange format and back again in order to be able to exchange records with any other system. All these necessitated to have a Common Communication Format or CCF. As a result, CCF has been prepared with the support of Unesco, within the framework of the General Information Programme, by the Ad hoc group on the Establishment of a Common Communication Format. The chief purpose of the format is to provide a detailed and structured method for recording a number of mandatory and optional data elements in a computer-readable bibliographic record for exchange purposes between two or more computer-based systems.

5 STRUCTURE OF THE DATABASE

Using the guidelines of CCF, the NLSIU library created database for its holdings. However, certain modifications in the format have made for one or more of the following reasons:

- To avoid redundant data entry;
- To make data entry easier and faster;
- To avoid unnecessary data entry (Unnecessary from the point of view of NLSIU's needs);
- To suit the local requirements of the NLSIU library; and
- In few cases, CDS/ISIS doesn't have the facility to adopt the features prescribed by CCF.

Following are the Data Elements used in the NLISU database:

Field Tag	*Name*
1	Accession Number
15	Bibliographic Level
22	Data Entry Date
40	Language of the Item
50	Physical Medium
60	Type of Material

Field Tag	Name
100	ISBN
200	Title
260	Edition
300	Statement of Responsibility
310	Corporate Body
320	Name of the Meeting
400	Place & Publisher
440	Date of Publication
460	Physical Description
465	Price and Binding
480	Series & Stat. Responsibility
490	Part Statement
500	Note (Extra Information)
530	Content's Note
610	Classification Notation
620	Subject Descriptors
700	Number of Copies
710	Added Entry–Author II
730	Added Entry–Author III
740	Added Entry–Collaborator I
750	Added Entry–Collaborator II
760	Added Entry–Collaborator III
770	Added Entry–Collaborator IV
780	Added Entry–Collaborator V
790	Added Entry–Collaborator VI
800	Added Entry–Series Editor I
810	Added Entry–Series Editor II
820	Key Words
830	Number of authors
840	Source
850	Bill No & Date

One can notice from the above list that, the fields 22 to 620 are the data elements prescribed by CCF. To simplify the task, the NLISU database has used the same field tags as that of CCF, though it was not absolutely necessary. Further, strictly speaking the fields 710-790 should have been included in field 300 itself as repeatable subfields. But, NLISU is using the

database for printing catalogue cards also. As it is impossible to have an access to a particular occurrence of a particular field,[1] there was no alternative but to declare the fields 710-790 as separate fields so that one can easily generate added entries.

Main entries

340.534
BUH Buhler, G Tr.
The sacred laws of the Aryans: As taught in the schools of Apastamba, Gautama, Vasishta and Bandharayana/Tr. by G Buhler–Ed. by Muller Max.-
New Delhi: Ahuja Book Co., 1990.
xxxviii, 620p: 20 cms. (Scared books of the East)
4847, 4848, 4849

341.754
GRE Greenaway, David
International Trade Policy: From Tariffs to the new protectionism/David Greeaway.–London: ELBS, 1983.
xiii, 240p: 20 cms

4860

Joint Author entries

340.0941
SMI B Bailey, S.H.
The modern English legal system/ P.F. Smith & S.H. Bailey.–London: ELIBS, 1986.
xxix, 780 p : 20 cms

4856

340.1
LLO F Freeman, M.D.A
Introduction to jurisprudence/ Lloyd & M.D.A. Freeman.–5th ed.–

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* Mini-Micro CDS/ISIS: Reference manual and CDS/ISIS pascal manual, New Delhi, NISSAT, 1989. p 33.

London: ELBS, 1986.
xiii, 1257 p: 20 cms

4858

Collaborator entries

340.534
BUH Max, Muller, Ed.
The sacred laws of the Aryas: As taught in the schools of Apastamba, Gautama, Vasishta and Bandharayana/Tr. by G. Buhler.–Ed. by Muller Max.-New Delhi. Ahuja Book Co., 1990.
xxxviii, 620p: 30 cms.–(Scared books of the East)

4847

341.242
BLA Foster, Nigel G Ed.
E.E.C. legislation/ Blackstone.–Ed. by Nigel G Foster.–London: Blackstone press, 1990.
viii, 252 p:

4835

While developing the display format for catalogue entries, one has to test for number of conditions using 'if–fi' loop. But, the maximum number of lines a display format contain in Ver 2.3 of CDS/ISIS is only 50 lines of 80 characters each. To be precise, it is just 4K. But, it is just impossible to accommodate and test all the conditions within 4K. So, certain sacrifices had to be made. For example, the CCF lists more than 85 role codes in the field 300. But the display format used by NLISU database can identify only five codes. However, it is said that in version 3.0 of CDS/ISIS one can have up to 32K in display format provided one has expanded memory facility.

The indentation command [eg, v10 (10,10)] works only with the fields and subfields. It doesn't work with literals. But in a catalogue card, the continuation lines have to be printed either at the first or second indent line depending on the situation. It is impossible to predict where exactly the literals like comma, semicolon, etc will appear on the card. If literals were to begin as the first character of a new line, then it would have

appeared in first column of the new line and thus resulting in the spoiling of the catalogue format. This problem was solved, of course, by an indirect method, using Ref function.

6 CONCLUSION AND FUTURE PLANS

Though complete adherence to CCF may be difficult, perhaps unwarranted also, there are several advantages in adopting it. Network communication among libraries/information centres is in the offing. So, it is but important that libraries adopt some standards such as CCF. One may even say that it is a ripe time for library associations and experts to guide the libraries in these matters.

The National Law School of India University Library has started the automation project with the creation of database for books. However, later it is proposed to create another database for journals and journal articles. Further, more importantly, different 'case law' databases in various fields of law will be designed. As at present there is no computerised 'case law' database in our country, it is hoped that the efforts of the Law School library will be very useful to legal professionals.

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APPLICATION OF COMPUTERS IN DIFFERENT AREAS OF UNIVERSITY LIBRARIES

GOLAM AMBIA*

1 INTRODUCTION

The increasing complexity of the Government and business operation puts a premium on the efficiency and effectiveness and thereby necessitates the use of more modern tools and techniques. The computer is one such modern tool which could be effectively used in administration, commerce, industry and education. The use of computer has been steadily increasing in science and technology. Most of the advanced countries of the world have made much advances in this respect. India has also made a start in this respect in the field of Industry and business besides science and technology. In India we have not been able to capitalize the utility of computers compared to the Western Countries, due to various constraints such as indigenous development of chips, import restriction and prices. However, there is growing awareness among the people about the utility of computers.

In India, University Libraries are growing day by day in terms of their books, and journals and readers. If we use computer in the University Libraries many problems can be solved. The time is approaching when more and more libraries will be forced to turn to computers in order to provide more efficient, effective and satisfactory services to their patrons because computers make possible better utilization of personnel and a wider and more flexible range of services.

2 AUTOMATION IN LIBRARIES

The term library automation refers to the processing of certain routine clerical functions in the library with the assistance of computers or other mechanized semi-automatic equipment. Automation can relieve the library staff from many routine, administrative or clerical functions. Automation includes mechanization of various processes and their operation as well as the use of machines, equipment, tools, ie, all sort of mechanical devices, automatic machines, electronic equipments and also systems. In libraries, automation or mechanization is playing a vital role these days.

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3 APPLICATION OF COMPUTERS TO LIBRARY AND INFORMATION SERVICES

Following are the various aspects of Library and Information Services which can be computerized or mechanized or automated.

31 ACQUISITION WORK

(*i*) Ordering
(*ii*) Preparation of order slips or cards.
(*iii*) Sending orders to vendor(s).
(*iv*) Updating the record file ie, documents or order receipt work.
(*v*) Verification of books with order file and invoices.
(*vi*) Print-outs of received documents and non-supplied documents, maintenance of accounts.
(*vii*) Income, expenditure and balance of allocated funds.
(*viii*) Budget control.

32 CATALOGUING

(*i*) Printing of catalogue cards.
(*ii*) Preparation of authority file/subject heading list.
(*iii*) Preparation of shelf list.
(*iv*) List of catalogued items.
(*v*) Centralized and cooperative cataloguing.
(*vi*) List of holdings.

33 MAINTENANCE

Vigilance in stacks and reading rooms with short circuit television, miscreants tearing pages from books can be detected. Electronic thief detector can be used to control unissued books.

34 CIRCULATION CONTROL

(*i*) Registration of members.
(*ii*) Issuance of library/borrower cards.
(*iii*) Charging of documents.
(*iv*) Discharging of documents.
(*v*) Reminders of overdues.
(*vi*) Maintenance of Statistics.

35 SERIAL CONTROL

(*i*) Ordering work.

(*ii*) Registration work.

(*iii*) Updating the record file.

(*iv*) Reminders to vendors/publishers.

(*v*) Binding List.

(*vi*) List of holdings.

36 DOCUMENTATION AND INFORMATION RETRIEVAL

(*i*) Indexing of micro and macro documents.

(*ii*) Preparation of Thesaurus.

(*iii*) Compilation of union catalogues.

(*iv*) Bibliographical work.

(*v*) Searching and printouts of reply of queries.

37 STOCK VERIFICATION

Preparation of accession list of all documents in the library, printout of list of accession number of documents missing, printout of list of missing documents after key punching bibliographical details of all missing documents and feeding the input into computer system.

COMPUTER CULTURE AND COMMUNICATION NETWORK OF LIBRARIES IN INDIA

BAMAN PARIDA*

INTRODUCTION

The modern information technology has brought a revolution in various operations of libraries and information centres. Since 1960's libraries and bibliographical information centres are using technology in general and computers in particular to automate a wide range of administrative, public and technical services. Now the library world is being acclimatised in computer environment for acquisition of documents, serials control, circulation control, indexing and abstracting, compilation work, technical processing. Thus, computer has gained the capability to cover important operations of the libraries and information centres with great speed and accuracy like super human.

1 COMPUTER CULTURE

The rapid developments in the field of science and technology and constant relay research in various subject fields led to the enormous growth of literature and ultimately posed intricate problems for various types of libraries. After the two world wars the post industrial society and scientific community witnessed the information explosion and realised the importance of computers and also utilised them for immediate availability of information more exhaustively and pinpointedly in spite of vast magnitude and wide range of information. Thus, for last two decades computer technology has transformed and substantially improved bibliographic control of documents through the information and library network. Further, computerization has relieved the pressure of workload in libraries and information centres. Therefore, it would be more appropriate to regard this as computer revolution and in somewhat dramatic terms as *'Computer Culture'*. Now the social and cultural effects of computers are fully realised and computers have pointed the way to an automated information society, through local, regional, national and international communication networks.

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11 EVOLUTION OF COMPUTERS

Computers can be identified basing on their computing power and generations. The development of electronic computer technology is the fundamental process that started in the early 1940s and which is accelerating now in the 1990s towards more advanced systems and technologies. During this period several stages have been identified in the development of computer technology and systems and these stages are known as 'generations'. Four generations have already been identified so far and the race is in the fifth generation.

The First Generation Computers developed during 1950s were characterised by the use of vaccum tube in electronic circuits as one of the principal components. They were physically very large and utilised punched card oriented slow input/output devices and low level symbolic language for programming. They were used for pay roll processing and record keeping applications (Example: IMB 650 and UNIVAC 1).

The Second Generation of Computers made during early 1960s was based on a newly invented electronic device known as the transistor which produced flows of electrons within specially treated crystalline structure such as silicon. They utilised magnetic cone as internal memory and tape oriented faster input/output devices for increasing main storage memory. They used higher level programming languages such as FORTRAN and COBOL. They functioned with increased speed and more reliability (Example: IBM 1401 and CDC 1604).

The Third Generation of Computers emerged in late 1960s and developed through 1970s, were based on solid state electronics using integrated circuits and having magnetic core and solid state main storage. They had smaller size, better performance and reliability. They were of more flexibility with disk oriented input/output devices. they were used to higher level programming languages, remote processing and time sharing through communication. They were used for on-line processing such as airline reservation systems (Example: IBM 360, NCR 395, Burroughs B 6500).

The Fourth Generation of Computers developed during the late 1970s and early 1980s had the unique features of the advent of microprocessor and microcomputers increased shortage capacity and speed of operation, greater versatility of I/O devices, use of large scale integration techniques to produce silicon chips, modular design and compatibility; availability of sophisticated programmes for specialised applications; internal memory based mostly of semiconductor devices rather than on magnetic cones.

The Fifth Generation of computer systems is now a matter of speculation

and under experimentation. The computers are supposed to be based on increasingly sophisticated electronic and artificial intelligence. They would have a natural language interface using knowledge Information Processing Systems and problem solving software. They are supposed to have capabilities of reasoning which are normally associated with human intelligence techniques characterizing voice recognition, speech synthesis, image processing, etc.

2 COMPUTER NETWORKS

The various computers can be grouped into different classes basing on their computing power such as super computers, main frame computers, minicomputers, microcomputers and personal computers. The super computer systems are very costly and are required by large corporations and government agencies for maintaining large databases and complex calculation capabilities. The main frame computers can process large amount of data at very high speed and support many input, output and auxiliary shortage devices. They have multiuser facilities so that they can support large network of terminals and remote job entry stations. The mini computers have the same type of capabilities as main frames but contain smaller primary memories and are less powerful than mainframe computers. Microcomputers are the smalles t, cheapest and commonly used computer systems. They have micro-processors with integrated circuit systems which control the sequence of operations both arithmetic and logical and store data and instructions. The personal computers (PC) are basically microcomputers used for personal applications of individuals with a wide range of capabilities. They are now very popular due to their low price, simple operating processes, reliable and efficient services.

A set of computers connected through communication lines forms a computer network. The data stored in a particular computer system in the network can be searched using any other computer belonging to the same network. Thus, computer networks are generally used for resource sharing among different organizations. The computer networks are of two types such as (*a*) Local Area Networks (LANS) and (*b*) Wide Area Networks (WANS). In a network system computers are located geographically at places so that they are very useful for resource sharing in libraries and information centres. A local area network (LAN) contributes to library services in different ways either the library is a node on a network which runs throughout the parent organization or the LAN operates within the library itself.

3 COMPUTER-BASED LIBRARY SYSTEMS

In early 1960s developed countries began to experiment with the use of

computer in library and information processing activities. Mainly, these systems were batch oriented and used punched cards as data input media. These systems did not yield expected results because the computer technology of the period was in its infancy and was inadequate to provide satisfactory solutions to the problems of the libraries and information centres. In early 1970s libraries made proper use of computer in various library operations and launched local systems successfully due to availability of improved computer technology and collaboration between libraries and computer specialists.

In 1970s computer based systems brought a revolutionary change in library co-operation and resource sharing as a result several library networks like OCLC (On line Computer Library Centre) came into existence. By mid seventies, organizations such as the US Library of Medicine, the Lockheed Missiles corporation and the Systems Development Corporation had started to offer online searching from remote terminals, from a variety of machine readable databases. In late 1970s many libraries started acquiring minicomputers and developed their in house computer based library systems for accessing bibliographic files remotely located. In 1980s the availability of micro-computers accelerated the computing facilities and were used as intelligent terminals being linked to remotely located main frame systems. Also microcomputers are now being used in small libraries to control a variety of functions such as the creation of local databases, acquisitions and serial controls circulation control cataloguing and catalogue card production, subject indexing, online catalogue, etc. During 1980s, the provision of 'packaged' hardware and software systems has come into practice and also gained popularity for information storage and retrieval processes and reference network of the libraries and bibliographical information centres.

4 TELECOMMUNICATIONS AND DATA NETWORKS

Telecommunications encompasse the electronic transmission of voice, data and video information from one location to another. The telecommunication technology during past two decades has been essential factors in the speedy growth of computer based library systems such as the use of centralised cataloguing and online search services. As a result a large collection fo bibliographic data on variety of computer systems throughout the world can easily be accessed from a terminal in the library or information centre. The terminals in various libraries and information centres can be linked to either a local computer system or to one or more remote computer systems for data transmission. A data network consists of host computer systems and remote terminals linked by a number of telecommunication channels. It is designed to minimise or eliminate the

disadvantages in using public switched telephone network for carrying digital information and to reduce costs. It also facilitates the inter library resource sharing networks. Other new telecommunication technologies like electronic mail and telex systems are very useful in liter-library lending networks. Thus, the use of telecommunication equipment plays a vital role in the Local Area Network (LAN).

A telecommunication network is a netlike combination of transmission of lines consisting of short or long distance transmission lines and nodes or switching points or exchanges. A network has mainly two components: (*a*) Exchange or Switch and (*b*) Transmission medium, interconnecting the Switches. All the lines interconnecting several exchanges, not dedicated to any subscriber but can be used by all subscribers when required, are known as 'Trunks'.

All the users (subscribers) of a network are assigned a unique address known as number. Thus the telecommunications network comprises telephone network, telex network and data network. Generally these networks can be divided in to two categories such as (1) Public Network and (2) Private Network. The Public Networks are operated and maintained by Government or Government agencies with some exceptions. Any person or organization can become a member or user of public network by paying necessary installation charges. The Private Networks are established by organizations for their own private use and usually owned by multinational organizations for interconnecting their offices or information units in different countries and cities.

5 ONLINE DATABASE ACCESS AND NETWORKS

The 'Online Database Access' is the interactive process of directly accessing and interrogating computer based systems for access to information. The range of information stored being very wide, the user (member/ subscriber) through this interactive process narrows down the search to the information required. The online access to computer database is performed using personal computers or workstations, that possess a keyboard and screen and a communication capability to establish a link to a database desired by the user. Such communication links may take the following forms:

(*a*) A direct dialled links via the public switched Telephone Network;

(*b*) A link via Packet Switched Public Data Network.

(*c*) Access via a leased circuit.

(*d*) Access via Local Area Network (for local databases).

Considering the multiplicity of databases a long felt-need to have a common command language for all the databases (where possible to make searches by users over multiple databases easier) came to reality when the National Information Standards Association of USA made some of the commands. Several basic types of standards have been established to facilitate comprehension and transfer of bibliographic data by the national and international bodies like the Library of Congress (LC), the American Library Association (ALA), the Network Advisory Committee (NAC), the American National Standards Institute (ANSI), the International Standards Organization (ISO), the International Federation of Library Associations (IFLA), the UNESCO, the Universal Bibliographic Control (UBC), etc. The first established and largest of the networks is the Online Computer Library Centre (OCLC), headquartered in Dublin, Ohio in 1967. Under the dynamic leadership of library automation pioneer Mr Frederick Kilgour, its Online shared cataloguing system first became available within the state in 1971.

6 INDIA'S PARTICIPATION IN INTERNATIONAL DATABASE ACTIVITIES

India has all along been an active participant in international initiatives promoted by the UNO such as INIS, AGRIS, FSTA, etc. The Agricultural Research Information Centre (ARIC) of Indian Council of Agricultural Research (ICAR) has been the national input centre for AGRIS. The ARIC has contributed thousands of items from crores of periodicals to the AGRIS database. It maintains SDI profiles and also provides retrospective search services on request. In 1970 the Bhaba Atomic Research Centre, Bombay started INIS operations in India and it acts as the national input centre on nuclear science and related areas originated from India. The Central Food Technological and Research Institute (CFTRI), Mysore has participated in compilation of FSTA database with close collaboration of International Food Information Service (IFIS), U.K. Thus, India's participation in international ventures leads to (*i*) development of comprehensive information system at the local level; (*ii*) promoting better dissemination of information at the local level; (*iii*) over coming local language barriers; (*iv*) decentralization of input preparation; (*v*) transfer of software for input preparation, local processing, information retrieval and related information technology; (*vi*) acquisition of international compilation instead of inputs; (*vii*) building up primary collections and required infrastructure for abstracting, indexing and computer handling at the central processing unit. Therefore, the Indian database producers should actively participate in international activities.

7 ONLINE ACCESS TO REMOTE DATA CENTRES IN INDIA

In India it would not be economically viable and operationally feasible to get all required databases on magnetic or optical media. At the same time it is necessary to provide information support services to scientists and technologists in India at par with those available in developed countries. Therefore, several attempts and experiments have already been made for online access to various remote data centres like DIALOG, and ORBIT. However, NISSAT has taken up the establishment of online search facilities on permanent basis in India. As per the scheme following five regional NISSAT Access Centres to International Data Centres (NACID) have been established:

(1) Indian National Scientific Documentation Centre (INSDOC), New Delhi.

(2) National Chemical Laboratory (NCL), Pune.

(3) National Aeronautical Laboratory (NAL), Bangalore.

(4) Central Leather Research Institute (NLRI), Madras.

(5) Indian Association of Cultivation of Science (IACS), Calcutta.

These NACID Centres operate by using normal Public Switched Telephone Network (PSTN) lines, local VSNL PAD (Packet Assembler Diassembler) and the international gateway facilities created by the Videsh Sanchar Nigam Ltd (VSNL), Bombay. The centres are having telex lines with message communication terminals (MCT) as standby. The centres will also provide SDI services on such databases for which the demand may not be sufficient to justify their installation in Indian Networks.

8 DATABASES ON MAGNETIC MEDIA AND CD-ROM

The use of databases on magnetic media was started in India in 1978. INSDOC, New Delhi, for the first time initiated SDI Services as an NISSAT project on Chemical Abstracts (CA) and INSPEC databases using CAN/SID software and the IBM370 system of IIT, Madras. In 1983, the University Grants Commission, India set up the National Centre for Science Information (NCSI) at the Indian Institute of Science, Bangalore. The NCSI provides SDI services based on CA, INSPEC, BIOSIS, GEOREF and MATHFILE, primarily to users in Universities. The R & D Centre on Iron and Steel (DCIS) of Steel Authority of India Limited (SAIL) has been running an information retrieval service based on METADEX and MATERIALS BUSINESS FILE databases since 1980 and 1986 respectively using indigenous software. The NIC-ICMR Centre on Biomedicals was set up for

implementation of the MEDLARS database programme in India in 1987.

Computerized databases on CD-ROM have very significant use in a developing country like India because of the following useful advantages:

(*i*) The telecommunication system is not fully reliable which ultimately constrains the development of online systems involving huge databases and query retrieval traffic. But CD-ROM offers the possibility of installation of databases at user sites obviating the need for communication over long distances;

(*ii*) The CD-ROM databases come with retrieval package; and

(*iii*) The use of CD-ROM requires inexpensive hardware such as CD-drive. Also PC as a processor which is within the reach of many information centres. Further CD-ROM is suitable to Indian environment. However this technology is not widely used in India due to lack of appreciation of its power or it might be the hesitation to invest in a technological option which is yet to stabilise in the world market.

INSDOC has started subscribing to Science Citation Index on CD-ROM since 1988. The National Institute of Oceanography has received abstracts on aquatic sciences databases on CD-ROM under a UNESO project. The NIC-ICMR Centre on Biomedicals is getting databases on CD-ROM. NISSAT has established CR-ROM Information Centre at the National Aeronautical Laboratory (NAL), Bangalore in 1988. Now LISA on CD-ROM is available in different centres.

91 ELECTRONIC MAIL SYSTEM AND SIRNET

Electronic mail (E-Mail) is a popular and rapidly expanding form of communication that enables scientists and engineers to exchange electronically created messages over computer communication networks. E-MAIL systems permit a user scientist to send messages to a specific individual or to a group of individuals or to every one connected to the network. Messages are entered as text files via a computer terminal or a personal computer (PC) that is connected to the network.

SIRNET is a computer communication network for the CSIR laboratories in India. SIRNET is the acronym for the Scientific and Industrial Research Network. At present SIRNET has only two mail nodes and eleven user nodes. Its one mail node is now functioning at INSDOC, Delhi known as *CSIRD*, and another mail node known as *CSIRB* located at INSDOC Regional Centre, Bangalore is providing linkage to user nodes of southern region. SIRNET will have another mail node at INSDOC Regional Centre, Calcutta. In future its nodes will be layered as: (*a*) user nodes, (*b*) laboratory

nodes; (*c*) city nodes and (*d*) backbone nodes. All these backbone nodes will be connected to the international networks like UUNET (Unix User Network). ERNET (Education and Research in Computer Networking). ERNET (Education and Research in Computer Networking) set up by Department of Electronics, Government of India, is linked to different nodes of SIRNET. The mail node CSIRD is directly connected to Department of Electronics mail server Vikram which acts as the clearning node in Delhi for ERNET. Similarly the node namely *Shakti* at the National Centre for Software Technology (NCST) Bombay acts as a national clearning node for all ERNET city nodes. The present ERNET main city nodes are *Shiva* of IIT, Madras, *Vigyan* of Indian Institute of Science and Bangalore and *Vikram* of DOE, Delhi. These city nodes dial up to *Shakti* two or three times a day and collect/deposit mail. The national telephone network used for this purpose is known as Public Switched Telephone Network (PSTN) in the internationally standardized term. The mail server *Shakti* at NCST, Bombay is well connected to the international network UUNET in the USA and in Europe and to many other networks. Thus, from SIRNET one is able to send mail to any network anywhere in the world.

911 *User Node Setup*

For setting up a user Node, the INSDOC, New Delhi recommends the requirement of following equipments:

(*a*) A PC-XT or PC-AT computer.
(*b*) A stand-alone modern with error correction facility at 1200 bps.
(*c*) A dial-up line to start with, and
(*d*) PROCOMM software (A communication software package that runs under MSDOS).

912 *Mode Node Setup*

The equipments required for a Mail Node are as follows:

(*a*) A PC AT-80386 UNIX machine with IMB RAM, 40 MB hard disk, 1.2 KB floppy disk, RS 232C port and parallel port.
(*b*) A stand alone modern with error correcting facility at 12000 bps.
(*c*) A dial up line with STD facility, and
(*d*) Provision of Basic Networking Software (UUCP) with Standard UNIX package to communicate with other Unix-System.

Thus, INSDOC, New Delhi has developed expertise in establishing E-Mail facilities and it offers to set-up USER NODES or MAIL NODES for Electronic Mail in CSIR laboratories and institutions with the help of

Networking team of SIRNET. Also many CSIR organizations may already have some of the required equipments. INSDOC is able to extend its support at different levels depending upon the requirements. Further, INSDOC has published and circulated SIRNET Electronic Mail System User Manual for this purpose and also made provision for training of personnel at the time of setting up and opertionalising the node.

92 CONCLUSION

The computer culture is a great concern of the modern information society all over the globe. So it is well predicted by the NISSAT adviser, Dr. A. Lahiri, that as a vast majority of the population especially those in developing countries have not yet reaped the benefits from the rapid advances in technology the information technology revolution would continue through this decade in the field of automated information storage and retrieval systems through computer communication networks. The trend in the use of computers at home and conduct office/library/information centre work from remote locations will get momentum. While computerized online and offline database services will be increasingly used by professionals, business and industries and services like travel and tourism, banking, etc. public databanks and videotex services for daily use information, may be available in all major cities. It is hoped that during Eighth Five Year Plan the computerized information retrieval systems will flourish in the most of the heading libraries and information centres of India.

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COMPUTERISATION OF GAUHATI UNIVERSITY LIBRARY

Mrs BINA MEDHI LAHKAR*

0 INTRODUCTION

A university library assists the university in research and advancement of knowledge, besides supplementing the materials for different academic programmes. The Gauhati University located in the State Capital of Assam, is the pioneer and oldest university in North-East India.

The University has six faculties viz Arts, Science, Commerce, Law, Medical Sciences and Engineering. PG courses of the first four faculties are conducted in the university. Some of the colleges affiliated to the university also conduct PG course. All PG courses in Medical Sciences and Engineering are conducted by respective colleges. In the university there are 13 departments in Science faculty, 21 departments in Arts faculty, 2 in Commerce and one in Law faculty. Almost all departments have their M Phil and PhD courses besides PG courses. The university is contributing a lot in the academic development of entire Northern region in general and Assam in particular.

1 GAUHATI UNIVERSITY LIBRARY

The Gauhati University Library named after the famous orientalist Prof K K Handiqui was established in 1948. It has acquired a huge collection of books and other materials. The Library acquires a good number of books every year and subscribes regularly to a number of journals of both national and international repute. The present situation of the library collection in GU Library is as follows:

1	Books	233680
2	Current periodicals	
	Science	282
	Arts	92
3	Back volumes of periodicals	31605
4	Thesis and dissertation	4870
5	Reports	4365
6	Maps	306
7	Bulletins	288

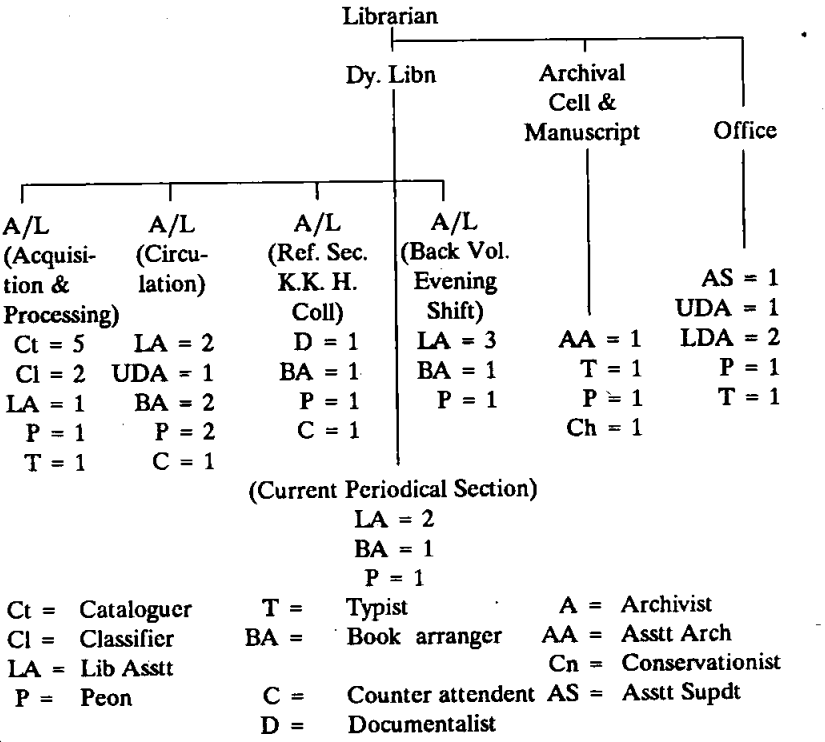
*Cataloguer, K K Handique Library, Gauhati University, Guwahati-781 014.

8	Newspapers	22
9	Popular journals	46
10	Manuscript	4000
11	Prof K K Handiqui Corner (Donated by him)	7593

Besides, the library is getting regularly some publications free of cost from different sources which are not accessioned and are not shown in the list above.

11 STAFF STRUCTURE

As mentioned, there are 68 library personel in K K Handiqui Library comprising both technical and non-technical staff. Each section is supervised by a senior staff. The staff structure is presently as follows:



13 LIBRARY MEMBERS

Membership increases every year. With the limited number of staff it is difficult to provide satisfactory service. The membership breakup is follows:

Teachers	758
Research Scholars	927
Students	3200
Officers	562
University Staff	359

There are casual readers also visiting library from different areas as the collection in the library is found to be most useful by these readers. These casual readers too have to be served with the existing staff.

Considering all the factors for upgrading library service standard and satisfaction of the demands of the readers, Computerization of library operations and services is the only solution. Sooner the library changes to computerization, better it will be.

2 COMPUTER APPLICATION IN LIBRARY

Advantages of automation are enormous. It enables libraries to place their collocation at the immediate disposal to its clients pinpointedly. After the establishment of the electronic system, the sphere of library activities are growing significantly to fulfil readers' demands. Libraries in the west have mostly solved the problems encountered through computerization. We can take a lesson from their experience and start using computers in the library.

There are various factors to be considered while introducing computerised library system at the initial staff. Few of them have been discussed here in the context of K K Handiqui Library.

211 *Fund*

The existing fund position of Gauhati University as also of K K Handiqui Library is not sound to go in for computerization. The budget estimates for the financial year 1992-93 for K K Handiqui Library are as follows:

Budget estimates for 1992-93
(Non-plan Budget)

	Rs (thousand)
Salaries	1634
Newspapers/Journals	30
Books & Binding	50
Catalogue Card	8
Printing & Stationery	20
Telephone & Postage	3
K K Handiqui Spl Collection	12
Maintenance of Zerox	25
Other charges	8
Total	1790

During the VIII Plan, the UGC under revised allocation has allotted an amount of Rs 20 lakh under 1st priority schemes for books and journals during 1992-93. The university plan budget for the library is as follows:

Head of account	Estimates for 1992-93
	(Rs in thousand)
1 UGC Grant Books & Journals (general)	417
Books (for library only)	267
2 Grants from Assam Govt (development Grant)	
Books & Journals (general)	1700
3 Matching share of both scheme Extension of library building	100

Additional funds will have to be provided if computerization is thought of. Organization like NEC, UGC and some semi-govt undertakings may be approached for providing fund for the purpose, if the University is not in a position to allocate the needed money from its our resources.

212 *Place for installing computer*

Extension work of existing library building is now in progress and there will be no problem for the K K Handiqui Library to make room to install computer in its building. It will be better to select computer's location in ground floor with required air-conditioned facilities, as most of the library sections are connected with readers in ground floor. Management of all services would be possible simultaneously by computerized control.

213 *Human Resources*

Human resources are one of the most important practical factor to work with the computer system. The K K Handiqui Library is also not an exemption. Persons employed to manage, operate and maintain the system are expected to have good technical knowledge to handle it. So, staff is needed to be initiated in the processes of computer system. Training is required to the staff who are appointed to handle the automated system. Library staff having required qualification, who will be using the computer system should be trained apart from detailed training to a limited staff at various levels.

214 *Hardware & Software*

With regard to selection of hardware and software, it is better to take suggestions from computer experts. Reputed company(s) with better post sale service facilities should be preferred while selecting a hardware. Advice may be sought from UGC, NISSAT and INSDOC for selection of software purchase in the library. Library personnel with computer back-

ground have also to be approached for selection of a software in the Library.

3 INSTALLATION OF COMPUTER SYSTEM IN K K HANDIQUI LIBRARY

A proposal for installation of computer in K K Handiqui Library has already been prepared by the Library and placed before the Library Committee in April 1992. Proposal comprised 4 basic points (1), fund, (2) training of staff, (3) accommodation for the computer system, (4) Types of computer to be installed.

The Library Committee consisting of the VC of the University, Treasurer, Deans of faculties of Science and Arts and some of the faculty members discussed the proposal in detail and resolved to computerize the Library. The Vice-Chancellor has assured to look into the matter for getting necessary funds for implementation of the proposal.

The Library Committee has resolved to depute two library personnel (one junior and one senior) to undergo training in Computer application in libraries in any of the organisations in India viz, INSDOC or DRTC. The library committee has also resolved to construct one separate air-conditioned room attached to the existing building to house the computer system.

Considering the fact that, selection of computer hardware and software is entirely the business of computer experts and library experts, the committee has requested the G U authorities to approach such expert(s) for suggesting appropriate hardware and software for the library.

4 CONCLUSION & SUGGESTIONS

It can be safely concluded that:

1 Computerization in library operations and services is very much essential in the present context specially in the days when library is becoming really a workhouse for the different academic programmes in the University.

2 Providing comparatively better library service is possible through the application of computers.

3 In future there is every possibility to save library funds.

4 The K K Handiqui Library has to show the way of modernization of its services in order to create proper library atmosphere in this region.

5 Young library scientists working in different capacities in the University library should be properly trained for handling computer in their day to day works. A computer environment is a must for upgrading library service standard.

6 There are different organizations, private or public who have their budgeted provision for providing funds for social work and if the University approaches properly, there is every hope of getting funds from such organisations.

7 Increased number of stock, membership and extensive and intensive study of the subjects demands efficiency of services and it is possible through computerizing library operations.

8 The time is ripe now for the Gauhati University in various aspects for introducing computers in its Library.

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COMPUTERIZATION OF BIBLIOGRAPHIC RECORDS: A JNU EXPERIMENT

JITENDRA VARMA*
Mrs NEENA KAPOOR**

0 INTRODUCTION

Jawaharlal Nehru University Library was established in the year 1969 in Vigyan Bhawan Annexe. It was shifted to JNU Campus (Old Campus) in the year 1970. *Colon Classification* Ed 6 was introduced with some modifications provided in the *'Preview'* written by Dr S R Ranganathan and Unit Card System in cataloguing following *CCC* Ed 5. All the fields which are present in AACR1–were introduced by suitably amending *CCC* format of Main entry.

Developments in the field of information retrieval and computerization were felt by the JNU Library in 1980s and that is the reason that some of the officers of the Library were sent for training in the School of Computer and Systems Sciences of the University. This proved to be a good initiation.

Development in mini-computer technology ushered a new era in Computer application in large and medium libraries in developing countries. JNU library was not an exception. It opted for purchasing a mini-computer and suitable software. Soon after the release of *AACR-2* in 1988 the library decided to adopt it.

1 COMPUTERIZATION EXPERIMENT

The major problem for library computerization in developing countries like India is the cost of computer as machine and the cost of the software package. The cost of software has tended to rise at least 10% annually while in the case of the hardware it is decreasing at much faster rate. Another major problem is that only a few software packages are truly portable. Hence, one has to take into consideration the cost of the hardware

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if the same (software) is not already available to the library. MINISIS package has been made available free of cost to the non-profit institutions in developing countries by IDRC, Canada. Although it is quite a sophisticated package which has proved its worth at several installations around the world, it requires a HP 3000 mini-computer system. JNU Library opted for H P 3000 mini-computer system as MINISIS software was to be installed free of cost by IDRC. The MINISIS (mini-computer-based information system) facilitates manipulation of information not usually amenable to traditional data processing techniques–information in which data is organised into fields and records of varying lengths. It is interactive, and controls most of user functions through interactive management. It is able to provide user dialogue in different languages and data distribution and its programming is of international standard format. Security system controls processor and data base access. It has capability of SDI service.

MINISIS is a member of the ISIS (Integrated Set of Information Systems) family of information systems. The ISIS systems were developed to permit the handling of bibliographic data using large mainframe computer. Minisis fills the same need, but operates on smaller, less expensive mini-computers. It is a completely new design and exploits advances in software and hardware design. Minisis supports variable length fields and subfields which may repeat or not exist at all. Minisis is based on rational database theory. Its practical application allows databases to be defined as selected parts of large databases, selected parts of larger records, or combinations of databases and records. The MINISIS design, based on rational algebra has resulted in a system in which problems are solved in constituent fashion, making the systems easily understood. Combined with the SPL (Special Programming Language) Language features and a modular programming approach, this has yielded a system that is reliable and capable of fast implementation.

Hewlett Packward 3000/XE computer system had been installed in JNU Library. It has 4 Megabyte RM, 571 and 81 Megabyte hard disks, 4 terminals, one console and a printer. The software package MINISIS was installed by IDRC in the month of June 1989. Training for computer operations was also conducted by IDRC for some of the Library staff.

The catalogue of a library is the most important record of the library collection. A good catalogue enables both users and library staff to utilize the library resources effectively. The cataloguing requires both professional skill as well as clerical skill–priority of computer application was first given to the cataloguing of books. Previously cataloguing was being done on the guidelines of classified catalogue code with some local variations. For

computer application it was decided to adopt *AACR-2*, so that in future it would be helpful for networking purpose. During July to October 1989, different sample data sheets were prepared and tested. Data input sheets using CCF (Common Communication Format) fields were prepared.

For processing of different documents in JNU Library, content designation of input sheet is based on CCF pattern and data description is based on AACR-2 rules. Input sheets of books, thesis and serials were framed according to their relevant fields. The databases of books, periodicals and thesis are separate because all the fields required for them are not common eg, serials holdings, periodicity and its numbering and date are important fields of the database of serials while these are not required for books and thesis. In case of thesis, the name of the supervisor, year of award; school and centre is needed which is not relevant for books and serials. The fields and subfields with tag numbers are provided in input sheets. These input sheets have been revised from time to time eg, the "Tracing field" has been replaced by the field "Added Entries". These input sheets are filled by the cataloguers and then the data is transferred in the computer by the Data Entry Operator.

Databases include all the required fields and subfields, may be repeatable or not with specific length eg, The field like name of persons has subfields like surname and forename, while the field LC Subject Heading does not have any subfield. The length of the field accession number is only 10.

Besides cataloguing of books, thesis and serials, separate databases for entering periodical literature and serials subscription have also been framed.

Although computerization of cataloguing is being done since last three years, there is no direct access to computer for retrieval due to the scarcity of computer terminals. Therefore the card catalogue is used for information retrieval. The outputs of various documents are taken from the computer in different formats along with indexes. The output of document in the form of which Main Entry in 5"x3" size is being generated in the computer is taken from the computer and the multiple copies are obtained by Xeroxing on 4 in 1 card. This print format of card form is generated according to the rules of *AACR-2* and it is compatible with LC catalogue.

An inbuilt facility has been created by which title of the record is being checked for duplication with the existing database. This helps us in inputting a duplicate record with only changed Accession Number and Book Number.

Separate databases are created for social science, science and the humanities divisions.

In case of serials, two databases have been framed, one is for Main Entry and second for shelf cards. The full data description is given in the Main Entry database. This data is copied in other database which is meant for shelf cards.

The outputs of books, thesis and serials are taken in different format along with indexes. One of the important print formats of books is *Monthly List of Books* ie, *Grant Suchi* and the list of periodical articles is *Suchika.*

Bibliographical information of periodical literature is another major computerised service which is provided by the Documentation Section.

2 JNU LIBRARY DATABASES

This size of the bibliographic records in the database is as follows:

1	Books	16793
2	Serials	35879
3	Manuscripts including thesis & dissertations	667
4	Periodical literature	
	1 Current w.e.f 1990	28127
	2 Retrospective–India & World Affairs	30000
5	JNU database of Devinsa project	5400
6	Serials subscribed in Delhi libraries	9000
	Total	1,25,864

3 OUTPUTS

(*i*) *Granthi Suchi*–Title wise listing of books added in the library is brought out from Database (Books) on fortnightly basis. The list is arranged according to broad subject heading, whose codes are fed in the record to get the print out. *Granth Suchi* is in two parts viz, Science and Social Science.

(*ii*) *Annual Granth Suchi*–Title wise listing of books added is yearly

arranged by broad subjects as in Granth Suchi. Author index is given in the end. This also is in two parts viz, Science & Social Science.

(*iii*) *Shodh-Prabandh Suchi*–In it the Dissertation/Thesis written by JNU scholars are listed. The list is arranged according to School/Centre and thesis and dissertations. The list is arranged by scholar under thesis or dissertation. Broad Subject index and supervisor's index is appended.

(*iv*) *Suchika*–Suchika is brought out on monthly basis. This is a listing of articles and important Press clippings indexed in a month scanning approximately a thousand learned periodicals of Social Science and 4 Indian Newspapers. The list is arranged Subject/Area wise under author. This is also a computer output taken from Database–(periodical literature).

(*v*) *India and World Affairs*–JNU Library took a project of publishing India and World Affairs–A bibliography wef 1947 onwards in 4 volumes. For this data collected by the Documentation section of ISIS and JNU was fed as a separate database, 2 volumes are already published.

(*vi*) *List of subscribed serials in Delhi libraries*–JNU Library did a project to compile a list of serials subscribed in Delhi libraries, sponsored by NISSAT and DELNET funded by DST. For this a separate database of 9000 items was created. The following listings have been produced:

1 Alphabetical listing of all libraries.

2 Social Science libraries–list of journals subscribed.

3 Physical Science libraries–list of journals subscribed.

4 Medical Science libraries–list of journals subscribed.

5 Agricultural Science libraries–list of journals subscribed.

Retrospective data entry work of 1500 periodicals and 1000 serials has been completed. The data generated has a magnitude of 40,000 records. Recataloging of old books is also on. Recataloging of such books which need to be shifted from one sequence to another is also under way. Library has not yet dispensed with the conventional card catalogue. The catalogue of new books wef January 1, 1990 stands separated.

4 FUTURE PLANS

The library has sent a proposal for purchase of extra terminals. Our

future plans include.

1 Computerization of membership work.

2 Computerization of charging system.

3 Retrospective cataloging.

The above, can be achieved only, if more terminals and manpower provided.

CREATING DATABASE ON GEOLOGY USING CDS/ISIS

D K NAG*
DEB SIKHA CHATTERJEE*

0 INTRODUCTION

India has a legacy of mining activity from time immemorial. There are also sporadic records of geological activity in the first half of the nineteenth century. However, systematic geological activities began in Indian subcontinent with the inception of Geological Survey India (GSI) in 1851 at Calcutta. Besides Indian subcontinent, the GSI officers had also to do work in outlying areas like Burma, Persia & Afghanistan and frequent expeditions into various parts of the Himalayas, the Pamirs and Tibet. Now GSI has evolved as one of the largest national surveys in the world, employing about 2,800 scientists and 15,000 supporting staff based in 33 operational centres spread over the country. It has played a vital role in the economic development of the country through discovery of new mineral resources. GSI has provided a sound database and mineral base

In the country. Since its inception, GSI has paid special attention to disseminate geological information gathered during field and laboratory investigation through an array of publications.

1 OBJECTIVE

For over a century almost the entire geologic literature of the Indian subcontinent and outlying areas was published by GSI through a series of publications which greatly influenced the development of geological science in this region. These papers are immensely valuable and helpful for critical appraisal on the historical development of the geological sciences in this part of Asia.

The prime publications are: (*a*) Memoirs (1856); (*b*) Palaeontological India (1861); (*c*) Records in 9 parts (1868); (*d*) Indian Minerals (1947); (*e*) Bulletin in 3 Series (1950); (*f*) Miscellaneous Publications; (*g*) Special Publications (1980); (*h*) Catalogue series (1982); (*i*) Manual Series (1983).

It has been considered desirable to develop a computerised bibliographic database (named GSIPUB) of GSI's own published contributions from

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1851 onward to facilitate efficient storage and quick retrieval of geologic information and to produce a computerised printout of the list of GSI publications.

2 SYSTEM CONFIGURATION

Microcomputer/PC based system using commercially available database management systems (DBMS) has emerged as an effective and efficient means of storing, managing, analysing, displaying and retrieving information. The GSI Central Library is equipped with a Personal Computer of 8088 microprocessor with 640 KB memory, 40 MB hard disk, MS-DOS operation system and one Dot metrix printer. It has been decided to create the database using CDS/ISIS ver 2.3 software developed by Unesco. It is a menu-driven Generalized Information Storage and Retrieval system designed specifically for the computerised management of structure non-numerical database.

3 DATABASE STRUCTURE

In designing the database following two basic points are considered: to select the field to be included and to identify the key fields for sorting and searching. Data elements selected for GSIPUB database are:

(*a*) *Author:* The name of the persons responsible for the intellectual content of the work. It is a repeatable and searchable field.

(*b*) *Title of article:* The title that is found on the title page of the item.

(*c*) *Title of serial:* The abbreviated name of the serial as found in the Serial Authority File maintained in the Library. This is a searchable field.

(*d*) *Part statement:* This field is used to enter information relating to series, volume, part, number, fascicules, memoir, pagination and year of publication of an article under each subfield. Series, Volume, Number, Part, Fascicules and Memoir Subfields are searchable fields.

(*e*) *Keywords:* This field is used to enter descriptors selected from GeoRef Thesaurus to describe the main subject of the item. Geographic descriptors are also selected. It is a searchable field.

4 DEFINING DATABASE

The database structure should be defined by delineating the characteristics of the record structure and its contents. It involves following steps: Field Definition Table (FDT), Data Entry Worksheet, Display Format and Field Select Table (FST).

41 FIELD DEFINITION TABLE (FDI)

The FDT defines the fields which may be present in the records of the GSIPUB database and their characteristics like tag–a unique numeric value identifying the field, field name; field length; field type *i.e.*, alphanumeric, numeric, alphabetic, pattern, etc, Repeatability; and subfields; S-Series, V-Volume, N-Number P-Part, F-Fascicules, M-Memoir, Y-Year, G-Page, L-Plate and I-Illustrations are used.

Field Definition Table (FDT) Database: GSIPUB

Tag	*Name*	*Len*	*Type*	*Rep*	*Delimiters/Pattern*
— 300	Author	220	*	R	
— 200	Title of Article	220	*		
— 201	Title of Serial	220	*		
— 490	Part statement	60	*		SVNPFMYGLI
— 620	Keywords	220	*		

42 DATA ENTRY WORKSHEET

One page data entry worksheet has been created to enter records of the database. This screen worksheet has the same name as the database and is open automatically selected when one accesses the database.

43 DISPLAY FORMAT

Used primarily for displaying records on the screen or printing records on the printer. The format has the same name as the database and is automatically selected when one accesses the database.

Database Name: GSIPUB *Format Name: GSIPUB*

V300(0,4)+|,|/MDL,V200(4,0),MPL,V201,XI,MDL,V490/" Keywords: ", MDL, V620

44 FIELD SELECT TABLE (FST)

Used primarily to define the fields of the database to be made searchable through the inverted file. The Table also defines criteria for extracting one or more data elements from a master file record for a particular process like, to create inverted file entries, to sort records in the desired sequence before producing a printed report, or to reformat records during an import or export operation. This Table has the same name as the database.

Database Name: GSIPUB FST for Inverted file FST Name: GSIPUB

ID	*IT*	*Data extraction format*
— 300	0	(V 300/)
— 201	0	V201
— 490	0	"Ser", V490^S
— 490	0	"Vol", V490^V
— 490	0	"No", V490^N
— 490	0	"Pt", V490^P
— 490	0	"Fas", V490^F
— 490	0	"Mem", V490^M
— 620	2	V620

5 CREATING DATABASE

The input sheet format for inputting the record into the GSIPUB database has been designed following the tags given in Common Communication Format (CCF) issued by Unesco. CCF provides a common method for structuring a bibliographic record so that such records could be freely exchanged among different information systems. The rules for describing the content and form of the fields are based on the second edition of the Anglo-American Cataloguing Rules (AACR2). The concept of main entry, as understood by AACR2, has not been implemented in these rules.

Subject indexing of each record allows the user seeking information on a specific subject to retrieve all the relevant records of the database. The indexing terms are selected from GeoRef Thesaurus of American Geological Institute.

Filled in input sheet is used to enter information of the record into the screen data entry worksheet of the database by accessing ISISENT menu. The Master File Number (MFN) is a unique number and is automatically assigned sequentially to each record entered in the database. The database now has over 6,300 records.

51 INVERTED FILE CREATION

CDS/ISIS allows an unlimited number of access points by selecting fields and subfields for each record through the creation of a special field called the Inverted file. The searchable elements for the database is defined by means of FST which contains the fields to be inverted and indexing technique to be used for each fields.

Out of the five indexing techniques available, we have used indexing technique) for the fields V300, V201 and subfields V490^S, V490^V, V490^N, V490^P, V490^F and V490^M to build term from the first 30 characters. Indexing technique 2 is used for field V620 to build an element from each indexing term enclosed in triangular brackets< >.

52 SEARCHING DATABASE

The inverted file contains all terms which may be used as access points during retrieval of a record and all those access points are collected in the dictionary which can be displayed to select terms for searching and retrieval of records. Two or more search terms may be combined by using search operators OR, AND and NOT which indicate the intended relationship between the terms. When the formulation of a search is not possible independent from the contents of the Inverted file, an alternate search method called free text searching is carried out.

6 PRINTING DATABASE

Out of a query/selected range of records/whole database can be printed, sorted by any combination of fields and subfields. The fields by which the records are sorted may be used as heading in printing.

One of the main objectives of the GSIPUB database is to produce computerised print out of the *List of GSI Publications* to replace the manually composed version now available. For this purpose, first the records are sorted by the name of the Serial then by Volume/Series, Part/Number, Memoir/Fascicules (as applicable to a particular Serial title) and finally by author.

An ASCII text file is produced on the hard disk for the whole database using report generator programme ISISPRT. This report is readable under word processing software. For spelling check, we import the file in the normal format of WordStar 2000. All the detected spelling errors are corrected in the database file using internal dictionary of WordStar and minor editing like subscript, superscript, boldface, italic characters, etc. is carried out.

This edited text file of the database is now processed in Desk Top Publishing (DTP) system to produce high quality printed output. The DTP system in our Department consists of one PC/AT with 2MB memory, one EGA monitor, 20MB hard disk, one Mouse, one Scanner and one Laser printers. Soft ware like Ventura Publisher (Professional Extension) Ver 3.0, Windows Ver 3.0, Scan Gallery Ver 3.0, Paintbrush and WordStar 2000 are used.

Page description language Ventura is a computer programme that defines exactly how the characters and other typographic elements are to be laid out on the printed page and the screen itself gives an accurate image of the document. The page design and formatting specifications of the file is stored as a 'style sheet'. This style sheet includes a range of descriptors for the main typographic elements–Primary heading, Secondary heading, Article title and Authors, etc.–together with specification for the font, point size, alignment and spacing that each element will use. Scientific symbol like α, β, ϕ etc., equations, if any, can easily be inserted. The final version of the edited and formatted file is printed using laser printer of 300 dpi resolution to produce camera ready master copy of the publication.

7 CONCLUSIONS

PC/Microcomputer based hardware system in conjunction with software of database management system provide an excellent opportunity to develop efficient and effective information storage and retrieval system in a library. CDS/ISIS, one of the best text based management systems, is now available through NISSAT (DISIR) New Delhi and can be used to develop bibliographic database. The use of DTP system enhances the quality of the printed output of database and allows to publish frequently updated material (current) and there is no need to hold a large stock of printed material, instead one can publish on demand.

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ANNEXURE-I

INDIAN MINERALS

Vol 1, No. 1, 1947

Anon

The Indian Coalfields' Committee. 9-12.
Keywords: Coal; India; Economic geology; Report.

Anon

The Mineral wealth of India. 3-8.
Keywords: Economic geology; India.

Anon

The utilisation of the mineral springs of India. 31-32.
Keywords: Hydrology; Springs; India

Coates J

Petroleum in India; 13-21.
Keywords: India; Economic geology; Petroleum.

Crookshank H

Emeralds in Mewar. 22-27.
Keywords: Minerals; Ring silicates; Emeralds; Rajasthan; Mewar.

Crookshank H

Zawar silver-lead-zinc mines. 22-27.
Keywords : Rajasthan; Zawar; Silver ores; Lead-zinc deposits; Economic geology.

Director, GSI

Mineral production of India during 1944. 33-44.
Keywords: India; Economic geology; Mineral resources.

CREATION & CONVERSION OF BIBLIOGRAPHIC RECORDS OF MONOGRAPHS AND DEVELOPMENT OF CATALOGUE MANAGEMENT SOFTWARE AT NSL

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0 INTRODUCTION

Retrospective conversion of manual records into machine readable form has assumed much importance as a result of the realisation of the need to resource sharing. The reasons for these are manifold including exponential growth of collections which double every 10-15 years. Every year the libraries hold a decreasing amount of World's stock of scholarly information while there is a 10% growth rate in amount of scholarly material generated. Increase in costs, and shrinking budgets have forced cut in material acquisition. New technologies are being introduced including Online Public Access Catalogues (OPAC) to provide greater access to the collections and services. Apart from the need to create a machine readable database for multiple uses such as Circulation and Public Access Catalogue, some libraries have also utilised this opportunity to clean up the inconsistencies in their catalogue that have occurred as a result of decades of changing cataloging rules, reversals in library policies, procedures and authority control work.

The results of shared and cooperative cataloguing are clearly visible in the world, when we consider the role of major bibliographic utilities such as Online Computer Library Centres (OCLC), Research Libraries Information Network (RLIN) & Washington Library Network (WLN). In Indian also, steps are being initiated for achieving these goals though not on the same scale. The major project in the offing, Information & Library Network (INFLIBNET) is going to connect over 200 libraries and major information centres all over India. Efforts are also on to connect libraries in various metropolitan cities. These include Delhi Libraries Network

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(DELNET), Calcutta Libraries Network (CALIBNET), and Madras Libraries Network (MALIBNET), etc. In achieving the ultimate goal of cooperative cataloguing in computer environment the first and foremost step is to create and convert the manual data into machine readable form. As part of its library automation activities, National Science Library (NSL) INSDOC, has undertaken this project. The various problems and issues involved in the project are discussed. The main features of a software package developed by NSL for catalogue management are highlighted. Some of the future developments visualised in this field are also touched upon.

1 NATIONAL SCIENCE LIBRARY (NSL)

NSL–an integral part of INSDOC is a major resource library for science and technology information. At present, NSL has over 1,30,000 volumes in its collection and receives about 3400 periodicals every year. The collection of 65,000 books and monographs cover various branches of Science and Technology and include 28,000 Russian books. The Library has one of best collections in the field of Documentation, Library and Computer Science. INSDOC started its library automation project in July 1990. The project for retrospective conversion was taken up on a priority basis and at present more than 45,000 records have been converted into machine readable form.

2 RETROSPECTIVE CONVERSION–PLANNING AND IMPLEMENTATION

The following aspects were taken into account while planning retrospective and current catalogue conversion.

21 SELECTION OF MANUAL DATA FOR CONVERSION

One of the crucial tasks before taking up retrospective conversion project is to determine which set of manual records to be used for conversion and what proportion of the collection to convert and in what order. Some of the basic considerations in this context would be, (*a*) utility and applications of the Library's machine readable database; (*b*) selection of crucial data elements for inclusion in machine readable record; (*c*) choosing the source records for conversion *e.g.,* shelf list, accession register or catalogue cards; & (*d*) need for verification from actual source items, etc.

211 *Data Capture*

Shelflist cards arranged alphabetically were used as the source for manual data. The problems encountered were–incomplete data *e.g.,* non-provision of keywords, multiple volumes data & poor readability, etc. Keywords were provided from the titles as far as possible.

212 *Data Preparation*

No specific manual worksheets were designed. However, detailed guidelines for data entry in *AACR2* format along with suitable examples were prepared. Data entry operators were provided on the job informal training for data input. Only in very rare cases were the actual source items (books) verified. It is worthwhile to mention that data entry for recent additions to the library is done only once, at the stage of acquisition. This data integration saves time and efforts otherwise required for reinputting the same data. However, in this process certain fields need to be edited and verified at the cataloguing stage.

22 BYPRODUCTS

The conversion or manual data into machine readable (cataloguing data) is to be created keeping in view the various byproducts that could be generated from the database. These are OPAC, printed version of the data such as 'Recent Additions' and generation of Catalogue Cards. These require some of the additional data elements not found in source records. For example "OPAC database" and "Recent Additions" require additional data elements like *Document type, Code* (subject), etc. The details of all the data elements are shown in the database structure in *Appendix I.*

23 EXCHANGEABILITY OF DATA

The utility of database created should be such as to allow for merging and sharing with other sources under the networking environment in future. This implies that a standard exchange format be adopted. The provision of certain fields has to be made keeping in view the standard format. In NSL, *Common Communication Format (CCF)* has been adopted which requires provision for certain codes in the database. For instance Rolecode pertaining to Authors, Title indicator, Publisher indicator, etc. have been included in the database structure. While adopting the standard format, another point worth mentioning is that mandatory fields as required by *CCF* must be provided including its sub-fields even if the data is not available in certain cases. This will ensure consistency of the same when the records are exchanged in future. Further, the data elements to be included may be categorised as follows.

231 *Traditional Access Points*

These include Author's name(s), Corporate Authors name(s), Series name(s), Title keywords, Subject headings etc. Accuracy & completeness is crucial in these fields.

232 *Unique Item Bibliographic Identifiers*

These fields are used to identify information that may be useful in specifically identifying a work and in distinguishing different editions of the same work. Edition statement and imprint are covered under this category.

233 *Coded Categorising Information*

This is unique to machine readable data in contrast to manual records. They are used to serve as a basis for various search qualifiers in Online Catalogues. They are fixed field elements. For example Doctype field represent various types of monographs. In NSL 's' represents simple books, 'c' for conference proceedings, 'l' for multi-lingual and 'p' for pamphlets. Despite its enormous potential in retrospective conversion, there are few difficulties also. These fields are often incomplete in source records. A library will have to examine these fields quite consistently and may have to add appropriate data rather frequently in order to ensure accuracy and completeness.

234 *Standard Control Numbers*

Though these are not types of information relevant to library users, they are often crucial in library automation projects. For example Accession number, ISBN and ISSN.

235 *Peripheral Information*

These elements do not have an obvious value to library user and the library staff. Physical dimensions, pages, etc. fall under this category.

236 *CCF Fields*

These include various codes *viz.,* Rolecode, Title indicator, etc., as defined in the *CCF guidelines.* The provision of the same has to be made in the structure to make the database exchangeable.

24 LOCAL VARIATIONS

Certain practices adopted by the libraries are peculiar and specific to their own system. For example, the number and type of categories used for identifying the particular collection of library. In NSL, the category 'D' before the class number indicates Documentation and Information Technology books, and 'R'–for Reference books etc. Similarly all libraries may not be following the same level of *AACR2* & within one scheme of classification say *UDC*, there may be some local variations in treating particular form of material *eg,* all the bibliographies may be kept together or placed under

the specific subjects. Another point of variation is whether to use an authority file and within an organisation there may be inconsistencies of their use in the past. All these deserve special attention since provision has to be made for these elements in the database structure.

241 *Status of Records*

The records which have been accumulated for more than 40 years, reflected varied practices of cataloging rules, inconsistencies in rendering information, use of local variations/practices from time to time. Though 100% accuracy in all the fields cannot be claimed, there is a tendency towards completeness of records. The accuracy however is very important in crucial fields as mentioned earlier and care was taken to achieve this goal.

25 RECORD VERIFICATION AND EDITING

While entering the data there are possibilities of typographical errors, incomplete data, inappropriate data in certain fields due to misinterpretation of data fields, etc. Experience shows that neglect of quality control during a conversion can lead to a great many problems and to a very expensive cleanup later, when the database is put to a definite use. However, all the fields may not be equally important in this context. A few crucial fields such as all access points, coded categorising information, control and standard numbers may be verified and edited. The same may be done either online or offline. Though both the methods have relative merits and demerits, the online method has one of the strongest features *ie,* its interactive nature which obviates the need for additional steps required in the offline method.

In NSL, online mode of data verification and editing was adopted shifting the main responsibility on the cataloguer. The authors are of the opinion that in case no additional editorial staff for conversion is provided then, this option becomes economical and advantageous.

3 SOFTWARE DEVELOPMENT

Among the various functions of library *viz,* Acquisition, Circulation, Cataloguing, Search and Retrieval, and Serials control, etc, the users are mainly concerned with Public Access Catalogue. This is the function which links the user's requirements to the library materials on the shelves. Keeping this in view an attempt was made to develop a software using runtime version of dBase IV which could provide the facilities for creating and maintaining the database and also search and retrieval by various options. It was also the intention to keep it as simple as possible in terms of user's friendliness, and commands using options. The software can handle up to 50,000 records and is suitable for small and medium libraries. It runs

under MS-DOS environment and is a stand-alone package. Hardware/ software requirements are PC-XT or above; Hard disk capacity and RAM depending on the size of library. The main features of the package are described in *Fig 1.*

CATMAN QUERY

1 RECENT ADDITIONS

2 COMPLETE CATALOGUE
QUIT TO OS

Fig. 1

31 CATALOGUE QUERY

The software is divided into two main modules *viz,* Catalogue Quary & Catalogue Administration (*Fig. 1 & 3*). Catalogue Query is basically meant for users of the Library. The main menu under this module displays RECENT ADDITIONS (RA) and COMPLETE CATALOGUE (CC). RA pertains to the records for no. of books recently (say last one month) received in the library and CC contains the records of books received more than one month back. RA & CC sub menus have various options for searching such as author, title, class no., publisher etc. However BROWSE facility which displays records alphabetically titlewise is available only under RA option (*Fig. 2*).

Recent Additions	*Complete Catalogue*
Search by...	Search by...
Keyword/Subject Heading	Keyword/Subject Heading
Title	Title
Author	Author
Publisher	Publisher
Class No.	Class No.
Accession No.	Accession No.
Browse	Return to Previous Menu
Return to Previous Menu	Quit to OS
Quit to OS	

Fig 2

While formulating the query the care has to be taken whether initial characters are required to be matched or any part of the heading (in all options), since CC menu permits only the former case while RA allows the latter possibility. To provide an additional help, the catalogue card rendered according to *AACR2* may be displayed on the screen as pop up window by press of a key and under class number option the main headings under broad *Universal Decimal Classification (UDC)* numbers could also be viewed to facilitate browsing under a particular subject field.

32 CATALOGUE ADMINISTRATION

This module contains the various facilities for database creation, its maintenance, automatic indexing and data management in addition to the search and retrieval facilities under RA & CC as available in the Catman Query module (*Fig. 3*).

CATMAN ADMINISTRATION

1 RECENT ADDITIONS

2 COMPLETE CATALOGUE

3 DATABASE MAINTENANCE

4 DATA MANAGEMENT

5 APPEND CATALOGUE

6 QUIT TO OS

Fig 3

It also allows appending of database in RA or CC from decentralised inputting and also the automatic transferring of RA records to CC records (APPEND CATALOGUE) as shown in *Fig 4.*

DATABASE MAINTENANCE

ACTIVATE DATABASE

ACTIVATE INDEX

INDEX DATABASE

APPEND DATABASE

Fig 4

Data Management option allows adding, editing, browsing, switching among various records and deleting of records as required. The records could be arranged conveniently in one of three ways *viz* natural order, accession nos. wise or title wise by using the option ACTIVATE INDEX.

Currently, work is on to integrate Catalogue Management Software with other library functions such as Acquisition, Circulation, OPAC, Serials control, etc. To enable the data to be used online the database is also being ported on to the Unix environment.

DATA MANAGEMENT

ADD RECORD

EDIT RECORD

DELETE RECORD

PACK

LIST RECORDS

DISPLAY RECORD

NEXT RECORD

PREVIOUS RECORD

TOP RECORD

BOTTTOM RECORD

RETURN

Fig 5

4 FUTURE DEVELOPMENTS

While continuing efforts are being made to generate machine readable records, the advancements in data capture and data preparation are also gaining momentum. In this context, the role of Optical Character Recognition (OCR) is worth mentioning. This technology could be used to transfer data directly from the actual source items (books) into the machine readable form. This will of course require lot of restructuring and rearrangement of data. The strongest advantage of the method would be its accuracy as the same will be a true copy of the source record. The other areas having potential scope for development are integration of all library functions, provision of bibliographic utilities type services at the shared nominal costs. On the other hand there is a need to standardise and have common agreement for interpretation of various data elements which fall under the domain of descriptive cataloguing, forming the foundation block. In order to facilitate data matching it should be made mandatory for the publishers, particularly the Indian publishers to provide ISBN/ISSN in all of their publications.

APPENDIX-1

Database Structure

Field	Field Name	Type	Width	Dec	Index
1	ENTRYDT	Numeric	8		N
2	AUTLNAME	Character	20		N
3	AUTFNAME	Character	18		N
4	ROLECD1	Numeric	3		N
5	AUTLNAME2	Character	20		N
6	AUTFNAME2	Character	18		N
7	ROLECD2	Numeric	3		N
8	AUTLNAME3	Character	20		N
9	AUTFNAME3	Character	18		N
10	ROLECD3	Numeric	3		N
11	TITIND	Numeric	2		N
12	TITLE	Character	120		N
13	NOVOL	Numeric	3		N
14	PLACCONF	Character	30		N
15	NO-OF-CONF	Character	5		N
16	DATECONF	Numeric	8		N
17	SECTITLE	Character	120		N
18	SPONSOR	Character	100		N
19	DOCTYPE	Character	1		N
20	TITRESP	Character	75		N
21	EDITION	Character	20		N
22	EDNRESP	Character	60		N
23	PLACEPUB	Character	30		N
24	PUBLISHER	Character	40		N
25	PUBYRIND	Numeric	2		N
26	DATEPUB	Numeric	8		N
27	PRELPGS	Character	7		N
28	NOPGS	Character	8		N
29	ILLUS	Logical	1		N

Field	Field Name	Type	Width	Dec	Index
30	REF	Logical	1		N
31	BIBL	Logical	1		N
32	DIMNH	Numeric	2		N
33	DIMNW	Numeric	2		N
34	ACMPMATL	Character	20		N
35	SERINAME	Character	60		N
36	SERINO	Character	8		N
37	SERINAME2	Character	60		N
38	SERINO2	Character	8		N
39	ISBN	Character	13		N
40	ISBNVL	Logical	1		N
41	ISSN	Character	9		N
42	ACCNO	Numeric	8		N
43	CATEGORY	Character	1		N
44	CLASSNO	Character	30		N
45	BOOKNO	Character	8		N
46	KW1	Character	50		N
47	KW2	Character	50		N
48	KW3	Character	50		N
49	LANG	Character	3		N
	Total		1157		

DATABASE ACTIVITIES IN SCIENCE AND TECHNOLOGY IN INDIA: A CRITICAL STUDY

N C HUGAR*

0 INTRODUCTION

In the fast developing world information or data is treated as a "POWER". This information is hence considered as the most powerful resources like men, material and money. In any research work, the pre-requisite is to collect all the available information relating to research areas of study. Information is essentially required commodity in any kind of research activity, only because of its immense value in forming the policy and decision making. Therefore, it is essential that those who 'have' information should share it with those who 'have not'. Thus information plays a vital role in all kinds of human activity and is an important factor for the overall progress and development of society.

1 INFORMATION GENERATION

Information is the product of one's own idea or knowledge through experience or experiments conducted either in laboratory or out side. This is reported or recorded in many formats such as current periodicals, conference proceedings, books, reports, patents, theses etc. Every day, every second the new information is pouring in, due to continuous ongoing creative research work throughout the world. The information especially in Scientific and Technical field is tremendous. Because of this constant information flow, the present world is passing through the revolution of information growth or the "information explosion".

11 INFORMATION GENERATORS

Who generates this information? Usually it is the expert community in all fields who does it. This expert community conducts studies or research and their results form the new information which is reported or recorded in many formats for the future use, study and for the next generation. Such recorded information triggers an application for the betterment of society or further research elsewhere. This leads to overall progress of the mankind. This type of activity may be conducted by an individual or group of individuals attached to specialised research institutions and organisations. In India,

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scientific and technical information is generated or produced by various specialised research institutions and organisations such as CSIR and DRDO laboratories, IITs, Public and Private Research Centers and higher educational institutions.

2 BIBLIOGRAPHICAL CONTROL

Information is not only generated or produced in abundance, but also available for use in several formats and on electronic media. In this world of information explosion, an information seeker or researcher finds it much difficult to identify and access the information of his/her choice when he/she needs.

In order to help needy information seeker, an effective mechanism for bibliographical control is utmost necessary to organise all recorded information in a systematic manner. This idea of bibliographical control has given rise to several secondary and tertiary sources such as abstracting indexing journals, reviews, etc. To help their own clientele, library and information centres have started bringing out documentation list, subject bibliographies and providing current awareness services. The bibliographical control basically aims at knowing what information is available and where, secondly to reduce the time of literature survey and lastly to avoid the duplication of work. This supports resource sharing and helps in exchanging data and networking of computerised database.

3 DATABASE ACTIVITIES IN INDIA

Database is nothing but a set of records on any subject and in any formats, which may be bibliographical, numerical and textual references and are stored electronically with a mechanism to retrieve as and when required and allow to update or delete records at any time.

New innovations in computer and communication technologies have made revolutionary changes in the field of data communication and its transfer. These new emerging technologies have made impact on libraries and information centrers of many countries. They have started creating computerised databases on various subjects and linking them, to access information at fingertips as and when needed, even from the remote corner.

The need of creating computerised databases and interlinking them with developed countries is also very much felt in Indian specialised libraries and information centrers. In this context, India is making much efforts in designing and developing various databases in general and on Science and Technology in particular. NISSAT under Department of Science and Technology is actively supporting the design and development of

Computerised databases at national and sectoral levels by assisting with softwares, hardwares and personnel training. DST has identified some institutes/organisations to create a specific databases for the regional, national use and for bilateral exchange with international information systems.

The application of computers in Indian libraries has already started. Some are in the process of adopting computers in their libraries. The NISSAT has distributed more than 700 CDS/ISIS package to Government and nonprofit-making organisations/institutions in India. It is assumed that many libraries are in the process of designing and developing databases in their specific fields.

4 SCOPE OF THE STUDY

This study covers primarily the database (See Appendix I) listed in the "Directory of Science and Technology Information Systems" brought out by the Department of Science and Technology during October 1990. Further, certain other databases are also included in this study. The information about such databases was collected personally or through professional contacts. Annual reports, news letters, journal articles have also been consulted. This study is confined to the computerised databases in science and technology in India. Manual type of databases and those produced by private and commercial organisations are excluded from the study. The coverage of the study is not comprehensive in nature, but gives an overview of the database activities going on presently in India. The main objective is to study the most frequently occurring characteristics and salient features of existing databases, to give some idea to those who are in the process of designing and developing new computerised databases in the field of their interest.

5 METHOD USED

A check list of 12 criteria (Appendix II) was made to collect salient features of the selected databases. The important criteria were: name of the institution/organisation, database name, subject area, documents covered, geographical coverage, software and hardware used, number of records held, search techniques, services, rendered, by products, updation of database and link with international databases. All the particulars about each database, covered by the study, were collected and tabulated.

6 OBSERVATIONS MADE

(1) Fifty research institutions, Government organisations/Departments, IITs, spread all over India, are having 83 computerised, databases in

Sciences and Technology. INSDOC, New Delhi, contributed more to Indian computerised databases on Science and Technology.

(2) New Delhi has 34 databases hence it can be called as capital of Indian databases. Bangalore took second place with 13 database.

(3) Subjects covered can be grouped as follows:

(*a*) Bibliographical databases	77
Non-bibliographical databases	6
	83
(*b*) Pure Science:	
Physical Sciences	14
Biological Sciences	1
(*c*) Applied Science, Engg & Tech	
Med and Agri Sciences	62
(*d*) Standards/Patents/Equipments/R & D Profiles	6
Total	83
(*e*) Agricultural Sciences:	
Basic Science	14
Engg and Technology	49
Medicine and Biotechnology	8
Others	6
	83

(4) Coverage of records in the databases can be viewed as below:

National coverage Databases	42
International coverage	37
Local coverage	3
	83

(5) Fifteen of these databases are associated with international database and some are accessed to online services also.

(6) It is important to note that out of the national coverage databases about half of them were developed with CDS/ISIS software and 37 out of the 83 databases under study. Dbase and Fortron softwares are in use next to CDS/ISIS in creating the databases.

(7) Most of the databases are medium sized using IBM compatible PC/AT or XT (41 out of 83), 5 mini computers and remaining use other type of computers.

The above observations have some messages too, for those who would like to design and develop new databases, they are:

(*a*) Using CDS/ISIS will help in exchanging of data from other databases which could be a first step towards networking.

(*b*) If CDS/ISIS is chosen, it is advisable to confine to common communication format (CCF) tag numbers and data elements which helps in networking.

(*c*) One can make a modest beginning even with a PC/XT or AT without waiting for mini or mainframe computers, with freely distributed CDS/ISIS software package by NISSAT of DST.

From this study, it is found that so far the databases created are the library holdings mainly, or on a specific area of interest, with a small user group of the respective institution. There are few larger databases like Indian Science Abstract, NUCSSI, etc but still several areas which go unrepresented in the so far created databases are:

(1) Govt. Reports (Annual, Scientific & Technical) of Central, State and Local bodies.

(2) Master's degree and PhD theses submitted to various educational institutions in India.

(3) Standards/Patents literature.

(4) Medical science literature.

(5) Comprehensive technological literature including conference proceedings.

(6) Who is who in Science and Technology in India.

(7) Ongoing project in India along with foreign collaborators.

7 CONCLUSION

This paper is a small step towards long journey. It is written at a time when INFLIBNET is being actively considered, there are lessons to be learnt from the last experience. Although this study is not an exhaustive but only an overview of the present situation, confining only to to the field of Science and Technology, it has implications in other areas too. Perhaps it is incorrect to look at Science and Technology, without considering social, political, and economic angles. In these days of interdisciplinary research realisation is a healthy attitude. Databases covered here are the drops that are going to make an ocean. It is hoped that when such databases are created and linked, every information put into use, every reader will get his/her information, every information will get its reader, reader time will be saved, that holds the key to the every growing world of information. In short, it would be possible to provide the right information to the right user, at the right time.

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APPENDIX-I

Names of Institutes and Organizations with Computerised Databases

S.No	Name of Institute/ Organisation, Place	Name of Database
1	Bhabha Automic Research Centre, Bombay	(*a*) BARC Book Catalog (BARC-BK)
		(*b*) BARC Conference Proceeding Catalogue (BARC-CP)
		(*c*) International Nuclear Information System (INIS)
2	Bose Institute, Calcutta	Biotechnology Information System (BTIS)
3	Bureau of Indian Standards, New Delhi	Manaka-Sandarbhika(MS)
4	Central Building Research Institute, Roorkee	(*a*) Current Projects Bibliographical Data-base (CPBIB)
5	Central Drug Research Institute, Lucknow	National Information Centre for Drugs and Pharmaceuticals (NICDAP)
6	Central Food Technological Research Institute, Mysore	(*a*) Food Science and Technology Abstract (FSTA)
		(*b*) Food Technology Abstracts (FTA)
7	Central Glass and Ceramic Research Institute, Calcutta	Glass and Ceramics (CGCRI)
8	Central Leather Research Institute, Madras	Leather and Allied Industries (NICLAI)
9	Central Tobacco Research Institute, Rajahmundry (AP)	Tobacco Database File (TDBFILE)
10	Central Machine Tools Institute, Bangalore	National Information Centre for Machine and Production Engineering (NICMAP)
11	Central Water Commission, New Delhi	(*a*) ABS CWC
		(*b*) Books
		(*c*) Journals
		(*d*) Bibliography
12	Central Water and Power Research Station Pune	Water and Power Information System (WAPIS)
13	Defence Scientific	(*a*) DRDO-Online Catalogue

S.No	Name of Institute/ Organisation, Place	Name of Database
	Documentation Centre, New Delhi	(DRDO-OC) (*b*) DRDO-Translation Bank (DRDO-TB)
14	Department of Biotechnology, New Delhi	Biotechnology Information System (BTIS)
15	Department of Environment, New Delhi	Environmental Information System (ENUIS)
16	Department of Science and Techlonogy	(*a*) Equipment Database (EDB) (*b*) Publications Database (PDB) (*c*) R and D Projects Database (RDPDB) (*d*) Science and Technology Information Systems (STIS) (*e*) Technology Database (TDB)
17	Directorate General of Health Services, New Delhi	AIDS
18	Geological Society of Indian, Bangalore	(*a*) Current Research on Indian Res (SANCHAYA) (*b*) Indian Geology (INDGEOL) (*c*) Society Publications (GEOIND)
19	ICMR-NIC Centre for Biomedical Information, New Delhi	Neurology, Cancer, TB and Bibliographic Database (NCTB BDB)
20	Indian Council of Agricultural Research, New Delhi	(*a*) Current Research Project Information System (CRPIS) (*b*) Indian National Agricultural Bibliography (INAB)
21	Indian Council of Medical Research, New Delhi	Integrated Research Information System (IRIS)
22	Indian Institute of Technology, Bombay	Faculty Publications (SHODAK)
23	Indian Institute of Technology, Madras	PhD Theses (THESE)
24	Indian Jute Industries Research Institute, Calcutta	Productivity Index Analysis (PI)

S.No	Name of Institute/ Organisation, Place	Name of Database
25	Indian Library Association, Delhi	Directory of Indian Libraries (NALANDA)
26	Indian Meteorological Department, New Delhi	Meteorology and Atmospheric Science (MAS)
27	Indian National Scientific Documentation Centre, New Delhi	(*a*) Current Contents of Indian Journals
		(*b*) Database of Indian Patents
		(*c*) Database on Conference Proceedings
		(*d*) Directory of Indian Science and Technology Periodicals
		(*e*) National Index of Translations
		(*f*) National Union Catalogue of Scientific Serials in India (NUCSSI)
		(*g*) Polymer Science Database (PSD)
		(*h*) Materials Science Bibliographic Database (MSBDB)
28	Information Centre for Aeronautics (NAL), Bangalore	Indian Aerospace Abstracts (IAA)
29	Indian Space Research Organisation (SAC), Ahmedabad	Space Application Centre Library Information System (SACLIS)
30	ISRO, Sriharikota	Space Science and Technology, (ROGER)
31	Industrial Toxicology Research Centre, Lucknow	(*a*) Databank on Toxic Chemical (DABTOC)
		(*b*) Abstracts of Current Literature on Toxicology (ACLIT)
32	NICHEM-NCL, Pune	Union Catalogue of Current Periodicals in Pune Library/Information Centres (UNICAT)
33	National Council for Cement and Building Materials, New Delhi	Cement and Building Materials Database (NCB)
34	National Environmental Research Institute, Nagpur	Documentation of Acquired Documents (DOCAD)
35	National Information Centre for Crystallography, Madras	Crystallography

S.No	Name of Institute/ Organisation, Place	Name of Database
36	National Information Centre for Textile and Allied Subjects (ATIRA), Ahmedabad	Textile Information Condensed (TEXINCON)
37	National institute of Foundry and Forge Technology, Ranchi	Foundry Technology (to be named)
38	National Institute of Immunology, New Delhi	Biotechnology patents (BP)
39	National Institute of Oceanography, Donapaula, Goa	Oceanography (OCEANLINE)
40	National Metallurgical Laboratory, Jamshedpur	Metallurgy and Materials Science (CASLIB)
41	National Physical Laboratory, New Delhi	Library Acquisitions Data base (LAD)
42	Physical Research Laboratory, Ahmedabad	Physical Sciences (READFAST)
43	National Centre for Bibliometrics-INSDOC, New Delhi	Science Citation Index
44	National Centre for Science Information IISc, Bangalore	(*a*) CSIR Research Output (*b*) Current Awareness Service in Science (*c*) Indian Experts in Biotechnology (*d*) Research Profile Database (Biological Sciences) (*e*) Research Profile Database (Chemistry) (*f*) Research Profile Database (Mathematics) (*g*) Research Profiles Database (Geology) (*h*) Research Profile Database–Physics, Elect and Electronic Engg and Comp Science
45	National Chemical Laboratory, Pune	(*a*) Indian Chemical Patents Abstracts (ICPA) (*b*) Library Information System (LIS)
46	Publications and Information Directorate, New Delhi	Medical and Aromatic Plants Abstracts (MAPA)

S.No	Name of Institute/ Organisation, Place	Name of Database
47	Raman Research Institute, Bangalore	Library Database (LDB)
48	Sir Padampat Research Centre, Kota	Information Services in Synthetic Fibers (CPD AND PB)
49	Tata Energy Research Institute, New Delhi	(*a*) Abstracts in Selected Solar Energy Technology (ASSET) (*b*) Global Warming Database (GLOBWARM) (*c*) Indian Energy Literature (INDEL)
50	The Patent Office, Calcutta	Information Service in Patents (ISP)

APPENDIX II NAMES OF INSTITUTES AND ORGANISATIONS WITH COMPUTERISED DATABASES ON SCIENCE AND TECHNOLOGY IN INDIA

Sl. No.	Name of Institute/ Organisation and Place	Name of Database	Subjects covered	Documents covered and year	Area covered	Soft-ware used	Hard-ware used	No. of Records	Search Method by	Service Rendered to users	Print pro-ducts	DB up-date	Link with Intl DB/ ONLINE Access
1	Bhabha Atomic Research Centre, Bombay	(a) BARC Book Catalogue	Nuclear Science & Engg	Books (1957)	Nat	FORT-RON	Prime-450	80000	Author Title Subject	(800) Free to Lib members	—	D	
		(b) BARC Conf Proc Catalog	-do-	Journals (1957)	Nat	-do-	-do-	1800	-do-	-do- (800)	—	D	
		(c) Intl Nuclear Inf System (INIS)	-do-	All litera-ture on Nuclear Science (1976)	Int	-do-	-do-	100000	Key-words	-do- (250)	SDI Servi-ces	M	Linked to Intl Data-base INIS Bilateral arrangement
2	Bose Institute, Calcutta	Biotechno-logy Inf System (BTIS)	Biotech-nology Genetics	All litera-ture on Genetic Engineering	Int	-do-	MIC RO-VAY II	10000	Key-words	Free	—	—	
3	Bureau of Indian Standards, New Delhi	Manaka Sandar-bhika	Stand-ards	Standards (1981)	Int	COBOL	MV 400	20000	Country and Class	Priced (200)	Monthly addition Std world over	M	
4	Central Building Research Institute, Roorkee	(a)Current Project Biblio-graphical Database	Build-ing Engg Material	Books, Journals, Conf Proc Articles (1960)	Nat	CDS/ ISIS	IBM/ PC/ AT	409	Boolean logic Terms Enduser Direct	Free on Demand (200)	—	A	
		(b)Publica-tions Index (PUBLIN)	Build-ing Engg. Archi-tecture Plann-ing	Published papers, Seminar papers, Research Reports, Monographs (1947)	Nat	-do-	-do-	3000	-do-	-do- (200)		A	

FACILITIES TO ACCESS INTERNATIONAL DATABASES IN DELHI LIBRARIES: A SURVEY

SUNIL KUMAR*

1 INTRODUCTION

Online searching of international databases is of recent origin in Indian libraries. The exponential growth of literature in the field of Science and Technology has forced the R & D scientists to know regarding almost all the developments in their specialised areas of research. In order to cater to the needs of researchers in shortest possible time many libraries have started providing online access facilities to international databases for wide coverage of the topic in terms of period and sources covered.

2. ADVANTAGES OF ONLINE ACCESS

Although online access to international databases costs considerably more, it is gaining popularity due to the following advantages:[1]

(*i*) The user is an *active participant* and can instantly adopt his request to the reality of what is actually in the reference file–perhaps very different from what he expects–and also readily recovers from errors of query formulation. This freedom of search leads to a situation in which a whole database can easily be searched and then if necessary re-searched (which in the case of conventional searching of a large number of index volumes or card catalogues requires more than average determination and stamina).

(*ii*) Easy and rapid access to an extremely wide range of indexes/databases, many of which may not be locally available. This may also include access to recent references during the time-gap prior to the availability of published index volumes.

(*iii*) Databases searchable online often offer a far greater number of access points than the corresponding printed index. For instance, an indexed database may be equipped with an average of 10 index terms per item. All may be used as online search keys while only 4 may be used in the printed version.

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(*iv*) More than one database can be searched simultaneously using a single query formulation.

3 THE SURVEY

A survey was carried out to assess the facilities available to access international databases in libraries of Delhi. All major libraries of Delhi were enquired either personally or through phone calls regarding the availability of this facility. Eleven libraries responded positively. These libraries were later on approached personally with the structured questionnaire (*Appendix A*) for gathering data to know the following:

(*i*) Online access facilities;

(*ii*) Most frequently accessed databases;

(*iii*) Hardware used;

(*iv*) Communication software used;

(*v*) Services provided and their costs; etc.

4 RESULTS

(*i*) *Types of Libraries:* All the libraries having online access to international databases support are R & D institutions except American Center Library and British Council Division (*Appendix B*). This may be due to the need of nascent information and availability of sufficient financial support.

(*ii*) *Hardware available:* All the libraries surveyed are using different make of micro computers. The wide range of makes include IBM, Unicomp, DCM, BUSYBEE, Zenith, Wipro, HCL, etc. In case of the printer, although there is a wide range, ESPON seems to be the leader having 5 installations. The other makes having one installation each are HP, L & T, HCL, TVSE, etc. All the libraries are using 'Multitech' modern as the device that connects the micro computer and the telephone line. The modern translates the digital messages of the computer into voice signals to be transmitted over the telephone lines and vice-versa.

(*iii*) *Communication Software:* It brings the computer terminal into a dialogue mode with the host computer of international databases. Eight libraries are using PROCOM Communication software for this purpose, whereas CROSS TALK, DIALOG LINK and PC-PLUS Communication softwares are being used by 4, 3 and 1 libraries respectively.

(*iv*) *Online facilities:* DIALOG is the most common online vendor in libraries of Delhi having agreement with 10 libraries. Some libraries are having more than one vendor. The other online vendor/ facilities are EASYNET, FT-PROFILE, Microbial Strain Data Network (MSDN), STN International, etc. The most frequently accessed databases are INSPEC, MEDLINE, WPI, CAB abstract, COMPENDEX, CA Search, etc. *Appendix C* gives details fo frequently accessed databases. Subject was identified using the directory.[2]

(*v*) *Services & Cost:* Online searching of international databases are done only on demand by all the libraries and the service is provided to specific users groups in their respective libraries. Many of the libraries do not charge for the online search, but some institutes like INSDOC, do charge for the search on actual cost of services. In such cases the service is open to all. Online searches are always done by qualified and experienced library staff.

(*vi*) *Problems:* The users were asked to specify whether or not they had any problem to access any online databases. Most of the libraries responded that they usually face problems which are solved by them and sometimes take the help of specialists. The major problems as mentioned by the users relate to:

– Getting connection to online host; and

– Search strategy for precision of the search.

5 CONCLUSION

As the online access to international databases is gaining momentum it is highly desirable to have specially designed training courses on search strategy in online. The cost of services is also so high that it is difficult for a researcher to access. Hence steps should be taken to reduce the cost. One viable alternative step could be to develop indigenous databases and join the DIALOG or other such vendor, so that the foreign exchange earned through the search made to these databases can help to reduce the cost of search to international databases.

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APPENDIX A

Facilities to Access International Databases in Delhi Libraries: A Survey

Dear Sir/Madam,

Please answer the following questions relating to facilities available to access international databases in your library. The investigator shall be evergrateful to you for your cooperation. (You may put cross mark (X) at the appropriate place).

1 Name of the Organisation _____

2 Contact Person _____

3 Address _____ Telephone No. _____

4 Online access facilities: _____

_____ EASYNET _____ DIALOG

_____ OTHER (Please specify) _____

5 Most frequently accessed databases (Please list):

6 Hardware facilities:

(*a*) Make and model of micro-computer used: _____

(*b*) Make and model of printer used: _____

(*c*) Make and model of MODEM used: _____

7 Communication software used:

_____ CROSS TALK _____ DIALOG LINK

_____ MIRROR _____ PC-TALK

_____ OTHER (Please specify) _____

8 Services:

_____ On demand

_____ In anticipation

9 Search facility provided to:

_____ All users _____ Only staff

_____ Only specific group of users (Please specify) _____

10 Do you charge for online search? _____ Yes _ No _____

_____

11 If yes, please give the structure of cost: _____

_____

12 Do you provide online search training facility to your staff?

_____ Yes No _____

13 Have you ever had problem in online search? Yes_____ No ___

If yes, please specify the problem: _____

_____

_____

14 How do you solve problems in online search?

_____ Ask specialists _____ Colleagues

_____ Ask colleagues in other libraries.

15 Any other information:

THANKS FOR YOUR COOPERATION

APPENDIX B

Name & Address of Library	*Access Facility*
1 American Center Library 24, Kasturba Gandhi Marg New Delhi-110 001.	DIALOG
2 British Council Division 17, Kasturba Gandhi Marg New Delhi-110 001.	FT-PROFILE
3 Centre for Biotechnology JNU, New Delhi-110 067	DIALOG
4 Defence Science Information & Documentation Centre Metcalf House Delhi-110 054.	DIALOG
5. Indian National Scientific Documentation Centre 14, Satsang Vihar Marg New Delhi-110 067.	DIALOG, EASYNET, STN International
6 Indian Oil Corporation Ltd. Scope Complex, Core-2 Lodi Colony, New Delhi-110 003.	DIALOG
7 National Informaties Centre CGO Complex, Lodi Road, New Delhi-110 003.	DIALOG
8 National Institute of Immunology Saheed Jeet Singh Marg New Delhi-110 003.	DIALOG MSDN
9 Ranbaxy Laboratories Ltd. A-1, Phase I, Okhla New Delhi-110 020.	DIALOG, STN Int
10 Sri Ram Institute for Industrial Research University Road Delhi-110 007.	DIALOG
11 Tata Energy Research Institute 9, Jor Bagh New Delhi 110 003.	DIALOG

APPENDIX C

Frequently Accessed On-line Databases and Their Subjects

Databases	*Subjects*
APILIT (American Petroleum Institute Lit)	Petroleum including petroleum refining, petrochemicals, storage and transpiration of petroleum and its products.
CA Search	Chemistry and allied fields.
CAB Abstract	Agriculture and allied subjects.
CAS React	Chemical Reaction & Synthetic Organic Chemistry.
CANCER Line	Cancer including chemotherapy, immunotherapy, radiotherapy & surgery.
COMPENDEX (Computerised Engineering Index)	Engineering and related areas including aerospace engineering, etc.
EMBASE (Excerpta Medical)	Medical sciences and related fields such as anatomy, anthropology, embryology, anesthesiology, etc.
Energy Line	Energy including electric power, transmission, storage, fuel production, industrial transportation and residential consumption.
Environ Line	Environmental science including air pollution, chemical, biological contamination and ecology.
INSPEC	Physics, electronics, computer, etc.
MEDLINE	Worldwide biomedical literature.
Management Contents	Management related topics including accounting, advertising, banking, etc.
SCI Search	Interdisciplinary, including acoustics aeronautics, agriculture, anatomy, biology, etc.
Toxline	Toxicology including drug chemistry, environmental pollution, pesticides, pharmacology, etc.
World Patent Index	Patents in various fields: Pharmaceuticals, agriculture technology, etc.

PROBLEMS OF AUTOMATION AND COMPUTERIZATION OF LIBRARY INFORMATION SYSTEMS

P.N DWIVEDI*

0 INTRODUCTION

In the local area networking category, at least seven areas of difficulty may be identified. Availability of computer processing time has been a problem for numerous library projects, the lack of priority given by computer centre to the development of library software has been another complaint, and a third is the lack of control by the library over decision regarding continuation of a project.

Attitudes of computer centre personnel may also be a source of trouble. Ignorance of libraries routines and their operations has frequently led to an assumption that the problems to be solved are simple or trivial, or at best, to the glib conclusion by systems analysts and programmes that they understand both the problems and their solutions.

Fifth problem, the high rate of turnover in systems analysts and programmers was noted by the Washington University School of Medicine Library in connection with its book catalog project.

1 SUPPLIERS

At least five types of problems can be identified in this category. The first is the failure of suppliers to deliver the necessary equipment. A second more common problem is the failure of suppliers to deliver the required software (ie, the programmes and related documentation), either on time or at all.

A third familiar problem is inadequate service response, which plagued most the projects using paper-tape machines and still troubles most libraries using automatic typewriters. It also seems clear that some machines, used in library automation projects are simply poor machines, either poorly engineered or poorly built.

Finally, and probably most common of all, the software supplied may be faulty, a problem which usually gets solved one way or another, but

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which may fatally disrupt the time schedule or the planned budget projects of all sizes.

2 LIBRARY STAFF

Perhaps the most serious problem originating with the library staff itself is the failure to distinguish legitimate research and experimentation from operational improvements or to provide separate funds for research. Some of the developments in library automation have been funded by grants (usually given to initiate expected operational improvements, not for research) but most have been funded from the operating budgets of individual libraries.

Library staff has also created by failing to agree on the desired characteristics of the final product of system. As might be imagined, cooperative projects and networks have been particularly vulnerable to this view.

Libraries were unaccustomed to defining their data processing requirement and quantitatively or with precision–both absolutely indispensable to the computer environment. Few library users understood the relationship between the system specifications and functional results, and fewer still under stood the significance of performance specifications.

3 POOR PLANNING

Some of the problems that have troubled library automation projects are not the sole province of any one of the above groups of people, but may originate with any or all of them. The first category of such problems may be thought of generally as poor planning. There are many valid reasons to begin an automated system; to do something better, or faster, or less expensively or to do something that can no longer be done effectively by manual systems, or to provide a new service, provided of source that the resources are available to pay for it. But many projects have been started, not for any of these reasons but because of pressure from the institution administration to "be modern" or "automate the library" to keep up with the journals of the library world, to promote a personnel reputation, or simply because somebody on the library staff is gadget-happy and needs a new toy.

One other problem in the planning category should be mentioned. Occasionally the planning for a system is based on the existence of "soft" money ie, money from grants or one–time gifts or appropriations or the assumption that such money will be available to the funds the project in

the future. This is both appropriate and desirable if the project is developmental or experimental, and designed either to terminate when the funds run out or to continue operating with identified, regularly budgeted funds.

4 POOR DESIGN

The actual design of many systems also falls pray to wishful thinking and unwarranted assumption, for example, that acquisitions data can be reused, without major changes, for catalogue cards, or that serials are regular and predictable enough that irregular serials will not be a major problem. System designs may also fail to provide for editing procedures, as in the Florida Atlantic book catalogue project.

A second problem associated with the design stage is prior choice of hardware. The machinery chosen may be satisfactory for the functions it was originally designed to perform, but unsuitable for use in another context. Equipment designed for intermittent use may fail when used in a high-volume, production environment, Software may also be misused.

Occasionally, too, a particular design or approach becomes a favourite not of a particular person but of a large number of libraries, in short, a fad. If the system design is basically a good one, such as the terminal-oriented circulation system, every one profits; if the system design is basically bad, such as the arrival card serial control system, every one suffers. The proof against this problem, of course is conscientious inquiry into actual results achieved by similar systems.

5 POOR IMPLEMENTATION

Once systems reach the implementation phase, most of the problems will have already been encountered, but some projects still falter at this stage. A common fault is that those charged with the implementation, whether librarians, system people, or administrativ staff, fail to take human element and human values sufficiently into account. Unless it is made clear to all staff members affected by the new system that the goal is better service or more assistance to them in their work, resistance is almost inevitable. Throughout design and implementation, documentation of the system and all procedures must also be produced, and some library systems have come to grief on this matter alone. A system may be implemented and working well, but if knowledge of the system is partly or fully in some key person's head and that person leaves or his services are otherwise lost, the solution of subsequent problems may be difficult if not impossible. All systems change, or at least should change, since any library is growing and the requirements imposed on the system consequently

differ. If documentation is faulty, changing the system may be a major problem, even in some instances enough to cause its abandonment.

Any catalogue of woe such as the foregoing is naturally depressing, and inevitably runs the risk of seeming overdrawn. Fortunately there have been many systems that avoid most if not all of the problems cited, and the successes probably out number the failures. To cite these in the interest of "balance", however, would be contrary to the purpose of this paper and at any rate no one expects a paper on pathology to conclude with examples of healthy patients. Library automation is basically healthy, despite the problems mentioned, but it will be more so when all of those involved can discuss, openly and candidly, the difficulties and even the failures that all sooner or later experience.

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ROLE OF CURRENT CONTENTS ON DISKETTE (CCOD) IN LIBRARY INFORMATION SYSTEM

SUDHIR GUPTA*
R K WALIA**

1 INTRODUCTION

Tremendous progress in various fields of science and technology has resulted into what is popularly known as Information Explosion. A professional who wants to keep himself abreast with the latest developments in his field/subject of specialization or the area of his interest looks for the latest information through various information sources, the Current Contents is one of them. The Current Contents Service gives information about the most Current bibliographic data from large number of science and social science publications.

It is almost impossible to get relevant information immediately with the manual methods of operations. Moreover, a small part of information documents is utilized, because scientists want to use only that information which can be retrieved quickly and with utmost ease. In order to provide prompt and relevant information services to the users, computers are being used in the library due to their fast speed, accuracy and mass storage capability. The Current Contents on Diskette (CCOD), which is a computerized form of Printed Current Contents is preferred due to its fast, accurate, multiple search and other facilities.

2 SYSTEM REQUIREMENTS

The CCOD can be used on IBM PC/XT or PC/AT or 100% IBM compatible micro-computer or an NEC 9801 micro-computer with the following minimum configurations

– MS-DOS version 2.0 or higher

– 640 KB RAM

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– One 3½" or 5½" high density floppy drive

– A hard disk with at least 6 MB space available for loading an issue.

The CCOD can also be used in micro computer based local area network.

3 FEATURES OF CCOD

Each CCOD issue contains the same journal contents data included in its corresponding Printed Current Contents issue. From May, 1991 the Current Contents on Diskette are supplied with abstract and hence are called Current Contents on Diskette with Abstracts. Each CCOD issue also includes Current Book Contents, which cover the new books.

The following editions of Current Contents on Diskette are available:

– Life Sciences

– Agriculture, Biology and Environment Sciences

– Physical, Chemical and Earth Sciences

– Clinical Medicine

In CCOD issue, journals are grouped by disciplines such as Chemistry, Physiology, etc. and all books are kept under the discipline Current Book Contents. In the issue, disciplines are arranged alphabetically with Current Book Contents as the first entry. Publications are arranged in alphabetical order within each discipline.

31 BROWSING

The Current Contents on Diskette can be browsed ie, displayed or viewed or scanned in the following three modes

(*i*) Browsing CCOD issue

(*ii*) Browsing by discipline

(*iii*) Browsing by source title

32 BROWSING CCOD ISSUE

By selecting browsing CCOD issue, the contents page of first publication is displayed and to move between the articles or between the different publications the following control keys can be used.

Control Key		*Function*
Dn-Arrow	–	Go to next article
Up-Arrow	–	Go to previous article

PgUp	–	Go to next page
PgDn	–	Go to previous page
Ctrl-PgUp	–	Go to next publication
Ctrl-PgDn	–	Go to previous publication
Ctrl-End	–	Go to last publication
Ctrl-Home	–	Go to first publication
Esc	–	Return to browsing menu.

33 BROWSING BY DISCIPLINE

On selecting Browsing by Discipline, list of disciplines covered in current issue is displayed. To move between the disciplines use Up-arrow, Down-arrow, PgUp or PgDn keys. In order to move to specific position in a discipline-list, type one or more initial letter(s) and press Enter Key. As the discipline of interest is highlighted, press enter key. The first publication in this discipline is displayed, use the above control keys to move between articles, publications or disciplines.

34 BROWSING BY SOURCE TITLE/JOURNAL

On selecting browsing by source title, list of all source titles/journals covered in current issue is displayed. You can move between the source titles using Up-arrow, Down-arrow, PgUp or PgDn keys. In order to move to specific position in source title list, type one or more initial letter(s) and press enter key. As the source title of interest is highlighted press enter key. The first publication in this source title is displayed, use the above control keys to move between articles, publications or disciplines.

35 SEARCHING

The search in CCOD is made in the form of a query, which consists of field selection and a search statement. The results of search queries are returned in few seconds and search can be made on the following fields.

Field	*Contents*
1 Basic:	Article's title, author assigned keywords list, or key words plus field.
2 Title:	Article's title only.
3 Author/editor:	Article's authors and book's editors.
4 Address:	Reprint author address.
5 Source:	The title of journals or books.

6 GA/Book Page: The genuine article number of journal or the B number of book, also the first page number of article.

7 Discipline: Discipline or Current Book Contents.

8 Document: type of document eg, letter, editorial, article, etc.

9 Language: Article's language or book's language.

10 Set number: The combined result of previous search queries.

Each search query is assigned a unique number. As soon as the query is entered, the number of records which satisfy the query are displayed as Hits (number of records) eg, the following query.

Query	Hits	Field	Search Statement
1	10	BASIC	LIBRARY

will search for the word LIBRARY appearing either in article's title, author assigned key words list, or the key words plus field, and shows that there are 10 records that satisfy the query, which can be viewed.

The default field in a query statement in Basic. In order to search for a different field, first change the field. Fields list can be displayed by pressing Alt-F key. To select a field for query, highlight the field and press enter key. The search terms can be combined by using boolean/logical operators (NOT, AND and OR). For each field selection CCOD has a dictionary of searchable items in the current issue, which can be displayed by pressing Alt-D key. To select a dictionary term, highlight the term and press enter key. The same search queries can be executed for different issues. To achieve this, number of search queries are saved in a file called Search Profile, which can be updated and deleted from time to time.

The Search Conventions are

* The search in CCOD is made in upper case only.
* The truncation symbol (*) can be used anywhere in the word stem, thus making search wider eg, CHLOR* (searches for all the words which starts with CHLOR).
* In case of multiple words in a search statement the CCOD searches for the exact match.
* The boolean operators can be used to make relationship between multiple search terms, for which the order of precedence is, NOT, AND and OR.
* The set number field can be used to combine the results of previously

executed queries.

* The THRU operator is available for set number search eg, 1 TRU 4 is equivalent to 1 or 2 or 3 or 4.

* The author name is entered as last name followed by comma and one, two or three initials with no space between the elements and no period following initials eg, *FREDE RICKSON, L.

36 VIEWING

The search results can be displayed by pressing function key F5 or from the article menu. The entire contents page of highlighted article can be displayed when viewing the search results or in browse mode.

The search result can be displayed in the following two formats:

1 Full Record–which includes Author, Title, Source, Pages, Keyboard, Keyboard+ (Significant word), GA/Book N. (GA number of journals or B number for Book), Discipline, Document, Language, Address (reprint Author Address), Editor (for book only), ISBN (for book only) and Publisher.

2 Author-Title–One line display of article's first author and title.

37 PIC ARTICLES

When the results of search query are displayed/viewed or the CC issue is browsed, one can choose the articles of one's choice using the Personal Interest Checklist (PIC) articles facility, which can later be printed or exported to text file.

38 ARTICLES

Genuine Article (GA) is ISI's fast document delivery service. GA articles list can be created when the result of query are displayed or when the CC issue is browsed. Only article and not the books can be added in GA Articles list, which can later be printed from Print GA order or exported to text file.

391 *Request-A-Print*

Using Request-A-Print option the reprint of article can be directly requested from the reprint author. Request-A-Print list of article can be created when the results of query are displayed or when the CC issue is browsed, which can be printed from Print Request-A-Print option.

392 *Printing*

All or selected articles can be printed. First display the Content page/

First page of article list you want to print. The records can be printed in the following three different formats.

1 Bibliographic–which includes articles authors, title and source (including volume, page and year)

2 Full Record–which includes Author, Title, Source, Pages, keyboard, Keyboard+ (Significant word), GA/Book No (GA number of journals or B number for Book), Discipline, Document, Language, Address (reprint Author Address), Editor (for book only), ISBN (for book only) and Publisher.

3 Full+Abstract–Which includes full record and abstract.

393 *Exporting*

The CCOD records can be exported into various different formats to use in different file management and word processing programs. The CCOD records can be exported into the following different formats:

1 Bibliographic–which includes articles, authors, title and source (including volume, page and year)

2 Full Record–which includes Author, Title, Source, Pages, Keyboard, Keyboard+ (Significant word), GA/Book No (GA number of journals or B number for Book), Discipline, Document, Language, Address (reprint Author Address), Editor (for book only), ISBN (for book only) and Publisher.

3 Full+Abstract–which includes full record and abstract

4 R-A-P/Comma delineated–Fields are separated by commas, contents of each field are enclosed in quotation mark and record ends with carriage return.

5 DIALOG-Medline–MEDLINE database format

6 NLM-Medline–NLM-Medline database format

7 Sci-Mate–Sci-Mate format

8 Pro-Cite–Pro-Cite format

9 Reference Manager–Reference manager format.

394 *Journal Coverage*

CCOD is provided in four different editions, each edition covers a group of related disciplines. The approximate number of journals covered

at present under each edition are as follows

Edition	*Total No of Journals*
Agriculture Biology and Environment Sciences	930
Life Sciences	1,230
Physical, Chemical and Earth Sciences	820
Clinical Medicine	890

395 *CCOD Comparison with Printed Current Contents*

The following information is not available in CCOD:

1 Subscription information,

2 Subheading regarding language, such as articles and abstracts in English.

3 Special subheading such as FASEB Journal–formerly Federation Proceedings.

4 Section headings such as correspondence and original articles.

The following differences are in data representation:

1 Author first name do not appear in CCOD, only initials. If there are two or more initials, they are not separated by spaces or periods.

2 CCOD does not use question marks, mathematical equality or inequality signs, subscripts, superscripts, stars, Greek letters and other scientific or mathematical notations.

396 *Limitations*

In CCOD each issue has to be searched separately ie, if a user has to search more than one issue, he will have to open each issue and then search, which is a time consuming process. However, the search profile can be made for the users and the CCOD issue can be searched accordingly.

397 *User Response*

The University of Horticulture and Forestry, Solan (Satyanand Stokes Library) was subscribing for printed Current Contents (Agriculture, Biology & Environmental Sciences) before January 1991 and the readers were used to consult the same. From January 1991 to December 1991 the

CCOD and Printed Current Contents both were subscribed in order to see the feasibility of CCOD. During the year, it was observed that initially users were reluctant to use CCOD because they were not familiar with the use of computers. With the introduction of few training programmes and by providing guidance to individuals the response for the use of CCOD increased rapidly, due to its various features and ease of operation. From January 1992 the UHF library has been subscribing to only CCOD.

4 CONCLUSIONS

With the rapid advancement of science and technology the modern library is not merely a store house of information but the main aim of the library is to provide right information with much ease and in minimum possible time. The CCOD plays a vital role in achieving the above mentioned goals.

The CCOD, interactive menu driven package provides almost all the facilities to its users for searching the latest information (Current Contents). The on-line help feature and use of function keys made CCOD more user-friendly. Viewing/Browsing CCOD by discipline wise, source title wise and searching on various fields are its distinctive features. The Genuine Article (ISI's fast document delivery service) and Request-A-Print (request a reprint of an article directly from the reprint author) are the added features of CCOD.

The CCOD provides immediate, fast, accurate and to-the-point search facilities of latest information (Current Contents), which is the need of the hour.

SOFTWARE FOR INDIAN LIBRARIES

M K MOHANDAS*
K C SHET**

0 INTRODUCTION

Computers have pervaded every walks of life. Some of the third world countries have successfully implemented informatics in varied sphere of human activities. But computerization in these countries has not maintained an even pace now as it had no anticipated effect in certain instances. The differences in the way various countries implemented their policies are believed to be the disparity of situation.

The fundamental obstacles that has held back the quick progress of the developing countries in the field of library automation is attributed to the phenomenon called "Technological dependence". In other words, developing countries have been "devised" by the industrialized nation to suit their specific needs. The inability to modify or innovate or adopt such techniques has perpetuated the phenomenon of dependence. The pull and pressure of developing economy not withstanding, certain countries proved that Informatics is not just prerogative of industrialized nations. Experiences show that development is unavoidable when backed by initiative and appropriate technology.

In this paper, we are highlighting the library automation software packages and the problems associated in using them. We also proposed new software package features for the Indian libraries to take a quantum jump into the 21st century.

2 SURVEY OF LIBRARY PACKAGES

The following packages are available an Indian market which are of specialised nature designed for library operations.

21 LIBMAN

It is a user friendly package designed for small and medium libraries. The menu driven packages incorporate the functional features of automatic

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retrieval data files, handling 60,000 books and periodicals, double level access, details of members, listing of fines and loan register facilities. The double level access information comprises : restricted one for members and unrestricted one for libraries. It has been developed by Ms Kasbah System, Madras. It is used under MS DOS environment.

22 WILISYS

It is a user friendly package developed by M/s Wipro Computers Limited, Bangalore, for library compterisation. It consists of two major components.

(*a*) WILIMAX : WIPRO library management system

(*b*) WILITRAX: WIPRO Abstracts System (Bibliographic search).

Both these packages are developed in 'C' language using UNIEFY Relations Data Base Management Systems for data storage. A judicious combination of fixed and variable length fields has been made for optimum utilisation of the available resources and a speedy retrieval. The package is aimed at computerisation of different activities such as library housekeeping operations, information retrieval etc, concerning books and periodicals by dividing into different modules.

23 UNILIB

M/s Hindustan Computer Ltd., Bangalore have developed a library management software package for medium/large size libraries which runs under UNIX/XENIX environment. It is one of the most comprehensive library management packages as claimed by the developer. This package is fully integrated multiuser and easy to operate and is Menu driven package. It ensures maximum productivity, minimum data entry requirement, efficient search and query facilities. It has two level security features ensuring privacy to each user and library staff.

It appears that the package is a little costlier than other packages.

44 CDS/ISIS

CDS/ISIS (Computerised Documentation Service/Integrated Set of Information Systems) is generalised information storage and retrieval (ISR) system for the management of structured textual databases. It can maintain and manage structures non numerical database especially bibliographic databases. The software is developed by UNESCO and is made available free of cost to Institutions in developing countries, under a licence agreement. The packages can be run on IBM-PC, PC/XT or compatible micros under MS DOS operating system. CDS/ISIS is also available for PDP–11 and Micro Vax-11 systems. For IBM-PC compatible micros, the package needs

256 KB Ram, two floppy diskette drives. The software is a user-friendly and once database is designed the system may be used by any person having little computer experience. The software is versatile in performing the following functions.

(*i*) Defining the databases containing user selected data elements.

(*ii*) Entering new records, modification, correction or deletion of existing records.

(*iii*) Automatic creation of fast access files, such as index files or inverted files.

(*iv*) Retrieval of records from a database using simple or complex Boolean expressions.

(*v*) Display of records according to user defined formats.

(*vi*) Sorting of records retrieved in desired sequences.

(*vii*) Printing records in user defined print formats.

(*viii*) Exchange on merging of records of two or more databases that are in compatible formats.

It is a menu driven, and having powerful search language software.

25 GOLDEN LIBRA

Golden libra aids in Library management and runs on IBM PC/XT compatibles. It keeps track of subscription, storage and retrieval of books/ periodicals. The programme generates reports on various matters such as over-due periodicals, list of magazines and books (code wise, location wise, subject wise) and reports to publishers and members for non-receipt of periodicals and books. Golden libra has also been provided with a stock module to give the status of stocks at a given periodicity, including the valuation of books. The system has been field tested at the British Council and American Libraries.

26 ARCHIVES

This library management system maintains vender file, maintain accession register, periodical registers and maintains issue and return of books/ periodicals. It also keeps track of budgetary control, generate revenue accounts statement. This is developed by M/s Minafax Electronic System, Bombay to perfectly suit the needs of any size and type of library centers. It is the first integrated computer system which covers all the functions of library management as claimed by the developers. It runs on PC, PC/XT, PC/AT under MS DOS environment.

27 LIBRARIAN

This library management software is perhaps the cheapest package available in the market, developed by M/s Mudra Electronics, New Delhi. This package helps in all spheres of activities of library such as receipt and issue of books, check the availability and quantity of books, search the books by title or the author, list the over-due books, or trace the borrower and other various counter functions and member assistances. It can handle 5,000 transactions per day, accommodate 10,000 members and 1,50,000 books data. It can be operated under Local Area Network.

In addition to the above packages, the general purpose relational database management system packages, such as dBASE III plus, dBASE IV, Foxbase, Softbase, Clipper, NELCO, SCI-MATE, etc can also be used for the development of library routines under MS DOS environment. The unified package can be used to develop library features under UNIX environment. Also there are highly powerful packages such as FOCUS, ORACLE, etc.

3 HOW GOOD IS INDIAN SOFTWARE

In spite of several vendors developing and supplying software packages there is no standardization in library packages. Thus it immediately calls for a statutory body to come out with guidelines for standardization of library packages.

Another big bottleneck for the software developer is the piracy. While the piracy is restraining the indigenous software industries in making them effective, it is also important to evaluate whether they are (at all) technically capable of giving an equal quality when compared with imported packages.

It is our experience that most of the software companies in India do not have any standard software at all, baring a few dedicated top ones. This itself has created a lot of confusion and hesitancy in the minds of librarians. Many software houses advertise that they "have certain packages" for library available with them. But when you get in touch with these software houses they say that they will "develop" it for us. Naturally, it takes several months to implement the library automation.

Once the software is developed and ready for sale, developers, find a stiumbling block in terms of investment. As a result, the end product will be a more or less, packet of a few floppies with negligible or no documentation. Unless there are several qualitative library packages at cheaper rates and easily available in market, the library automation is bound to be slow.

4 PROBLEMS IN AVAILABLE LIBRARY SOFTWARES

There are several problems in Indian library software, which have retarded the progress of Indian library automation. Some of these are highlighted hereunder

(*i*) The cost of software seems to be high. This problem has several other inter–related parameters such as number of packages sold by the company and commitment by the developer towards the packages.

(*ii*) Software portability: There are very few software packages portable from one environment to the another environment. This will frustrate the effort on the part of user.

(*iii*) Software purchase: It appears Indian user is reluctant to pay anything for software. He easily gets a package pirated through one of his known computer centres. Thus, the developer is deprived of his revenue. This ultimately effects entire software industry.

(*iv*) Standardization: A statutory body needs to be formulated to look into the standardization of library software package.

(*v*) Shortage of Manpower availability: This needs training of library staff in maintaining computerised library management.

(*vi*) Funding: Liberal funding is needed for library automation by the Government/management.

5 DESIRABLE FEATURES FOR LIBRARY SOFTWARE

The following are the features envisaged in the new library software packages.

(*i*) Portability: The software must be to run in any standard computer hardware or environment;

(*ii*) The package must have efficient search routine; in other words, searching a record among 75,000 records should take minimum time.

(*iii*) Restriction on field length, number of fields, number of records, number of books, etc, must be reduced as far as possible.

(*iv*) Search or sort on abridged notation of field is desirable.

(*v*) It is desirable to have variable size record so that overall storage requirement is kept minimum (such a feature does not exist in dBASE III Plus but is available in CDS/ISIS).

(*vi*) Menu driven packages are desirable. This should also have hierarchical menus, user-friendly, context based help menu, scroll of menus, etc. It should take minimum learning time to use the package.

(*vii*) Privacy/Security: The records and files must have sufficient security features in various levels for the smooth functioning of library objectives.

6 CONCLUSION

This paper surveys the availability of specialised library management packages in the Indian market. As any survey suffers from any omission and commission, this survey is not exceptional. However, efforts are being made to include all the latest software. The desirable features for the new library package are outlined. It is hoped that the Indian library software will become a catalyst in automating most of our library and information centres.

The INFLIBNET project proposes to link libraries and information centres in all universities, colleges, institutes of national importance and research laboratories. It provides better access to bibliographic information. It shifts reliance of users from local collection to region, national and international collection and vice versa to optimize information resource utilisation through resource sharing and to facilitate scientific communication effectively. The Indian library software may provide a firm foundation to realise the objective of INFLIBNET.

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SOFTWARE FOR LOCAL DOCUMENTATION LIST IN MUL

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N G BAPAT**

0 INTRODUCTION

"Information service is a service provided by...a library which draws the attention to information possessed in the library....in anticipation of demands; this is done by preparing and circulating news sheets, literature surveys, reading lists, abstracts, particulars of articles in current periodicals, etc."[1]

A combination of serval factors have resulted in the growing awareness of the importance of information. There are now many potential users wanting to have access to information. The growth in the amount of published information is fast enough of itself to justify the growing awareness of the need for information services to act as a clearing house, switching centres or technological gatekeepers for rest of the population. To provide information to one and all there is a need for providing information services.

1 INFORMATION SERVICES

Generally, the users of information want to keep themselves abreast of current information up to a fair degree, want to have specific information in their field of investigation or want almost all relevant information on a subject or brief but complete picture of recent developments of a related subject or a subject in which user was not very much interested or which did not come within the area of his main interest. As a result of this he is not quite current with the subject. Hence in such a situation, he expects to have in a communication system a device which will help him in quickly catching up with the subject.

To meet these information needs of 'users', a modern library has to think of following information services.

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1 Current awareness service

2 Condensation service

3 Repackaging

4 Reference Service

5 Evaluation service

6 Back-up service

7 Location service

11 LOCATION SERVICE

The service which shows the place of a document on shelves or elsewhere in which required material can be found either from location mark in a catalogue entry or from a bibliography, is known as location service. It can be provided by following methods:

1 Indexes

2 Bibliographies

3 Catalogues

4 Local Documentation List.

111 *Local Documentation List*

The Local Documentation List is reasonably quick method of informing a large number of clientele of the contents of journals books received in the library. This list is generally arranged alphabetically with broad subject headings. The periodicity can be monthly or weekly.

2 LOCAL DOCUMENTATION LIST (LDL) OF MUL

Marathwada University Library (MUL) established its Documentation Unit (DU) during the year 1976 for locating the microdocuments.

The Assistant Librarian of reference section, along with two professional assistants is responsible to bring out *Local Documentation List* for the humanities, social science and the science periodicals. It covers current learned journals, popular magazines, and newspapers subscribed by the Library, giving full bibliographic details of the article.

Almost all current periodicals received in the library are scanned by the staff of the unit. The articles are marked out for inclusion in the LDL. Entry of each article selected is prepared on 8" × 5" slip with full bibliographic details ie, author, title of the article, title of journal, volume number, date of publication and page number.

The entries are classified according to *DDC 17th ed.* and broad subject headings generally three in number are assigned to each entry. The assigned subject headings to each entry are compatible with *Sear's list of Subject Headings, Biological Abstract, Chemical Abstracts, Physical Abstracts*, etc. Each entry is assigned Sr No 1, 2, 3,..... and so on.

The arrangement of LDL is according to *DDC* for main subjects. Under each main subject the entries are arranged alphabetically by broad subject headings, within the same subject headings, entries are further arranged alphabetically by author, title, etc for the convenience of the users, eg

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Botany

Germination

104, Givilberg, A. and Horwitz, M. Germination Behaviour of Solenium nigrum seeds.

J Expt Bot. 135 (153); April, 1984; p 588-90.

The subject index is also prepared with the broad subject headings. Each subject term assigned to the article is noted on the slip and corresponding serial number of the article is given to this term for easy location of the information in the list of articles. This index is arranged alphabetically by subject headings eg

Argonomy	186
Birds	135
Fermentation	69
Germination	104
Holography	163
Oceanography	83, 84
Soybean	95

The serial number against each term indicates the serial number of the article in the documentation list.

List of journals indexed and subject contents of the documentation list are also given for the benefit of the users and are also arranged alphabetically, viz,

List of Journals indexed

1 *Annals of Botany.* 56(3) May, 1984.
2 *Journal of Experimental Botany.* 135(153), April, 1984.
3 *New Scientist.* May 10, 17, 1984.

Subject Contents

1 Agriculture

2 Botany

3 Chemistry

4 Energy

5 Mathematics

6 Zoology.

The parts-list of journals indexed, list of articles, subject index and subject contents are sent to typing unit for preparing stencils. The prepared stencils are checked and cyclostyled. Finally the LDL is checked and arranged in the following order:

1 List of journals index

2 Subject contents.

3 Subject index.

4 List of articles.

After arranging the pages, they are stitched together. These cyclostyled lists are circulated in the university departments as well as in local colleges as a location as well as current content list.

3 NEED FOR COMPUTERIZATION OF LDL IN MUL

While verifying the records as well as after an interview with the librarian it was learnt that LDL has become irregular feature due to shortage of staff, increase in backlog of material standing unprocessed for unidentified reasons and existence of bugs in the system, making it clear that MUL needs an aid to process its operations speedily, accurately and economically without any demand for additional staff. Under these circumstances computer is the only answer to solve these problems.

In spite of the availability of national/international databases, the ability to access remote online search via telecommunication network, "..... the need for processing local internal information remains... especially in university and research libraries."[2]

"Though the ready-made software packages are available, they are designed either for specific purpose of the library or for specific machine they are not much useful to all libraries."[3]

Marathwada University is having computer infrastructure, the Zeus-386 hardware, a multi-user system with OS UNIX. The authors of the paper decided to use available menu-driven, user friendly software package for MUL for minimizing time lag and cost for providing information to users.

31 OBJECTIVES

The software was developed with a view–

1 To create the database, correction and addition in the database.

2 To get local documentation list.

32 METHODOLOGY

Computerization of LDL was divided into 2 steps–*Step No. 1 : Creation of document profile:*

Bibliographic information of all articles appeared in current periodicals was noted and analysed for assigning subject headings, which can be used as a base for preparing monthly documentation list and for providing CAS, SDI and RSS.

Step No. 2: Printing the Output:

The output printing was done for printing Local Documentation List.

33 FILE MANAGEMENT

For the purpose of each step computer programme in BASIC language was developed and through such programmes necessary data files were created for storing bibliographic information of the micro-documents. The data was given as an input at the time of execution of the programme.

Computer application system was divided into two types of files ie, (*a*) Data files and (*b*) Programme files.

(*a*) *Data Files:* Data file is created for storing necessary information of the documents.

Two data files were created: (1) Current doc and (2) Master doc. Both current doc as well as master doc are with block length 500 and record length 500. In each record there are 16 fields as shown in Table No. 1. These fields are the constant information relating to each microdocument. The current doc is appended up to one month, thereafter by taking LDL, it is merged in matter doc and again for next month current doc is created.

Table 1
Table showing the fields, their types and field length in current doc and master doc

Fields	Field type	Field Length
Keywords (up to 7)	Alphanumeric	25 each
Author/s (up to 2)	Alphanumeric	20 each
Title (3 lines)	Alphanumeric	75 per line
Name of journal	Alphanumeric	20
Year of publication	Alphanumeric	04
Volume & Issue No.	Alphanumeric	08
Pages	Alphanumeric	08
Date of entry	Alphanumeric	10
Serial Number	Numeric	04

(*b*) *Programme files:* Programme files contain instructions to the computer. The programmes can be classified as–*1. MUL.BAS:* This programme is a main programme and call the external subroutine modules for execution as per the given option.

2 DOC.BAS: This programme was prepared for the implementation of first step. With the use of this program current doc–the current document profile can be created, appended and updated. In each record the bibliographic information relating to the document is stored.

3 LDL.BAS: This programme is prepared for printing the LDL by providing list of articles in periodicals with their bibliographic details along with keywords. The output is enclosed in *Appendix-A.*

In short the software for LDL in MUL is menu driven and works as shown in the figure.

4 CONCLUSION

The software prepared was tested and found that LDL can be prepared with adequate information and in a presentable form.

The software being user friendly, the LDL can be prepared by the library staff without any formal knowledge of computer. Moreover the LDL can be prepared timely and accurately without any demand for additional staff. It is hoped that the use of the software will make LDL in MUL a regular feature and can be distributed to the users and researchers of the Library as well as other libraries.

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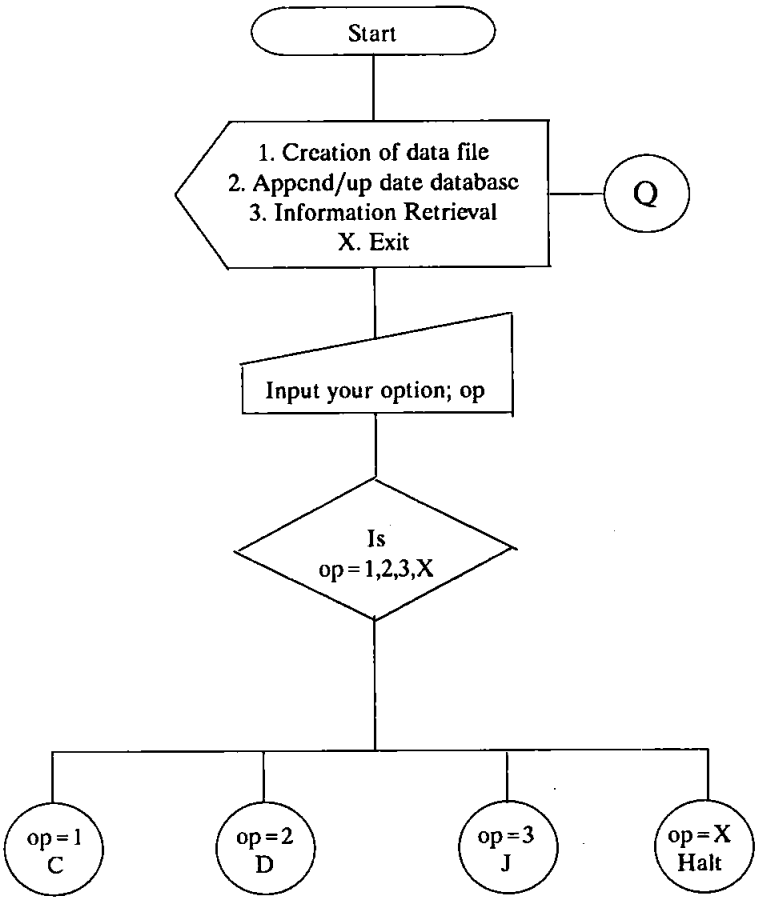
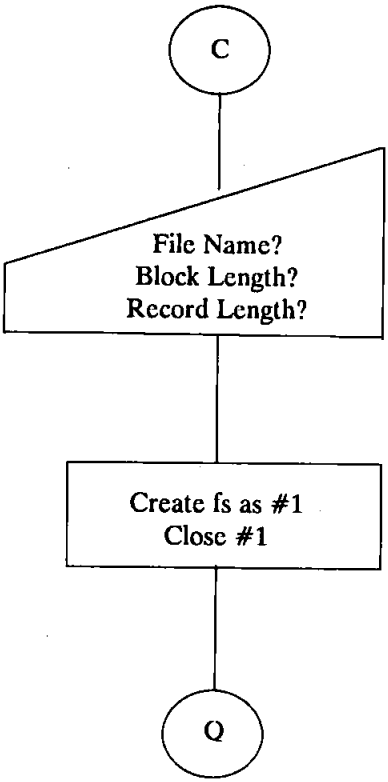
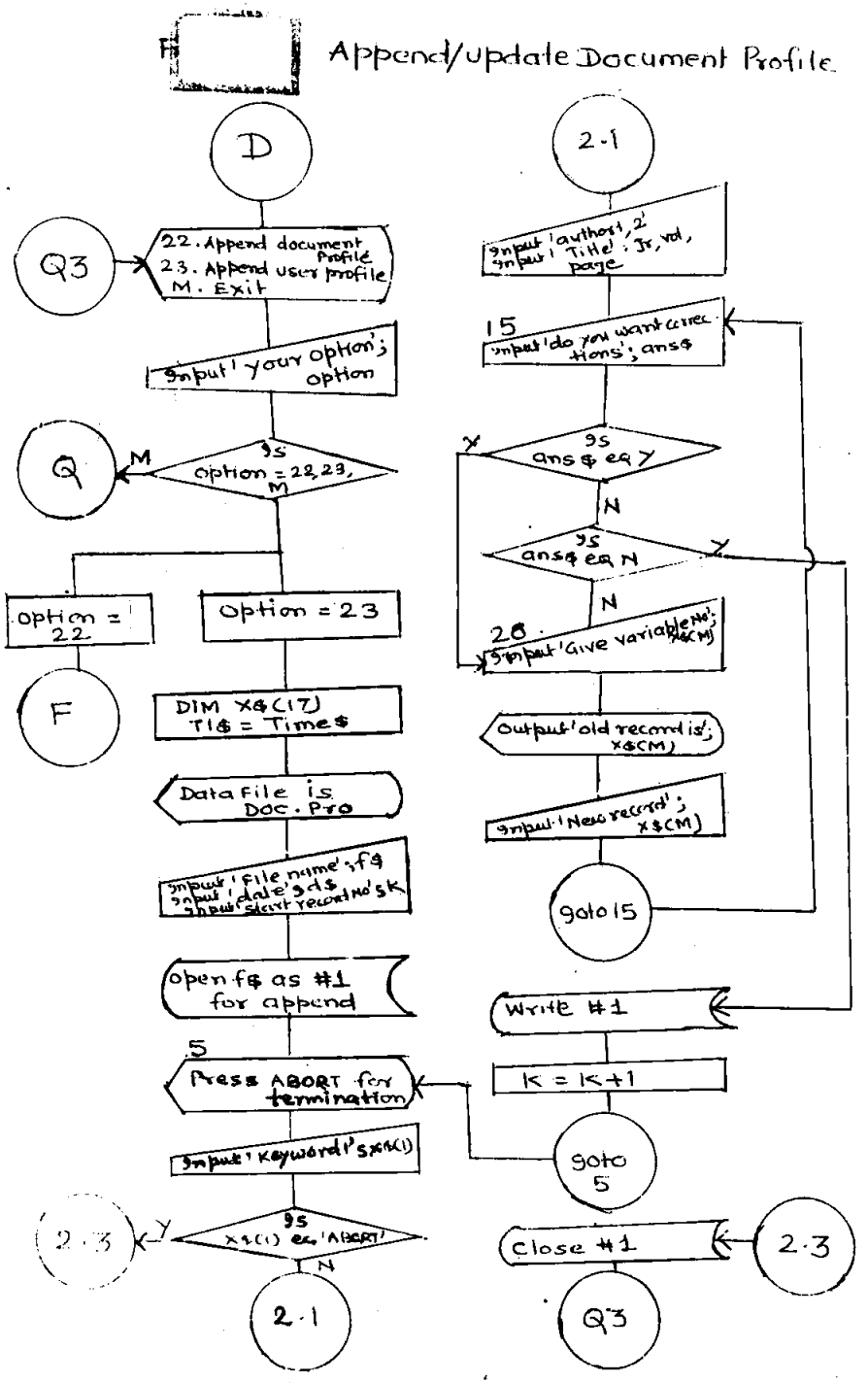


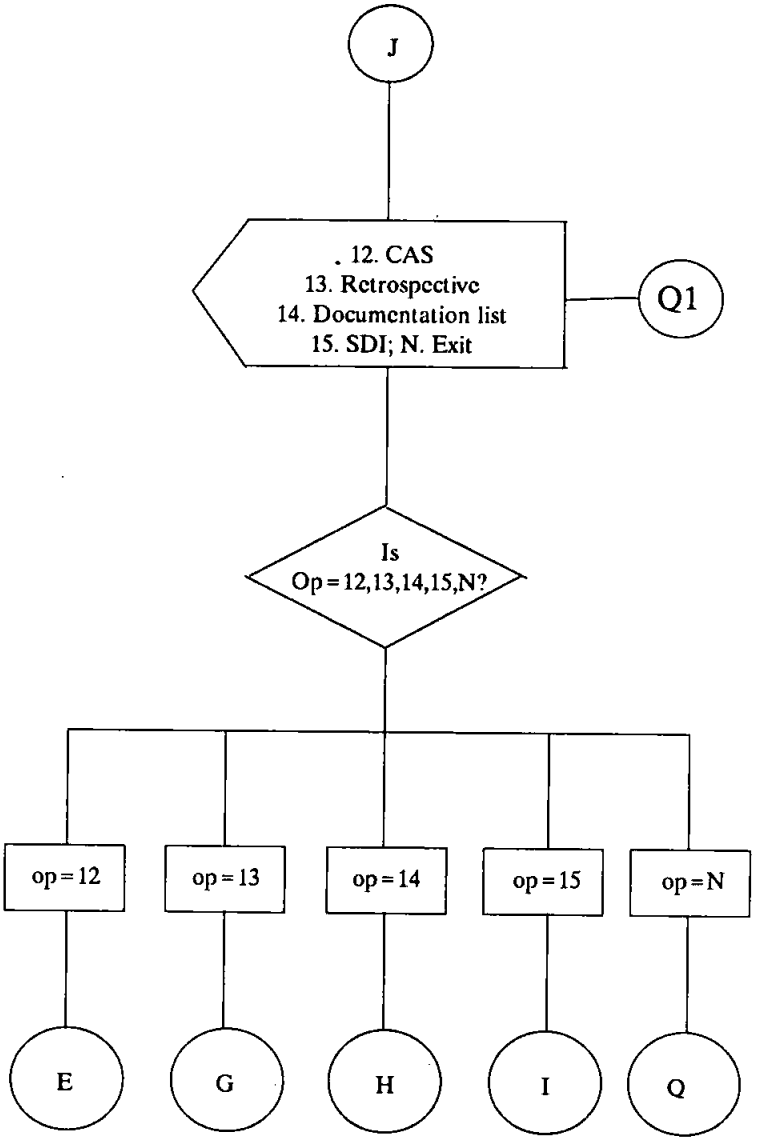
Fig. 1 Flow chart showing working of computerised Information Service System



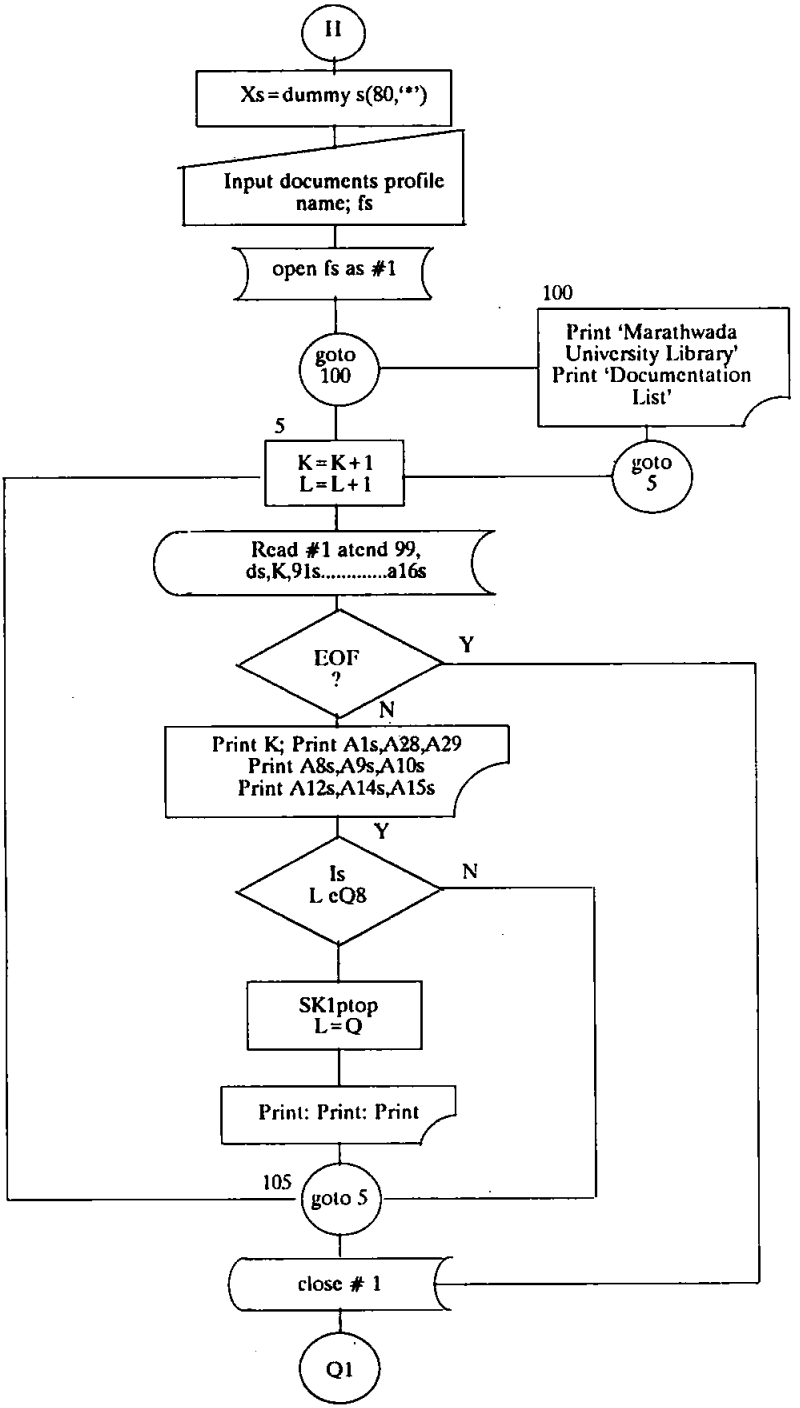
Creation of Database

Append/Update Document Profile





Information Retrieval System


II
Xs=dummy s(80,'*')
Input documents profile name; fs
open fs as #1
100
goto 100
Print 'Marathwada University Library'
Print 'Documentation List'
5
K=K+1
L=L+1
goto 5
Read #1 atend 99, ds,K,91s.....a16s
EOF ?
Y
N
Print K; Print A1s,A28,A29
Print A8s,A9s,A10s
Print A12s,A14s,A15s
Y
Is L eQ8
N
SK1ptop
L=Q
Print: Print: Print
105
goto 5
close # 1
Q1

APPENDIX-A

Marathwada University Library
Documentation List

1 Zoology Helminthology Trematoda
Kechemir N. Theron A.
Dynamics of the Intramolluscan Larval Development ofSchistosoma Haematobiu: Replication of Daughter Sporocysts and Cercarial Production
Jr. of Helminthology 1989 63(1) 1-5

2 Zoology Helminthology Cestoda
Brooks D.R. Deardrff T.L. Rhinebothrium Devancyi N.Sp. (tucestoda-Tetraphyllidea) & Echinocephalus Overstreeti Dearddrff & KO. 1983 (Nematoda: Gnathostmatidae) in Thorny Back Ray Urogymmus Asperrimus from Enewetak Atoll with Phyllogenic Analysis of B Jr. of Parasitology 1988 74(3) 459-465

3 Zoology Helminthology Nematoda
Brooks D.R. Deardorff T.L.
Rhinebothrium Devancyi N. Sp. (Eucestoda-Tetraphyllidea) & Echinocephalus Overstreeti Deardorff & KO. 1983 (Nematoda: Gnathostomatidae) in Theorny Back Ray Urogymmus Asperrimus from Enewetak Atoll with Phyllogenic Analysis of Jr. of Parasitology 1988 74(3) 459-465

4 Zoology Helminthology Cestoda
Dronen N.O. And others
Some Parasitic Helminths from American Oystercatcher Haematopus Palliatus Temminck from the Texas Gulf Coast & Common Pied Oystercatcher H. Ostralegus Linnaeus from New Zeland Including Dildotaenia Latovarium N. Gen. & N. SP. (Cest Jr. of Parasitology 1988 74(5) 564-567

5 Zoology Helminthology Cestoda
Gardner S.L. And Others
Echinococcus Vogeli Rausch & Bernstein 1972 from the Paca Cuniculus Paca L. (Rodentia: Dasyproctidae) in the Departmento De Santa Cruz Bolivia
Jr. of Parasitology 1988 74(3) 399-402

6 Zoology Helminthology Cestoda
Kumazava H. Yagyu K.
Rostellar Gross Anatomy and the Ultrastructure and the Histochemical Characterization of the Rostellar Tegument Related Structure in Hymenolepis Nana
Int. Jr. of Parasitolo 1988 18(6) 739-746

7 Zoology Helminthology Cestoda
Pawlowki I.D.
Observation on the Possible Origin Formation and Structure of Calcarius Corpuscles in Taeniid Cestodes
Parasitology Research 1988 74(3) 293-296

8 Zoology Helminthology Cestoda
Rees F.G.
The Muscle Nervous & Execretary System of the Plerocercoid of Callitetrarhy Gracilis (Rud 1919) (Pintner 1931) (Cestoda: Trypanorhyncha) from Bermuda Fishes
Parasitology 1988 96(2) 337-351

9 Zoology Helminthology Cestoda
Sawada I.
Further Studies on Cestodes of Japanese Bats with Descriptions of Three New Species of the New Genus Vampirolepis (Cestoda: Hymenolepididae)
Zoological Science 1987 4(4) 721-729

10 Zoology Helminthology Cestoda
Schmidt G.D. and Others
Cloacotaeniella Tringae N. Gen. N. SP (Cestdidea: Hymenolepididae) from A Red Shanks Tringatotanus (Charadriformes) in Israael
Jr. of Parasitology 1988 74(5) 888-869

11 Zoology Helminthology Cestoda
Schmidt G.D. Wertheim G.
Inermicapsifer Beveridgei N.Sp. (CestoDidea; Anoplocephalidae) from Provavia Capensis (Hyracoidea) in Israel with Notes on Two Species of Hymenolepis
Jr. of Parasitology 1988 74(3) 487-488

12 Zoology Helminthology Cestoda
Horii Y and others
Leukocyte Accumulation in Sparganosis: Further Characterisation of an Esinophil Chemotactic Factor of the Plerocercoid of Spirometra Erinacei
Jr. of Helminthology 1989 63(1) 6-12

13 Zoology Helminthology Cestoda
Kumar D. and Others
Comparative Evaluation of various Immunodiagnostic Tests for the Diagnosis of Taenia Solium Cysticercosis in Pigs Using Fractionated Antigens
Jr. of Helminthology 1989 63(1) 13-17

14 Zoology Helminthology Nematoda
Adedeji S.O.
Synergistic Effect of Migrating Ascaris Larvae and Escherichia Coli in Piglets
Jr. of Helminthology 1989 63(1) 19-24

15 Zoology Helminthology Cestoda
Van Der Vorst E and Others
Hymenolepis Murissylvatici: Humoral Response in Intestinal Larvages Larvages of the Mouse
Jr. of Helminthology 1989 63(1) 25-31

16 Zoology Helminthology Cestoda
Robinson R.D. and Others
Survey of Intestinal Helminths of Well cared Dogs in Jamaica and their Potential Public Health Significance
Jr. of Helminthology 1989 63(1) 32-38

17 Zoology Helminthology Cestoda
Irshadullah M. and Others
Observations on the Suitability and Importance of the Domestic Intermediate Hosts of Echinococcus Granulosus
Jr. of Helminthology 1989 63(1) 39-45

18 Zoology Helminthology Nematoda
Van Aken D. and Others
Mammomonogamus Laryngeus (Railliet 1988) Infections in Cattle from Sri Lanka
Jr. of Helminthology 1989 63(1) 47-52

19 Zoology Helminthology Nematoda
Griffin Christi
Oswaldocruzia Filiformis (Nematoda: Trichostrongyloidea) in Frogs (Rana Temporaria) from Three Locations in Ireland
Jr. of Helminthology 1989 63(1) 53-62

20 Zoology Helminthology Trematoda
Kearn G.C. and Others
An in Vitro Study of the Forcible Ejection of the Metacercaria of the Strigeid Digenean Apatemon (Australapatemon) Minor Yamaguti 1933 by Rapid Inward Expansion of the Cystwall
Jr. of Helminthology 1989 63(1) 63-71

THE USE OF INFORMATION TECHNOLOGY IN THE LIBRARIES OF MEDICAL, DENTAL AND ENGINEERING COLLEGES OF MANGALORE UNIVERSITY

A K BARADOL*

1 INTRODUCTION

The libraries and information centres have been using the different tools to provide service to the clients. The information technology includes the use of communication technology. Now-a-days the information technology is applied in every sphere of activities. It has influenced many fields like offices, the industries and many other organizations including the libraries and information centres. It has an important role to play in social transformation. Pitroda says, "Information technology has changed significantly in the past 20 years. The world of mouth got changed to print media and then to electronic media. The merger of communication and computer technologies has given an impetus to an entirely new thinking in organising, structuring, transmitting, manipulating and messaging information to derive a variety of outputs."[1] The data transfer from place to place through the information networks has become a reality. The communication technology has largely facilitated the improvements in the information dissemination. To quote Parthasarathy, "The rapid strides in telecommunication technology facilitated numerous services-transfer of digital information, data networks, value added data services, local and wide area networks, fax, telex, teletex, videotex, and so on. When computers are linked by telecommunication network (Computer-Mediated Communication), it gives a new dimension to information handling, processing, transfer and evaluation, resource sharing and online searching and retrieval".[2]

2 MEANING

The information technology is a very wide concept. Its use is found in variety of services and activities. Many people have felt that it includes various new technologies. To quote Zorkoczy "information technology" aids synonymous with 'the new technology'–the use of micro processor-based machines: micro computers, automated equipment, word processors

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and the like".[3] The information technology (IT) includes communication technologies, tele-communication, data communication, artificial intelligence, Electronic Publishing, Desk Top Publishing (DTP), Tele-conferencing, E-Mail, Chip Technology, Compact Disks, etc. To quote Haravu, "The need to store and process large volumes of information efficiently, and the need to make it available at those points where it is required, when it is required, has led to the development of new media, products, and services. Most of these products and services are the result of technological advances in electronics, materials science, computers and telecommunications. The spectacular growth in computing hardware, advances in software, the development of high density magnetic and optical storage media, and developments in computer-communication systems have been dubbed as the Information Technology (IT) revolution. Apart from activities and equipments connected with the use of micro processor based machines the plain paper copies or xeroxing machines are also included in the information technology. To quote Bedi, "Information technology is a generic term used to denote all activities connected with computer based processing, storage, and transfer of information. It involves computers, electronic media, satellites, telecommunications and reprography".[5]

3 NEED

Concerted effort are on to adopt the information technology in all spheres of activities. As long as these were not available the libraries were managing the processing of information and rendering the information services manually or with the help of the existing devices. The use of information technology is necessary to render more effective and efficient information services. To quote Rajasekharan, "The role of information technology is to improve the overall efficiency of library and information services in catering to the information needs of the users. The basic concept in the use of information technology is nothing but to free the librarians from routine jobs. The time thus saved could be used for more intellectual involvement in meeting the users information needs."[6] To save the time of the staff of the libraries and information centres the information technology is needed.

The information technology has brought the people of the globe nearer. Although application of the information technology is only about 20 years old it has revolutionized the information services. The computers are applied for various purposes. To quote Krishan Kumar, "A social revolution is taking place which is making it possible for information to be made available to the farthest corners of the globe. While the bibliographical sources may not be directly available to a user, still he can have access to information".[7] The universal availability of publications is difficult to achieve. Even the

universal availability of bibliographies was also a difficult task. But with the availability of information technology the universal availability of bibliographies has become a reality. The application of information technology is needed in all types of libraries. Any library or information centre is not self-sufficient. It will have to depend on other libraries or information centres or databases for the information requirement. Hence, the online information networks are necessary. The online information retrieval is very expensive. It is generally argued that any technological advancements will make the things/services cheaper. In fact it is not always true. The users and librarians want to have the required information always with them. By online information retrieval it is not possible. Whereas by the Compact Disk Read Only Memory (CD-ROM) database it is possible to some extent. Hence, it is necessary to have as many CD-ROM databases as possible.

4 THE USE OF INFORMATION TECHNOLOGY IN COLLEGE LIBRARIES

The Mangalore University was established in September 1980. A few colleges coming under the jurisdiction of Mangalore University were already there in existence. Up to September 1980 these were under the jurisdiction of University of Mysore. The Mangalore University is one of the youngest universities in the country. The University consists of, besides 19 post-graduate departments on the campus, 82 colleges of arts, science and commerce, etc. Out of these the number of medical, dental and engineering colleges is 12. The use of information technology in these institutions is presented in the Table.

41 USE OF COMPUTERS

The Table shows that out of total 12 colleges only five college libraries are using the computers for the different purposes. Out of four engineering colleges only three are using the computers. Out of the two medical colleges only one is using the computers for different housekeeping operations.

The Kasturba Medical College (KMC) Library Manipal, has computerised the serials control. It also provides the computerised SDI services for four staff members. The Manipal Institute of Technology (MIT) has a Local Area Network (LAN) facility at the institute. The MIT, Library has computerised the serials control. The library has a terminal. The MIT Library also is in the process of computerising the entire catalogue of the Library. The bibliographical information of documents is available in the machine readable form. The ABSM College of Dental Sciences (ABSMCDS) Library is also computerising the catalogue. The ABSMCDS has a Local

Use of Information Technology in the College Libraries

Sl No	Name of the College	Year of Est	CD-ROM	Use of Computer	Plain paper copier
1	Kasturba Medical College, Manipal	1952	Yes	Yes	Yes
2	Kasturba Medical College, Mangalore	1953	–	–	Yes
3	SDM College of Ayurveda, Udupi.	1958	–	–	–
4	Fr Muller's Homoeopathic Medical College, Mangalore	1985	–	–	–
5	SDM College of Naturopathy and Yogic Science, Ujire	1989	–	–	–
6	AB Shetty Memorial College of Dental Science, Mangalore	1985	Yes	Yes	–
7	KVG Dental College, Sullia	1991	–	–	–
8	Yenepoya Dental College, Mangalore	1992	–	–	–
9	Manipal Institute of Technology, Manipal	1957	–	Yes	Yes
10	Karnataka Regional Engineering College, Surathkal	1960	–	Yes	Yes
11	KVG College of Engineering, Sullia	1986	–	–	–
12	NMAM Institute of Technology, Nitte	1986	–	Yes	–

Area Network (LAN) facility. The NMAM Institute of Technology Library is using the computer for the acquisition of books.

42 CD-ROM

It can be observed from the Table that out of 12 college libraries only 2 (two) have the CD-ROM databases. The Kasturba Medical College Library, Manipal has 30 CD-ROM disks. The use of CD-ROM databases is free for the staff of the college where as an hourly fee is charged from the students to meet out the cost of the service. The ABSM College of Dental Science also has acquired a CD-ROM drive and the CD-ROM disks. The use of the CD-ROM is still in the initial stage.

43 PLAIN PAPER COPIERS

Out of the 12 college libraries only 4 have got the plain paper copiers of xerox machines. Although there is a need for xerox machines it can be met with by the services available at the private sectors.

5 CONCLUSION

In conclusion it can be said that the information technology which was so far used only by the libraries in developed countries has entered the developing countries and more specially the libraries of professional colleges in India. The Indian libraries will not be able to afford the costly access to foreign databases through online information retrieval. Hence, a number of organizations are importing these databases on CD-ROM. It is a duplication of resources. As it is yet a beginning period the situation needs to be watched for some more time. By the turn of the twentieth century the information technology will be widely used in India. Many of the proposed library networks will be operational. A few networks which have just begun like INFLIBNET will be functional. A number of libraries would have gone in for automation and will use the information technology extensively to provide a variety of services.

The situation which is existing at present in the college of Mangalore University is also existing in many of the professional colleges coming under the jurisdiction of other universities at other places in India. If the colleges want to be more effective and achieve speed and comprehensiveness they will have to use the Information Technology (IT) extensively. The IT has a tremendous impact on the utility of the information at large. After studying the existing situations the following suggestions are provided:

1 All the professional college libraries should computerise the catalogue and also should use the computers for the other activities in the libraries like serials control, acquisition and circulation.

2 The colleges must procure the CD-ROM drive and the CD-ROM databases available in their subject fields.

3 The charge for the use of CD-ROM databases should be uniform in all the colleges.

4 The E-Mail and FAX facilities should also be made available by the colleges to the libraries.

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2 PARTHASARATHY (S). Fiche and Chips: *Frontline* Vol 9(17); August 15-28; 1992; p 61.

3 ZORKOCZY (Peter). Information Technology: An Introduction Ed. 2, New Delhi, Affiliated East-West Press, 1985; p 3.

4 HARAVU (L J). Information Technology and Libraries in India. Talk delivered at the Karnataka University Dharwad, 1988; p 3.

5 BEDI (D S). Information professional and the new technology: *DESIDOC Bulletin of Information Technology,* Vol 11(3); 1991; p 4.

6 RAJASEKHARAN (K). The impact of information technologies in increasing information access in developing countries. *In:* National Information Policies and Programmes, ILA Delhi, 1991; p 425.

7 KRISHAN KUMAR. Reference Service. Vani Educational Books, 1984; p 417.

AUTOMATED INFORMATION RETRIEVAL SYSTEM IN A UNIVERSITY LIBRARY

PIJUSHKANTI PANIGRAHI*
M KANAKACHARY**

1 INTRODUCTION

Teaching and Research are the basic functions of any university. These functions certainly need accurate, reliable nascent information (world-wide, comprehensive and up-to-date). This information is made available through the university library. Therefore, the university libraries play a pivotal role in the universities.

There is multidimensional, continuous exponential growth of information. Day-to-day, the proliferation of information is increasing tremendously on one side and on the other, the demand for the utilization of information is also increasing. Thus, the university libraries are in crisis of information processing.

As a supporting system, a university library has to feed the information to the research community pin-pointedly, exhaustively and expeditiously. But there is multi-form, multi-disciplinary nature of information scattered throughout the world. Out of the mountains of complex information, the libraries have to identify the source, pick up, process, retrieve and supply to the research community in a desired form. This is the meaning of reference service given by Dr S R Ranganathan.

This paper explores the ways and means of retrieval functions. To perform these functions, there should be a database, it is difficult to retrieve the required information unless suitable retrieval techniques are applied.

There are several Information Systems. They are:

1 Information Retrieval Systems (IRS).

2 Database Management Systems (DBMS).

3 Management Information Systems (MIS).

4 Question-Answering Systems (QAS).

In this paper, we discuss only the IRS.

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** Assistant Librarian, CIEFL, Hyderabad-500 007.

2 INFORMATION RETRIEVAL SYSTEM (IRS)

Information Retrieval concerns with the techniques and processes of representation, storage, organization and accessing of information pertaining to a set of items.[1] The items may be any. There is no restriction on the type of items. But here in this paper, the types of items is restricted to documents only (books, reports, standards, periodical articles, serials, microfiches, microfilms, etc). So IRS means a system suitably designed and organized procedure for providing exact information by filtering out unwanted information to the users. The author, title, classified and subject catalogue which we are using in our libraries are essential in an IRS. They are Manual Information Retrieval Systems (MIRS). But for many advantages, computers or other suitable machines are replacing MIRS. They are known as Automated Information Retrieval Systems (AIRS). Generally AIRS can exist with computers only. In this paper we, use IRS. It is implied that this IRS is automated one. An IRS need not necessarily be associated with a library. It may provide only the secondary information with which users can find the books in a library or elsewhere or buy them. Abstracting periodicals like *Chemical Abstracts, Engineering Index,* etc are examples of IRS, which by themselves are not libraries. Similarly INIS, AGRIS, etc are also examples of IRS.

Any IRS, generally consists of following three components

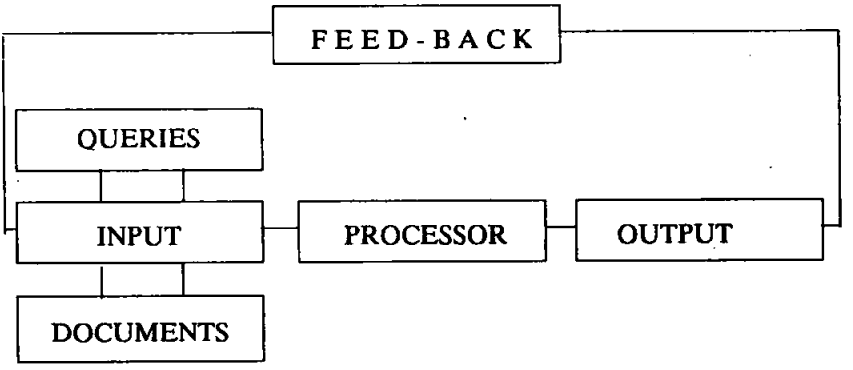


Fig. 1.

The input is generally in the form of worksheets containing bibliographic data whereas the query is expressed using Boolean logic. The processor concerns with the retrieval process which involves structuring the information

in an appropriate way. It also includes executing search strategies in response to a query. The output is generally a set of citations/references or document numbers.[2]

In the case of an Automated Information Retrieval System, the functions are carried out by a computer. In automated IRS the conversion of records to machine-readable form and vice-versa is essential for handling of information by the machine. It is also convenient if the conversion functions can be carried out by the machine itself.

3 WHY AUTOMATION IN IRS?

The fourth law of Information science states that "Only Timeliness Adds Value to Information".[3] This means "to maximize the user's satisfaction by providing desired information efficiently and minimization of the user's time loss between setting up the query and retrieving the information" which are chief objectives of IRS. Thus, it is possible only through automated IRS.

Similarly, the fifth law of Information Science states that "The Universe of Information is Ever-growing".[4] The exponential growth of information certainly needs proper handling, which is very difficult when manual techniques are employed. Efficient and effective handling are only possible by computers which have the added advantage of being highly accurate. By automating an IRS it is possible to save time, resources, and effort, which in turn results in an overall improvement of efficiency.

The IRS is quite helpful and useful in:

controlling the collection of information;
imposing effective search strategies;
establishing linkages with remote databases;
updating information collection;
keeping users aware of new additions of information in the storage device;
avoiding drudgery in the process;
carrying out quick search;
overcoming the barriers standing between the users and the desired information.[5]

4 BUILDING UP AN AUTOMATED IRS

Before building an automated IRS, one has to have a thorough knowledge of the important concepts of information storage and retrieval in the computerized environment. Briefly, some of the concepts are given below:

1. *Storing:* Storage of information should be done using software based on database management systems having efficient accession facilities.
2. *Search formulation:* A correct search expression should be supplied to the computer so that interface software can take care of all related procedures including converting the expression into machine-readable information.
3. *Browsing:* Convenient display formats should be selected for browsing the required information.
4. *Differentiating:* Differentiating concerns the interaction between (that is, the matching/mismatching) queries and information. This property helps to find out the right information from the databases against each and every query placed by the potential user.
5. *Extracting:* Extraction concerns the supply of information to the respective users in desired way. For this purpose, the information can be extracted from the database by downloading onto the floppy disks or by taking print out on paper as hard copy.

For solving any problem in IRS, construction of Flow Chart is an important step which would help us to follow the systematic different stages involved in automated IRS.

5 SEARCH FORMULATION

Searching is an important function of any IRS. There are various methods of searching depending upon the file organization and the storage media that are used in our database. Usually, the database can be created on a hard disk or magnetic tape or CD-ROM (Compact Disk Read Only Memory) or any other secondary storage device. The database management system can be into three categories. They are local databases, CD-ROM databases, and Online databases. Local databases are created and maintained by individual libraries using any DBMS packages like–CDS/ISIS, MINISIS' etc. CD-ROM databases are available in compact disk medium and generally created by secondary information agencies. Online databases are also created generally by secondary information agencies and are made available by online hosts like–DIALOG, BRS etc.[6] Here we prefer to discuss only searching of CD-ROM databases and Online databases.

(*i*) *Searching Of CD-ROM Databases:* CD-ROM technology has given the enormous scope of storing a large amount of information. In practice, CD-ROM disk can store information which can be stored in a hard copy of more than three lakh pages. The interface software is generally provided by the secondary information agencies for example silver platter Information

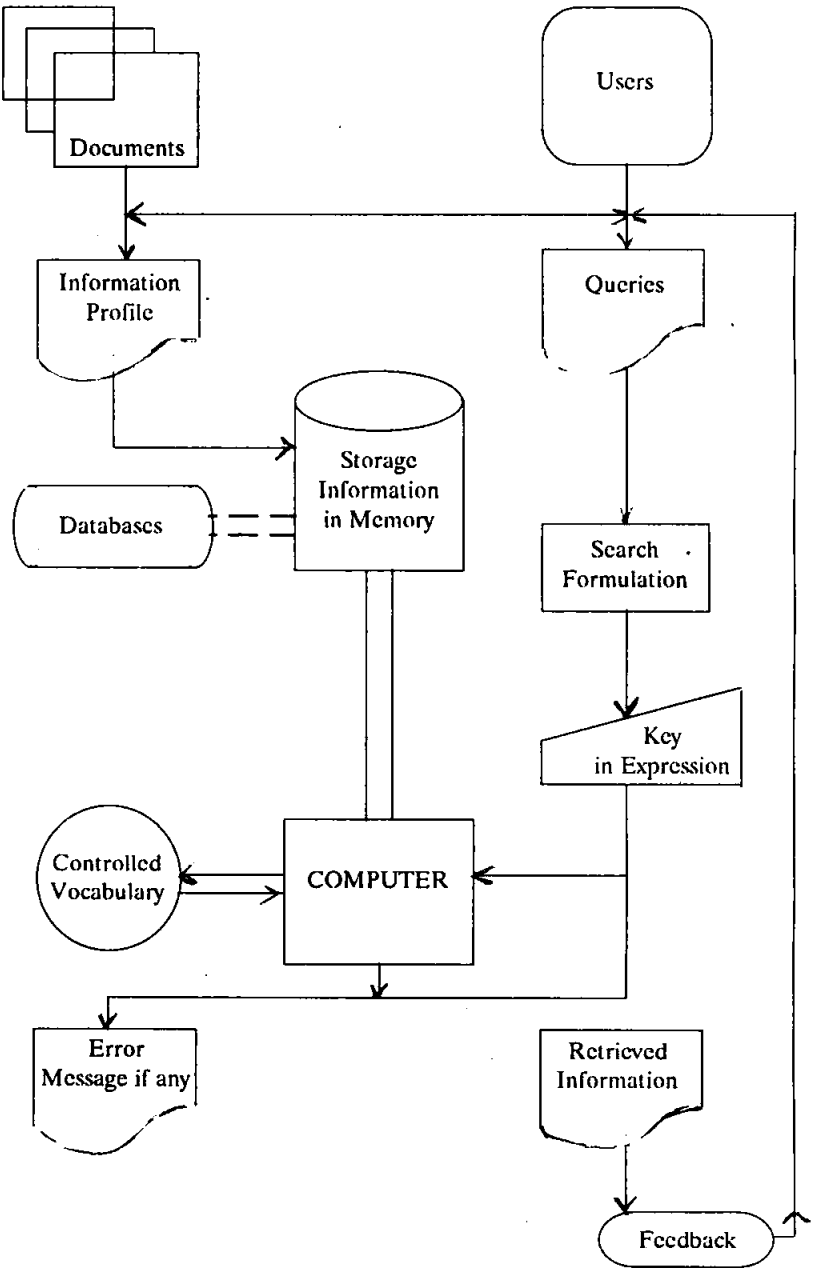


Fig. 2 Flow Chart for Automated IRS

Retrieval System (SPIRS) interface software allows to search databases applied by SPIRS.

In an automated IRS, each document is represented by a record that a computer can read and manipulate. Typically, these records contain data identification marks, and a set of index terms to provide subject access. Following is a sample search session conducted on Silver Platter's LISA database in CD-ROM. Suppose, we want to have a search for the items of information available on a topic *"Planning and Designing of a National Documentation Centre for the Humanities in India"*. The searching procedure can be carried out using the following expression step by step.

FIND: (Planning OR Management) and (National) AND (Documentation OR Information OR Library) AND (Center OR Center) AND (Humanities*)

Searching Result is as follows:-

Sliver Platter 2.01 LISA (1/69–9/89)

No	Records	Request
1	5169	PLANNING
2	8584	MANAGEMENT
3	13552	NATIONAL
4	5682	DOCUMENTATION
5	49055	INFORMATION
6	58088	LIBRARY
7	5917	CENTRE
8	2584	CENTER
9	548	HUMANITIES*
10	2	(Planning or MANAGEMENT) and NATIONAL and (DOCUMENTATION or INFORMATION or LIBRARY) and (CENTRE or CENTER) and HUMANITIES*

In the above expression we have used the facilities of right transitions and different Boolean operators. According to rules of right truncation the databases should retrieve all relevant documents when the prefix and the root of a key term are presented. In our expression we have used "Humanities". All the key terms starting with the substring "Humanities" are to be retrieved. The wild card symbol (*) indicates that the substring "Humanities" can be suffixed by any any letter occurring any number of times to form keywords.[7]

51 BOOLEAN EXPRESSIONS

Almost all the interface softwares allow Boolean Search by using Boolean

Statements (AND, OR and NOT). When a query is structured non-linearly, the Boolean expression is necessary.

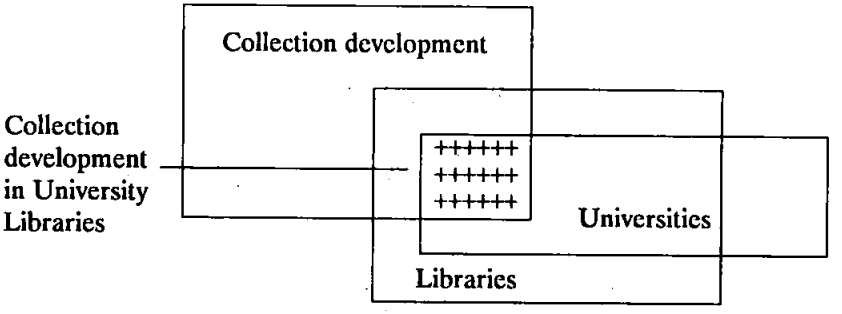
"A Boolean statement is composed of index terms connected by the AND, OR, and NOT operators, with parenthesis used for grouping. A simple index term is a legitimate Boolean statement. It retrieves all documents indexed by that term. If we have any legitimate statement S, then NOT S is also a legitimate, and retrieves everything not retrieved by the statement S (and those items).

We can combine two statements, S_1 and S_2, using AND and OR operators. S_1 AND S_2 will retrieve everything that would be returned by both S_1 and S_2 separately. Thus if S_1 retrieves d_1, d_2, d_3 and d_4 while S_2 retrieves d_1 and d_5, then the statement S_1 AND S_2 would retrieve only d_1. Note that AND narrows the search. If S_3 retrieved only d_6, then S_1 AND S_3 would retrieve nothing.

On the other hand, OR expands the search. S_1 OR S_2 retrieves everything S_1 retrieves and also everything S_2 retrieves. In the above example, S_1 OR S_2 retrieves d_1, d_2, d_3, d_4, and d_5 (d_1 can only be retrieved once)"[8]

(*a*) AND (Intersection):

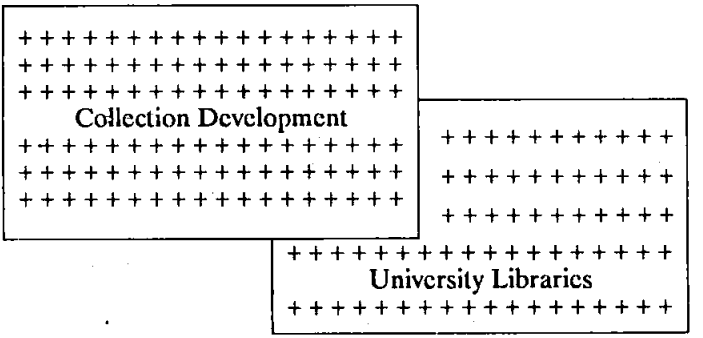
Another example, a user wants to search on *"Collection Development in University Library"*. In this case there are three facets. They are: Collection development, Universities and Libraries. Now, the AND operator can be used in the search statement. Then the statement would be 'Libraries AND Universities AND Collection development'. The following figure gives a clear idea.



This search gives the list of all the items of documents on 'university', 'libraries' and 'collection development' with their interrelationship. The shaded part of the figure is representing the information on "Collection development in University Libraries".

(*b*) OR (Union):

If a user wants all the items of information on 'Collection development' together with documents on 'University Libraries', the OR operator can be used in search statement. The figure gives a clear idea.

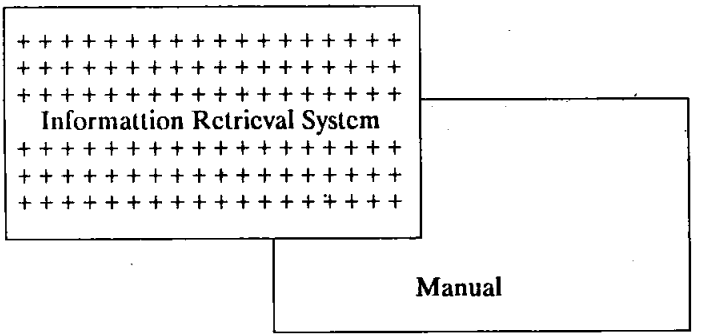


This search gives the list of all the items of information on 'Collection development' and 'University Libraries'. The shaded part of the figure is representing the same.

(*c*) NOT (Complementation):

If a user wants information only on "Automated Information Retrieval System" but not manual one, then NOT operator can be used in search statement. The following figure gives the clear idea.

The search expression 'Information Retrieval Systems' NOT 'Manual' retrieves all documents on 'Information retrieval systems' except MIRS' *ie,*



Manual Information Retrieval Systems. The shaded part of the figure is representing the same.

This Boolean Logic is also having some restrictions. One of the weakness of using Boolean logic they fail to assign partial membership to an item in a set. Recently, research is going on to overcome this weakness by applying Fuzzy logic.

6 ONLINE SEARCHING

Online searching is nothing but a search procedure of databases which are away from the user. Online searching is one of the important procedures for automated information retrieval also. An online information retrieval system consists of a computer and associated hardwares like computer terminals, telecommunication lines and links, modems and disk drives as well as complex interface software packages that can carry out storage and retrieval functions on databases. Obviously databases are collection of information which are properly organized and systematized in machine readable format. These records are stored, processed and organized in the form of binary digest (nos of 1 and 0). Though data handled by the computers or other data processing equipment are in digital form but conversion equipment like mode can take care of converting the digital information to the analog form which can be transmitted through telecommunication lines and at the other end the analog signals will be converted to digital form. In the case of an online information retrieval system, the end-user or an intermediary like information scientist or librarian uses the remote computer-terminal to interact with the databases to retrieve the information.

Effective retrieval in Online searching can be gained through the use of controlled vocabularies. The idea of controlled vocabulary is centred round the use of descriptor (s) in representing information.[9]

7 CONCLUSION

In an information age, automated IRS is a foremost and fundamental requirement particularly in a University Library where serious research is being carried out. In recent times, research on IRS has moved in many directions. Still serious research is needed. It is better that the library professionals should keep abreast of latest trends in IRS and design suitable systems for their libraries.

8 ACKNOWLEDGEMENT

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COMPUTERIED INFORMATION RETRIEVAL SYSTEM FOR STOCK-SHOTS: THE EXPERIENCE OF A MEDIA LIBRARY

AMJAD ALI*

1 INTRODUCTION

Modern libraries are turning to be resource centres. The concept of traditional librarianship is changing with more emphasis on the informational activities. Libraries now hold the collections of films, videos, audio-cassettes, slides, photographs, scripts, press-clippings, magnetic tapes, CD-ROMs and multimedia discs apart from books and journals. The role of a librarian is changing from a custodian of books to a more meaningful link between information and their users.

11 MEDIA LIBRARY

Libraries attached to the audiovisual media production agencies possess all the characteristics of being a model of future libraries. Media libraries support in the production process at different stages of production with varied types of library materials. They provide ideas on the topics of programme through subscriptions to periodicals or the press-clipping services. The idea can be further elaborated with the help of books, films and periodicals. The topic of production is usually finalized keeping in view the financial capability, availability of subject experts and the feasibility of shooting. But what we do not take into consideration is the amount of feedback already available in the libraries in the form of stock-shots. Normally, every producing agency possesses some programmes which might be its own productions or the materials procured from outside. Basically, all the productions must contain reusable shots which can be indexed for their possible use in forthcoming productions. The production agencies can use the shots since being their own productions copyright is not a problem for them. The shots from other agencies' productions can be used up to certain duration free of charges. The International Film and Television Archives Association has recommended and restricted the use of shots up to 30 seconds. One particular shot can be used in a number of programmes

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and in different perspectives, thus conveying different meanings.

2 WHAT ARE STOCK-SHOTS

'Stock-shot' literally means a shot from the library collection. They are visuals or a combination of audio and vision already available in the library. They can be identified from slide/tape programmes, films or videos. Some of the stock-shots have been used in innumerable productions. The reuse value is directly proportional to their archive value. The live coverage of dropping the atom bomb at Hiroshima and Nagasaki, man's landing on the moon and various expeditions undertaken by mankind have a high archive value. But there are some stock-shots which saved mankind from a possible disasters too or rather by seeing the impact of these bombs (SCUD missiles, etc) could be a deterrent in future. It could even advocate in preventing the production of these weapons for all times to come. This would depend on how effectively these events are originally recorded and preserved.

On October 23, 1984 a stock-shot about a drought in Ethiopia was shown by BBC in England and by NBC in the United States of America. Starving children with bloated bellies and stick-like arms in refuge camps were depicted. The effects of this television coverage were immediate and dramatic in the form of a public outpouring of contributions and demands for action. Rock musicians in England and America, previously noted for their over blown egos and free-wheeling lifestyles, altruistically, raised millions of dollars for Ethiopian food relief by holding concerts and by recording songs. The US government also donated funds and soon tanker ships loaded with foodgrains were docking daily at Ethiopian sea ports. A single stock-shot brought into focus the Ethiopian drought problem on the world agenda and saved millions of lives as lost in an early drought.

21 TYPES OF STOCK SHOTS

Stock-shots can be divided into the following four categories:

1 Recordings of Historical Events
2 News Stories
3 Shots listed out of Complete Programmes
4 Rough Cuts.

211 *Recordings of Historical Events*

Historical events may include visits of dignitaries, launching of new programmes, seminars, international meets and even the events which seem to be common today but may obtain significance in the time to

come. In West Bengal, the government has decided to withdraw the tram service from the city of Calcutta. This might be overlooked being an ordinary event day but is in fact significant for a person having futuristic outlook. In the time to come shots on trams will certainly be needed by anyone who attempts to write the history of Calcutta or of the modes of transportation. He or she can no longer find trams running on the tracks. It will always be better to fulfil the arising requirement in advance. Gandhi and Nehru are no more with us but they are still needed to inspire the generations.

212 *News Stories*

New stories are usually available on video or in 16 mm film with combined or separate magnetic sound tracks. They form a valuable source of material for reuse not only for strictly news purposes but also provide a wider range of themes which can be incorporated for teaching and learning purposes. In fact, every significant event is news at first which goes down slowly into the pages of history. The reusability of the coverage depends upon its news values and also its non-availability. There are news stories which can never loose their value at any point of time. Even if there are no financial constraints involved in special shooting, the producers may come across difficulties leading to delay in programme production; one cannot wait for a whole year to cover a shot of heavy rain or snowfall. Just imagine waiting a full day to shoot rising sun which may disappoint further if covered with clouds at the time of sunrising. In a case like this the stock-shot is the best answer.

213 *Stock-shots identified from complete productions*

Stock-shots can be identified from complete film and television programmes available in a library or a group of libraries for resource sharing purposes. Producers use shots from their early productions or from the current productions of others they preview but such use is generally based on the personal memory of the producers or their diaries if maintained by them properly. A computerized information retrieval system can provide an easy access to a vast amount of audio-visual resources. This is slowly becoming inevitable.

214 *Rough Cuts*

Shooting is to be done as extensively as possible to provide a wide range of choice to the producers at the time of editing. Normally the quality of a programme depends upon the ratio of the shot footage and the footage finally retained. In this process most of the coverage is left unused in the form of rough cuts. This may be as great as 40 times of the master

production. In New Delhi, a video newsmagazine NEWSTRACK adds about 40 cassettes a month to their collection eventhough they produce only 90 a minute programme. They have used their stock-shots repeatedly in a number of issues and show a few shots for business promotion while advertising for the subscription of their video magazine.

3 COMPUTERIZED INFORMATION RETRIEVAL SYSTEM (IRS)

Dr S R Ranganathan did not live to see the Information Revolution at its full swing as it is in today's society. But long back he predicted the compelling need of "mechanization of library services". This mechanization in the true sense leads to the introduction of computers for restoring, processing and retrieval information in the contemporary society. Once Dr. Ranganathan told:

"You are a growing organism. Therefore you must grow with the world. The world now has entered the Electronic Age. You should use electronics to speed up work and to save man-power wherever practicable".

31 ADVANTAGES OF COMMUNICATION OF IRS

The characteristics of a computerized informations retrieval system and the advantages of such system are as follows;

(*a*) A common means of access to the library materials.

(*b*) Accurate and timely updation of the database.

(*c*) Continued viability of access to database over a time.

(*d*) Accurate and timely processing of the new arrivals for availability of all the users.

(*e*) Recording of and access to status and other information about catalogue transactions.

(*f*) Strong organization towards patron service and effective access to library materials.

(*g*) Operation and maintenance of both a dynamically organized and arranged catalogue and collection.

(*h*) Ability of all units of a library or library system to act in a connected fashion and to have access to all composite lot of data file.

(*i*) Providing of accurate and reliable statistical data in the form of reporting, management and budget.

(*j*) Reduction in staff time devoted to those aspects of cataloguing not directly related to users.

In India, the majority of the media libraries faces the problem of shortage of staff. They find it difficult even to maintain the normal functions of procurement, processing and circulation of the library materials. One can't think of previewing, analysing and indexing individual stock-shots with the existing manpower as the number of individual shots might be hundred time larger comparing the total collection of an audio-visual library.

32 DOORDARSHAN EXPERIMENT

The Documentation Unit of the TV News Library of Doordarshan in collaboration with the Indian National Scientific Documentation Centre (INSDOC) developed a system for listing of stock-shots having archive value. About 350 different subjects were covered and three separate files maintained for the retrieval purposes under Tape, Programme and Description or Subject Retrieval. The system was designed for producers and news editors as the target users. But the system no longer works and the main reason behind its failure is the limitation of being operated manually since they did not introduce computer. The shortage of staff available for the purpose was also a contributing factor to this failure.

4 COMPUTERIZATION ATTEMPT AT THE MASS COMMUNICATION RESEARCH CENTRE

The Mass Communication Research Centre of Jamia Millia Islamia in New Delhi was established in 1983. The Centre runs a two year postgraduation course in mass communication and also offers Ph.D. programmes. The second important function of the Centre is the production of the instructional and enrichment materials on sound tapes, colour slides, videotapes or films. The Centre has a Library Resource and Documentation Unit containing collections of books, journals, pressclippings, scripts, 16 mm films, audio cassettes, videocassettes and music tapes. Most of the programmes available on video are the productions of the Centre and are recorded on U-Matic cassettes, a format suitable for broadcast purposes as well as for the purpose of transfer and reuse.

Once the decision to use computer in the Library Resource and Documentation Unit was taken in 1987, the search for a suitable computer software was on. At the same time, UNESCO's package CDS/ISIS was being distributed through the Department of Science and Technology, Government of India. The package was primarily designed to cater to the needs of the libraries, documentation centres and archives. We obtained the package and installed the same on a PC. The idea was to cover as many functions of the library as possible. It was found that the version available had not incorporated the provision of class numbers whereas being a special library and implementing the *Universal Decimal Classification*

scheme we needed a suitable software for the information retrieval purposes. CDS/ISIS was found more suitable for processing of the microdocuments. Being users friendly, it is easier to search through it. But the main difficulty we came across was in filling up three separate sheets about a particular stock-shot. Keeping in view the limitations, it was decide to develop a software suitable to the local needs. A system operative on PCs under *DOS* environment was developed. The main components of the software designed are as follows:

Data Structure

Field	*Type*	*Digital*	*Decimal*
Acc. No.	Numeric	7	–
Acc. Date	Date	8	–
Title	Character	40	–
Start	Numeric	5	2
End	Numeric	5	2
Duration	Numeric	5	2
Cassette No.	Character	10	–
Annotation	Character	200	–
Key words:			
(1)	Character	20	–
(2)	Character	20	–
(3)	Character	20	–
(4)	Character	20	–
(5)	Character	20	–
(6)	Character	20	–

41 INFORMATION RETRIEVAL SOFTWARE

The software is menu driven and user friendly. It provides the following three options for search:

411 *Keyword Search*

One can have access to the desired information entering any of the keywords. For standardization, the keywords are assigned using the *Sears List of Subject Headings* or the *Library of Congress List of Subject Headings.* A dictionary of standard terms is being maintained.

412 *Global Search*

Search can be carried out through any of the words appearing in title, keyword or synopsis.

413 *Search Through Cassette/Film Number*

This type of search is particularly useful when intended to know about the shots contained in a particular cassette/film.

5 CONCLUSION

The utility of stock-shots in audiovisual production can no longer be ignored. They provide economy in cost and time and are the best alternative while visualizing the past. But close co-ordination among all media centres for uniformity in systems and resource sharing is vital. Adequate hardware including preview machines and computer systems should be available. No media library is self supporting in matters of collection development or the maintenance of computer softwares. In this venture, an active co-operation of the production staff and the computer professionals is very much need

LOCAL AREA NETWORK: HOW IT CAN WORK IN A UNIVERSITY INFORMATION SYSTEM?

A TEJOMURTY*
KAUSHIK BOSE**

1 INTRODUCTION

Today Local Area Networks (LANs) are generating great interest within the data processing field. Users are assessing potential benefits of this new technology in education, office systems and other limited distance applications. The proliferation of users and unprecedented increase in computer power create a need for a low cost communication technology that has the capability to interconnect tens to thousands of local terminals to terminal, terminal to computer, and computer to computer users, and application by means of electronic transmissions of voice data and video information from one place to another. As progress in automation and modernization of libraries/ information centres continues, creation of networks of geographically separate libraries/information centres become more plausible. That is why libraries/ information centres/documentation centres are becoming more interested in linking local library systems in a university campus in order to promote resource sharing and to satisfy the growing demands of users.

2 LOCAL AREA NETWORK DEFINITION

"A local area network (LAN) is primarily a data transmission system intended to link computers and associated devices within a restricted geographical area".[1] The basic LAN consists of a software package and several pieces of hardware including many personal computers linked by twisted pair or coaxial cable or optical figure which ensures high data transfer rates within a restricted physical area. The term 'local' refers to the limits imposed by the cable running to each piece of equipment which may range from a few hundred metres to a few kilometres. At present, here in India, several manufacturers in data communication field introduced LAN with many terminals, with one computer located in the central constituent having networking capabilities of as many as feasible, within a fairly small geographical locality. Such a system has been found practicable as well as attractive for libraries and other specialized institute located in a

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university campus.

3 UNIVERSITY INFORMATION SYSTEM

"The primary purpose of the university is acquisition, possession, and transmission of scholarship"[2]. This presupposes the setting up of a sound information system in the university to deal with storage as well as dissemination of information. Generally an information system in a university consists of its university computer centre, central library, departmental libraries, and specialized information centres/libraries. Though each departmental library has a prominent role in supporting the specific academic departments, the university computer centre or the central library has a key role, and can function as a coordinating agency of the whole information system.

4 HOW CAN LAN WORK IN A UNIVERSITY INFORMATION SYSTEM?

In a University Information System and LAN can be multi-terminal mainframe or super mini computer at the central unit with necessary peripherals and all terminals in other buildings of the university campus having personal computers. This way they can get the compatibility to function as terminals for the main system installed in a centrally located computer centre of a university. At the beginning the client may not require high processing. However, keeping in view the time to come and to provide a reliable and effective service to the user, the application may require high processing. So, the LAN system should be such that it could provide a reliable and effective service to the user community.

5 APPLICATION OF LAN IN A UNIVERSITY INFORMATION SYSTEM

The application of LAN in a University Information System may be enumerated as follows:

1 Library operations: Acquisition, cataloguing, serial control, circulation, management, statistics, etc.

2 Information service: Reader services, CAS, SDI, Current Titles, Research in progress, Abstracting services, etc.

3 University Office Management: Establishment, Accounts, Academic, Registration, Examination, etc.

4 Services associated with departments by providing data to the teachers and students for their projects.

6 ADVANTAGES OF LAN

Application of LAN in a University Information System has multi-dimensional advantages. They are as follows:

1 The primary advantage is data sharing, especially large volumes of dynamic data.
2 LANs have an enormous cost advantage over any other type of facility, because they involve only a one-time cost, with little or no recurring cost.
3 Maintenance costs are typically minimal. On going costs are usually limited to the purchase of new connectors if additional equipment is connected to the LAN.
4 Machine to machine communication is much factor than machine to human, since a non-thinking machine can accept data much faster than a human can absorb and interpret it.
5 Since PCs are used, many small libraries will be able to take advantage of the benefits of library automation.
6 Since programmes can be down-loaded to a desk top computer, in many instances a library simply add software for a new application and an additional microcomputer terminal.
7 Improved high density, disk storage is now available for small microprocessors to meet the local storage needs.
8 The ability to share peripherals, such as highspeed or letter quality printers and the facilitation of rapid communication between users via E Mail.
9 LAN has the potential for expendability.[3]

7 DISADVANTAGES OF LAN

1 Lack of application software is a major issue.
2 A second software issue involves possible violation of copyright law.
3 Problem of software may occur with supplier and dealer support of LANs.
4 Planning for LAN requires the protection of data which is sensitive to misuse.
5 Cabling costs for an LAN are high.

8 COMMON FEATURES

81 TOPOLOGY

The topology of an LAN usually follows the following three configurations: Star configuration, Ring Network, and Bus Network, each of them having some advantages and disadvantages. In Star Configuration PABX (Private Branch Exchange) telephone system plays a vital role but have a relatively slow transmission capacity. In Right Network, if any break occurs in the

cable, that could bring a disaster in the entire network, and that is why, today, a lot of impetus is given in designing Ring Network so that a node which fails can be easily bypassed. So, in our opinion, any of the topology can be preferable keeping in view of the degree of users present demand, future demand, and cost of implementation of the whole system.

82 TRANSMISSION MEDIA

Transmission media suitable for LAN includes twisted-pair wire, fibre-optic cable and baseband, and broadbased coaxial cable. Though twisted pairs are of low cost and easy to instal, its main drawbacks are low data rate capability and susceptibility to noise interference. Fibre optic cable has the potential to be superior medium for use in LAN. Moreover, it is not susceptible to electromagnetic interference nor does it generate such interference. But fibre optic technology is still expensive and not suitable for multidrop LAN environment. The most popular LAN transmission media are baseband and broad band coaxial cable. While broadband promises higher performance for the future, more baseband systems are being successfully implemented today. Because it is less expensive and does not require the relatively expensive moderns needed by broad band to modulate the carrier. So, broadband system is more preferable keeping in view of future requirements where integration of voice and video as well as data will pass through medium at one time.

83 TRANSMISSION CONTROL MECHANISM

LANs must prevent data collisions which could occur when two or more devices want to access and send information on a single channel to transmit data effectively at the same time. Strategies often used to avoid collusion are the CSMA/CD (Carrier Sense Multiple Access/Collision Detection) and token passing. However, each of them has some plus and minus points too. In token passing mechanism if the token is lost then it creates problem in recovering. On the other hand, in CSMA/CD mechanism transmission delay is unpredictable especially on heavily loaded systems.

84 CHOICE OF OPERATING SYSTEM AND SOFTWARE

Though MS-DOS operating system is still popular among Indian users, Unix system which is suitable for multiuser environment are emerging steadily, because it is flexible and also support long distance tele-communication. Moreover, Unix provides a simple, very robust operating system with an emphasis on fault tolerance. So, the central filesaver should be Unix based machine where LAN will operate under the protocols of Unix environment. At the same time central filesaver will act as a clearing node for other user nodes. The user nodes may be MS-DOS based machine which works as a terminal of Central Unix Based machine. It is very

interesting that all PC-based application programmes like Wordstar, Lotus, dbase IV, and Autocad can be run on an LAN. In fact these software run much faster on an LAN than on a stand-alone computer.

Today software vendors are increasingly offering more LAN operating system software than ever before. Various companies like Aurolac, Tata Consultancy Services, and Zenith computers are offering various operating system softwares like Falcon, Microsoft LAN Manager, Novel netware, etc. "Also several network operating systems are available in the market like 3-COM, Appletalk, Starlan, Benyan Vines, TOPS, Ten Net, D Link. Some of these systems can easily compete with large mainframes offering the same or even better performance at fraction of the mainframe cost."[4] For library operations MICRO CDS/ISIS which is the microversion of MINSIS package developed by the UNESCO for library and information application can be used. It is now available free of cost to all educational institutions from NISSAT.

91 COST OF IMPLEMENTATION OF A LAN IN A UNIVERSITY INFORMATION SYSTEM

The cost of designing and implementation of a LAN must be at least partly considered as a strategic investment. During the 8th Plan, a substantial amount of money has been provided by the UGC to various universities for the purchase of computer hardware, peripherals, etc. But ironically no amount is provided for the maintenance, and serving purpose. So it has become a great problem for a university (which is a non-profit-making institution and cannot exploit the computer system like business house). Due to the paucity of funds many machines have already become out of use (because the serving agents demand a great amount for servicing computers). So, the UGC should look into the matter seriously, otherwise it becomes a headache for the universities.

92 PROPOSAL OF LAN IN VIKRAM UNIVERSITY

In Vikram University, the computer centre presently has an HCL Magnum Minicomputer which has Main Memory 32 bit CPU, 8 MB RAM, 68882 Co-processor and 340 MB Hard Disk Drive. The number of terminals is 32, extendable to 128. Recently few more departments have installed HCL's PC, XT and AT computers. So our proposal is that all the IBM imcompatible machines can be connected with centrally located university computer centre through suitable LAN interface card, BMC connector, and proper transmission media, because all the departments are located not beyond 700 meters from the university computer centre. The installation of cables and other peripherals and software costs can be jointly shared by all the departments. So, finally, it can be like the LAN of Regional Engineering

College at Tiruchirapalli (Tamilnadu) where a LAN links such diverse computers of PC's, AT's, a 32 bit Unix minicomputer, an inter microprocessor development system, and a CAD (Computer Aided Design) workstation–all on the same campus.

93 CONCLUSION

In view of the above, the planning and implementation of an LAN in a university campus is not an easy task because it is a sophisticated information system where maximum benefits vis-a-vis the cost involved in operation and devices play the key role. However, LAN in our country is increasingly getting importance as a promising vehicle which can bring important changes in our academic institutional procedures as well as users practice. Its usefulness can further be intensified if it is linked with existing wide area networks like NICNET and INDONET systems to get access to external and internal databases.

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MODERN INFORMATION TECHNOLOGY AND READER'S SERVICES IN UNIVERSITY LIBRARIES OF INDIA AND ABROAD

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1 INFORMATION TECHNOLOGY

Information technology is of crucial consideration for libraries. It not only effects the external environment but also has important role in operational and management process. Its central concern information or knowledge is the raw material of library work. Definitions of Information Technology tend to apply microelectronics based technologies to the activities–acquisition, processing, storage and dissemination of information which form the essence of library services. The information technology has special impact on the following four areas which together makeup library service.[2]

–Raw material
–Operational process
–Management process
–Customer interaction

Raw material of library service is the holdings and collection of the library. It may be in print form and other such as records, videos, photographs, etc. Traditional library systems are geared to the identification and retrieval of these artefacts–a particular book title, journal issue, video recording, etc. But information technology can convert all these types of information–carrying artefacts into digital data for the purposes of storage (*eg* optical disc), processing (*eg* computing), and transmission (*eg* data communication networks).

The operational processes of libraries involve many routine jobs (*eg* books issue and return and their reservation, etc) which are suited to automation. Circulation control systems, cataloging processes, systems for ordering and acquisition of stock and for serials control can be automated.

The management processes of planning and control can be considerably enhanced by Information Technology. An intergrated system can provide important stock management information.

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The nature of customer interaction may be changed by the use of information technology. It can do by speeding up routine processes at library counter, by widening the scope of choice of available information sources and services and by making library services more effective and accessible.

2 INFORMATION TECHNOLOGY DEVICES

In short the modern information technology devices may be keep into the following broad categories:

(*a*) Micrographics

(*b*) Data systems and Networks

(*c*) Facsimile Transmission

(*d*) Videotext

(*e*) Newsline Service

(*f*) Electronic Publications

(*g*) Electronic Mailing.

3 CONCEPT OF READER'S SERVICES

The work in reader services is possibly the most interesting and demanding in the library and involves meeting readers in large numbers.[3] Though all the services of library directly or indirectly are related to the readers, but some services which are directly related to the readers may be kept in the category of reader's services. Such services related to the readers may be kept into the following four broad categories:

1 Personal assistance to the readers;

2 Other services within the library campus;

3 Off campus library services;

4 Physical facilities for the readers.

The personal assistance/service to the reader starts from the very introduction of library to the reader. It will include all activities such as orientation, initiation, lectures on library and all other personal help in study and research of readers.

Secondly other services within the campus may include all activities and services provided to a reader within the campus or premises of the library. It may include the following services:

(*a*) Indexing services, (*b*) Abstracting services, (*c*) Reprographic serv-

ices, (*d*) Translation services, (*e*) Audio-Visual aid, (*f*) Bibliographical services, (*g*) Lending services/facilities, (*h*) Public relation services.

The third category *ie,* off side campus library services may include all the activities and services organised beyond the library premises, to satisfy the demand and to cater the needs of readers. The following services may be included in these services:

(*a*) Inter-library lending services;

(*b*) Campus document delivery services;

(*c*) Postal loan services, etc;

The fourth category of physical facilities is the essential of library services. Unfortunately, it is being ignored by most of University libraries and has not been given due attention. Moreover, in India library professionals donot count these services as essential part of reader's services. But it is ever forgotten, though these are small things but contribute more in promotion of library use. Some how, these are such services which prove the existence and utility of the library and also gives the reader a heathy atmosphere to make them habitual user. In this age of competition libraries should come forward to promote and popularise the services among the readers. This category may comprise the following facilities and provisions for readers:

(*a*) Individual space for sitting, (*b*) Facilities for typewriter, (*c*) Provision for smoking, (*d*) group discussion room, (*e*) Comfortable seats, (*f*) Provision for cafeteria, (*g*) Air cooling and lighting, (*h*) library hours, (*k*) Display Boards.

4 CONCEPT OF READER SERVICES AS DEVELOPED BY LIBRARIANS ABROAD

Eatwell[4] has put in the following services under the category of reader's services:

(*i*) Circulation system,

(*ii*) Reader Instruction,

(*iii*) Reprographic services,

(*iv*) Information work,

(*v*) Inter library loans,

(*vi*) Exhibitions.

KW Humpherys keeps library activities relating to the readers into the

following four categories[5]:

(*i*) Service activities,

(*ii*) Control activities,

(*iii*) Reproduction activities,

(*iv*) Information activities.

5 PURPOSE OF THE PRESENT PAPER

Despite all the glory embellishments and the high sounding words that have been used to elevate the concept, the status of library services in our Universities is appealingly low. Many of us are realising that the number of satisfied readers is on the decline and the reasons for this decline are: (*i*) Multiplicity of demand (*ii*) non-availability of sufficient funds to cope with these demands and (*iii*) lack of reader's services organisation in a logical and scientific method. Besides, in many University libraries reader's services have reached near the point of stagnation. Libraries have, of late, been thinking that this is the right time to review the existing state of services and to develop new concepts to promote better services and to adopt recent techniques and modern information technology in the libraries.

6 POSITION OF READER'S SERVICES IN INDIAN UNIVERSITY LIBRARIES

Generally the University libraries in India are arranging the orientation programmes for readers in the name of personal assistance. Most of libraries provide the reprographic facilities and inter- library lending services to their readers. Some University libraries have installed computers but still they are far away from the automation and the use of modern information technology. The different studies carried out by the library professionals reveal that readers in University libraries are not satisfied with the existing services. The study carried out by Sewa Singh reveals that out of 50 University libraries surveyed, 49 University libraries provide inter-library loan service to their users. During the survey 40.4% users showed their awareness about the inter-library loan service. But majority of readers reported that inter library/reference personnel did not attend properly to their requests. Barring faculty members and some research scholars, were not satisfied by this service. This study suggests the use of modern information technology specially all important and heavily used University libraries may be linked by some telecommunication media *ie,* telex which would help in saving time of the borrowers and the libraries alike.[6]

61 BIBLIOGRAPHIC SERVICES

Bibliographic services as provided in Indian University libraries are mostly limited to new arrivals typed with different names, such as select list, or recent additions, or select books, etc. The librarians call these lists of new arrivals as subject bibliographies.

62 INDEXING AND ABSTRACTING SERVICES

The indexing and abstracting services in Indian University libraries are not properly organised. Most of the libraries do not produce any index regularly. The University libraries are not producting their own abstracting service to the readers. Here it would be right to ensure the use of modern information technology to provide the services and it would be better if, 'Bibliographic/Documentation cell' is created in every University library.

63 REPROGRAPHIC SERVICES

The readers in Indian University libraries are not satisfied with the reprograhic services provided, as unnecessary time is taken in these libraries.

Moreover, microflim reader and micro card readers are available in some University libraries, they do not have the facilities of their own to prepare the microflims or microcards of valuable and/or fugitive materials, while such services are common in advanced countries.[7]

64 INTER LIBRARY LOAN SERVICES

A study of Calicut University library carried out in 1989 reveals that 18% of respondents were aware of inter-library loan service and it was found that this service requires wide publicity to make optimum use of resources. The 58% of respondents were aware about the reprographic services available in the library and only 6% were statisfied with photo copying service. The users were dissatisfied with the quality of copies of documents. As regards microflim service 32% respondents were aware of this service and only 4% were making use of this service.[8]

Another study of inter-library loan service of Indian University libraries carried out in 1989 found the service below expectation and suggested that every University library should have telex installation for quick information transmission. Moreover every library should have the facility of microfilming and photocopy of document requested on inter-library loan may be loaned without and delay.[9]

A random sample survey of faculty members of University of Rajasthan, Jaipur was carried out by the author of this paper in 1989, it also reveals that members were not satisfied with inter library loan services.

On the basis of these basis of these studies it is proved that the University libraries in India have still not adopted the present prevailing information technology in the world. Now in India, indigenous information technology is available and NISSAT is leading in this direction. The main object of NISSAT is to support and promote research, development and innovation in information technology. Besides NIC and CMC is engaged in promotion of latest information technology in India. The University libraries in India can take the advantage of NICNET, INDONET, STEP (The satellite telecommunications Experiment Project), Facsimile transmission, INFLIBNET, CALIBNET and other international databases *eg.* DIALOG, ORBIT etc. These libraries can induct the modern technology to provide better and effective services to the readers.

65 STATE OF READER SERVICES IN UNIVERSITY LIBRARIES ABROAD

The University libraries abroad specially in UK and USA systematically organise the reader instructions. They appoint the subject specialists and reader's advisers for the personal assistance of readers. The libraries also widely use the modern information technology for the organisation of reader's services. They organise seminar to impart the institutions to the reader's on the use of the library. University library in Britain use Audio-Visual techniques for reader's instructions. These libraries also use films and tapes, slides, close circuit televisions. The libraries had produced tape slide guides covering the subjects as patents, Beilstein, Chemical abstracts, Sociology, etc.[10] University libraries in UK have also settled the information work into a pattern, which includes library instruction, literature searching, preparation of book list and bibliographies, SDI services, guides to the literature and the latest service the use of online databases such as the European space Agency, BLAISE, Lock Heed Dialog, SDC, ORBIT and Euronet, etc.[11]

The study of information technology application in UK published by the European commission in 1987 reveals that many libraries are using some form of computerized catalogue production (mainly still comfiche) and some are moving to PAC and towards network access to library catalogues. Some Academic labraries are using JANET-the Joint Academic Network to access each other's catalogue. Similarly a survey published by ALA 1987 reveals that 80% US University libraries provide online search services.[12]

In Canada Ontario Council University libraries developed an inter University transit system for transporting inter-library between ontario University libraries, and the office for library coordination has been managing on their behalf a document catalogue system, a union list of serials and an

automated catalogue system known as Unicat/Telecat which uses the service of UTLAS–the Association of Atlantic Universities also operates a similar joint cataloging system on behalf of the members of its group.[13]

In Australia University libraries are very much concerned about the physical facilities and readers place/space in libraries. A study reveals that the highest places available in University libraries were 46.6% against the population of regular readers. University libraries in Australia are also using information technology for reader's services.[14] Australia is probably also better placed to develop computerized literature services. MEDLARS (MEDLINE) has been available in Australia since 1968 and has been operated for some years through a network comprising 10 University libraries, the national library of Australia and the Commonwealth department of Health. University libraries in Australian regularly access DIALOG and/ or ORBIT for their readers and six Australia University libraries provide the main membership of AUSINET, an Australian service giving access to both domestic and overseas databases.[15]

7 CONCLUSION

The information technology directly and indirectly effects housekeeping functions such as circulation control, serial control and acquisition in libraries. It also effects the customer related services which means online search services. It also effects inter-lending and document delivery services. The level of Reader's Services in Indian University libraries can be enhanced to the level of UK and USA, if the modern information technology available in India and abroad is applied in a logical way and then the Indian University libraries shall be able to satisfy the readers community to a great extent.

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NATIONAL LEGAL INFORMATION CENTRE: A PROPOSAL

C U NAVALGUND*

1 NEED FOR NATIONAL LEGAL INFORMATION CENTRE (NLIC)

As every one is aware, the contemporary society is an era of information explosion. Information is playing a vital role in every decision making process. So also, the authentic, speedy and accurate information is inevitable for the effective and speedy administration of justice system and welfare of society in general.

A tremendous amount of legal information is being produced every minute in the form of Legislative materials (both state and central governments), courts, decision (Supreme Court, High Courts and other subordinate courts), books, journal articles, etc. It has become very difficult to the lawyers, judges, academicians, research scholars, the judicial administrative machineries and to the libraries to cope with the growth of enormous amount of information and to get all required authentic, accurate and speedy information at the right time to the right person at least at one place in this big country for speedier decision making process:

The following factors will further justify the need for NLIC:

1 The bad state of affairs is that enormous amount of cases are pending before the lower courts to the Supreme Court of the country. Among the several other reasons, the lack of availability of speedy, authentic and accurate information at the right time to the judges/lawyers, etc, is the most conspicuous one.

2 The non-availability of comprehensive published information at a central place in India immediately after the publication is a serious drawback.

3 There is no single organisation in the country where the law academicians and research scholars can have access to all required

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information at one place for carrying out their research.

The import of the above factors is that it has become very much essential and ripe time to establish an NLIC to promote systematized legal research and for quick delivery of justice system in the country. The already available information/communication facilities in the country. The already available information/communcation facilities in due country such as NICNET, INDONET, etc, may be utilised for this purpose. This may help the courts and other legal professionals not only for quick delivery of justice and legal research but also to improve the quality, uniformity, efficiency among the lawyers, judges and other legal professionals especially the conditions prevailing in this global world at present.

In fact, one should thank to the legal professionals of our country for their contribution to the social, political and economic development of the nation in spite of the lack of availability of systematized legal information at their disposal for their research so far. Even then, today, ours is one of the well developed and major legal systems of the world.

2 PURPOSE AND BROAD OBJECTIVES

The purpose of establishment of this centre is to have an easy access to legal and related information at least at one central place for lawyers, judges, academicians, research scholars and other administrative machineries as well as those who seek legal information for discharging/carrying out their duties/research effectively and efficiently and for other welfare purposes of society.

3 OBJECTIVES

1 The Centre will act as a clearing house of legal information–Indian as well as foreign legal information.

2 To collect, store, process, organize, retrieve and disseminate legal and related information.

3 Computerised storage of information for accurate and speedy retrieval of information.

4 To make available the information for reference and supply the information on demand those who are in need of information, if necessary, at a nominal cost.

5 To plan, guide and implement in establishing, collaborating and working effectively the regional centres to achieve the goals.

6 To provide 'computer literacy' to lawyers, judges, administrators, academicians, etc. for the efficient and effective utilization of information.

4 FEATURES OF THE INFORMATION SYSTEM

To achieve the above mentioned objectives, it is necessary to develop an information system which is responsive to the ever dynamic information requirements of the legal professionals. Some of the important features that are to be considered in planning are as follows:

1 The system should be designed for efficiency, speed, economy, relevance and usefulness in terms of information services.

2 The system should be designed based on the study of the users requirements of information with due consideration to the type of institution, field to which the users belong and the nature of functions they perform and their background and experience as far as possible. This calls for a preliminary survey.

3 The system should be designed as a service centre with open access system with necessary mechanisms to serve to readers in different parts of the country.

4 Each item of information put into the system, should be made available for quick retrieval and use. This needs adequate planning for appropriate staff and facilities commensurate with the workload involved.

5 FUNCTIONS OF THE NLIC

1 The centre would collect, store, organise, retrieve and disseminate information on any aspect of Indian legal and interdisciplinary areas. It will also include the unpublished materials such as theses, dissertations, proceedings of conferences, seminars, etc.

2 It will be organised essentially as a service centre. Its services will be available to all those who are engaged in the study and research in the field of law and related areas working in various organizations in the state and centre, courts, research institutions, university departments, and individual scholars in the country and abroad.

3 It will integrate and coordinate the services and facilities in the country in the field of law and related areas. This requires an organised system of networks among the various organizations, research institutions, courts (Supreme and High courts), law departments in the government (both state as well as central) and university department, etc, would work under close collaboration with and under the guidance of NLIC.

4 It will build up a National Database Central Information File in the field of Indian law and related areas.

5. To identify the needs of Indian legal professionals, it will conduct a comprehensive user survey.

6 It will plan for a computerised network for the entire country, after building up necessary database from all legal and related information sources.

7 It will compile a union catalogue of periodicals to obtain information about the holdings of various libraries in the field of law and related areas in the country.

8 It will develop national tape archives, where all the important legal information (including cases) could be preserved, duplicated and made available to the scholars when needed.

6 ORGANISATIONAL STRUCTURE OF NLIC

This centre would be consisting of large central facility at the central place which is to be identified with all the high courts, Supreme Court as well as other academic/research organizations attached to it. The libraries attached to this centre would collaborate and cooperate with this centre to carry out the work, assigned to them. The responsibility of various regional centres attached to this centre is to assist the centre in carrying out its functions.

The following services are proposed to be offered by NLIC:

- Current Awareness Service.
- Selective Dissemination of Information (SDI) Service.
- Creation of Computerised database.
- Data processing and Information Retrieval.
- Indexing and abstracting service.
- Compilation of bibliographies and literature survey.
- Consultancy service.
- Retrospective and literature search.

7 CONCLUSION

The project will require infrastructure facilities like building necessary documents (both Indian and foreign), computers and other modern gadgets, furniture and personnel (legal, computer, and information experts) not only to the NLIC but for other regional centres also. Ministry of Law and Justice may take lead and initiate with the co-operation of the law ministries

of all state governments and contribute its share of finance. The budget and action plan could be worked out in detail if required.

If this NLIC is established, it could be a boost to the Indian legal professionals for effective, efficient and speedy delivery of justice system as well as to carry out systematized legal research.

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ONLINE INFORMATION RETRIEVAL: A CASE FOR INDIGENOUS DATABASES

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1 INTRODUCTION

Storage and retrieval of information are the basic issues concerning librarianship. Although, methods exist since ages for the storage and retrieval of information but with changes in 'environment' such methods have also undergone changes. The major changes, recently, in the environment, have been markedly effective in Science & Technology. These have been two pronged: (*i*) the vast increase in the number of scientists and technologists and the corresponding increase in their literary production and; (*ii*) the increasing specialization and the phenomenon of information explosion. The problem has further been compounded by the escalating cost of publications, affecting particularly developing countries like India. Technology has come to the fore in providing appropriate solutions, enabling Library and Information Centres serve their users in the best possible way. Electronic data processing has been the answer to provide speedy retrieval from huge masses of information. At the same time, communication technology helps to access relevant information across national and international boundaries, providing access to maximum literature possible with minimum expenditure of time and money.

'Online-information' is the talk of the day to day. It is information accessible instantly residing in the CPU of a computer. The system could be available at the desk of a user or at a distance from the user. The present discussion would concentrate on the later aspect *ie,* searching of information from a distant system by using communication technology. These systems are interactive and work in a time-shared mode. Before embarking on a discussion of the topic, a few points need to be made clear about databases.

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2 DATABASES

A database is information stored in systematic, meaningful, logical, and distinct elements called fields. A number of fields constitute a record of the database. A number of records go on to constitute a file; a number of files comprising a database.

Databases may be divided into following categories:

21 REFERENCE DATABASES

Those databases which suggest to refer to another source for the information sought. Reference databases are of two kinds:

212 *Bibliographic Databases*

These databases contain bibliographic details of the information sources to be sought.

212 *Referral Databases*

Such databases refer to sources of information which are unpublished.

22 SOURCE DATABASES

Those databases which contain information themselves. Such databases may further be divided into following types:

221 *Numeric Databases*

Such databases contain survey data and/or statistical data.

222 *Textual-Numeric Databases*

Such databases containing numeric as well as textual data *e.g.,* annual reports, etc.

223 *Full Text Databases*

These databases contain complete text of articles, reports, patents, etc.

224 *Software Databases*

In such databases computer programmes are available which could be transferred (downloaded) for use on local computers.

These databases are produced by collaborative efforts of organisations and agencies involved at various levels to provide a comprehensive coverage of the subject. Some of the examples of these databases are LISA produced by Library Association; SCISEARCH by Science Citation Index; LESA (Leather Science Database) by BICLAI, Madras. The type of organisations involved in producing such databases are varied *eg* academic, commercial,

national and international institutes, professional associations, etc. These databases are acquired by agencies which in turn provide services based on these. Such agencies are called 'database vendors'. It would be impossible for individual, libraries/institutions to access information from these databases in view of high costs involved therein. However, this use has been made possible by means of a cooperative agreement existing among vendors and the user libraries/institutions, resulting in sharing of resources and costs, thus, making accessible which otherwise is out of reach of individuals. This sharing of resources is facilitated by the communication networks connecting databases and the users. Some of the commercially available database services/vendors are Dialog/developed by Lockheed; Orbit/developed by SDC, etc. The vendors have the infrastructures available with them in the form of powerful computer systems storing voluminous data/information; search software and documentation facilities which are shared by users. The vendors maintain and update their databases periodically.

At present, there are more than 7000 databases produced by about 2000 producers available through about 700 vendors. A brief view of the growth of database services given by Caudra[1] is as below:

Year	*Databases*	*Database Producers*	*Database Vendors*
1979/80	400	221	59
1980/81	600	340	93
1982/83	1350	718	213
1983/84	1878	927	272
1984/85	2453	1189	362
1986	2901	1379	454
1987	3369	1568	528
1988	3893	1723	576

3 SEARCH

In order to gain access to the required information, an appropriate search strategy has to be formulated. This is a point that needs proper understanding and experience to acquire most precise information. This involves:

(*a*) Understanding of the specific topic on which the information is to be sought which involves ascertaining the concepts involved in it.

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(*b*) Finding out the broader, narrower and synonymous terms using thesauri and indices.

(*c*) Selecting appropriate databases which contain the relevant information.

(*d*) Define and formulate a proper query.

This assumes a comprehensive knowledge of the database, which can be obtained from the database documentation or database chapter. It involves the indexing features of the database to be searched and the terminology used. The query also depends on the complexity of the information sought, as this would determine the logical operators to be applied. A knowledge of system software used is also needed to formulate a well defined query.

4 OUTPUT

The search results could be obtained online or off-line. Though online results are available immediately after the search is over, a major anomaly of online searching is that results are preferred in an offline mode, reason being high costs involved in online output.

Cost involved in online searching depends on the following factors:

(*i*) *Connect time:* Time period for which the user is connected to the host database. This rate varied with the database used/searched.

(*ii*) *Database use charges:* This varies with the number of references selected from the database.

(*iii*) *Telecommunication network charges:* This is payable to the telecommunication agency depending on type of connection made.

Some databases also charge for the number of terms (index) through which search was made. Therefore, to economize on the search, a number of points to be kept in mind are:

(A) Minimum connect time of the database is made. This would automatically result in minimum of charges made towards the telecommunication costs involved. For minimum connect time following measures should be followed:

- The topic has to be very clearly understood by the searcher particularly in such case where search is carried on by an inexperienced hand.
- All the features of the database and system software have to be clearly understood.
- Appropriate query has to be formulated with well defined display format.

– In case, the information sought is not very urgent, it is better to obtain it off-line.

If the above mentioned practice is strictly adhered to, a cost effective online search compared to manual search is possible.

5 ONLINE IN INDIA

Though experimental and prototype demonstration of online services in India started as early as 1976, when INSDOC in collaboration with NISSAT had arranged for demonstration of ESA database through remote terminals at TIFR, Bombay. There were demonstrations again at Bangalore and New Delhi of ESA/IRS database. Later on in June 1986, facility for access to ESA database was provided at NAL, Bangalore. This facility was available only to government organisations.

Now NISSAT provides such facility for accessing its databases through NACIDS (National Access Centres for International Databases) at the following national centres:

1. National Aeronautical Laboratory, Bangalore.
2. National Chemical Laboratory, Pune.
3. Indian Association for cultivation of Science Calcutta.
4. Central Leather Research Institute, Madras.
5. Indian National Scientific Documentation Centres, New Delhi.

These centres provide online access to various databases using PSTN (Public Switched Telephone Networks) up to the local PAD (Packet Assembler/Dis-assembler) and thereafter by GPSS (Gateway Packet Switching Service) to international networks. Trained intermediaries conduct the searches or help the users in searching. Normally, searches which are direct and do not involve much of logic are conducted by users themselves. Complex searches are entertained by the intermediaries who are trained in the job of searching.

Some local databases have also been provided by the NACIDS for onling searches. In India, INSDOC is a leading organisation engaged in developing and/or providing various databases for online use. Some of the databases offered by INSDOC for online use are as:

1 National Union Catalogue for Scientific Serials in India (NUCSSI): It contains records of holdings of about 840 libraries covering about 36000 serials. These include libraries of scientific institutions, universities, R&D units of industrial complexes and institutions of higher learning.

2 Database on Indian Patents: It is a bibliographic database consisting

of nearly 40,000 records covering patents published in India during 1972-90.

3 Polymer Science Database: At present a bibliographic database, has plans to include abstracts later, has records of about 4500 from 30 national and international journals available in libraries in India.

4 Current Contents of Indian Journals: A monthly update of content pages of about 1000 Indian journals, in Science and Technology, received in National Science Library.

5 Medicinal and Aromatic Plants Abstracts (MAPA): This is a database of abstracts of about 55 national and international journals published on medicinal and aromatic plants. It is based on a bimonthly publication of PID, New Delhi. This database includes inputs from member countries of ASCA (Association for Science Co-operation in Asia).

6 Materials Science Bibliographic Database: This database covers material–alloys, aluminium, ceramics, composites, fibres, glass, polymers and wood. It is based on information collected from ISA (Indian Science Abstract) and SCI (Science Citation Index). It contains about 8,000 records from over 700 periodicals both Indian and foreign.

The National Information Centre for Crystallography, Madras also provides online access of its database called as NICRYS through INDONET since 1990.

Online services are gaining popularity in India. The recent development being the NACIDS (National Access Centres for International Databases) of NISSAT, providing access to international databases. However, there is a strong feeling that such international databases have a partial coverage of information regarding India. Moreover, local information needs are not fulfilled by these databases. This could be overcome only if we have indigenous databases covering such information. A national body such as NISSAT and parallel organisations (academic, R&D units, public undertakings, etc) should work cooperatively in this direction. A proper planning as regards the format and structure of these databases should be formulated and strictly adhered to. At present searching of international databases is a major hindrances because of the complexity and the high cost involved particularly in India. This has been a major factor responsible for a low use of such services in India. User friendliness of the databases should also be foremost. This would result in more effective and efficient search strategies formulation. Another advantage to access to indigenous databases would be the reduction of the cost of searches. With the recent advances in telecommunication networks, if these indigenous databases are available

through such networks, this would result in major changes in the use of online services in India.

6 CONCLUSION

There has been considerable activities in the field of database building as well as telecommunication networks in India. Almost all sectoral centres of NISSAT have future plans of developing the local databases and providing them online through various networks in India such as I-NET, INDONET, SIRNET, INFLIBNET, DELNET and many others. Databases are being developed by other organisations too if provided online through collaborative efforts such as those of NISSAT would give an impetus to cost effective online services in India.

PUNJAB PUBLIC LIBRARY AND INFORMATION NETWORK: A PROPOSAL

JASMER SINGH*

0 INTRODUCTION

Public Libraries are considered the nerve centre of society, and their role in the social change is undisputable. They serve the diverse needs of society. These are regarded as social service centres for the whole community which offer their services for recreation, information and education to people under its jurisdiction irrespective of any discrimination. An informed public opinion is the basic infrastructure of a sound democracy. If we want our state to be economically sound, politically integrated and culturally deep rooted, we must have our people educated and informed.

Development depends on mass education and library is the only media through which mass education is feasible. The need of public library services is also most urgently felt in view of mass education programme to remove illiteracy and ignorance among the masses. Literacy and library are two important prerequisites for participation in a democratic development process. Both induce a quantitative change in the understanding perception, attitude, life style and working conditions of the people. Literacy is a tool, a capability, and a capacity to communicate and get communication in written form while library and information service provides access to this recorded communication of information and knowledge.

National policy of library and information system in India, states that central and state governments shall resolve to extend public library facilities to urban and rural areas, so as to cover all sections of the people by the end of the century.[1]

Thus, importance of public libraries as partners in socio-economic and cultural advancement, self development, life long education and literacy promotion has to be recognized to recommend a public library and information network at state level. "Public library network will not only help National Adult Education Programme but also supplements it."[2]

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1 STATE OF PUNJAB

The present Punjab state consists of 14 districts; 129 towns; 5 cities; 118 blocks and 12,342 inhabitated villages. Its total area is 50,362 kilometrers. The total population of Punjab according to *Census of India*, 1981 is 167.81 lakhs. Its rural population is 121.41 lakhs ie, 72.3 per cent) and urban population is 121.41 lakhs (ie, 27.7 per cent) of the total. Number of literate and educated persons in Punjab, as enumerated in *Statistical Abstract of Punjab* 1988 is 68,60,348 forming 40.86 per cent literacy rate, which is much higher than National Literacy rate ie, 36.23 per cent.[3] Rural population in all the districts of Punjab is much higher than the percentage of urban population.

2 CONDITION OF PUBLIC LIBRARIES

In Punjab public library and information system does not exist. There are some public libraries at state, district and lower levels, but in the absence of proper coordination, library service in the state has turned out to be sporadic. This obviously leads to overlapping and wastage of resources, which are already limited. Punjab Government has yet not enacted public library legislation, while Tamil Nadu, Andhra Pradesh, Karnataka, Maharastra, West Bengal, Manipur, Kerala and even the neighbouring state Haryana have passed public library legislation. Here is an example of a most advanced state of India lagging so miserably in a field which directly as well as indirectly is of utmost significance for social, educational and economic development of the people. Punjab has got one Central State library, 12 district libraries, nearly 95 municipal libraries and about 965 Panchayat libraries (Table 1).[4] With the exception of a few libraries; they are poor replica of public libraries. Most of the existing public libraries are not at all meeting standards so far as their buildings, staff, reading material and services are concerned. It is significant to note here that Panchayat libraries do only receive occasional grant from state Government and have no professionally qualified staff to look after them. However, the total available infrastructure may well provide a suitable base for effective functioning of the proposed PPLIN in its preliminary phase.

3 PRESENT ADMINISTRATIVE SET-UP

Central State Library and district libraries are functioning under the directorate of education. Chief Librarian of the Central State Library acts as controlling officer of the 12 district public libraries of the state.

There is no separate public library department in the Government of Punjab. There is not even a deputy director of public libraries under whose charge Central State library and district libraries may function.

Table 1

Name of district	*Number of villages having libraries/ reading rooms*		
	1983-84	*1984-85*	*1985-86*
Rupnagar	8	7	7
Ludhiana	107	100	101
Ferozepur	44	44	44
Sangrur	75	83	100
Jalandhar	32	87	87
Hoshiarpur	27	27	23
Gurdaspur	11	10	24
Amritsar	105	105	106
Faridkot	247	250	250
Kapurthala	3	6	6
Patiala	52	53	53
Bathinda	139	137	164
	830	909	965

The foregone survey of present scene of Public Library System in Punjab provides a pathetic state of affairs of public libraries. It is despite the fact that Punjab is the most prosperous state of India and as stated elsewhere it has got much higher rate of literacy than that of India as a whole.

4 PROPOSED PUBLIC LIBRARY AND INFORMATION NETWORK

The Model: The foregone pages elucidate that there is no network of public libraries in Punjab. The concept of Library networking is not new but the speed with which libraries are involving with networking activities is somewhat slow. "When two or more libraries engage formally in a common pattern of information exchange through communication for some functionally interdependent purpose, we have a library network."[5] The concept emphasises that public libraries at different levels, viz states, city, district along with branches or service units should be so interlinked as to form part of a system(s) or network(s). Bret Butler defines the library network as, "An independent organization serving more than one library, using at least some communication technology which distributes services to user libraries and, at the same time, receives information directly related to the continuing production of services from the user libraries for the purpose of sharing the resources for the libraries."[6]

Keeping in view the length and breadth of the state, it is suggested that hierarchical type of network should be used for development of public library system. Hierarchical network entails members sharing resources locally and passing unsatisfied needs along to the next greater resource centre.

It can be better understood with the help of Fig. 1.

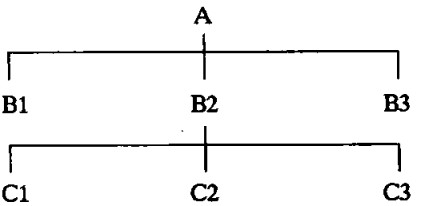


Fig. 1.

4 NETWORK OBJECTIVES

The basic objective of network is to provide better service to the patrons or member libraries. It involves lower cost, provides access to more materials and ensures rapid availability of materials. It helps to provide improved library resources more economically by pooling or sharing resources.

A well laid out public library network to cover the entire state may comprise State Central Library, district libraries, corporation/municipal/ city/town libraries and their branch libraries, block libraries and Panchayat/ village libraries.

Hierarchy based public library network may be diagrammatically represented as per *fig.* 2.[7]

The public library chain designed in *Fig. 2* could well be controlled by the state library authority, presided over by Minister of Education with the director of libraries having administrative control.

The network would eventually consist of 144 semi autonomous district library networks, each under the control of district library authority. The headquarters of Central State Library should preferably be housed in state capital's public library. Similarly headquarters of district public libraries should be housed in the respective district headquarters. District libraries would be controlled by Central State Library, and would themselves act as district headquarters for Municipal and Block libraries falling under their respective territorial jurisdictions. Proceeding in the same manner Municipal libraries would function as headquarters for various branch libraries, reading

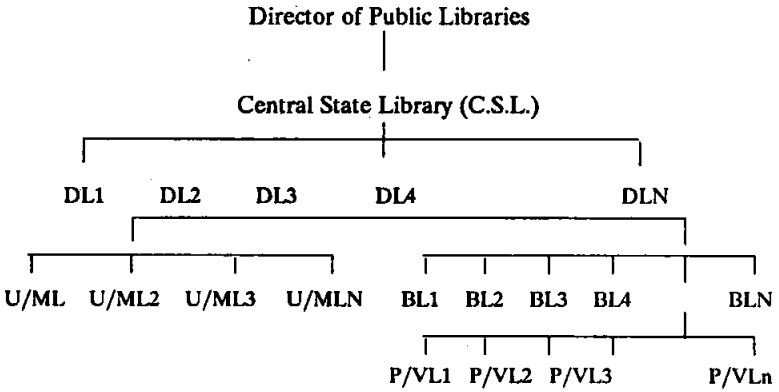


Fig. 2

Abbreviations: DL = District Libraries
U/ML = Urban/Municipal Libraries
BL = Block Libraries
P/VL = Panchayat/Village Libraries

rooms and mobile libraries falling under their respective jurisdictions. Similarly Block Libraries would function as headquarters for Panchayat libraries and mobile libraries functioning under their respective territorial jurisdictions.

41 OBJECTIVES

The public libraries to be established under this plan should not be mere store houses of books. "They should play an active dynamic part in the social, educational and cultural life of their communities, providing facilities, not only for reading and study, but also for exhibitions, displays, film shows, lectures, adult classes, and other cultural activities and thus be the centre of community's cultural life."[8]

42 ADMINISTRATIVE CONTROL

Overall administrative control of various kinds of public libraries covered under the network should rest with the library authorities specially constituted for them.

421 STATE LIBRARY AUTHORITY

State Library Authority (SLA) should function as supreme administrative body of state public library network. It should be responsible to sanction budget for all participating libraries, employment of staff and to provide various physical facilities and reading material to maximise the use of public libraries at various levels.

422 DISTRICT LIBRARY AUTHORITY

District Library Authority (DLA) should function as principal administrative body of district library network. It should be responsible for preparing budgetary demands of various municipal libraries and block library networks under its administrative control in addition to its own budgetary demands. It should also be responsible to get approval for staff needed to manage various libraries under its territorial jurisdictions from SLA. It should also distribute grants to the various public libraries under its control.

423 MUNICIPAL LIBRARY AUTHORITIES

Municipal Library Authority should function as principal administrative body of the municipal library network. It should be responsible for organization of municipal libraries on modern lines and make efforts to maximise use of municipal library network. It should arrange for branch libraries and mobile library services for distant places of the respective cities. It should prepare budgetary demands to be presented to Central State Library through DLA for approval.

424 BLOCK LIBRARY AUTHORITY

Block library authority should function as principal administrative body of block library network. It should be responsible for establishment of village/Panchayat libraries in all the villages falling under its territorial jurisdiction and proper functioning thereof. It should prepare budgetary demands, requirements of staff and material for sanction of SLA through DLA.

425 PANCHAYAT LIBRARY AUTHORITY

Panchayat library authority should function as its principal administrative body. It should be responsible for provision of qualified staff, better reading facilities and better reading material. It should also arrange for audio visual materials like TV, Radio, VCR and VCP, etc. to supply latest information to literate as well as illiterate people. It should also send an account of its monetary and other needs to block library for inclusion in its budget.

5 FINANCES

The public libraries need both recurring and non-recurring funds for construction of new buildings, renovation of old ones, staff salaries and acquisition of the much needed books, audio-visual materials and other reading materials, etc. Awfully, our libraries are not paying much attention towards buying the publications for want of funds.

While allocating funds for the libraries, "the State Government should not weigh the returns, for the information supplied is priceless and it is difficult to justify the costs of services rendered to the public especially when the assessment of the knowledge so gained is far too difficult.[9]

51 SOURCES

Funds for libraries may be raised through various methods. Some such methods are enumerated below:

1 State appropriation
2 Local revenues
3 Central grants
4 Library cess
5 Donations from big industrial houses and charitable institutions.

State Government should take full responsibility to finance public library system. In United States, the advocates of increased state support believe, that "libraries, specifically public libraries, and local schools are the integral part of the states' mandate to provide public educational services, and that pattern and level of state fiscal support for public libraries and local schools should be more closely related.[10] Expanded educational services of the future can be expected to utilize heavily the information material and services of the public library.

Keeping in view the bilateral relation between public libraries and formal as well as non formal education it is suggested that Punjab Government should take a considerate view to develop public libraries and should spend at least 8 per cent of the total state budget for development of public libraries and information centres. The pooling of finances for this percentage should be enhanced from the budget allocations earmarked for public relations, agriculture, rural development, social welfare, local self government, community development and education, etc.

In my opinion, local revenue as a source of financing public libraries is not dependable, especially when we hear the proposal of abolition of octroi, etc. On the other hand village panchayats do not at all collect any such local revenue while nearly three-fourths of the state's population lives in villages.

The proposal of library cess sounds well. But "under the present economic and political set-up, the proposal of levy of cess should be thoroughly studied."[11] I am of the considerate opinion that the tradition to levy library cess should be dispensed with.

Though a state subject, the Central Government has also an equal responsibility towards public libraries. In order to support the states efforts, the Government of India has established the Raja Ram Mohan Roy Library Foundation as a Central promotional agency for the development of public library services in the country. The foundation has been supporting the public libraries at different levels under a programme of matching and non-matching assistance for construction of library building, purchase of furniture and equipments, augmenting the book stock and finally for the acquisition of audio visual materials. The foundation has undertaken a project for strengthening children's libraries or children's sections of public libraries and it has a plan to develop text book sections in public libraries."[12]

Some funds can be drawn from integrated rural development programme, adult education programme, Jawahar Rojgar Yojna, Panchayati Raj Scheme, etc. It is suggested that central assistance should match the proposed 8 per cent of state's share for creating effective public library and information network.

6 NEED FOR LEGISLATION

Public library and information network is not possible without library legislation. The enactment of a public library law does ensure enormous advantages for the system. It is in the interest of growth and better functioning of these libraries. Legislation is essential for providing and maintaining any public library and information service in the state. It creates the authority responsible for providing such services, spells out powers and duties. It outlines structure for management of the service. It authorises the agency to appoint staff, make necessary regulations and by laws, inspect and control the system and the services. It also stipulates how funds are to be allocated for the purpose.[13]

In Punjab the first attempt was made in 1948, when the first provincial conference was organised by the Punjab Library Association at Shimla.[14] Various unsuccessful efforts were also made in 1962, 1964, 1966 and 1972 by the Punjab Library Association for enactment of library legislation in Punjab. A meeting was held by the Education Secretary to the Government of Punjab on 14th May 1980.[15] During this meeting certain issues were raised regarding enactment of library legislation in Punjab and experts were asked to comment but nothing tangible could be heard later on. The association should take up the issue with the Punjab Government. It should work hard to mobilize public opinion in favour of PPLIN. It should also approach elected representatives of the people of Punjab to muster support for early enactment of bill relating to PPLIN.

7 SUGGESTIONS

In order to achieve a planned development of public library and information network in Punjab and also to meet the social purposes expected of it, following suggestions are given:

1 Punjab Government should assume responsibility of providing public library and information service, as it is essentially a state responsibility.

2 Government should immediately take necessary steps for enactment of library legislation, so that adequate finances on recurring basis may be provided for establishment of successful library and information network in the state. It should involve Punjab Library Association to provide helpful professional suggestions for proposed PPLIN legislation.

3 State Government should set up a committee or commission to (*a*) conduct a study of the existing pattern of the public library system, (*b*) give recommendations for the development of public library and information network through library legislation in the state, and (*c*) suggest a public library and information policy for the State.

4 The public libraries should be used as a popular and well known educational centre and should easily be utilised as a forum for adult educational work. If the two services–the public library and adult education are integrated, and their financial, material and staff resources pooled together, the existing public library system could be easily revamped. "It may even help to establish new public libraries in rural areas where none exist, and may be, in this way the long cherished dream of a public library may come true."[17]

8 CONCLUSION

In view of the above discussion and suggestions it can be concluded that establishment of public library network in the state is possible only through the tacit financial support of the State Government, which can only be possible if Punjab Government adopts library legislation. Punjab Library Association, being an apex professional body, should not take rest, till the goal of enactment of library legislation and establishment of public library and information network is achieved.

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A SURVEY OF CD-ROM IN DELHI LIBRARIES

SANJAYA MISHRA*

1 INTRODUCTION

The information storage medium has changed through the ages from clay tablets and wall paintings to paper followed by silver hailed film, magnetic tape and optical storage. The computer revolution, resulted in a domination of magnetic storage, but recently optical storage medium has come out as an excellent competitor due to its various advantages. CD-ROM (Compact Disc-Read Only Memory) is one such optical storage method which stores data in an optical way. The technology is mainly based on the reflective principle where light is the transport medium. The CD-ROM was standardised in 1983 by Philips and Sony, which was later on in 1985 agreed upon by the High Sierra Group. This later on became the ISO 9660.

A CD-ROM can hold about 600 MB of data equivalent to 275,000 typed A4 size pages or 1600 floppy discs. The disc is 12 cm in diameter, 1.2 mm thick and has a hole of 15 mm across in the centre. The information is stored in a 5 km concentric track coated with a reflective metal layer, which is then covered by a protective layer in one side and polycarbonate plastic layer in the other (Fig 1). The concentric layer consist of microscopical pits with different sizes and distances. To access information from the CD-ROM, a laser beam is focussed on the spiral track of pits and lands. The light reflected back from the lands (flat surface) are detected by the photo detector which through a decoding process is converted into digital data usable by the computer (Fig 2).

2 POTENTIAL VALUE OF CD-ROM

Nwali[1] has discussed the potential value of CD-ROM as follows:

(*i*) It has enormous storage capacity;

(*ii*) Stored information is not affected by power cuts;

(*iii*) Discs can not be damaged by magnetic or microwave scanning;

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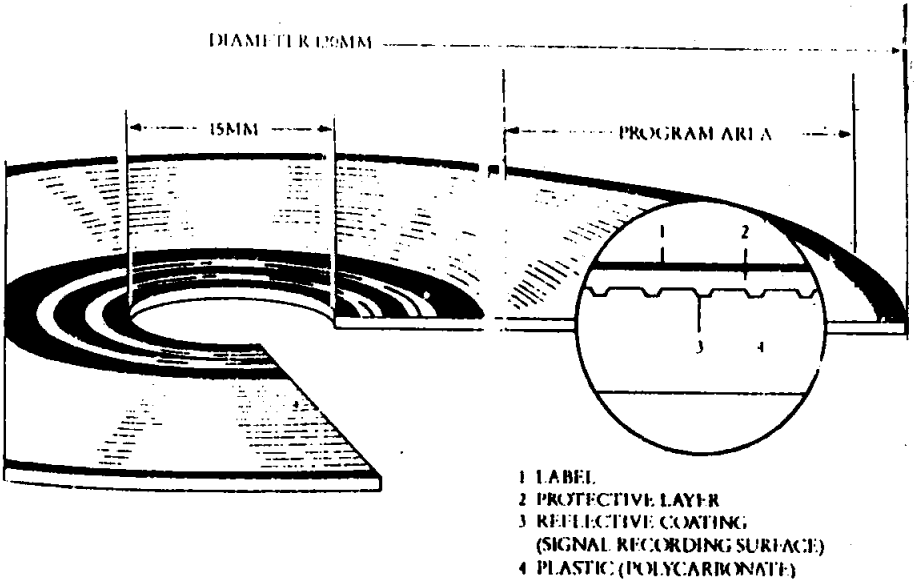


Fig 1. A Compact Disc

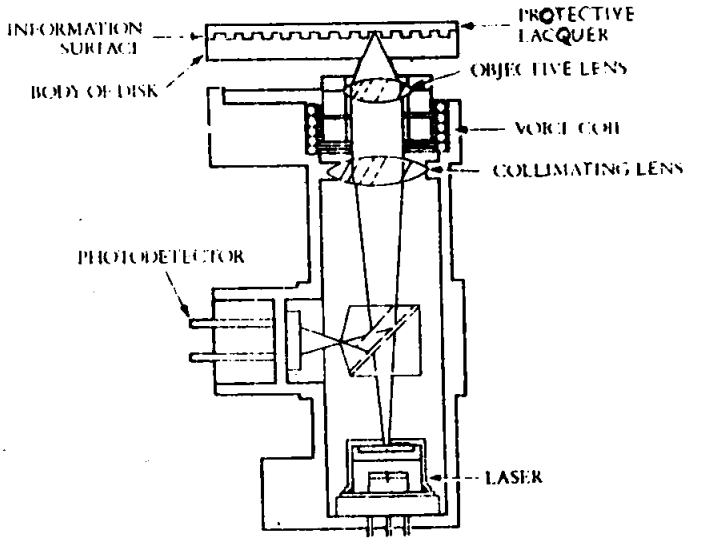


Fig 2. Optical head of CD-ROM drive

(*iv*) They can not be damaged by scratches or finger marks, unlike floppy discs;

(*v*) They are not at risk from extreme climatic conditions;

(*vi*) CD-ROMs are available without online charges;

(*vii*) Librarians and information officers can do other library tasks;

(*viii*) Unlike online services, where the annual cost depends on the number of searches, CD-ROM provides an easy estimate for annual budgeting.

(*ix*) Telecommunication links are not necessary; and

(*x*) CD-ROM being user friendly it is easy to use.

3 THE SURVEY

Due to the potential value of CD-ROMs, its use is increasing enormously. To assess the availability of CD-ROM in libraries of Delhi, a survey was conducted. The libraries having CD-ROM were identified through personal inquiry and phone calls to a large number of libraries. Only a few number (16) of libraries responded that they are using CD-ROM. These libraries were then approached with a questionnaire (*Appendix-A*) to determine the following:

(*i*) CD-ROM drives and other equipments in use;

(*ii*) Availability of databases in CD-ROM and their supplier; and

(*iii*) Installation and maintenance problems in CD-ROM.

4 THE RESULTS

(*i*) *Types of Libraries:* All the libraries having CD-ROM are specialized institutions. This is perhaps due to the specialised need of their information users and availability of sufficient finance to acquire it (*Appendix-B*).

(*ii*) *Equipments:* Compatibility of CD-ROM drive with the micro-computer is very essential to use it. At present, three CD-ROM drives are available in India–Hitachi, Philips, and Toshiba. However, the Hitachi is the market leader having 15 installations. Philips and Toshiba share two installations each. Most of the libraries have a single CD-ROM drive, but some libraries like British Council, Indian Institute of Technology, Defence Science Information and Documentation Centre have more then one CD-ROM drives.

The range of micro-computers being used is of more than 10 different makes. The makes which are in use are: Wipro, HCL, Unicomp, Zenith, Keltron, Blue Star, PCL, DCM, Shyam, Modi Olivetti, etc each having one installation. Use of PC/AT 286 and 386 are common. The wide range of models in use is due to their compatibility with CD-ROM.

A wide range of printers are being used, but EPSON has a dominance over others. It has 5 installations. The other makes in use are TVSE, L & T, Wipro, etc. But, the users have commented that 'almost all types of printers are compatible and it does not create any problem.'

MS-DOS CD-ROM Extension is common to all CD-ROM users. This consists of a "device driver for a CD-ROM player and a RAM resident programme called MSCDEX. EXE that interfaces with MS-DOS."[2]

(*iii*) *Databases available:* A wide range of database are available in CD-ROM. An alphabetical list of the databases, their subject coverage and availability in libraries of Delhi is given in the *Appendix-C.*

(*iv*) *Managing the installation:* As reported by many libraries, the installation of a CD-ROM costs around Rs 55000/-. But, some libraries like National Medical Library and National Institute of Health and Family Welfare Library has received CD-ROM drives as gift.

The libraries surveyed do not allow the users to access CD-ROM themselves. Library staff makes searches and provide the required information to the users. But one library specially mentioned that it 'intends to allow all the library users to make their own searches in future.'

The training aspect of CD-ROM use is almost lacking. Library staff learning by experience and impart training to other users (staff) in an informal manner.

Most of the libraries mentioned that they get problem in the CD-ROM drive and some even reinstalled it by their supplier. Usually, the technical problems in the CD-ROM are solved by the supplier.

(*v*) *Comments of users:* The users were asked to comment on CD-ROM. The following are some of the reactions:

- Ideal technological solution to provide cost effective and efficient information access to users.
- It is a substitute to online services, if not fully, partially.

5 CD-ROM IN INFORMATION SKILLS TEACHING

Mastering search strategy is one of essential information retrieval skills. According to John Akeroyed "CD-ROM provides an ideal vehicle for training both library and information professionals and end users in the techniques of information searching. This can be informal, where once again the absence of any connect time charges allow users to work and learn at their own pace, using the prompts and help screens available on most systems... [even] structured exercises can be provided to show the problems and possibilities of the searching processes."[3]

6 CD-ROM NETWORKING

Networking of CD-ROM drives has opened a new era in the sharing of information resource. "The first CD-Network was developed by Maridina Data Inc, USA and today there are several companies which offer networking solution to CD-ROM Connectivity."[4] Developments of daisy chained CD-ROM player and juke box systems are some of the initiatives in this regard. But, for these developments to enter Indian library scenario is a dream at present.

7 CONCLUSION

Realising the potential value of CD-ROM, its use is increasing in libraries of Delhi. During the survey, it was learnt that some libraries are also, planning to acquire CD-ROM in near future. NISSAT, also organised a national CD-ROM users meet during July 16-17'1992 to discuss their problems. It is hoped that this survey shall act as an informative report to know the CD-ROM use in libraries of Delhi and help potential users to get expert advice from libraries already using CD-ROM.

8 ACKNOWLEDGEMENT

I am thankful to Mr. Sunil Kumar for helping me in collecting data for the survey.

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APPENDIX-A

CD-ROM in Libraries of Delhi

Dear Sir/Madam,

Please answer the following questions relating to CD-ROM in your library. The investigator shall be ever grateful to you for your cooperation. (Please cross mark (X) at appropriate place).

1 Name of your Library _____

2 Address _____

Phone _____

3 Contact person _____

4 Micro Computer(s) used for CD-ROM:

How many _____

Make & Model _____

5 Operating System and Version _____

6 Are you using MS-DOS, CD-ROM Extension? Yes __ No _____

If no then what else? _____

7 CD-ROM player(s)

How many _____

Make & Model _____

8 The CD-drive is

___ Multiuser ___ Connected with more than one CD-drive

___ Juke Box ___ Ordinary

9 Do you have a separate printer attached for the CD-ROM use?

Yes _____ No _____

If yes, its Make & Model _____

10 Please list the CD-ROM databases available in your library?

Databases	*Supplier*
_____	_____
_____	_____
_____	_____

11 What was the approximate installation cost of CD-ROM in your library?

_____

_____

12 Who has access to the CD-ROM?
All staff members _____ Only qualified staff _____
All users of the Library _____ Only specific user group ____
(please mention)
All _____

13 how do you train the new users?
Group instruction _____ One to one instruction _____
Training programme _____ No training at all _____

14 Have you ever had problem in CD-ROM use? Yes __ No ___
If yes, please describe _____

15 How do you solve the problem in use and application of CD-ROM?
_____
Ask the Vendor/Supplier _____
Ask colleague in other libraries _____
Yourselves _____
Comments if any: _____
_____
_____
_____

APPENDIX-B

Libraries Having CD-ROM

1 American Center Library (ACL)
24, Kasturba Gandhi Marg
New Delhi-110 001.

2 British Council Division (BCD)
17, Kasturba Gandhi Marg
New Delhi-110 001.

3. Centre for Biotechnology (CB)
Jawaharlal Nehru University
New Delhi-110 067.

4 Defence Science Information &
Documentation Centre (DESIDOC)
Metcalf House
Delhi-100 054.

5 Indian Agricultural Research Institute (IARI)
Agriculture Research Information Centre
KA. Bhavan, Pusa
New Delhi-110 012.

6 Indian Institute of Technology (IIT)
Hauz Khas,
New Delhi-110 016.

7 Indian National Scientific
Documentation Centre (INSDOC)
14, Satsang Vihar Marg
New Delhi-110 067.

8 Institute of Nuclear Medicine & Applied Sciences (INMAS)
Lucknow Road
New Delhi-110 064.

9 National Informatics Centre (NIC)
C.G.O. Complex
Lodhi Road
New Delhi-110 003.

10 National Institute of Immunology (NII)
Sahid Jeet Singh Marg
New Delhi-110067.

11 National Institute of Health and
Family Welfare (NIHFW)
Near Old JNU Campus
New Delhi-110 067.

12 National Medical Library (NML)
Ansari Nagar, Ring Road
New Delhi-110 029.

13 National Physical Laboratory (NPL)
Dr. K.S. Krishnan Marg
New Delhi-110 012.

14 National Social Science Documentation Centre (NASSDOC)
ICSSR, 35, Feroz Shah Road
New Delhi-110 001.

15 Ranbaxy Laboratories Ltd. (RLL)
A-1, Phase I, Okhla
New Delhi-110 020.

16 Solid State Physics Laboratory (SSPL)
Lucknow Road
New Delhi-110 054.

APPENDIX-C

Alphabetical List of Databases Available

Databases on CD-ROM	*Subject*	*Availability*
AGRIS	Agriculture and allied discipline	CB, IARI
Analytical Abstract	Analytical, inorganic & organic chemistry, pharmaceuticals, etc	RLL

Databases on CD-ROM	*Subject*	*Availability*
Applied Science & Technology Index	Science and Technology	IIT, INSDOC
Biological & Agricultural Index	Biology & Agriculture	INSDOC
Biotechnology Abstracts	Biotechnology	CB
Books in Print Plus	–	ACL
Book Bank	UK Publication data	BCL
BNB	–	BCL
CAB	Agriculture	IARI
Cancer CD	Cancer related fields	NIC
Cambridge Science Abstracts	Science and Medicine	NII
CHEM Bank	Hazardous Chemicals	NIC
Dissertation Abstracts	–	ACL
ERIC	Education	BCD
Facts on file News Digest	US & World News	ACL
General Science Index	–	INSDOC
INSPEC	Physics, electronics & Computer	NIC, NPL, DESIDOC
Information Science Abstracs	Information Science; Computer & Communication	DESIDOC
International pharmaceutical Abstracts	Pharmaceutical Science	RLL
LISA	Library & Information Science	DESIDOC
MEDLARS	Medicine and allied discipline	BCD, CB, NIC, NML
National Directory of Addresss & Telephone Numbers	Address & Telephone no. in USA	ACL
NTIS	Environment, Health & Safety, Computer, Communication, medicine, aeronoutics, etc.	DESIDOC
Popline	Population Information, Family Planning, Contraceptive Tech.	NASSDOC, NIHFW
Reader's Guide to Periodical Literature	–	ACL
Science Citation Index	–	INSDOC
Toxline	Toxicology	NIC
Ulrich's plus	Serials	ACL
USIA's International	Drug	ACL

Drug Library
Unesco CD-ROM NASSDOC
Prototype

APPENDIX-D

List of CD-ROM Suppliers

1 ABI Book (P) Ltd.
Vaikunth, 82-83
Nehru Place
New Delhi-110 019.

2 Dataware Consultants
18, Satyaniketan, 2nd Floor
Opp. S V College, Moti Bhagh
New Delhi-110 021.

3 Infirmatical (India) Pvt. Ltd.
New Delhi-110 001.

4 Institute for Scientific Information
Philadelphia, USA.

5 Mamex Information System
C-25, 2nd Floor,
Green Park Extension
New Delhi-110 016.

6 Silver Platter Information Services
37, Walrut Street, Wellesley Itills,
Massachusetts 0218 USA.

7 Whitaker & Sons
12 Dyott Street London,
WCIA IDF 01836 8911 UK.

8 Wilson (H.W.) Company
950, University Avenue,
Bronx, NY, 10452, USA.

Apart from these Unesco, WHO, CAB, FAO and John Hopkins University, USA supply their CD-ROM products directly.

CD-ROM NETWORKS: BUILDING INFORMATION WORKSTATIONS IN ORGANIZATIONS

J.P.S AHUJA*

1 INTRODUCTION

Technology has become a major factor in Information delivery. The Information and developmental needs of society plus the economic pressures require the library to shift away from a role as a repository of knowledge in the form of documents and towards becoming a node in the network of information providers. Until the advent of computer, the rate of change in library technology followed a predictable evolutionary pattern. Today libraries are experiencing an explosion of new technologies. Advanced telecommunications coupled with the power of computers is at the centre of the radical changes in information creation, storage and dissemination.

Any library with a micro computer and modem can hook into one of thousands of listings, called databases. Many of these databases are also available to anyone with a home computer and a mode, allowing people to link with other computers by telephone.[1] The potential is that a library patron would have access to resources that he or she needs regardless of where they are located.

One of the more exciting advances, however, does not require a direct outside connection that is the optical digital, or compact disk. Huge amounts of digital information is placed into the disks with a solid state laser, which is also used to read it. A 30 centimeter disk can store the equivalent of 160,000 pages of text, or 400 books with 400 pages each. To get the information of a disk, a library needs a scanning device and a micrcomputer.

2 CD-ROM AND THE END USER SEARCHING

CD-ROMs are commercially available for searching databases that are primarily bibliographic in nature. Each disk holds a large volume of data stored in digital form.

Many databases, which were earlier available only through Online vendors or as conventional abstracting and services are now available on CD-

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ROM. The databases on CD-ROM contrary to on Online searching, offer more freedom to the user in formulating search strategies and in conducting experimental searches with different search strategies.[2]

While the subscription costs of CD-ROMs may be quite high, it is a fixed cost and thus budgetable. The real disadvantage of CD-ROMs is the equipment costs. They require not only a full PC with enough RAM to run complex search strategies, but also a CD-ROM drive, an expensive and sensitive device. Costs are moderate in terms of training and staff time. CD-ROM is the most cost effective way to provide end-user searching.

3 CD-ROM Vs ONLINE SEARCHING

CD-ROM searching differs quite a bit from online searching. It operates much faster. There are no peak hours as in online searching. When it is processing a truncated term, all the variations for the term are shown on the screen. Now one can actually see what is occurring during those long waiting periods we would sometimes experience online.

The On-disc product also has an easy method of searching for beginners. It is menu driven and allows for subject, author, title, journal name, and publication year searches. The users can limit to specific fields as well. A searcher would use the menu system to search related terms first, in actuality conducting a Boolean "or" search. The search can be modified with additional terms if necessary, the equivalent of a Boolean "and". It is easy to learn and would be excellent for staff members who wanted to conduct their own searches. The most Important difference between online searching and "on-disc" searching, is the lack of time constraints. The system would run entirely in the library incurring no telecommunication costs and none of the attendant telecommunication problems. The users could search as they liked without incurring charges by the minute.

4 THE CD-ROM NETWORKING

For effective information dissemination, it would be necessary to create an environment that could support a great diversity of data resources. Such an environment could be established by building a CD-ROM network. This offers several advantages over stand-alone systems. It allowes more than one user to access the same CD-product at the same time. Users would not have to move from terminal to terminal to search related but separate CD-ROM products, or different years of the same product. In addition to user convenience, it also means that staff would not have to change discs for patrons or check out discs to patrons. This would also allow librarians to access CD-ROMs on any server along with the users. This shall make the use of databases more convenient as compared to

stand alone work stations. Any CD-Network must use low-cost, highly rated network software which would allow shared access to CD-ROM hardware. CD-ROM Drives working in a local area network (LAN) environment offers an ideal solution. In fact CD-ROMs and LAN are a natural match. Although CD-ROM drives and disks are still to expensive for most desktops, LANs let these costs to be spread among many users.

5 LOCAL AREA NETWORK

These are communication systems that are used to link the terminals, computers, word processing stations and other data processing resources in order to be shared, within a compact area.[3]

51 TYPES OF LANs

LANs generally are of two types, server-based and peer-to-peer LANs. Peer-to-peer networks operate democratically. In these networks each workstation has the option of both contributing resources to the network as well as using resources on the network. Printers and hard disks attached to any workstation in the network can be defined as a network resource to be shared by all workstations.

Server-based networks, on the other hand, follow a centralized model. Computers in these networks are either workstations or servers. A server provides resources to the network while workstations use the network without contributing resources.

52 LAN TOPOLOGIES AND PROTOCOLS

There are three basic network topologies; ring, star or bus. At present there are three popular transport protocols; Net BIOS (or Network Basic Input/Output System), TCP/IP (Transmission Control Protocol/Internet Protocol) and IPX/SPX (Inter network packet exchange/sequence packet exchange). There are three common access methods Ethernet, Token ring and ARCNET and there are three cabling choices for connecting the network devices; coaxial cable, twisted pair-shielded and unshielded (telephone wire) and fibre-optic Cable.

6 CD-ROM LAN: SOFTWARE AND HARDWARE

Microsoft the organization which authored MS-DOS wrote special software to handle CD-ROMs. That software, the Microsoft MS-DOS CD-ROM extensions (MSCDEX) is a DOS file redirector that intercepts BIOS read and write requests that involve CD-ROMs and handles these requests itself.[4]

Server-based LAN operating system can handle very large hard disks, so that they could avoid the redirector hassle entirely by attaching the

CD-ROM drives directly to the server–but they lack the drivers that they need to make their servers work with CD-ROM drives. Without these drivers, server based LANs must attach the CD-ROM drives to a microcomputer on the LAN.

Peer-to-peer LANs, which have no dedicated servers, also must work with CD-ROM drives on LAN systems. Each client system must therefore run two redirectors the one that LAN requires and MSCDEX. Some peer-to-peer LANs such as LANtastic avoid this approach altogether by providing explicit support for CD-ROM drives.

61 THE LANASTIC SOLUTION

LANtastic is designed to be inexpensive, easy to install and maintain. It is a peer-to-peer system which does not require the use of a dedicated file server. The workstation which acts as a file or network resource server may also be used as a fully functioning network work station, or node. LANtastic is one of the few network software packages which offers built-in and virtually transport support for CD-ROM drives. LANtastic is perhaps the easiest network-operating system to install and maintain.[5] LANtastic ease of use results in part from the excellent design of Net manager, a comprehensive network management tool. Net-manager enables the network administrator to install new users, change passwords, regulate access, install new devices such as printers and CD-ROM drives and keep audit trails. These functions are menu-driven with online help. In addition, LANtastics Net command allows the user to connect with network resources using interactive commands. NET commands from any of the workstations allow a user to logging to the server, change passwords, send mail or connect with network resources.

62 THE DEDICATED CD-ROM SERVER SYSTEM

This system, which resembles a tower-style PC, sits on a LAN and does nothing but let one use its CD-ROM drives. This can use up to seven CD-ROM drives, and one can add up to seven more drives in a second cabinet. The minimal system comes with one CD-ROM drive, a 12-MHZ 286 CPU and 2 MB of memory.

63 ONLINE COMPUTER SYSTEM'S OPTINET

The other way to provide LAN access to a CD-ROM drive is to hook a standard single-user-CD-ROM drive to any PC on the LAN use that drive. That's the approach of online computer system's optinet.

Optinet handles upto 24 CD-ROM drives at once, and online computer systems sells a four-drive box. Optinet can run on any Net BIOS compatible LAN or directly on Netware's IPX. Optinet is just software, but to use it

one need both a CD-ROM drive and a LAN PC to which we can connect that CD-ROM drive.

64 NETWORK OPERATING SYSTEM FROM CBIS INC. USA

Network operating system is a peer-to-peer DOS based LAN with Net BIOS compatibility. Its sole function is to provide access to the CD-ROM drives on the dedicated CD-ROM server, but the software itself does provide for setting up workstations as file servers and print servers. The dedicated CD-ROM server is a tower of seven CD-ROM drives made by CBIS Inc. This is basically a microprocessor with a monochrome monitor, a key board; one 12 megabyte floppy drive, no hard drive, and up to seven Toshiba Model 3210 B CD-ROM drives stacked on top of each other in a chassis. The server could be Intel 80286 or 80386 12 MHZ CPU.

641 *CD-Connection Software*

This adjunct to the network operating software enable the individual workstations to access the CD-ROM drives. CD connection provides a substitute for the Microsoft extensions for CD-ROM while supporting all MSCDEX calls. It eliminates the need for installing the CD-ROM extensions on each workstation. The CD connection software also provides for disk caching on the extended or expanded memory of the CD-ROM server. Together the device driver, the Network-OS software and the CD-connection software use only 40K of memory on a workstation.

65 CD-NET FROM MERIDIEN DATA INC USA

The heart of the LAN consists of a Meridien Data CD Net Model 100T-80286 tower base unit with an 80286 microprocessor and five CD-ROM players plus an expansion tower (Model X20-286) of six CD-ROM players plus an expansion tower (Model X20-286) of six CD-ROM players. A 286 AT file server runs all the software, including CD-Net and Novely Netware runs over a twisted pair wire network with Thin ethernet. CD-Net software integrates multiple CD-ROM drives into a standard local area network (LAN). CD Net software works with Novely Netware and Net BIOS based LANs CD Net Software employs data caching techniques and "read-ahead algorithms" to improve data retrieval rates. Each enduser on the LAN can use networked CD-ROMs with access times and retrieval rates as good as and often better than, those of a single-user local CD-ROM drive. The software's multi-tasking and request interleave capabilities provide for simultaneous access of multiple CD-ROM drives.

66 PLUS NET SYSTEMS FROM CD PLUS, USA

Plus net 1 is the customized CD-ROM network simultaneously serving up to 4 searches. Plus net 2 is the magnetic based system supporting as

many as 20 simultaneous searches. Comprehensive files, from the MEDLINE database to the online MeSH tools, all also available with the plus Net systems. The plus Net 1 server consists of a 486/25 MHZ EISA Computer with 16 MB of RAM 8 CD-ROM drives, a 386/33 MHZ Optical server as well as a 650 Mb hard drive. With this Configuration the entire MEDLINE database is loaded on CD-ROM, as well as being segmented on the magnetic disk. By combining CD-ROM and hard disk storage with powerful proprietary network software, CDP Net and CDP load, response times are dramatically improved over a standard CD-ROM network.

The plusnet 2 file server consists of a 486/25 MHZ EISA computer with 16 MB of RAM, two magnetic storage units (6 giga bytes of hard disk storage) and a DAT tape drive. The entire MEDLINE database has been loaded and configurated on the 6 gigabytes of hard disk storage, providing speeds equivalent to, and often faster than, mini-or mainframe systems.

7 PROBLEMS ASSOCIATED WITH CD-ROM LANs

The biggest problem associated with CD-ROM products is that they require a large amount of RAM. In addition to the RAM requirements for the network software, the MSCDEX requires 8 K or RAM for each CD-ROM drive. When the number of CD-ROM was increased, these competing RAM requirements clashed. This can be solved by installing one megabyte of RAM and attendant memory management software on every workstation and rebooting the workstations each time a user selects a new CD-ROM product.

The CD-ROM vendors usually charge very high for each LAN user and there is no viable agreement on this issue between clients and vendors.

CD-ROMs have another problem related with speed. While high capacity hard disk drives are driving access times below the 10-millisecond mark, CD-ROM drives area still battling for the 300-ms barrier.

8 CONCLUSION

The emergence of CD-ROM technology is currently producing many changes in the ways that people obtain the information they need. Information on the network is visible and easily accessible. Information off the network or in print is less convenient to obtain. As the CD-ROM LAN technology is quite new on the Information scene, there are bound to be problems. CD-ROM networking offers libraries a powerful and effective tool for providing increased access to electronic information. The CD-ROM network will result in the number of work stations available to users. This shall make the use of databases more convenient as compared to stand alone

work stations. In near future, some databases will only be available in CD-ROM format, and the demand for highly used databases in this category is likely to be adequately met only through networking.

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CD-ROM SEARCH STRATEGIES

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Ms PADMAJA RANI**

0 INTRODUCTION

Although text searching is an operation common to computers, it is beneficial for us to reexamine its mechanisms in the context of new techniques and technologies for storing data. The compact disc has revolutionized the music industry and is beginning to revolutionize the computer industry. Its immense storage capacity (about 550 MB) allows enormous files to be stored on a magnetic disc. Text files as big as an encyclopaedia can be stored on an CD-ROM with room to spare. Cooper, Lorraine K.D. and Tharp, Alan L have introduced the inverted signature tree, a new means of storing and retrieving mass text on a CD-ROM.

Applications such as the electronic encyclopaedia using the CD-ROM as a storage medium can now provide the existing feature of audiovisual information to the user. Such projects already exist and others are in the development stages. The multimedia aspects of the electronic encyclopaedia is made possible by the immense storage on the CD-ROM. Here the emphasis is laid on the encyclopaedia application in order to perform a usability analysis of the inverted signature tree data structure for CD-ROM storage and retrieval.

1 SEARCH TECHNIQUES FOR CD-ROM

The inverted signature tree data structure is one of several data structures that could be used for storing and retrieving text data on a CD-ROM. Alternative methods include simple inversion, Bloom filters, B+ trees, hashing functions and text signatures. Comparison of the usefulness of the inverted signature tree to the usefulness of the text signatures and the B+ tree is enumerated here.

Before an appropriate data structure can be investigated, it is important to understand the disadvantages of the CD-ROM as a storage medium, its read-only nature and its access time. The fastest CD-ROM drives require a read access time of about ½ s. At ½ s the access time of a CD-ROM is comparable to that of a floppy diskette. It is evident that to have an

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efficient text searching algorithm for use with data stored on a CD-ROM, access to the CD-ROM need to be minimized. An unusual combination of storage factors space is virtually unlimited and time is of the greatest importance. (Access time includes radial positioning time, settling time, and latency time).

2 TEXT SEARCHING

The primary types of databases currently being placed on CD-ROMs are full-text databases and structured record-oriented databases. Full-text data consists of large collections of unstructured text from which partial or entire documents are retrieved with one request. The electronic encyclopaedia application falls under the category of full-text data. The other type of database–the structured record oriented database consists of highly organised collections of data from which particular information from a record in the database may be retrieved.

There is ongoing debate over the method that should be used for the creation of the search keywords (indexing). Most experts favour automatic indexing, which means that keywords are created automatically from the contents of document titles, abstracts, or bodies. The emphasis here is not on appropriate indexing methods but examines how to manage the keywords once they are created.

3 TEXT SIGNATURES

The major benefit of text signatures is that a line of text needs to be scanned exhaustively for a search word only if there is a high probability of finding it in that line. The actual text is condensed into a bit string representation called a "signature". The signature is searched initially as opposed to the text itself. Tharp and Tai refined the use of text signatures. In their implementation, the signature is formed by hashing all contiguous K-symbol groups into an integer in the range [O, m-l] where m is the size of the signature, usually a multiple of the computer word size. Since it is not possible to search for a pattern of length less than K, K is usually chosen to be two. The bit position corresponding to the integer result of the hashing function is then set to one. For example, with the string:

String problem solving is a common paradigm of computer science. If k = 2 then all two-symbol pairs are hashed, that is, h(pr), h(ro), h(ob), h(bl), h(le), h(em), h(m), ..., h(e).

Where h is the hashing function and represents a blank symbol. If a line of text contains 80 symbols, 79 symbol pair combinations are hashed to form the signature for the line. If we want to search for the pattern

"computer", the first step is to form the pattern signature by applying the hashing function to adjacent symbol pairs, that is, h(co), h(om),..., h(er).

4 INVERTED SIGNATURE TREES

The name Inverted signature tree is derived from its two components. An inverted list, associated with each word that might be searched for, gives the location on the CD-ROM where a sentence containing that word begins. Signature trees are used as indexes to improve searching for the appropriate inverted list. Each letter of the alphabet as a separate signature tree associated with it. These inverted lists are contained within a single file. The lowest level of the signature tree contains the signature for each word. The final position of the signature tree contains the location of each word's inverted list on the CD-ROM.

Each inverted list contain locations in the order of the starting position of the sentence containing the word. The reason for listing the starting place of the sentence rather than the word itself is that two words in the same sentence may be on different sectors of a CD-ROM, and as such would not be identified as matches. The inverted list for a word contains the word, the number of occurrences of the word, and the list of occurrences of that word on the CD-ROM.

5 B+ TREES

A B+ tree is a common data structure for storing information requiring both direct and sequential retrieval. The B+ tree structure consists of the nonterminal nodes continuing an index or directory and linked terminal nodes of data called the sequence set. The B+ tree is balanced in that all leaf nodes are on the same level, and all retrievals require the same number of probes. If each pointer from a leaf node points to an inverted list on the CD-ROM, such as in Fig. 2, rather than pointing directly to an occurrence of the word on the CD-ROM as with a traditional B+ tree, the death of the tree may be reduced.

51 COMPARISONS

To evaluate the effectiveness of an inverted signature tree as an example task of storing an encyclopaedia on a CD-ROM and subsequently searching it for information has been done. An encyclopaedia size of 12,000 pages and the distribution for first letter of words for searching was based upon the *World Book Encyclopaedia.*

The storage requirements for all the signature trees and inverted lists were calculated by using the actual percentages of keywords occurring in

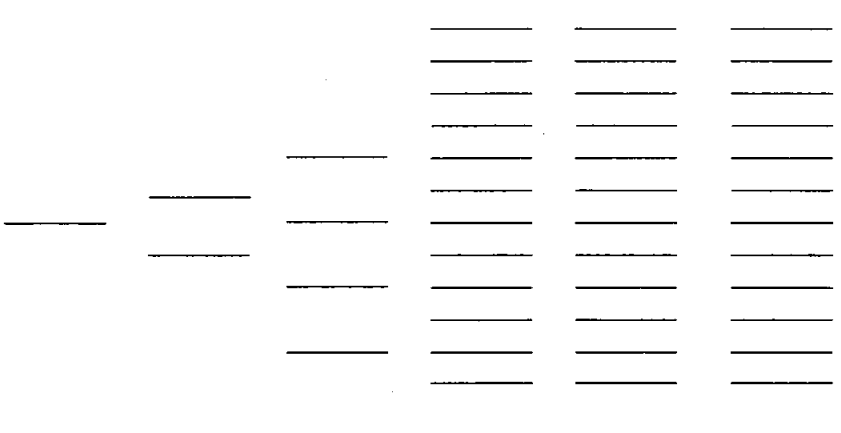


Fig 2. Signature tree containing 12 signatures at the lowest level with two higher levels created by superimposing three groups of three, then two groups of two, then one group of two.

the encyclopaedia for each letter. The total megabytes storage requirements are,

		MB
For the text itself (12,000 pages)	:	113.4
For the signature trees	:	1.4
For the inverted lists	:	44.0
For the four signature trees stored directly with the inverted list	:	0.2
		159.0

Since a CD-ROM has a capacity of 550 MB, 391 MB would remain after storing an entire encyclopaedia and its indexes.

6 ANALYSIS

When using either inverted signature trees, text signatures, or B+ trees with a CD-ROM, storage is not a factor. The time required to read data structure and algorithm is better suited for used on the CD-ROM. The time needed for searching on both a 12-page and a 12,000-page text file is also analysed.

7 CONCLUSION

For small files, text signatures, inverted trees, and the B+ trees are equally efficient. All three methods involve same, although different, pre-processing activity. Because a CD-ROM has a huge capacity, the 12,000 page text file is more appropriate for storing on a CD-ROM than the 12-page file and therefore those results are the more meaningful.

71 READING THE DATA

Data is retrieved from a CD-ROM disc using a CD-ROM player or disc. A laser read head captures and decodes the variations in refrom reflectivity of the disc surface. The data is recorded in digital from as pits and lands in the master disc by laser burning copies are made on plastic substrate and given a reflective layer and finally coated with a protective material. At the playback stage, laser light passes through the substrate and is focussed on to the reflective layer. Light is reflected in the area where is no pit (land) and largely scattered by the pit so a change in the level of the reflected light signal represents a transition from a pit to a land or vice versa representing 'O's and 'l's.[2]

As an example the search strategy in Lepac is illustrated which is simple encompassing six steps.[3]

Step-I: The user selects the type of search required, author title or subject.

Step-II: An alphabetic list of access points from the selected index is displayed. The user browses the display and selects a section of the index to be displayed in greater detail.

Step-III: A second level display of the selected section of the index. The user again signals the term closest to that of interest or uses the "previous" key to recall the first level display.

Step-IV: The third level display presents a complete listing of entries in the chosen section of the alphabet. For author and title searches, the display includes see references and the most commonly used call No, for title, the exact call No is shown.

Step-V: The step is required only for author and title searches. The display shows the titles of all works under the selected heading. Call numbers are included for each title.

Step-VI: A full display of the bibliographic record for the selected item. A library can select which data elements are included in the display, and can also choose the format in which they are displayed.

If the system is configured with an optional printer, hard copy can be generated at any stage of the search.

Word # loc | _ _ _ _ _ _ locations – up to 500 _ _ _ _ _ |

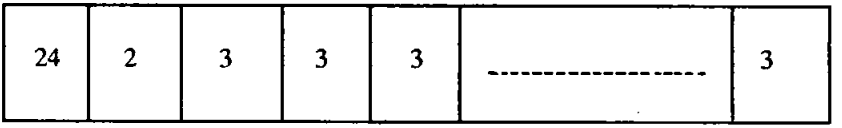


Fig. 3 Digram of inverted list for one word.

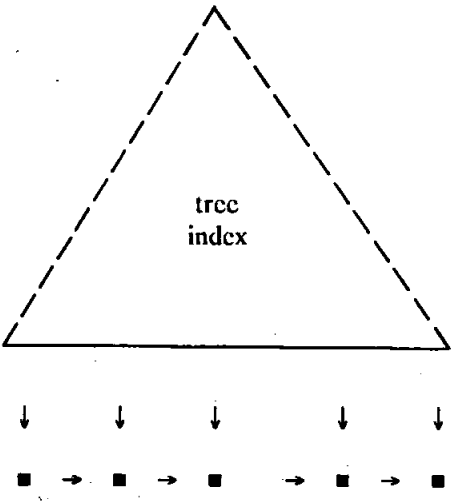


Fig. 4. Structure of a B+ tree where ■ represents a data node in the sequence set.

8 SEARCH TECHNIQUE IN LEPAC

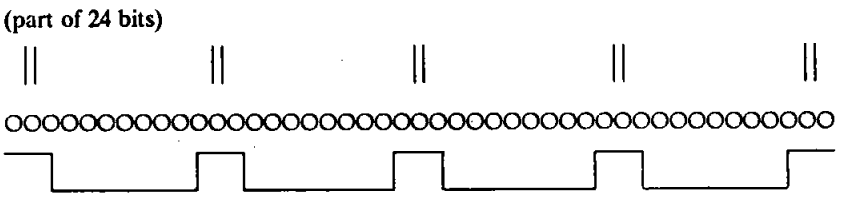
Men driven Lepac offers the user the choice in the type of search to execute and format of the information. Function keys control the choices for using the catalogue while the formats work like macros where the All key is combined with a preassigned number key. The system defaults to the public access format. Printing (by pressing the ALT and F_7 keys) is available from title lists and title displays only. The print screen key has been deactivated. The user moves through the search by choosing options from the command line at the bottom of the screen.

Broadart[4], a library support business provides clear, step by step instructions on loading the software and CD-ROM. The first screen a user sees presents a colourful welcome with the prompt to press any key to begin. This screen allows the user to begin searching immediately. The next screen, How to use the catalogue, lists four choices. They include Browse, Express, Info. and Help. Names, locations and hours of the libraries covered by the catalogue appear as well as library programmes and schedules and community events. User makes choices by moving the pointer or prompt with the down arrow key and pressing enter. Pressing the Esc/ clear key exits from this screen. The user returns to the How to use the catalogue screen. The user has many choices how to use help, key board and special function keys, how to use Browse and Express, windows location searching and locating material in the library[4].

81 CD-ROM SEARCHING VS ONLINE SEARCHING

CD-ROM searching differs quite a bit from online searching. It operates much faster, if no one else is using it during peak hours. The on-disc product also has an easy method of searching for beginners. It is menu driven and allows for subject, author, title, journal name, and publication year searches. The user can limit to specific fields as well. The most important difference between online searching and "on-disc" searching, as we like to call it is the lack of time constraints. There is no clock taking away the minutes, attached dollar amounts. For the first time on ERIC, references have been located on almost every subject for which members have made inquiries. In the past, with the online database, one would not always take the time to really delve into it. In this one would usually find a few relevant hits and have to limit himself to those. ERIC has become more versatile than it was ever thought possible.

Online ERIC searches have a minimum average cost of $ 10 based on our information centre's average online connect time. They have conducted approximately 13 more searches per month, with the CD-ROM version. This would cost $ 130 per month, or $ 1,560 per year if searched ERIC



A 'I' is represented by the transition from a land to pit or a pit to a land. 'O's are represented by the run length between transitions i.e., length of a pit or land.

Source: Philips Compact Disc brochure, 1984.

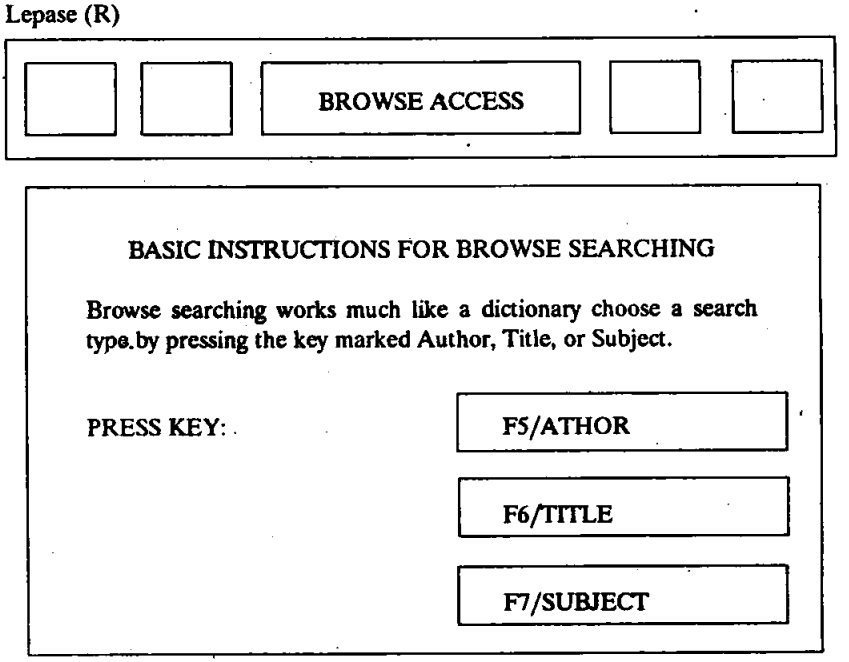


Fig. 5: This is the Browse menu screen. Here you choose what kind of search (Author, Title or Subject) you would like to do.

online. The cost of the ERIC on disc was $ 750, which if subtracted from the $ 810 this year. Even if we take off the one-time expense of purchasing the Philips CD reader $ 740, it would still have $ 70 in savings.[5]

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CD-ROM: THE MODERN PAPYRUS

KRUSHNA C. PANDA*

0 INTRODUCTION

The medium of storing and disseminating information seems to have changed faster than ever before. History of information communication repletes that, by the pace of time, Information transfer has witnessed a spectacular change in medium from cave walls, ancient papyrus, clay-tablets, illuminated manuscripts, printed books to, audio and video casettes, micro forms, computers, magnetic media, and finally, the optical device. While magnetic media once filled an important void in the data processing market, many of the high capacity applications for which they were originally developed can now be addressed more effectively and economically by optical storage technology.

1 CD-ROM: ORIGIN & ABODE

Unlike the papyrus of antiquity made by the Egyptians, CD-ROM can be considered as the modern papyrus that has created revolution in the LIS market. Both digital video disc and CD-ROM technologies are spin-offs of the entertainment industry (Eaton, McDonald, and Saule, 1989, p 17). Introduced jointly by Sony and Philips in 1980 (Saffady, 1989, p 3), CD was intended for musical recordings abnitio. Five years after the introduction of commercially available products, this optical storage medium remains a subject of considerable interest of Information management professionals.

While Zink (1990, p 510) says that CD-ROM as a Library resource was introduced in January 1985, Karch (1990, pp 81-86) and, Miller and Loeding (1989, p 24), on the other hand, have stated that this medium was introduced in Library market in 1984. CD-PACs were first introduced by Brodart in Summer 1985 (Bills and Helgerson, 1988, p 67) and in less than five years, CD-ROMs have come to be widely regarded as nothing less than a library fact-file (Nelson, 1990, p 45). The 1990 edition of "CD-ROMs-in-Print" lists over 600 commercially available titles (*Ibid*). China was probably the first Third World country to introduce CD-ROM in 1987 and began to offer services at the Scientific and Technical Information Institute of Oceanography. In the following two years, over 20 University

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Libraries in China imported CD-ROM-based information systems (Yan and Lin 1990, p 95).

This shows that CD-ROM as a storage and dissemination medium has spread like pestilence in the library market, more particularly, in the USA, Canada and other European countries. This technology in fact, has provided a new avenue to store and retrieve libraries' vast bibliographic records.

11 TYPES OF OPTICAL DISKS

Optical disks can be divided by technology and intended application into two broad categories (Saffady, ALA, 1989, p 43), namely, *Read-only* and *Read-write* optical disks.

2 CD-ROM: KNOW-HOW

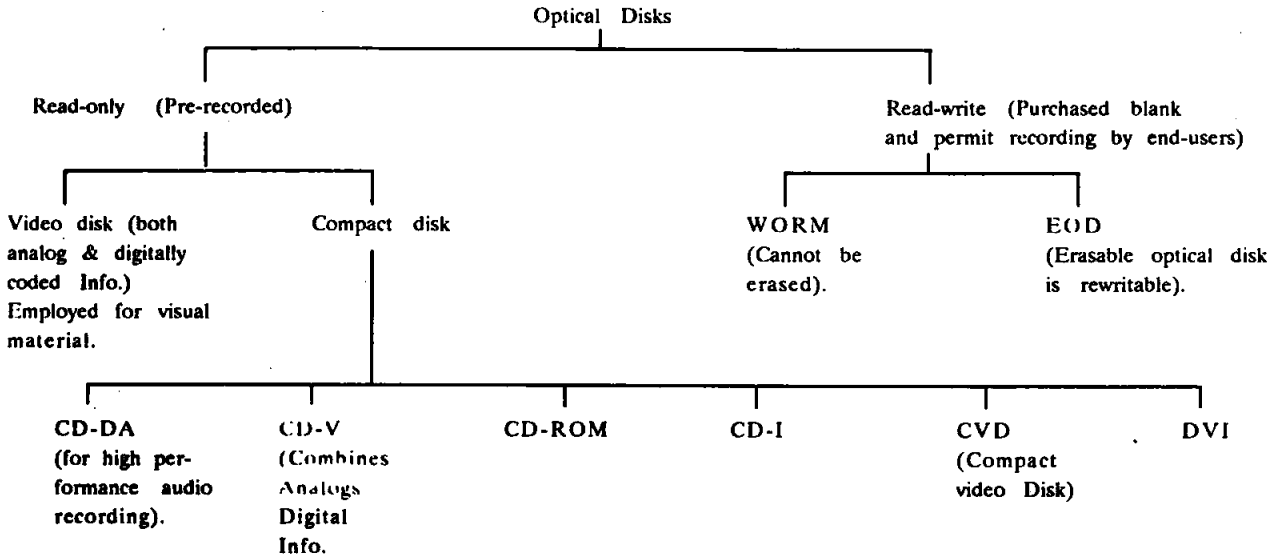
A typical compact disk is a rigid plastic platter which measures 12 cm (*ie,* approximately 4.75 inches) in diameter and is 1.2 millimeter thick (Saffady, 1989, p 3). The Compact Disk-Read-only Memory (CD-ROM), the subject of this discussion is an implementation of compact disk technology designed specifically for machine-readable, computer-processible data and features a reflective metal layer covered with a protective coating (*Ibid*). It records information by altering the light-reflectance characteristics of a specially designed medium in a manner that a laser-based reading mechanism can detect (Saffady, 1989, ALA p 43).

3 CD-ROM: STORAGE CAPACITY

A CD-ROM can store data equivalent to approximately *250, 000 pages* of text in ASCII (*i.e.,* digitally encoded text) format (Landau, 1990, pp 56-59), over *550 megabytes* or more than *1500 floppy discs* (Miller and Loeding, 1989, p 24), *250 large books* (Kascus and Merriman, 1988, p 181) and can also store other digital data equivalent to *1500 images, one hour of sound* or *any combination* of text, graphic, and sound (Baumbach, 1990, p 142). The working memory requirement of CD-ROM databases varies *from 512 to 640 Kilobytes* (Downing, 1988, p 22). A study on physical feature of this medium conducted by the *US navy* as reported by peniston (1989, p 21) reveals that CD-ROM is *40 times lighter than fiche in weight,* and over *1400 times lighter than paper for the equivalent storage* capacity and one CD-ROM is *equal to 3,000 fiche;* or *39 magnetic tapes;* or *810,000 pages of paper,* which clearly reflects the tremendous physical benefits this technology relish.

4 CD-ROM: PRODUCTION STRATAGEM

Hendley states three basic steps required for production of a CD-ROM disk. (Landau, 1990, p 56). They are:



(Fig. 1)

Read-only optical disks can be sub-divided into two major groups: Video disks and Compact disks. Compact disk which support computer-processible databases are again distinguished by the type of Information they store. CD-ROM, a type of compact disk and the subject matter of this paper is physically identical to CD-Audio, is produced by a mastering process and contains pre-recorded, and computer-processible information on one side only (Taneja, 1991; p 116). The know-how of this medium is dealt separately in succeeding pages.

Step-1: *Database Management* (*i.e.*, data selection, data conversion, database structuring, and data directory creation). First, the information to be stored on a CD-ROM has to be generated on a normal computer and then to be written to a magnetic tape (Muller, 1987, p 752).

Step-2: *Premastering* include physically blocking of data in CD-ROM format on tape.

Step-3: *Mastering and Replication* which include cutting of master disc and pressing of replicate disks. Data which is stored in microscopic pits are seared into the master disk by a laser beam, and the pits are then duplicated as holes and flat surfaces pressed into the surface of replicated disks. Typically, publishers do the first two stages themselves and contract out for the mastering and volume replication operations that can require hardware and software costing $ 100,000 or even more (Landau, 1990, p 56). This clearly shows that the production stratagem of CD-ROM seems to be highly complex and expensive.

5 CD-ROM: CONSTITUENTS

In order to access the information stored on compact disk, a typical CD-ROM work station as suggested by Tenopir (1989, p 76) will have the following constituents:

- a micro computer (frequently requiring a hard disk drive);
- a CD-ROM player (know as CD-ROM optical disk-drive);
- a printer (a laser printer);
- a modern (to use with external databases to which some CD-ROM products allow access);
- appropriate software.

Muller (1987, p 752) states that, to run a successful CD-ROM application, *two different software packages* are needed–

- one, for building and maintaining the database; and the
- other, for retrieving the current information requested out of the database stored on CD-ROM.

Linda (1990, p 121), on the other hand, is of the opinion that, a *personal computer* (usually IBM PC-Compatible or Apple), and a *CD-ROM optical disk drive* are the two basic components suffice to provide CD-ROM service. Linda, however, described printers, modern, high resolution monitors, audio-interfaces, etc as optional peripherals, which if procured, will be of

help to the libraries to improve their services. These peripherals also help the CD-ROM workstation to serve as an online station.

6 CD-ROM: TAXONOMY OF PRODUCTS

Different authors have classified the CD-ROM products differently. As cited in Tenopir (1989, p 72) and Downing (1988, p 21), Nancy Melin Nelson, Editor of Meckler's CD-ROM Librarian classified CD-ROM products into *four broad categories.* They include:

(*i*) *Cataloguing support* saw the first CD-Product on the market (*eg,* Library Corporation's Biblio-File). Nelson further estimates that there are over 500 Biblio-file installations. Companies like EBSCO, Faxon, and OCLC are now bringing cataloguing back to the local level with CD-Cataloguing support databases.

(*ii*) *Online Public Access Catalogues (OPACs)* are said to be the recent applications for CD-ROM technology. CD-OPACs are now created by many firms, *eg,* Brodart, Auto-Graphics, and WLN. Besides, 'Laser-Cat' and 'Access Pennsylvania' are the two important online union catalogues deserves special mention;

(*iii*) *Collection Development* is gaining rapid acceptance by the professionals, notably with *Book-in-print plus; Ulrich's Plus* from Bowker and, Lasersearch from Ingram, and *EBSCO Serials Directory,* etc.

(*iv*) *Reference Support* is said to be the largest and most popular category which accounts for 80 of the 100 products counted by Nelson. Some of the important reference sources included such as *Microsoft Book Shelf* (which is a whole set of ready reference materials, namely–the *American Heritage Dictionary, US Zip Code Directory; Bartlett's familiar quotations,* etc), *Oxford English Directionary,* and Indexes such as, *Readers' Guide; Library Literature, Social Science Index; Grolier's Electronic Encyclopaedia, Facts on File*–a visual dictionary, etc.

Most of these CD-Versions of textual database are already online. Librarians have been relatively quick to accept CD-ROM as a viable alternative to their online databases.

7 PRE-INSTALLATION RUMINATIONS

Despite its meteoric entrance into the library market, too few institutions, says Zink (1990, p 51), have reviewed the implications of CD-ROM before making their purchases. Tenopir (1989, p 73) has enumerated a couple of ruminations to be taken into account before this technology is employed in any library. These include:

- how frequently should disks be updated?
- what software features and search techniques work best?
- what kind of hybrid systems (such as links between online and "on-disks" databases) are desired?
- which software has better search techniques and better user-interfaces?

Nelson (1990, p 47) too felt that, "it is a more difficult assignment to choose a CD-ROM system than to choose a book". Retrieval software and functions, update frequency, associated products and services, vendor reliability, subscription price, says Nelson, are some of the vital considerations that must be weighed in the balance before a final selection is made.

It is to be remembered that once a system is employed, it must be continued. Above all, allocation of funds is an important factor as CD-ROM requires ongoing commitment of funds to keep the system current, since CD-ROM is more expensive in terms of subscription and hardware costs. Kascus and Merriman (1988, p 181), however, have suggested few more ruminations such as *standardization* (of disk size, application, users' interface, logical), *space, security,* users' consistency and *uniformity in search strategy* so as to use the same with all CD-ROM titles. Though space consideration little seem to be logically inconsistent and is not immediately apparent, the other considerations need to be determined prior to introduction of CD-ROM technology.

8 COST

Cost is the vital factor which determines whether to employ a new technology or not. *Tenopir* (1989, p 75) has cautioned that costs should be estimated and weighed against benefits before a decision to purchase a CD-ROM is made, and estimates that one CD-ROM workstation would typically costs around *5,000 dollars. Landau* (1990, p 59), on the otherhand, however, has estimated that a quality self-contained CD-ROM system could be procured for under *30,000 dollars.* While emphasizing on long-term funding, as the only solution, Zink (1990, p 51) is of the opinion that equipment start-up costs for each workstation remains *between, 3,000 and 5,000 dollars.* Ferguson, Director of Columbia University, has spent a little over *291,000 dollars* both for subscriptions (46.8% *ie,* 154, 812) and related equipments (53.2%) including built-in online access, telecommunications costs, PC with CD-ROM reader and printer, cost for one time CD-ROM installations, etc. (Ferguson, 1988, p 328).

The cost incurred by Columbia University Library may bring surprise to some professionals. Mention may be made that, costs of different products may be difficult to compare because of two reasons. *First,* the nature size,

and quality of the hardware costs may be the factors for high costs. *Second,* each publisher sets his own subscription, purchase, access policies, as well as own pricing schedule. "Trying to compare the prices of CD-ROMs with that of their printed counterparts is like trying to compare raspberries with organs–since CD-ROM is undeniably expensive than print ....." says Juhl and Lowry (1990, p 76).

Robert Van Eijk described this high cost situation as the "waiting game" that "hardware (drive) and software (disk) are playing: hard ware manufacturers are waiting for the software prices to come down, and the software publishers are waiting for the hardware prices to come down. Meanwhile, users are caught in middle .....". (Linda, 1990, p 124).

91 SEARCH-DEVICE

Searching of a CD-ROM database is not so easy as it seems to be. Sometimes, the participants did not understand the basic concepts of searching, such as selection of search terms, use of Boolean Operations, truncation and limiting (Charles and Clark, 1990, p 324). The devices employed in searching CD-ROM systems are virtually the same as that of the search techniques used with online bibliographic databases.

Most CD-ROM database allow the user to search in at least two ways: (*i*) the *browse* search, and (*ii*) the *analytic* or Boolean Search (Baumbach, 1990, p 142). A *browse search* allows the user to look through an alphabetical index of words or titles. This type of search is relatively broad because, the searcher cannot use a combination of words or techniques. The *analytic or Bookean Search,* on the otherhand, is more complex and allows the user to combine keywords to narrow the search. In these searches, three familiar words (AND, OR, NOT) are used as logical connectors to define the relationship of the keywords in the article. Other advanced search techniques include the use of (*iii*) *truncation,* and (*iv*) *wildcards.*

Truncation allows the user to locate all occurrences of a root word with various endings. For example, for the word POLITICS would retrieve far fewer hits than a search for the truncated word, POLIT, which would also retrieve POLITY, POLITIC, POLITICAL, POLITICS, POLITICIAN, etc. while *Wildcards,* allow for spelling variations within a word.

For example, the Wildcard in the word WOM≠N would also retrieve the words WOMAN and/or WOMEN. Some users also conduct their search on a CD-ROM database with the assistance of available thesauri and user-aids to find out a bibliography of articles on a given subject field.

92 ADVANTAGES

CD-ROM has numerous advantages. The key advantages are:

- CD-ROM is free from the threatening aspects of time-based charges–thereby allowing a user to search without feeling under pressure;
- it is a user-friendly search system by which, a user not only gets relaxed but also acquires ability to produce successful search strategies as its user-interface is simple to learn;
- the library implementing this medium need not depend upon any external telecommunication network as it is a stand-alone device;
- it allows unlimited use of a work once purchased or leased;
- it is faster than searching the equivalent tool in print:
- the searcher need not have to worry about online time or about security of passwords;
- like online, it offers the advantages of increased subject access to information by allowing complex combination of terms;
- it aims for both poor and rich in the sense that it is indicative of the movement toward stand-alone library systems;

Taking the numerous advantages into account, Michalak (1990, p 64) rightly described CD-ROM as a "Weapon in the researcher's arsenal". Tenopir (1989, p 75) is of the opinion that CD-ROM brings the library a good image.

93 LIMITATIONS

In spite of these several and significant merits, CD-ROM according to Nelson (1990; p 50) too, suffers from certain limitations. The main limitations are that:

- It is *not a viable substitute for traditional PC storage;*
- Since it is *a read-only* medium, the user can not modify, amend, or erase the data on the disc;
- CD-ROM *must be mastered before it can be used* and that mastering costs at least 1500 dollars and may take as long as three days to complete;
- CD-ROM requires the use of an additional piece of hardware– the CD-ROM drive which may cost around 1000 dollars–thus it is *expensive* and *dependant*.
- It is unlikely to be as update as an Online version, as most of the CD-ROM databases are reissued with updates on six monthly basis (Williamson, 1990; pp 26-27);
- Library usually does not own all cited materials thereby increasing

traffic of ILL activities and Reference Librarian's workload (Trett, 1990; pp 65-66).

- It usually allow one user per disk, except where LAN holds promise;
- the end-users require some initial training as software varies (Tenopir, 1989; p 75);
- most of the available softwares do not provide random-access as data on CD is arranged sequentially (Hegarty, 1988; p 105);
- the doses frequently do not provide the retrospective coverage required to completely replace the online bibliographics services or paper copies (Kascus and Merriman, 1988; p 185);
- the users would probably by bewildered by a one-minute CD-ROM search that generates, say, 200 references for a five-page term paper (Michalak, 1990; p 65);
- the expected mechanical problems such as paper Jams, printer problems of the sort are not familiar to any librarian who has ever worked in the same building with a photocopying machine (Juhl and Lowry, 1990; p 75).

Even though CD-ROM is not free from pitfalls and criticism it is going to stay, because of its enormous capability to store massive quantities of data, that are portable. However, while attacking sharply on slow-access time of CDs in comparison to computer memory or WORM disks, Peniston (1989; pp 21-23) feels that the future of CD storage seems uncertain. Apparently, high costs seem to be the only barrier responsible for preventing the widespread implementation of this medium. While CD-ROM has formed steady friendship with the Library community and still serves as an effective reference tool in European countries, it is yet to take a ride in Indian libraries planning of their first step towards automation.

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CD-ROM–AN INFORMATION MEDIA

V. GEETHA*

1 INTRODUCTION

Library and Information Science is one of the most fast changing fields in higher education today. There is a movement from Library Science to Information Science. It is affecting the job opportunities from public to private sector. Today library is a part of a World Communication System which is available at the touch of a Computer Key.

2 OPTICAL DISKS

The main types of Optical Storage devices are:

(*a*) The Read o\ce read many Optical disk.

(*c*) The erasable or Recordable Optical disk.

3 STRUCTURE OF CD-ROM

CD-ROM is a advanced technology that holds great promise for librarian as information media as well as storage media. It is also best alternative for online system as well as printed sources.

4 APPLICATION OF CD-ROM IN LIBRARY AND INFORMATION SCIENCE FIELD:

CD-ROM is being used inhouse by a range of Public and Private Organisations for data storage and data distribution and used in technical fields such as areo space, Desktop publishing, information storage and retrieval, and bibliographic databases.

CD-ROM is used for search services like:

(*a*) Current and retrospective bibliographic search.

(*b*) Patent search service.

(*c*) Thesis search service.

(*d*) Full text retrieval services.

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Regarding multimedia application of CD-ROM CDI is used as storage media of high resolution graphics and moving pictures with sound and data on one single compact disk. CDU is used as multimedia vehicle for type of information on education and entertainment.

CD-ROM resolves many of retrieval issues of preservation, access and storage. In India the following data bases are produced on CD-ROM.

- Indian National Bibliography.
- Indian Science Abstracts.
- Indian Leather Literature.
- Indian Medical Literature.
- Indian Agriculture Literature.

COMPUTER APPLICATION IN AGRICULTURAL LIBRARIES WITH A SPECIAL EMPHASIS TO THE ADOPTION OF CD-ROM TECHNOLOGY

VIRENDRA PRAKASH SINGH*

1 INTRODUCTION

India is a vast country, densely populous and very rich in natural resources. The land is limited and population is increasing every day. So the agriculture has been given the top priority in our planning to solve the present food crisis and to give a boost to the economic condition of our country.

2 WHY USE COMPUTERS IN AGRICULTURE LIBRARIES?

An information revolution has taken place because of the vast and speedy book production or document production in the field of agricultural sciences. Information is doubling every second year. There are abut 24 million articles produced per year in research journals. A good scientist can at best hope to scan about 3,500 articles per year and may read 5 to 10 per cent of those available.

The libraries have now stored massive information in books and periodicals. It is now the urgent task to disseminate the pertient information to the scientists and the technologists at the right time.

Now the major concern of todays library and information centres, is dissemination of information through current awareness and the Selective Dissemination Service (SDI).

The computer can be used to keep pace with the growing mass of stored and incoming information. It is also difficult to provide SDI manually.

Now the Agricultural Librarians have realised the utility of computer in library and information centres. Today, developments in computer and telecommunication enable the movement of information more quickly, easily and cheaply than movement of people.

Library as an institution for disseminating knowledge must keep pace with the modern advancement in automation and computer techniques. The printed material must reach the user in the minimum possible time:

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otherwise it may be outdated. The computer can come to the rescue of librarians in such contexts.

Many libraries/information centres have been using computers for some of functions of the libraries. For example, Indian Council of Agricultural Research (ICAR), New Delhi uses AGRIS to provide search services to its institute and other agricultural research centres in India. It is high time for librarians to acquaint themselves with computers and their application in the libraries.

3 COMPUTER APPLICATION

Computer has provided better services in the following areas.

31 CIRCULATION CONTROL

Circulation control has been one of the most popular areas of library housekeeping to mechanize. Most computer based loan systems employ machine readable book cards punched with a unique identification number and perhaps also with brief author, title and subject information.

Borrowers are similarly supplied with a machine-readable identification card (ID card). By machine, loan data is converted into machine readable form which reads both punched book card and borrowers card, and writes data from both to an punched card, punched paper tape, or magnetic tape. For returned loan and overdue books the same machine reads the books card alone, writing the data to the card or tape.

32 STOCK VERIFICATION

With the help of computer, the stock verification became very easy. For example, a stock taking of the Rajendra Agricultural University Library, Pusa, Samastipur (Bihar) was held in August 1990 with the help of computer.

In this process a staff of 16 persons was pressed into computerised stock taking operation. The staff was divided into groups of two each and each group was assigned a specific area. Each group was instructed to pick up every document in that area, and note down its accession number on the blank sheet paper and place the book in its original place.

The data sheets bearing accession number in haphazard manner were collected and passed on to the computer centre for processing. The accession numbers were fed into computer and then computer programme designed to give out accession number in a sequence printed accordingly. The accession numbers which were not shown in the printout were those of missing books. Had this work been done manually it would have taken many months.

33 INFORMATION AND BIBLIOGRAPHICAL RETRIEVAL

This is an age of information revolution as every day lot of literature is being published in the world. The contributions in agricultural sciences are fairly high, as around 3,00,000 to 4,00,000 primary documents are normally produced every year in agricultural and related sciences.

The information revolution and the availability of lowpriced microcomputers have encouraged a large number of libraries to participate in the automation of library and information services.

The computerisation of information has provided a practical means to organise and process this flood of information efficiently. Typically, once a document record has been entered into the computer, can the computer place the reference in its appropriate position in the sequence of entries for the next issue, and generate the subject, author and other entries required for the indexes to that issue. Later the computer can accumulate the issue indexes in a fraction of the time.

Among the important indexing and abstracting services with world-wide coverage is AGRICOLA of the USDA through which printed "Bibliography of Agriculture" is published in the field of Agro-biology. "Biological abstracts" is a leading abstracts journal in the world which are compiled with the help of computers.

The computer tapes from which secondary publications are produced, could also be used to search for information. These databases can be used to provide SDI. SDI aims to keep its users abreast of new publications in their individual fields by searching the latest issue of a database for relevant references. Computers are able to carry out this routine task in a rapid and reliable way.

In a computer based retrieval system, the database is in machine-readable media such as magnetic tapes or magnetic discs. The database could be created either by key boarding the information (manual data entry) or by obtaining the database directly in machine readable form.

With the development of magnetic discs, the capability to access data in radom fashion has become possible. The development of visual display terminal (VDT) has enable fast interaction with a remote computer. In other words, it is no longer necessary for a user to physically go to the computer to get a job done. He can enter data and programme at his terminal and almost immediately see the results on the television like screen of his VDT.

Large capacity discs, VDTs and time sharing systems have enabled the

development of interactive retrieval system. In an interactive retrieval system it is possible for the searcher to access the database files at any time, he is able also to formulate his search query in a step-by-step fashion.

The use of computer network may overcome the problem of locating the documents in the agriculture and related fields. Mention may be made of the following databases:

(*a*) *AGRIS:* It is an International Information System for Agricultural Sciences and Technology of FAO in which about 117 countries are participating including India. The ARIC of ICAR is the National Input Centre and is contributing to the databases about 3500 items per year. The computerized SDI services using the AGRIS Magnetic tapes is available to the Agricultural Scientists in India. AGRIS covers the whole of agriculture, food science and fisheries literature, and includes many types and levels of documents.

(*b*) *AGRICOLA (AGRI Cultural On-Line Access):* It is major Agricultural database, and is produced by the US National Agricultural Library (NAL). It covers subjects related to agriculture and other related fields. Databases is over 8,00,000 items with an estimated growth rate of 1,20,000 per year.

(*c*) *The Commonwealth Agricultural Bureaux (CAB):* The CAB product is available in machine readable databases. The CAB abstracts database is the archive of research on agriculture, forestry and allied disciplines, including social sciences and aspects of human medicines. The entire database containing millions record is available for on-line searching and now also available on the CABCD. The scope of the CAB abstracts database is agriculture in its broadest sense, with significant extension into medicine and sociology.

Besides, there are large number of databases available in different countries and in different language.

34 CATALOGUES

By the use of computer the catalogues can be produced, in card, punched card microfilm or magnetic disc. Advantage of using computer is that, it can store entries, include or withdraw entries and print out updated version in a desired form.

35 BIBLIOGRAPHY

The compilation of descriptive and analytical bibliographies are being done by computers. However, computers are being used on a large scale on a systematic bibliography.

Indexes like Indian science abstracts, Chemical abstracts, biological

abstracts, physics abstract,s etc are also produced by computers.

Besides the above areas, the computer can also be utilised for the listing and accounting, book ordering, periodical registration, acquisition and checking of duplication of books, resources sharing, etc.

4 ADOPTION OF CD-ROM

It is forecast that by the year 2000 every scientist will use a terminal in the office and one at home to retrieve and transmit information.

CD-ROM is the acronym for "Compact disc-read only memory" and is one of the types of optical discs. It uses digital audio compact disc (CD) system for storage and retrieval information.

Due to the complexities and high cost of online information searching, users find it easier to use CD-ROM.

41 CHARACTERISTICS

CD-ROM is the new medium for information storage, retrieval and dissemination.

A CD-ROM is disc (12 cm. dia.) can store 600 MB of data, which is equal to 2,75,000 typed pages approximately. CD-ROM provides mass storage enabling a lot of data to be stored on very little physical space.

42 ADVANTAGES

No training is needed for the operation of CD-ROM. It has high storage capacity, low production cost, high archival life, easy portability, speedy retrieval and safety of data.

43 LIMITATIONS

Knowledge of computer is necessary for the use of CD-ROM discs. CD-ROM is an alternative to the magnetic floppy disc, but it cannot replace them totally. It cannot keep users up to data information search.

44 MACHANISMS FOR RECORDING AND READING INFORMATION

Information is stored digitally in the form of 'pits' and 'lands' of variable lengths on the concentric/spiral tracks of reflective layer of CD-ROM disc. Basically, there are two methods of recording data on these discs:

(*a*) Constant Angular Velocity (CAV) Method

(*b*) Contant Linear Velocity (CLV) Method

Data/information is retrieved by translating the position of 'pits' and 'lands' into a time dependent signal. Reading is done here by a non-contact method which is free of wear.

45 APPLICATION OF CD-ROM

Introduction of CD-ROM in Agricultural Libraries and Information Centres has ushered in a new 'Optical information systems' era. In advanced countries, most of the libraries have already acquired these systems and are providing instantaneous information services to the readers. For example, Dr Y.S. Parmar University of Horticulture and Forestry, Naun, Solan, has made research information access easy, accurate and comprehensive by introducing CD-ROM technology.

Commonwealth Agricultural Bureaux (CAB) has so far released, three compact discs covering period from 1984-90. Its first two discs hold nearly 8,00,000 abstracts and can give instant access on the computer screen. The CABCD is easy to set up and use. All that is needed is an IBM-PC or one which is 100 per cent compatible, with 640K RAM, MS-DOS or PC-DOS version 2.1 or higher, and a CD-ROM player.

46 RESOURCE SHARING AND NET WORKING

Resource sharing and networking is becoming common by the use of CD-ROM system. The Union Catalogue can be developed on CD-ROM with microfiches as a distribution system.

Books and racks can be replaced by the use of CD-ROM technology. Its technology is very simple and cheap in comparison to the on-line information.

5 CONCLUSION

The computer services in technical libraries will be highly useful and significant in the technology of library functions and services. Its use in Indian Agricultural Libraries will lead to qualitative improvement in library technology.

It also helps to start such services which are impossible to start manually.

CD-ROM is the most recent computer technologies. Its use offers a significant saving in shelf space due to extremely high density data storage capacities.

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INFORMATION TECHNOLOGY IN INDIA: WHERE WE ARE?

A TEJOMURTY*
KAUSHIK BOASE**

1 INTRODUCTION

Today we are living in an Information Society. Information Society is basically a knowledge society where information technology occupies the central place. In modern times no developing nation can afford to neglect the existence and advancement of information technology, in order to keep pace with other members of global community. In fact, it is not a luxury meant exclusively for the developed nations, but a potential tool for the developing nations as well. That is today it is now being viewed as an important and essential resource for solving numerous and unique problems of developing nations.

2 CURRENT STATUS OF INFORMATION TECHNOLOGY IN INDIA

Information technology has its origin in the technologies related to the restricted view of information, viz, the generation processing and distribution of representations of information. Examples are telecommunication and computer engineering (which are considered the core of Information Technology ingredients), the data processing and office industries. The product of these industries still form the bulk of information technology products. However, in recent years a remarkable progress has been made towards the extension of 'data engineering' or 'telematics', to an increasing range of areas of application. This has brought with it an active interest in human aspects of information (its quality, value, utilization, etc) or informatics. The developed nations like the USA, Canada, UK, Germany, Japan and also the developing nations like Singapore, Korea have recorded a tremendous growth in this area. In this paper an attempt has been made to evaluate the state of information technology in India, in view of the recent government's liberalization policies which may be of interest for planners, government officials, business managers, educationists, librarians, and information officers.

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India is considered as one of the eight top industrial countries of the world. With a repository of scientific and technical manpower, it is considered second largest country, just after the United States. India spends 1.5% of its GNP on R&D, compared to 2.5% in the USA. But, surprisingly in the past, information technology input in planning, communication, industries was minimal and this was a curious case of industrialization without the development of necessary information infrastructure. But, dramatically the scenario has changed during the mid 80's. According to the World Bank Report[1], India's 70% workforce is still in the agriculture sector, and only 10% in the service and information sector (as against 65% in the USA). But the most notable factor is that these small segments of workers in the service and information sector contribute the largest share (42%) to the country's GNP.

Now, let us trace the development of information technology in two main areas, ie, in the areas of computer and communication technology.

3 DEVELOPMENT OF COMPUTER TECHNOLOGY

Today, computers and computer oriented technology have come as a boost to nations which are struggling to either remain in the forefront of technology or are trying to restructure their economies to create wealth. Thus, computerization combined with a high degree of quality has given their products a leading edge in global markets, resulting in a higher growth rate and robust economic growth. So, the nations that are prospering are one which have successfully integrated computer technology into their economy. For example, thirty years ago, South Korea and Taiwan were poorer than India. Today they form the 'Asian Tigers' along with Singapore and Hong Kong, and have catapulted to the forefront of technology. But here in India we failed to understand that development does not mean providing just the basic amenities or creating infrastructure. It has to begin with investment in R&D providing right type of information at the right time. And this can be possible with large scale computerization together with computer networks, and many more allied technologies.

Fortunately, after a long time ignorance, Indian government woke up. In November 1984, the Department of Electronics, Government of India, announced a new computer policy, where it envisaged a large measure of computerisation as an effective way to solve the problems of the country. Following a price war in microcomputers launched in 1986 by Hindustan Computer Limited (HCL), the microcomputer market in India escalated. More and more new companies rushed to capture a niche in the market. By 1988 there are 250 computer manufacturers in India. The figure has now stepped up further, and now has reached to 400. "At present it is th-

blue chip of Rs 15,000 crore industry (hardware, software service) with an annual turnover of Rs. 2,214 crores in 1990-91."[2] Further, in September 1991 the Government of India announced another policy on import of computer hardware, software, software export and foreign companies participation in domestic market, which also eventually escalated the boom in microcomputers. In the current year it is expected that the industry will achieve about 45% growth rate which is significant, keeping in view of high inflation rate.

21 COMPUTER HARDWARE

Until recently, the growth of the Indian computer industry was quite slow. India's first computer was installed at the Indian Statistical Institute in 1955. In between 1955 and 1964, and 1965 and 1972, there were total 166 and 170 computer systems installed respectively, mostly in educational and R&D institutions, 75% of which were International Business Machines (IBN). In 1972, an effort was made to start an indigenous computer industry by providing the Electronics Corporation of India Limited (ECIL), a government subsidy, with a carte blanche to manufacture computers. Between 1973 and 1978, ECIL installed 94 computer systems in India. However, in the late 1970's a minicomputer policy was evolved by the Department of Electronics, the primary government agency controlling the growth of the electronics industry in India. IBM was asked to leave in 1977, when it refused to allow majority (greater than 50%) Indian ownership of the company in India. A government undertaking, Computer Maintenance Corporation (CMC) was established to ensure the availability of spare parts and the maintenance of computers in India.

Though the introduction of microcomputers in the USA in the late 1970s and their subsequent adoption in India created a large potential computer market in the country, but in true sense computerization did not take place on a large scale before 1980s. Actually the scene changed overnight with the introduction of Government's new policy on electronics in 1984. This had enabled the electronics and the computer industry to face foreign competition. At the same time both sectors have experienced increasing pressure from the Indian government to design their products in line with international specifications and at approximately the same prices. To create a huge domestic market and to promote exports, the Government announced another policy in 1991 in which imports of hardwares, softwares, as well as indigenous production were encouraged. Responding to government's new policy all the major computer giants like IBM, FUJITSU, OLIVETTI, MOTOROLA, TEEXAS INSTRUMENT, COMPAQ, CITICORP, etc came to India with 51% equity participation in joint ventures with Indian companies. Thus, the foreign collaboration has brought state-

of-the-art computer technology to Indian manufacturers. As a result, Indian computer manufacturers are happy not to reinvest the technological wheel, enhance their productivity and international competitiveness by acquiring state-of-the-art computer technology from foreign collaborators. Valuable foreign exchange is conserved as the Indian Government no longer needs to important such foreign computer products.

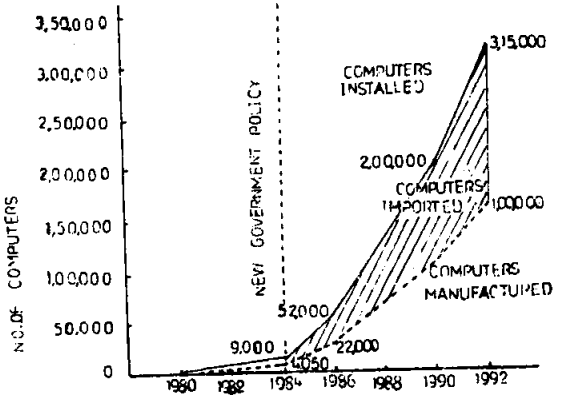


Fig 1. Growth of the Indian computer hardware industry (1980-1992)

The impressive growth of hardware industry has raised expectations. In this direction the *Working Group Report* of Department of Electronics seems to be very ambitious, but it is achievable if the industry continues to hold its performance. The Eighth Five Year Plan has projected[3] up to Rs 10. Furthermore, the hardware industry is expected to grow to Rs 40,000 crores by 1995, and Rs 1,20,000 crores by the time India enters the 21st century. It will really be a phenomenal growth by all aspects and perhaps the highest ever for an industry.

32 COMPUTER SOFTWARE

India has made a significant progress in computer software industry, and this has happened due to several reasons. Firstly, India possesses the world's second largest pool of scientific manpower, which also happens to be English speaking. Secondly, here in India the manpower costs are low which provide India with an edge in the world market. When the new software policy was introduced in November 1986, the software made almost a quantum jump from Rs 3 crores in 1980 to Rs 175 crores in 1988. It is estimated that it will grow further to Rs 5,000 crores in 1995 and will touch Rs 20,000 crores in the year 2000. "In 1990-91 the software industry recorded a turnover of Rs 475 crores, up from Rs 345 crores in 1989-90, and this year it recorded more than 700 crore rupees. So, naturally, very few industries can boast of such an impressive growth."[4] But the most

interesting fact is that India occupies only 0.5% of the 100 billion dollars global software market. So there is a lot of scope for further growth. At present big software giants like IBM, Microsoft, Citicrop, Compaq are leaning towards joint ventures with Indian software developers which will change the scenario very soon and will bring the condition more favourable to India.

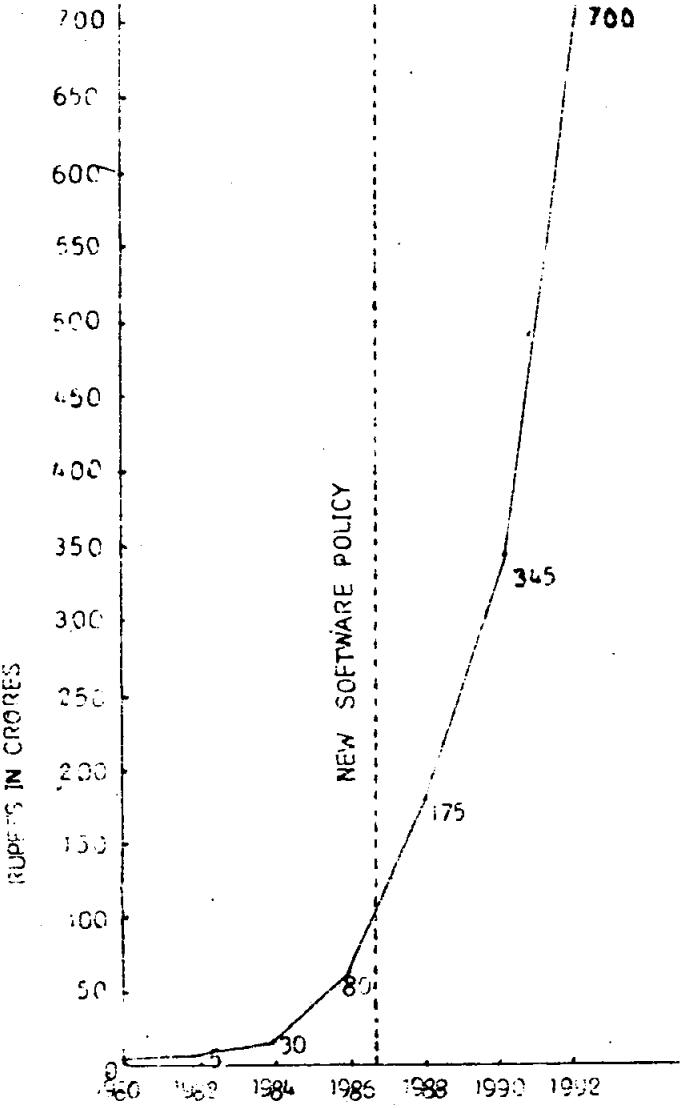


Fig. 2. Growth of the Indian Software Industry

4 STATUS OF COMPUTER ADOPTION IN INDIA

The early adopters of computers in India, like their counterparts in industrialized countries generally have high income. They include scientists, R&S workers, senior bureaucrats, engineers, top managers, and medical doctors. But the situation has changed dramatically during the 1980s when computers have penetrated into almost all sectors of the economy and are progressively being used for government, management, education, and R&D. Our understanding computer applications in India can broadly be classified into the following segments, namely, government, public and private sectors, educational and R&D institutions, banking and insurance, defence and dealers.

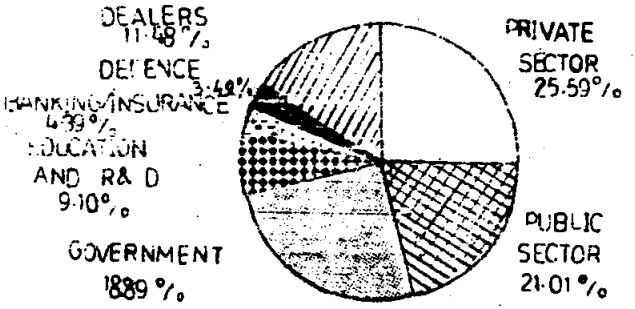


Fig 3. Application of computers in India.

5 MANPOWER REQUIREMENT–A HELPLESS SPECTATOR

Though we have come to know from the earlier discussion that in hardware and software technology, India has made a spectacular performance, but in manpower development area it is lagging far behind. In fact it became a helpless spectator, as the problem of manpower shortage–both quantitative and qualitative–reaches a level that cloud its very survival. "The Eighth Plan document had predicted an enormous manpower shortage of 80,685 by 1995 in the Information Technology Industry."[5] However, software industry's problem was recently highlighted in a World Bank funded study conducted by Info Tech Consulting Inc, a USA based firm. The study said that for Indian Information Technology Industry, to reach an export target of $ 1 billion by 1996, an estimated 4,000 professionals must be added to the software and service export section, implying an increase in the growth rate of manpower from the present 13 to 19 per cent. It sounds not alarming, but it is sure that in near future India will

face a quantified shortage. The fact that there was s shortage of manpower was first acknowledged in the early 80s. The Rajaramana and Sampath Committees focussed on the availability of manpower from the government education system. Later, the need for private training institutes was recognised as the number required could not be met by government system alone.

Table 1
Manpower shortage in IT industry (Eighth Plan Projections)

Level	*Requirement*	*From Institutions*	*Gap*
PhD	255	240	15
M Tech	14,355	2,500	11,845
B Tech	23,945	7,000	16,945
MCA	40,040	18,000	22,000
DCA	98,880	80,000	18,880
DCE	18,340	7,000	11,000
Total	1,05,805	1,147,740	80,685

6 DEVELOPMENT OF TELECOMMUNICATIONS IN INDIA

Telecommunication is now accepted as a basic infrastructure along with other inputs such as power and transportation for growth of national economy. It is also appreciated as the means of faster distribution of the fruits of economic growth to all regions in the country. "The studies conducted by the International Finance Corporation, an affiliate of the World Bank, show that telecom facilities add substantially to the GNP of a country at the stage when the per capita GNP is low. In the context of India where the per capita GNP is around US $290, the impact of telecom services is expected to be more substantial."[6]

India reputedly has the world's worst telephone service, with only 0.6 telephones per 100 residents (compared to 75 in the USA, and 7 in Malaysia.). Realizing the importance of advanced, widely accessible telecommunications, the government announced a telecommunication policy in 1985. This policy permitted foreign collaboration with the Indian private sector in manufacturing indigenous telecommunication equipment; created a Department of Telecommunications by bifurcating the Indian Posts and Telegraphs Department, and established autonomous telephone corporations (MNTL) to serve Delhi and Bombay.

At present the telecommunication network has an equipped capacity of 6.1 million lines with 5.192 million working connections. In the Seventh Plan it was 4.5 billion of which one-fourth is earmarked for imports.

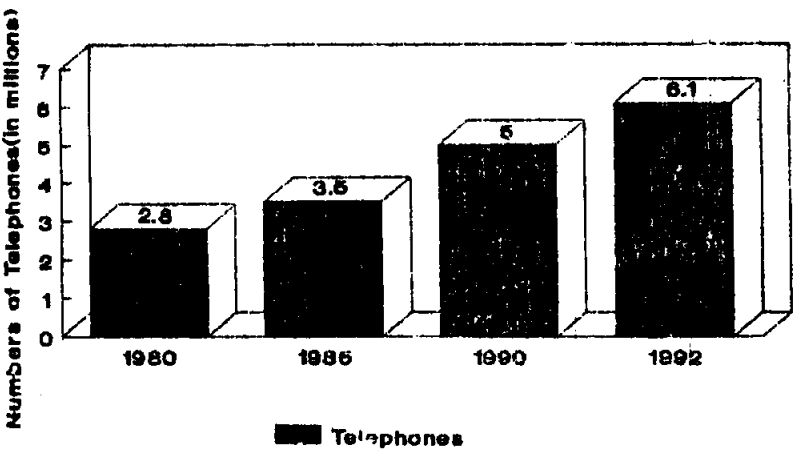


Fig 4. Growth of Telephones in India

Department of Telecommunication (DoT) is currently involved in a policy debate on the benefits of importing expensive telecommunication technology versus developing long term indigenous capabilities to manufacture such technology. In the coming five years India will spend Rs. 4 billions for the improvement of telecom facilities. As India has made telecommunication one of its top five development priorities along with literacy, drinking water, immunization, and oilseed production.

61 PRESENT TELECOMMUNICATION BOOM

India has the distinction of entering the field of telecommunications almost at par with its invention, and keeping pace with the technological innovations. For example, public data communication has remained almost a dormant field in India, but things are changing. Two public networks, a packet switching, and a satellite network already set up, Videsh Sanchar Nigam (VSNL) set up an international gateway switch which ensures international connectivity for the packet network. This has opened new fields for Value Added Networks (VANs), private network office automation, and a whole lot of communication service vendors and consultants. As for VANs and private networks, attractive opportunities are being thrown up. Now government is going to allow the private sector to operate small electronic mail system, videotex, teletex systems, databases, etc. Many companies, headed by State Bank, ONGC, SAIL, NTPC, etc have gone in for private networks and computer networks, throwing open a lot of business for network connection and computer companies. At present 23 wide area

networks have been set up from which a lot of organizations are getting benefit. Recently DoT invited international tenders to operate cellular phones in three metropolitan cities. So it is expected that by proper planning and adopting of proper strategies, India will be able to modernize the network for introduction of new telecommunication services, and eventually should hardness the full potential of the information revolution by exploiting the facilities offered by telecommunications.

7 CONCLUSION

Today computers are becoming more popular in government departments, in service oriented industries such as airlines, railways, and banks, and in educational, research and industrial setting. India has a worldwide competitive advantage in software development due to its English language ability and relatively lower salaries. Problems which restrict the future development of India's high-tech computer industry include a screw-driver mentality, inadequate infrastructural services such as reliable telephone and datacom lines, software piracy, the absence of a computer culture, and the lack of adequate computer trained manpower to meet India's information handling needs. Morcover, collective research 'technology fusion' is not found in the whole industry. So, it is expected that government should look into this matter, and the industry should put maximum efforts for technology development–from linear to demand articulation. Because in high-tech era the key issue of technology strategy has become not how technology to break through in technological bottlenecks, but how to put existing technology to the best possible use–use for national development and national economy, and for a better life. What India needs is a clear and dynamic national informatics policy that will respond to the rapidly changing environment and the necessary infrastructure to achieve the desired goals.

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TRENDS IN INFORMATION TECHNOLOGY INDUSTRY

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1 INTRODUCTION

We are at present in an interim phase in the automation of science and technology, again the growth of information and technology have changed the modern society, whereas information is becoming one of the major resource. Now-a-days, no information centre can think of acquiring such comprehensive collections in any field for information seekers. Therefore, to achieve the comprehensive access to information, libraries have to use various technologies and services.

Information technology is synonymous with the new technology ie, the use of micro computer, micro processor based machine, automated equipments, word processor, micro electronics and telecommunications, etc. In the applications of these products and concepts to specific areas of human needs there are a variety of modes in which information is processed, stored, retrieved and disseminated apart from the traditional form of printing books and journals. Now the publishers are moving towards electronics combination for books and periodicals.

F W Lacaster viewed that by 2000 year the formal communication in science and technology will be almost exclusively electronic system, 50% of the existing abstracting services will be available only in electronic form.[1]

2 COMPUTER RETRIEVAL SYSTEM

Microcomputers can perform many of the information handling functions traditionally run on larger computers, such as circulation control, acquisitions, cataloguing, information storage and retrieval, indexing, etc. The introduction of microcomputers for information handling has resulted in the development of a number of innovative applications such as the Reference Librarians Enhancement System (REFLES).

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The online system to a database management system is a boon. A user can order document which can be sent to him electronically, where the various levels of users demands can be satisfied within no time.

3 TRENDS IN COMMUNICATION MEDIA

Communication technology is able to shut around electronically coded text and graphics from one machine to another along in house telecommunication lines as local networks, channel capacities, reliability and error rates have improved dramatically concurrent with major cost reduction in both switching and communication means such as coaxial cables, optical fibres, microwave laser beams and satellite communications, radio links, computer transmission, TV communications, etc.

The satellite can transmit information for high speed and bulk transmission of data over a long distance. More complex information and documents can be transmitted and received via satellite. The use of satellite for broadcast transmission is technically similar to their use as part of the international telephone network. Applications include remote browsing using slow-scan TV searching of automated catalogues, searching of bibliographic databases, SDI services, document delivery via facsimile transmitters, distribution of cataloguing information, teleconferencing, etc.[2]

The developments in the optical fibre communication glass fibres are used to convey pulses of light energy packets as signals. The media offers very wide band-widths and thus high transmission rates and low losses. A single hair-thin optical fibre measuring 0.125 mm in diameter can transmit 10,000 telephone circuits for several hundred of TV channels.

4 TRENDS IN STORAGE TECHNOLOGY

Any creation of database needs its proper storage for information and retrieval. Now there are three major advances in digital storage technologies that will have a significant effect in information handling.

(*a*) *Magnetic disc storage:* In it the fundamental physical elements are the magnetic surface and the heads. Magnetic tape was one of the earliest form of storage. The tape provides only serial access to information. The tape and read/write heads suffer wear out. Hence, discs have random accessibility. Floppy disc is either a 5½ inch or 8 inch plotter than can be recorded on one side or both the sides.

(*b*) *Halographic storage:* It offers the advantage of storage density of large scale. A holograms on 4 × 6 inches microfische can store as much as 2 × 10 bits of information. It has been estimated that 24 million volumes could be stored in this fashion in the surface area of one million pinheads.

It is like photography in that an image is recorded on film but it offers three dimensional photographs.

(*c*) *Optical storage:* There are three types of optical digital disks for optical storage. The digital encoding of information on optical video disk and the storage of digital information on the digital video compact disk. Apart from, this there are other categories of optical recordings like: operator cards, ultrafiche microform and video disk, etc. Microforms are estimated to reduce the storagé space requirements in comparison with paper by 98%. They can be generated either by photographic reduction of documents or by direct output from computers. In the latter case text created on the video screen can be recorded on film by means of a computer output microform recorder. Microforms can be read by means of optically magnetic reading devices or by equipment which present the magnified image on video display. Recently, microform technology has been combined with computerised indexing and retrieving.[3] One of the most important optical storage technology like CD-ROM (compact disk-read only memory) is based on this new form of consumer phonograph and it offers tremendous application potential special in the field of information storage and retrieval systems involving large bibliographic databases.[4]

5 THE TREND IN PUBLISHING

The publishing and printing industries are in the business of mass production and distribution of information. In the form of books, periodicals, etc.

(*a*) *Electronic Publishing:* In electronic publishing, the text may be prepared on a computer based text processor. Some publishers already provide their authors with text processors and so reduce the time taken for editing the manuscript. The use of a text processor also allows the rapid production of camera ready copy. The existence of computer software and hardware for text processing has made it possible for information transfer through electronic medium only. Here the editor has to set programme and further editing can be possible by online.

(*b*) *Micro Publishing:* In a recent invention, here the text processing machines with their variable character sets allow automatic justification, not only of words but also of the single characters.

(*c*) *Desk Top Publishing (DTP):* DTP is one of the economical and fastest growing incorporations of personal computer technology. It has a wide implications for every areas of production like printing, writing, type-setting, illustration, graphic design, editing, etc. All these works can be done by using only one person as a desktop publishing system. It is essentially

a small scale computerised prepres and production system that can be operated by one person. Its elements are: A video display terminal, keyboard, Mouse, Disk drive, Word processing and Page make-up, software and output device–laser printer, phototype-setter or graphic printer, etc.

6 CONCLUSION

Thus, the new technology offers the possibility of rapid collection, processing and distribution. Now-a-days in mass market that researchers, scientists, specialist and teachers may have varieties of ways to handle information through different technological devices. More and more publication will be available in electronic form only. By the year 2,000, 50% of existing/abstracting services will be available only in electronic form.[5] The librarian of 2000 year may be a freelance information specialist working from an office or from the home. According to Folk (1977) the libraries in the traditional sense may wither away in the electronics age.

Thus the use of computer in housekeeping process has been on the increase. There are about 2000 computer installations in various research centres, industrial establishments, Government Departments and many of the research technical institutes in India. Experiments have also been going on for use of online transmission of information through bibliographic database from Europe and USA. Communication satellite was used in Bombay in 1977 and IIT, Madras in 1982. Computer Society of India organized a demonstration of online interaction with ESRIN, dBASE of FRESCATI ITALY in Delhi. The INSDOC and DESIDOC have now begun with CAN/SDI software and the databases like chemical abstract, INSPEC tapes and compounded tape, electronic mail services in India.

Now, NIC has developed information transfer systems in India and are planning to develop a National Data Centre. In fact, India should have a good network for document transmission system for a national hookup of Telefacsimile. Transmission of text of documents like USA and UK etc, such services would help not only libraries but more the media centres. The potential of information technology for document delivery service is enormous and methods of overcoming legal and organization hurdles have been suggested and pursued. Freedom of access to the information technology will make the task of maintaining other technologies easier. The Copy Right Act should be changed. There must be open access for information and retrieval. Such open system will facilitate both publishers and readers for their interactions.

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DESIRED CHANGES IN LIBRARY AND INFORMATION SCIENCE EDUCATION IN THE WAKE OF NEW INFORMATION TECHNOLOGIES

G SURYA RAO*
G E P ABBULU**

1 INTRODUCTION

The successful performance of the services connected with the dissemination of information depends to a large extent on the competence and quality of library personnel which in its turn depends upon the pattern of 'Library and Information Science Education'. In the light of the rapid changes taking place in the information environment, the changing role of librarianship especially in the wake of application of computers and the related forms of automation what we call "Information technologies", in Library procedures and services in recent times, there is a need to effect changes in the curriculum of Library science education. Therefore a plea is made in this paper for inclusion of topics relating to use of computers and other information technologies in the curriculum of library science education and the need for providing in-service training in their application to the existing library personnel.

This paper is prepared on the basis of scanning through the syllabi prescribed in different Departments/Schools in Library and Information Sciences education which are either attached to Universities or run independently in Andhra Pradesh and in some other states at B.L.I.Sc. & M.L.I.Sc., or in M.Phil, levels and also on the basis of literature available in different documents the titles of which are cited in the references at the end of this paper.

Importance of Information: Knowledge and wisdom result from understanding and using information. Information can be applied constructively to solve every problem in society. In fact the assets of society of today are measured not by the material products but by the quality and quantity of information possessed and communicated to guide mankind in its undertakings. Every nation has now recognised information as essential

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for its socio-economic development. They are therefore trying to tap the rich resources of information available in the world as a whole and apply for productive use.

Realising the importance of information for national development the Government of India has also started taking steps to modernise library services by coordinating and upgrading the existing library and information systems and services and initiating new programmes relevant to our national needs, taking advantage of the latest advances in information technology which includes computer application. There is, therefore, a much greater need today for specialists with expertise knowledge in selecting, collecting, organizing, and presenting the relevant information in a usable form at a time when it is required.

Information environment: The information environment is the totality of the information infrastructure including the plans for organisation and provision of information, the trends in information utilization, information sources and services, and development in information science and technology.

The most important feature of modern times is that information is being produced faster by more people than in the past. The increased pace of research and development taking place in difference spheres of human activities throughout the world has greatly contributed for the rapid growth of knowledge. Moreover the increase in specialization and the discovery of new relationships among many subjects give rise to a wide variety of new knowledge. With the result the literature, not only in sciences and technology but also in social sciences and humanities has crossed all limitations in quantity as well as quality. This increasing information is called as 'information explosion' and it is being produced in different conventional formats like books and journals and in other media like the films, slides, discs and computer files which are popularly known as 'information packages'. This enormous growth of recorded information has created a greater problem, in the library procedures and services for their organisation and retrieval with the knowledge of traditional methods of library procedures and operations.

Computers and various other forms of automation including micrography and reprography known as modern 'information technologies' have already been introduced in library operations and services such as circulation control, book ordering, abstracting and indexing services, Selective Dissemination of Information (SDI) and Current Awareness Services (CAS) etc. Now it is possible to speed up the, process of information storage and retrieval. The computers and online terminals facilitate operations like centralised cataloguing, network planning, resource sharing, etc, at a considerable low costs.

Thus all these new developments in information field eventually have created the need to adopt mechanical aids like the computers and other related forms of information technologies in the library procedures and services.

Impact of Information technologies on library and information services: In the wake of fast developments taking place in the present information environment the 'librarian' or the 'information scientist' should know the application of information technologies in order to perform his functions. In this regard there are at least three basic tools he must learn. First he should know about computers because they can process information in the form of words very effectively. Second, he should know about communication channels because this technology is capable of distributing word and picture information at great speeds to different people where ever they may life. Finally, he should know about the field of miniature photography called micrographics, because film technology allows a lot of information to be condensed into a small space. But the successful performance of his role to a large extent rests on the pattern of library and information science education which he receives.

Desired changes in curriculum in library science: Education in any profession must respond to the changing needs of that profession. So also 'library science education' should concern itself with such changes.

At present all most all the schools or departments of Library Science with an exception of a few have adopted the conventional subjects in their library science courses. These subjects include 'Library Administration', 'Library organisation', 'Physical bibliography, etc, besides the core subjects 'Library classification', 'Library cataloguing' etc, for study at BLISc, degree course and 'Universe of knowledge', 'Library Systems', 'Documentation and information retrieval' etc., in addition to the advanced study in 'Library Classification' and 'Library cataloguing' for study at MLISc, degree course.

Thus it is clear that the content of these courses have a little consequence in the context of the present day functional approach to the development of Human Resource requirements in information services in the wake of the growing demand for more information services, the rapid advances in information technology such as the computerisation of information systems and their extension at national and international level with the help of satellite communication channels, the changing pattern of document production in 'non-book materials, etc.

It is therefore essential for the library schools in the country to give a fresh outlook to the existing curriculum in order to give a new orientation

to their programmes by integrating the application of computers with other information technologies and communication techniques and the using of micro-forms in their courses.

Continuing education in library and information science: Continuing education includes in-service training programme, conferences, workshops, seminars, short courses, extension courses' etc. This is intended for the librarians in services specially for those who have had their professional education long ago when the idea of the application of modern information technologies was not popular at that time.

These personnel must keep themselves continuously well informed of the latest developments in the field which is possible only through continuing education system. In fact facilities are now created to advance continuing education programme by way of summer courses, workshops, seminars, etc. for Library and information personnel at DRTC, Bangalore, the INSDOC, New Delhi, ILA, IASLIC and in some Universities sponsored by the UGC.

Conclusion: It is thus clear that the environment in which the libraries operate is changing rapidly and that the Government of India is also intensifying efforts for the introduction of new technology in library and information systems and services.

A proper coordination and balancing in the curriculum between the "conventional courses" and the new areas of information science such as 'Information Storage and Retrieval' 'Computer Applications in Libraries', 'System Design and Analysis', etc. be achieved. The curriculum should be subjected to periodical review and revision so that it could be receptive to pace with the latest developments in the field.

Facilities for continuing education should be recognised as an essential part of 'human resource development' programme in the use of computers, etc. Opportunities for the continuing education as in service training for the existing staff must be created by deputing for short term courses, workshops seminars, etc, conducted by organisation like INSDOC, New Delhi, DRTC, Bangalore ILA, IASLIC or Summer classes provided by some of the institutions and Universities, etc.

Due consideration is being given for the development of human resource for library and information services by the Ministry of Education and other organizations. But the progress seems to be slow in introducing in the use of the courses information technologies in Library and Information Science. The library schools, the Library and Information Science Departments in the Universities and the UGC must take responsibility in adopting a uniform pattern of syllabi in Library and Information Science

Education so that a competent manpower can be developed for managing different kinds of libraries and information systems, using the latest information technologies.

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HUMAN RESOURCE DEVELOPMENT FOR LIBRARY AUTOMATION IN INDIA

AMITABHA CHATTERJEE*

0 INTRODUCTION

Serving the right information to the right user at the right time is the goal of every library of information centre. The successful achievement of this goal largely depends on the tools and technique used for the purpose. During the last few decades, there has been enormous rise in the flow of information on the one hand and greater demands for information due to accelerated research activities on the other. The traditional tools and techniques of information retrieval have been inadequate in the face of this double pressure, making it imperative to find new tools and techniques which can withstand this onslaught and help achieve the goal. At this juncture, computer and communication technologies, with their enormous capabilities, have come as a boon to the library and information workers.

1 NEED FOR HRD

Not only in the west, in India too, computers are now making their way vigorously into libraries and information centres. Besides, several computerised networks, like INFLIBNET, CALIBNET, DELNET, etc areas in the process of development. As a consequence the need for developing suitable human resources for library automation is increasingly being felt. Obviously, this has to be done in two ways: as a short term measure by training the existing personnel through continuing education programmes and as a long term measure by training the fresh students joining different library schools by reorienting their course curriculum.

2 CE FACILITIES

Continuing education programmes on computer application/library automation began in this country in late 1970s and with NISSAT taking initiative in the matter, the number gradually increased to 17 in 1987 and 1988. However, subsequently the number has gone down and at present around 10 courses are run per year mainly by DRTC, INSDOC, ILA and IASLIC. Computer facilities being limited, the intake of these courses often does not cross 15 and, therefore, not more than 150 professional

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workers get the opportunity of training in a year. The scope of training is, thus, very limited and certainly insufficient. Besides, the courses conducted at different centres are neither uniform nor planned according to the needs of the participants. Persons with different backgrounds and belonging to libraries and information centres which are at different stages of computerisation and even LIS teachers are offered the same course. Hence, the effectiveness of the courses is bound to be different for different participants. It is necessary that a definite policy is laid down for training of existing personnel, that the programmes are properly planned and that different levels of courses are organised for different groups of personnel. It is also necessary to expand the opportunities of training.

3 REGULAR COURSES

There are at present about 80 university departments in the country conducting BLIS courses and about half of them also conducting MLIS courses, besides associateship programmes run by DRTC and INSDOC and, other lower level courses run by library associations, polytechnics, etc. A close look into their course curricula reveals that except in the courses of DRTC and INSDOC, in which library automation gets good weight, the course curricula of very few library schools incorporate library automation and that too mainly at the Master's degree level. Even where library automation forms part of the syllabus, the students often do not get enough exposure to practical computer work. In short, the type of training imparted by most of the library schools, hardly meets the requirements for library automation.

4 CHANGE IN ORIENTATION

There is, therefore, an urgent need to reorient the present LIS courses in such a manner that the trainees coming out of these schools are able to participate in library automation effectively and efficiently. This, however, does not mean that all the traditional subjects now being taught at different levels of LIS courses should be discarded. This is neither possible nor advisable in view of the fact that the traditional systems of organisation of documents and provision of services will continue in a large number of libraries in the country for many more years to come. The LIS courses should ideally have an optimum blend of traditional and new techniques.

5 APPROPRIATE LEVEL

There may be differences of opinion about the appropriate level of LIS course in which library automation should be introduced in the course curriculum. Experience, however, shows that the introduction of the subject

only at the Master's degree level, as is the current practice, is not sufficient. When a computer is installed in a library, every professional worker has to be involved in the computerisation process, though their degree or level of involvement may differ. As such, it is felt that library automation should be introduced even at lower level courses. But the course structure should be carefully designed keeping in view the level of the course, course objectives and the level of the trainees.

6 CURRICULUM DESIGN

Though four levels of courses are now being conducted, *viz.*, Certificate (for those who have passed secondary level examination). Diploma (for those who have passed higher secondary level examination), Bachelor's degree (for those who hold Bachelor's degree in any other stream) and Master's degree (for those who hold Bachelors' degree in LIS), there is neither any integration among them, nor is it a prerequisite for a candidate to have passed the lower level examination for getting admission in a higher level course, except in case of Master's degree course, where a Bachelor's degree in LIS is essential for admission. This makes designing of library automation curriculum difficult. This also makes it necessary to repeat some of the curriculum areas at different levels. The size of the course module or paper on library automation may vary from level to level, *eg*, at the certificate or the diploma level it may constitute at least a half paper of 50 marks, at the Bachelor level a full paper of 100 marks, and at the Master level one and a half papers of total 150 marks. Besides, since computer application is more practical than theoretical, enough opportunity should be available to candidates for practical work.

7 COURSE CONTENTS

Though there may be slight variations in the course contents prescribed or to be prescribed by different LIS schools, the core areas must find place in every syllabus. Model course contents for different levels are suggested which may form the basis for developing suitable course curricula on the subject by different schools.

71 CERTIFICATE LEVEL

1 General introduction to computer and its functioning
2 Common computer terminology
3 Introduction to PC operation
4 Keying-in of data.

Note: Persons completing a course of this level are expected only to key-in the given data.

72 DIPLOMA LEVEL

(conducted in polytechnics only)

1 General introduction to computer and its functioning
2 Common computer terminology
3 Introduction to hardware, software and peripherals
4 Details of PC operation
5 Input and output of data
6 Elements of word-processing

Note: Persons completing a course of this level are expected to input given data, obtain required output and compose notes, letters, etc through word-processor.

73 BACHELOR'S DEGREE LEVEL

1 Computers: types, characteristics, units and functions
2 Computer terminology
3 Hardware, software and peripherals
4 Operating system
5 Details of PC operation
6 Input, manipulation and output of data
7 Database management
8 Library/information software: CDS/ISIS
9 Word-processing: composing and editing
10 Processing, searching and servicing of information.

Note: Persons completing a course of this level are expected to do house-keeping jobs, design, compose and edit, notes, letters, reminders, etc, design and manage databases through a library/information software package and provide computer based services.

74 MASTER'S DEGREE LEVEL

1 Computer, communication and media technology
2 Data structure and file organisation
3 Programming
   – Basics of programming: algorithm, flowcharting
   – Familiarity with major programming languages
   – Programme writing by a language suitable for library and information oriented programmes
4 Computerised house-keeping work

5 Data storage
   - Databases: bibliographical and nonbibliographical
   - Database management: database designing, data entry

6 Data/information processing
   - On-line and batch processing
   - Data manipulation, sorting, etc

7 Searching strategies and dissemination of information
   - Search strategies and techniques
   - On-line and off-line searching
   - Current and retrospective searching
   - National and international database searching services
   - Bibliographical services
   - Current awareness service
   - Selective dissemination of information

8 Library/information software packages: CDS/ISIS, MINISIS, LIBSYS, etc

9 CD-ROM and its characteristics: searching of databases in CD-ROM

10 Networking: LAN

11 Text processing, including word-processing

12 Standards for computerised library and information work.

Note: Persons completing a course of this level are expected to organise files, prepare or get prepared suitable programmes, supervise house-keeping and information storage and retrieval work and coordinate network activities.

8 CONCLUSION

It is true that the LIS schools in the country have genuine constraints, like lack of funds for purchasing machines and non-availability of teachers who can teach both the theoretical and practical aspects of library automation. This often deters them from introducing the subject in their course curricula. Even those who have introduced the subject are facing problems in making arrangements for proper training. It is also not surprising that one of the library schools, which introduced the subject at the Master's degree level as early as in 1979, had to discontinue it a few years later for the same reason. This is certainly very discouraging. We should make all out efforts to promptly and seriously meet the challenge as otherwise persons from outside the profession having computer knowledge may replace professional workers in library and information centres. And if this happens, our profession will be demoralised and divided.

HUMAN RESOURCE PLANNING AND DEVELOPMENT FOR AUTOMATED LIBRARY AND INFORMATION SYSTEMS

R RAMAN NAIR*

1 INTRODUCTION

Automated Library and Information System (ALIS) is a System (ALIS) iwhich utilises computers, telecommunication technology and the methods and devices provided by current information technology for its functioning. While computers are seed for library housekeeping and information processing, retrieval and dissemination; telecommunication technology is used for accessing the remotely located databases for which also computers are the most essential requirement. Only a computerised library system can harness the possibilities offered by modern information technology.[1] ALIS is mainly a computerised system.

11 THE MACHINES

Among the electronic machines invented by man computer has made a greater impact in society than any other single devices. They have extended man's powers in information processing to regions that could not be previously dreamed of.

A computer system consists of three basic elements; hardware, software and humanware. The electronic and elector-mechanical equipments including CPU, primary storage units, peripheral devices such as terminals, printers, disk drives and tape drives are called hardwares. The software is the intelligence of the computer system. It is a set of programmes which control the activities of the computer system or which may be processed that is run on computer to do some useful work.

12 HUMAN ELEMENT

Computer is only an extension of the human brain's function of data processing and its manipulation by machines. So human beings are the most important component of the Computer system. Many machine interface is so vital that usually the human component of the system is termed as humanware.

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Staff of ALIS mediate between information and information seekers. Their work is becoming increasingly complex with the developments in information technology. The success of an ALIS is dependent to a large extent on the knowledge, skills and attitudes of its staff, since they are the people whom users meet and it is their version of the system's objectives and their user orientation or lack of it that is apparent to users in everyday climate of the library.[2]

So it is the skills of the human beings that go to make for a successful ALIS. And the measure of their ability in designing, programming and planning is the measure of the success of ALIS. Hence the first and most important requirement for establishing or changing to an ALIS is the availability of qualified and experienced staff. Not only for operating the system but also during the stages of actively specifying, designing, programming, testing and installing an ALIS qualified and experienced staff are clearly needed.

13 FUNCTIONS OF ALIS

In an ALIS the works for which computers are used can be classified into two categories.[3]

(*i*) library housekeeping and information services.

(*ii*) library management information services.

The first category consists of works like acquisition, serial control, circulation, cataloguing and information services like CAS and SDI. The second category is the works related to processing of information which the library management requires to control Library operations, make decisions and maintain statistics which would help the management to evaluate user behaviour and library's performance. This would enable the library management to observe the total system clearly, control it and correct deviations if any.

Automation would have a significant impact on the rest of the library structurally. When computer takes over; some functions will disappear, some will be simplified to meet new requirements, some required to run ALIS will be introduced, some will be altered and the integration of certain functions to serve or to use the new system will also take place. For ALIS to be efficient the computers should be an integral part of the library system accessible to library management, controlled by it and run by competent work group.

2 MANPOWER PLANNING

Qualification and skill of the existing staff of library and information

systems who followed traditional and manual methods will not be sufficient for ALIS which has to use highly advanced technologies.[4] So training the existing manpower or recruiting new professionals will become essential.

Organizing function of an ALIS would involve grouping of work into logical and efficient levels and divisions and grouping of work teams into units meant for them order to carry out plans and achieve goals. If the work units are to be effective each unit member must know what his job includes and where he stands in the hierarchy and should have the technical knowledge to fulfil the duties of that position.[5]

The composition of ALIS depends on the tasks and jobs which takes place in the system, the scope and magnitude of data processing work which must be performed and the extent to which this work is carried out by it.

ALIS would require staff with qualification and experience in the application of computer and telecommunication technologies. They should also have knowledge, skills and abilities in librarianship. Individuals with knowledge of both aspects are rate. So usually the twin skills can be obtained only from two or more persons.

3 COMPOSITION OF ALIS

Computer installations meant for ALIS vary considerably in size and the way in which they operate. The works in an ALIS and the staff required for types and levels of work are discussed below. Depending upon the size of ALIS and its operation it may employ some or all the personnel mentioned below. Universities and Resource Sharing Networks like INFLIBNET will require all the levels and categories of staff. A college library or small research institute need only employ a staff of the second level at first and can make use of the computer consultancy services for all non repeating specialized jobs.

The works in an ALIS can be grouped into the following levels and divisions for assessing manpower requirement.

31 OVERALL MANAGEMENT

ALIS is a project; very large and complex. It involves intricately detailed activities that need to be efficiently organised and controlled. Since the work of computer system will be related to the rest of the library, without cooperative effort the project cannot be a success. There should be Head for ALIS. He as manager of the system should have knowledge of where and how best to employ computer in the various operating divisions. His duties would include long term planning, organizing, coordinating, controlling,

motivating and innovating to achieve effective ALIS. He has to forecast manpower requirements, monitor the quality of work, evaluate the efficiency of the sub systems and the effectiveness of the whole ALIS.

The Head of ALIS must be able to act as a means of communication between the library staff and the computer professionals who will design the computer systems, write and test programmes. He must be able to speak both languages. He must be sufficiently mature and must possess a broad knowledge and understanding of library's aims, objectives and methods to command the respect from other divisions and ensure the co-operation of all staff. His task will be to determine library's requirements expressed in librarians vocabulary to fix necessary quantitative measures, of the systems in question, and to translate them into requirements for the computer system in computing terms.

32 SYSTEM DEVELOPMENT

System development work is based on the functional division of analysis and programming. There should be a senior staff to manage system development. Under him will work staff meant for systems analysis and programming.

321 *System Analysis*

The staff who does system analysis has to study the existing system which is to be computerised. He has to study the problems to be solved and prepare solutions and programme specifications. He has to determine what processes should go on, volume of data to be processed, time of processing the data and the feed-back from the users. One librarian from each section of the library will have to assist him in system analysis. The activities of system analyst includes analysis, design and project leading.

On the basis of the analysis of the existing system, the system analyst would design a computer based system. The design will cover four main parts of the system; the programmes, the inputs, the files and outputs. After the system has been implemented the systems development manager will review the project and the working of the system to ascertain whether the objectives have been achieved or not. This will help systems development manager in future project planning.

322 *Programming*

Computer programmes are to be prepare on the basis of the specifications prepared by system analyst. The staff who supervises programming assisted by computer programmers will define the logic of the system which would be tested by putting test data through the executing programme. The

programming function is sometimes further divided into preparation of new application and maintenance of existing programmes. The staff who supervises programming will be responsible for keeping the programmes running throughout their operational life by removing errors, amending the existing ones, and developing yet another for new application.

33 COMPUTER OPERATIONS

In ALIS it should be ensured that the devices work perfectly and are used efficiently. The staff who manages computer operations should possess knowledge of internal working of the entire system. He has to ensure that the devices under his control remain functional. He will be responsible to the Head of ALIS for this. His duties are to control, plan and organize the complete output of information and the use of all equipments of ALIS. These operations will be carried out by a work team consisting of four staff members looking after computer operations, data preparation, files and maintenance of hardware.

331 *Machine Operations*

There will be a staff responsible for actual operations of the machines from start to shut down time. He feeds the messages to the operating system through console typewriter. Much of the work however consists of loading and unloading magnetic tapes, discs, and computer stationery. He will also be responsible for environmental control such as temperature and humidity. He will also maintain records of batches processed, timings and error reports.

332 *Data Preparation*

Accurate and timely conversion of data from various source documents into computer input media is essential in ALIS. The staff should be entrusted with the responsibility for this work. The source documents will be submitted from various sections of the library according to predetermined time table. This staff will report faults in the equipments to the maintenance engineer and maintain record of machine availability. The staff who manages computer operations takes appropriate action if the situation is unsatisfactory.

333 *File Maintenance*

File Librarian will be responsible for keeping safely all computer files. At the time of their operational use file librarian will have to locate them and issue them for the staff who undertakes machine operations. File librarian will maintain a catalogue of all the files and in some cases duplicate files also.

334 *Hardware Maintenance*

Hardware items of ALIS require maintenance and continuous servicing. The maintenance engineer performs preventive maintenance and routine repairs of the equipments. He will also help in further expansion of the ALIS by additing new devices, auxiliary memory, etc.

The important question in regard to the hardware engineers is whether or not they should be employed as library's own staff. If the planned programme for automation is a combination of more than one or two very simple systems the ALIS will need the full time services of maintenance engineer. But if the ALIS is only a part of an institute or industrial firm which has its own computer division the engineers from that division can be made use of.

34 MANPOWER REQUIREMENT

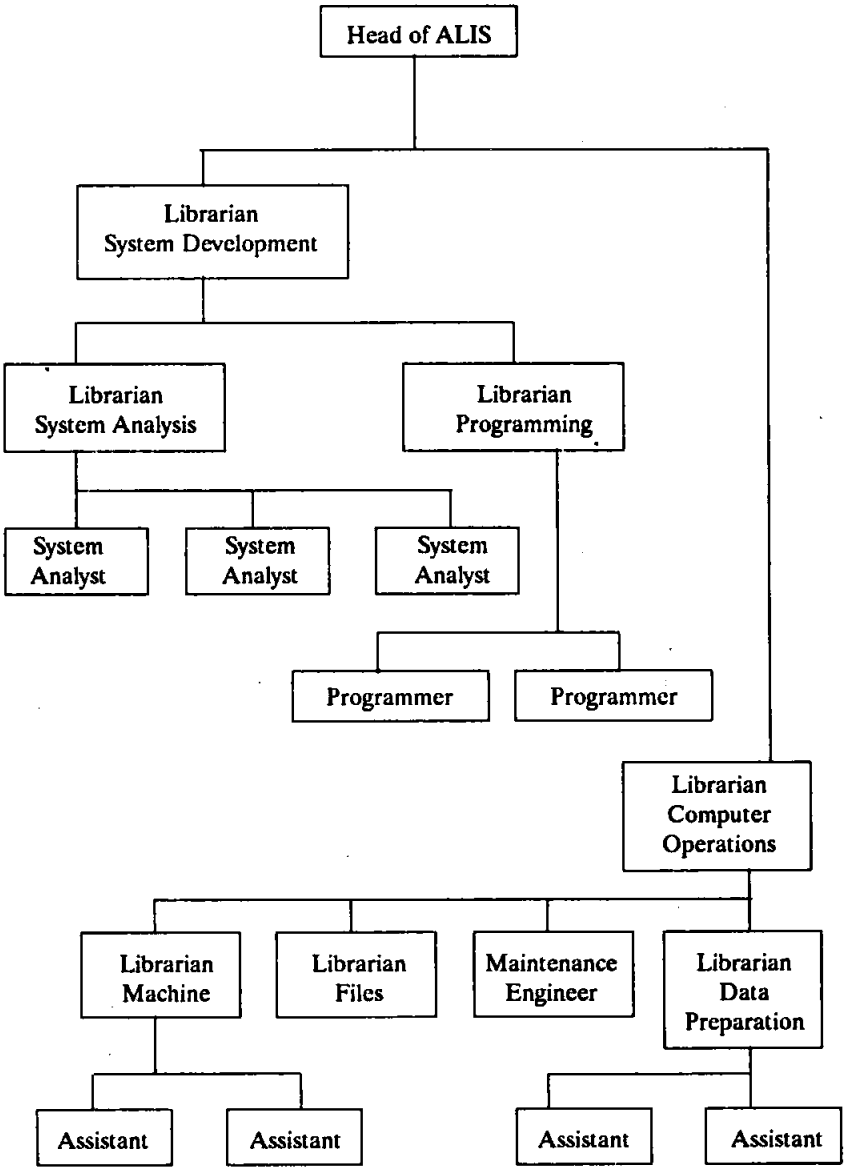
At the topmost level ALIS will require a person to head the system. In University Libraries the University Librarian or a staff equivalent to his grade specially meant for ALIS should manage the system. At the second level there should be two senior staff to manage system development and computer operations. Under them will come the third level of staff meant for the subsystem of ALIS. The same is explained in the Figure 1.

4 MANPOWER DEVELOPMENT

While offering infinite possibilities for information access ALIS has simultaneously made librarian's work much more technical and complex than ever before. No longer is it possible however to leave these aspects entirely to computer specialists. In order to profitably exploit the versatile capabilities of computers and telecommunication technology it is essential for the librarians to have a good understanding of these technologies, so that specific tasks in a library and information centre in which these could be applied can be identified.[6]

Although computer professionals may not have an appreciation or understanding of the various jobs involved in the running of a library and information centre, once the library and information worker identifies the task to be achieved, the computer professional will find it relatively easy to implement the job and to achieve the final objective. Without a broad understanding of the capabilities of computers the library and information worker will not be able to identify and define the scope of jobs which computers can be made to do.

It is in the above context that one has to realise the need to give due prominence to a general grounding in the computer technology to library



Staff Structure of ALIS
Fig. 1

and information science students. The purpose of the course has to be to inculcate computer literacy. Neither is it possible nor is it necessary to develop high level expertise in computer science or computer programming among library and information science students. The expertise has to be of such level as to permit the library manager or information scientist, to intelligently interact with computer scientists in order to explain the job the computer scientist has to do for the library and information science worker.[8]

41 EDUCATION AND TRAINING

It is clear from what we discussed above that in order to successfully apply computers to library and information work it would be essential to give first priority to education and training of manpower. It is the man at the job who matters. If we succeed in giving excellent education and training to existing library professionals and potential professionals then our information systems will be efficient.[9] So there is an important and pertinent question. Are our library science departments of universities and colleges able to provide to the students the education and training that would enable them to cope up with the needs of present computerised library and information systems?

42 LIBRARY SCIENCE COURSES

Library and Information Science courses of many of the Indian Universities have not yet included computer application in their syllabi. The papers some universities are offering on computer science as part of BLISc or MLISc course are inadequate or obsolete in the changed context of present computerised library and information service environment.

Hence the curriculum content of library and information science courses of all our universities require thorough revision and also replacement of some papers on traditional methods by computer application and other aspects of present information technology. The UGC should also set up a Curriculum Development Centre for Library and Information Science similar to the ones already set up by UGC for other disciplines.

43 INFORMATION TECHNOLOGY

Computer basics with programming, and networking, online information systems, computerised library housekeeping and information retrieval should be included in two or three papers at BLISc and MLISc level. At Master's Degree level courses specializing on computer application or modern information technology can be started. The following should be the objectives of such courses.

* to expose library professionals to computer applications and other aspects of current information technology.
* to enable the professionals to evaluate, select and install microcomputer system in libraries.
* to develop the ability of the professionals to design, evaluate and implement various softwares.
* to strengthen the self-confidence of the professionals to make them attain proper status in society.

5 REDESIGNING SYLLABUS

BLISc and MLISc syllabi should be totally redesigned to include application of Information Technology. Existing syllabi for application of computer and telecommunication technology of Information Technology in general at Bachelor's and Master's degree levels should be reviewed and redesigned, to include theory and practicals on the following aspects:

51 COMPUTER SCIENCE

* History of computers–computer generations–classification of computers–basic principles of operation of digital computers–comparison of mini, micro and mainframe computers.
* Hardware components–central processing unit, Memory, Arithmetico Logic unit, control unit–secondary storage devices–Input/output devices–personal computers–selection of hardware.
* Data processing concepts–computer codes and arithmetic.
* Software components–types–machine languages–high level languages–compilers, interpreters and operating systems–Pascal–CDS/ ISIS.
* Systems analysis and programming–Feasibility study–criteria for system selection–programming analysis–preparing computer programme–flow charting.

52 COMMUNICATION TECHNOLOGY

* Tele-communications and Networks–possibilities for information flow.
* Communication media–dial-up phone lines–analog leased lines–digital leased lines–digital dial-up lines–coaxial cables–microwave communication–satellite communications–fibre optics communication–laser communication.
- Data communication–point to point versus multipoint networks–half duplex versus full duplex transmission–asynchronous versus synchronous communications–timing modes.

- Modems–multiplexers and concentrators–front end processors.
* Terminals for data communications–CRT displays–Teletype terminals–RJE line printers–facsimile transmission units–character printers–word processing systems–portable terminals–personal computers–point of sale terminals–hand held terminal.
* Networks–types–Local Area networks–high speed, medium speed low speed PBX networks.
* Video text–display, access and input–terminal–telecommunication link–view data bases–links to other information systems.

53 AUTOMATED LIBRARY AND INFORMATION SYSTEMS

* Information online–vendor types–vendor support services–selection of vendors–databases–search process–equipments and communication software.
* Information storage and retrieval systems–structure of records–files and databases–formulation of search strategies.
* Computerised library house keeping–acquisition processes–serials control–cataloguing–circulation–classification and inter library loan systems.

6 EXISTING STUDY FACILITIES

Of the library and information science courses conducted in India INSDOC, DRTC and a few of the central universities like Beanaras Hindu University and Delhi University have covered satisfactorily the above aspects of Information Technology in their course curriculum.

61 DRTC

In DRTC computer application to library and information work is taught intensively in their Associateship in Documentation and Information Science Course. The courses cover the following topics.

* Systems analysis and programming.
* Pascal and Cobol languages
* Automated library housekeeping
* Computerised information retrieval
* Use of CDS/ISIS package.

During the course students get well acquainted with the use of computers and they use computers for their dissertation work. DRTC also conducts one short term course on computer application to library and information activities which is sponsored by NISSAT.

DRTC has the required hardware and software systems to be exclusively used for teaching and research activities. Those systems were acquired for the DRTC-NISSAT project on training manpower developmental programme.

62 REFRESHER COURSES

At present most of the personnel working in our university, college, special and research libraries lack computer knowledge. They should be helped to develop their computer knowledge and skill in view of proposed computerisation and networking projects to be introduced in Indian library environment. For improving the skill of these working librarians and teachers in library science, continuing education programme should be started. Summer schools, refresher courses and inservice training on computer application to library and information work should be conducted in all universities and library schools.

63 EXISTING TRAINING PROGRAMMES

A number of training programmes and workshops are regularly conducted for manpower development in library field under NISSAT to fulfil the above objectives.[10] These courses are conducted from various national, sectoral and regional centres such as INSDOC, DRTC, DESIDOC, SIE, CSIR, and BARC. Apart from these a number of training courses and workshops are also being conducted under NISSAT sponsorship. INSDOC conducts the following training programmes regularly under the sponsorship of NISSAT.

* Computer Application to Library and Information Activities. A five-week course for freshers.
* DBMS and dBase with particular reference to application in library and information activities. Four-week duration.
* CDS/ISIS version 2.32 with Pascal interface for those having exposure to CDS/ISIS version 1.0. Four-week course.
* Bibliometrics. Two-week course.
* Recent developments in Information Science and Technology. Two week course.
* Two-year full time course leading to Associateship in Information Science.

7 MANPOWER SELECTION

Availability of the right kind of manpower in appropriate measure and quality at various levels is essential if any meaningful achievements are to be expected from automation. So manpower planning and selection is an issue of growing significance. In order to automate our university, college, and special libraries and to enable them to play their role efficiently and

effectively we need adequate and highly skilled manpower. There are two aspects for library manpower.

* manpower required to run ALIS.
* manpower required for the library schools that could train library and information workers required for ALIS.

71 PARA PROFESSIONAL FIELDS

Medical professions has by now recognised many para professional fields and has delegated many duties which it performed earlier to those fields. Like that library and information science field also should be able to delegate specialised technical works related to ALIS to concerned fields and control them. Libraries, library systems and networks should recruit computer hardware, software and telecommunication engineers to handle the concerned work. At least one post of lecturer with Master's Degree in Computer Application and experience in that field should be created in every library science school.

8 STATUS AND POSITION

The efficiency and effectiveness of the ALIS would depend on the competence of the staff. The availability of competent staff will depend on the status of the position and the facilities and environment provided for their work and development. So allowing higher pay scales and fixing sufficient qualifications and norms for recruitment of personnel are essential to maintain quality of ALIS. The following categories of pay scales and qualifications are suggested for staff of ALIS and teachers who are to educate these staff.

Designation	*Scale of Pay*	*Qualification and Experience*
Head of ALIS	4500-7300	MLISC/MCA Doctorate or published work of high standard. 10 years experience in managing computerised library systems.
Librarian for System Development	3700-5700	MLISC/MCA Doctorate or published work of high standard. 10 years experience.
Designation	*Scale of Pay*	*Qualification and Experience*
Librarian for managing computer operations	3700-5700	Do
Librarian System Anlaysis	3000-5000	MLISC/MCA 8 years experience on concerned work.

Librarian Programming	3000-5000	Do
Librarian Machine Operations	3000-5000	Do
Librarian Data Preparation	3000-5000	Do
Librarian (Files)	3000-5000	Do
Computer Programmer	2200-4000	MCA and five years experience.
System Analyst	2200-4000	Do
Maintenance Engineer	3000-5000	M.Tech in Computer Science and five years experience.
Lecturer Computer Operations	3000-5000	MCA, Doctorate or published work of high standard. Eight years teaching experience.

9 CONCLUSION

Human aspects are all pervasive and play a vital role at all stages of the development of ALIS and its operations. So investment in manpower development is to be regarded as the most significant element in ALIS. In this fast changing environment the library and information workers are required to possess enhanced managerial, professional and technical skills, adequate knowledge and right kind of experience. The manpower should be so competent and trained that they can anticipate changes and respond to them, seize opportunities at the right time and take initiative whenever necessary. They must possess flexibility of attitude, imagination and scientific bend of mind.

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IMPORTANCE OF INFORMATION ON WILDLIFE LITERATURE

Dr B N MISHRA*

1 INTRODUCTION

Plants and animals are complements to each other in a web of life, and they interact with each other in finely balanced fulcrum. Destruction of one part of the ecosystem sets in a chain reaction to the complete harmony in nature affecting ultimately the man. A triangular relationship amongst men, plants and animals have been established and abridged a longfelt vital gap in the information flow in an ecological setting.

India has nearly a strength of about 29,500 veterinarians and 60,000 supporting personnel. Each year, about 1300 graduates are produced from existing 28 veterinary colleges and about 2,000 stock assistants/compounders from the state training centres. About 19,340 Veterinary polyclinics, hospitals and dispensaries and another 20,780 stockman/Veterinary aid centries are functioning all over the country. About 2,000 in UG and 450 PG admissions are taken in a year.

2 WILDLIFE ACTION PLAN

The National wildlife action plan adopted in 1983 provides the framework of strategy as well as programme for wildlife conservation. At present, protected area network comprises 70 National parks and 412 sanctuaries covering 4.5% of the total geographical area of the country. It is proposed to be increased to 4.6% by setting up more parks and sanctuaries.

3 RESEARCH IN WILDLIFE

Research programmes in wildlife are carried out by the Wildlife Institute of India, Dehradun. Research projects involving habitat evolution, elephant movement, ecology of gharials and turtles, status of endangered species, animals, etc are carried out.

The library is the centre of storage and retrieval of Informations. So the importance of the Modern Library is becoming hard day by day due to dissemination of information. The following are the sources of Information:

* Campus Librarian, Bihar Veterinary College Library, Rajendra Agricultural University, Bihar, Patna-800 014.

1 Documentary sources–Primary, Secondary and Tertiary Sources.

2 Non-documentary sources

3 Human sources

4 Institutional sources.

The Environmental Information System (ENVIS) centre has important role to play in bridging the gap between users and information. Much of its activities during the past seven years have been towards becoming a computerised information system, and efforts are also being made to develop software specifically suited to the ENVIS centre's needs. Interaction and contact between systems and agencies implementing and developing computerised techniques are necessary for progress in the field.

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QUALITATIVE DEVELOPMENT OF HUMAN RESOURCES IN LIBRARIANSHIP

KEDARNATH MAHAPATRA*

1 INTRODUCTION

Modern management has been laying increasingly greater emphasis on the ability of the people in the organization to achieve its goals and objectives. Effective Human Resources Development (HRD) is one of the most pressing needs that the library faces today. It is also the most sensitive aspect of management because the human beings are distinguished from other resources for the ability and role of co-ordinating, integrating and thinking. As such, Human Resources Management (HRM) calls for highest attention in the modern library management.

2 WORK FORCE MANAGEMENT

Work force management or managing man at work is essential for achieving productivity and efficiency. Efficiency should reach optimal level to produce better quality service in libraries. In librarianship work force management is a concern of top level management. A junior librarian's attitude is influenced by library relationship climate, which in turn, is brought about by the mutual interaction between management, parent organization, professional societies and the government. For driving the workforce towards desired goal the library managers should assume a positive role of influencing the attitude and behaviour of junior librarians towards enhanced production. The junior librarian must have full faith in the management's impartiality, fair play and sincerity so that they can respond positively. A healthy information climate should be created by library managers where every professional believes that his economic and social interest is in safe hands and he is being best cared for by the management. Library managers should aim at developing a spirit of comaraderie and group cohesiveness. Such a spirit creates not only a tremendous commitment but also a sense of belongingness. For developing a feeling of comaraderie the management must provide a sense of identity to the group and recognition for achievement. A prerequisite for this comaraderie is the full involvement of management with each of library activities not as a controller or order giver but as a guide and a co-worker.

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It led properly such groups develop a sense of pride and strive to achieve high level of performance collectively as well as individually.

3 QUALITY CULTURE

People in all levels in the library contribute towards the overall goal of the organization. Hence, it is essential to create a culture in the library which allows each and everyone to fully participate and give his best. The key to promote quality lies in adopting a positive and open door HRD policy to provide a fully participative type management. "Suggestion Schemes" and rewards for ideas leading to improvement of organization with enhanced productivity should form part of such a policy.

31 QUALITY CIRCLE

It is very much necessary for libraries to set up "Quality Circles" and encourage their work. Quality circle is a small group of employees in the same area doing similar type of work that voluntarily meet regularly for about an hour every week to identify, analyse, and resolve work related problems leading to improvement in the total performance and enrichment of work life. This essentially involves recognition of the power of people to imagine, to delve deep into the problems, to understand them, analyse various aspects and come up with alternatives for solution.

The benefit of quality circles in libraries is tremendous. Apart from improving quality, it leads to higher productivity, simpler methods, innovation, cuts in delay, cost saving and employees satisfaction. However, the success of quality circles depend on the commitment of library management, other key success factors relate to presence of harmony, clear objectives, voluntary participation, effective commitment, training of professionals and an open and positive attitude. Library management should create favourable conditions to improve quality work life (QWL). This can be possible by openness, trust, collaboration, autonomy, total quality management (TQM), fairness in appraisal and rewards, need-based training, risktaking leadership besides developmental orientation in managing mistakes and role play. Quality circles can lead to diffusing of tension and creating a climate of cohesion, mutual trust and understanding in an organization.

4 COMMUNICATION FACTOR

Communication system is an essential factor of HRD. It is the process of co-ordination among the people of a library. For qualitative development of manpower the senior librarian must involve and identify himself in the work process. Library management should provide clear, conceivable and unambiguous formal instructions containing major policies, objectives and systems to be implemented to attain the desired goal of the library.

Communication of ideas, sharing of knowledge and experience develop an ethical sense in the person being communicated. The phenomenal development in the communication technology in the form of telephone, fax, telex, computer and satellite do not end the problem of communication. They only mediate a message. Social communication, on the other hand, is complete only when the receiver understands it and motivated to work on it. A genuine straightforwardness is the hallmark of cogent communication. The vital part of communication system is credibility, sincerity of purpose and acceptance. The library management should create a common ground of consensus. In the changing technological scenario of libraries, a smooth transition to modernity can be facilitated by bringing about a sense of identification of the innovative ideas of the people. The senior librarian should resort to feed back, to the proactive ability of people to respond to others around. Aggression, apathy, withdrawal, fixation and substitute goals distort the process of communication. They should realise that the purpose of effective communication is to produce a participative spirit through information dissemination; gain a greater commitment through letting others have their targets and schedules, enhance speed of operation to reduce lead time; and to create self motivated professionals through feelings of common goals, philosophy, value, culture and strategies.

5 HUMAN RELATIONS

Human relations is the essence of productivity in librarianship. It should form the basis of interaction between the user and the staff, senior librarian and subordinates and professionals and library systems. The senior librarian should develop the basics as smiling at people; calling them by their names and listening to them patiently and attentively. He should spend leisurely talking to the subordinates about their families, their background, the environment in which they are brought up and their attitude to society to know their strength, weakness, success, failure, etc. He should be generous with praise; reserve with flattery; cautious with criticism; have a respect for other's personality; open mind and considerate to the feelings of others.

Human relations development is a personality factor. It is a librarian's state of mind, his attitude towards others in the library and his estimation of other people in the environment. It consists of his recognition that the people are precious assets; people contribute to the organisational goals; people need recognition; people aspire development; people believe in participating with management and team work and people know their job better.

Human approach is an elevation process to be created by the library management. A senior librarian should expect that his subordinates are

mature, responsible and co-operative people who want to work in open and trusting climate with full participation to improve themselves and the effectiveness of the organization. He should create vision and ideas that challenge people to give their best. He should believe that the way to get the best out of people is to give them the scope to devise their own solution to the problems.

6 LEADERSHIP STYLE

The chief librarian should assume the role of a leader to guide the subordinates towards the objectives of the organization in a dynamic way. A senior librarian should understand a subordinate's individual potential and try to take the best out of him. He should come out to shoulder the blame of his subordinates and comfort them when they admit their mistakes. He should learn that mistakes are learning opportunities than offences. He should give frequent and honest feed back of follow up and develop a tendency to share his knowledge and experience with his subordinates. He should find the force of persuasion, humour, conversation, encouragement and personal relationship much more effective in getting a work done. He should hardly crave for power, authority and weapons for himself. He should train and promote the new generation and colleagues who may be able to take over from him. He should be a man of integrative power with an intuitive sense of timing; longevity, ability to listen and have a missionary zeal for what he believes in. He should attempt for provision of adequate motivation, training, development, opportunities for carrier progression commensurate with demonstrated merit and potential for advancement in organisational hierarchy. He should learn to foresee the formation of pressure groups; understand the mutuality of interests which create and bind these groups and manage the inter and intra groups as well as resultant organisational conflict with minimum turbulence. He should be able to analyse the current facts and project future trends so as to develop appropriate strategies to retain organisational relevance in a continually changing scenario.

7 HUMAN RESOURCE TRAINING

Learning is a unique fund in the sense that the more one draws from it and passes one, the more it grows instead of depleted. The senior librarian should assume the role of a mentor to provide the professionals with an opportunity to meet the generative needs, to stay them informed about technological advancement and overall change. He should establish performance feedback and counselling as a subsystem of total HR system. This can be achieved by creating an effective mentor-protege relationship within the library. A formal training programme should be regularly conducted to make subordinates realise the importance of building up relationship

with seniors who can coach, guide and sponsor them. Library management should make professionals skilled in planning, organization, execution and review of programmes of the library. Evaluation of training is most important for which a methodology should be set up. The methodology should consist of a control and an experimental group which follows a four tier system by the subordinates, by the superiors, by the peers and by the trainees in terms of observed behaviour before and after the training. A senior librarian should be an ideal trainer for cultivating 'people skills', winning over trainee groups' acceptance and with an untiring urge to scale behavioural excellence, enthusiasm and devotion. He should help professionals to learn from themselves and develop their own experience; enable each to learn from the experience of other professionals; give them the real opportunities to develop their skills and demonstrate tangible benefits through the development of action plans. Induction of an organisational culture should be consciously attempted and encouraged as a part of HR training. For this a series of well planned exposures and interaction with senior colleagues serving as a role model are desirable from the recruitment stage at professional level. A senior librarian is expected to pass three distinct stages in his carrier. Firstly as a learner when he is learning while doing his assigned task. Next as a leader when he is leading while doing his assigned task and finally as a teacher while doing his assigned task.

8 MOTIVATION

Motivation and human dignity greatly contribute to employee satisfaction at work place. Motivation makes a person a self-propelled man with a desire to perform to fulfil certain objectives. The prominent motivation factors are organization policy, quality of supervision, working condition, pay structure and job satisfaction. The senior librarian should endeavour to create a culture of trust; time off (No time keeping). No financial sanction (self approval); open discussion; speakout attitude and information sharing. He should establish certain core beliefs such as catch slogans, symbols and mottos which can go deep in to hearts of people.

Just as the management expects result from an employee, the employee as well expects certain things from management. The usual expectations are: (*a*) Robust Salary package; (*b*) Maintain self respect; (*c*) Challenging job for better growth; (*d*) Job rotation to avoid monotony of work; (*e*) Job recognition; (*f*) Awards for outstanding contribution; (*g*) Merit based promotion system; (*h*) Excellent educational and training facilities; (*i*) Excellent working condition; (*j*) Delegation of authority; (*k*) Encouragement to experiment innovative ideas; (*l*) Excellent image and reputation of employer; (*m*) Growth of the organization.

91 CONCLUSION

All these factors significantly contribute to the motivation of a professional in the library. Work environment is key to motivation and organisational excellence. The factors vital for this are: quality of management; quality of products/services; innovativeness; long term investment values; financial soundness; ability to attract, retain and develop employees, social and environmental responsibility and corporate image. All these help to create automatived persons in an organization.

A senior librarian's basic task is to make use of untapped human resource potential of his subordinates. He must create an environment in which all his subordinates may continue to the best of their ability. He must encourage their full participation on important matters and continually broaden the scope of self direction and self control by subordinates. As the subordinates make full use of their abilities, they get job satisfaction. As they direct and control themselves operational efficiency improves.