COMPUTERIZATION & LIBRARY NETWORK

Seminar Papers

Thirty-Sixth All India Library Conference
University of Jodhpur, Jodhpur, December 26-29, 1990

Edited by

C P Vashishth

Associate Editors

R K Dave
M L Saini

INDIAN LIBRARY ASSOCIATION
DELHI-110 009
1991

VASHISHTH, *Ed*: COMPUTERIZATION & LIBRARY NETWORK

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PREFACE

A process of great change is taking place in Library and Information Systems of the advanced and industrialised nations of the world as a result of the application of computer and the new technology. We here in India have been rather slow in introducing the computer to library and information activities. This is largely due to the lack of proper computer environment, necessary stimulus and required financial support. However, the situation is now changing for better. Serious attempts are now being made to sort out the problems of computer hardware, software and the humanware. The National Information System for Science and Technology (NISSAT) is quite keen to promote the computer culture in library and information environment throughout the length and width of our country. In collaboration with different national level Associations and Institutions it is organising computer exposure workshops for the benefit of library and information personnel and also distributing the CDS/ISIS software package developed by the UNESCO free of cost. The Indian Library Association has alone organised 11 such computer workshops in different cities of India. Many of the participants after taking training in these workshops have switched over to computerisation of library and information activities in their organisations.

The computerisation of house keeping operations in library and information environment has many fold advantages. It not only saves labour and time in handling routine and repetitive jobs, it speeds up the operation, increases productivity and contributes to efficiency in terms of recall and precision parameters. The added advantage of the computerisation is that it facilitates the interlinking with other libraries and information centres to form a Network. If we take the stock of our computer-based activities in library and information systems, we find that it is far below our expectations. The advances in new information technology are so fast and rapid that we have to leap frog in our endeavour to catch up with other advanced nations of the world. Our INDONET, NICNET, VIDYANET, SIRNET, CALIBNET, DELNET, INFLIBNET projects have a lot of potential for library and information centres. These net-

works can also be made use of as gateway system to access information on-line from international databases. With such developments, the future of library and information centres in India is turning to be better.

It is with this background in view that the Indian Library Association decided to organise a Seminar on "Computerisation and Library Network" during its XXXVIth All India Library Conference at the University of Jodhpur during December 26-29, 1990 and accordingly gave call to its members to contribute papers in the areas of their competence in the field of application of computer in library and information activities. The response has been very encouraging. The contributors have dealt with various facets and phases of computerisation of library and information activities. They seem to be doing wonderful jobs in their respective organisations. Fortythree of the papers received well before the last day fixed for the receipt of papers in the Office of ILA have been included in this *pre-conference volume*. There are 25 more papers which were received after the expiry of date. The authors of these papers have raised significant issues which need to be discussed and deliberated. The discussions will be really rewarding and decide the future course of action to be taken by the managers of library and information activities to take the country to 21st century.

C P VASHISHTH
Editor

Delhi
December 20, 1990

COMPUTER APPLICATION IN THE LIBRARY OF CENTRE OF ADVANCED STUDY IN GEOLOGY (PALAEONTOLOGY AND HIMALAYAN GEOLOGY), PANJAB UNIVERSITY, CHANDIGARH—A PROPOSAL

S S PAWAR*
G S THAKUR**

0 INTRODUCTION

In modern days, the library is a fast growing organisation. The age-old methods of maintaining are no longer applicable in dynamic and evergrowing society. In the present age, the geographical and language barriers have been removed due to expanding communication technology. The information is being used and reused by the producers and consumers (scholars). Due to the growing need of quick retrieval and dissemination of information and better services for its users, introduction of modern methods has become absolutely indispensable. When the manual activities are being automated in various organizations, libraries are no exception.

1 HISTORICAL BACKGROUND

The Department of Geology was established in 1958 at the Panjab University Campus, Chandigarh under the headship of (late) Professor M. R. Sahni, a world renowned Palaeontologist, after his retirement as Director, Geological Survey of India. The Department was given the special status of Centre of Advanced Study in Palaeontology and Himalayan Geology by the University Grants Commission in 1963. The progress of the research work in the Department during the last 32 years can be seen from Table 1.

*Asstt Librarian, C A S in Geology, P U, Chandigarh.
**Asstt Librarian, P U Library, Chandigarh.

Table 1 : Progress of Research Work in Department of Geology/CAS in Geology

Name of Degree/ Research Work	*1958-70*	*1971-80*	*1981-90*	*Total*
D Sc Dissertation	—	2	—	2
Ph D -do-	10	26	35	71
M Phil -do-	—	09	63	72
M Sc Degrees	140	200	200	540
Research Publications	238	630	583	1451

2 DEPARTMENT LIBRARY

As we know library is a place where information seekers visit to obtain material on the subject area of their choice. It is the professional librarian, who has been regarded as an expert in the communication of information. It was as late as 1977 when the post of a professional librarian was filled up. With the coming of a professional, various services were started for its users. The present librarian expanded the following services within the limited resources available at his disposal:

1 Card catalogue was prepared for all documents for the use of its readers.
2 Display rack for unbound journals (new arrivals of subscribed journals) was installed.
3 Open access system was introduced.
4 Exchange of publications was started because the Department is publishing two journals in the field of Geology and its allied area.
5 Photostat service was introduced for students and staff in 1987.
6 Inter-library loan service with the sister institutions in the region was another area of library extension service.
7 Microfilm reader was installed for the use of readers in the Department.
8 Bibliographies were prepared on demand.

At present the Department is subscribing journals worth more than

Rs 1 lakh every year. The stock of the Department Library contains;

1	Books, Journals, Reports etc.	8,000	appox.
2	Ph D, M Phil, M Sc Dissertations	260	
3	Microfilms	256	
4	Movies on Earth Science	12	

The Library is extensively used by the faculty staff, research scholars, postgraduate and undergraduate students of the Department and those students of other departments who opt Geology as subsidiary subject in their Honours school courses. The geologists from Wadia Institute of Himalayan Geology; Oil and Natural Gas Commission, Dehradun; Geological Survey of India, stationed at Chandigarh; and Industries Department of Government of Haryana and Punjab make use of geological literature in the following areas :

1 Applied Geology
2 Crystallography
3 Economic Geology
4 Exploration Geology
5 Mineralogy
6 Palaeontology :

   (a) Micro Palaeontology
   (b) Vertebrate Palaeontology, and
   (c) Invertebrate Palaeontology

7 Petrology
8 Stratigraphy
9 Structural Geology and Tectono-physics

As we know the literature in science and tcchnology is doubling very quickly. Then how to provide the users within the shortest possible time whatever material/literature that is available in the area of his study and allied areas. It is not possible to acquire each and every publication published due to various constraints. It is the foremost duty of the librarian to provide, through his farsightedness, the information on the availability of the litetature to the scholars to avoid duplication in research and wastage of time, energy and money.

3 NEED FOR AUTOMATION

Library and information centres in modern days are concerned with dissemination of information. They have to ensure that relevant and useful information is communicated to the users at the right time who need it. This requires that the stored information should be scanned, analysed and made uvailable at a high speed which is not possible to to achieve manually. A computer can help in this process efficiently and effectively. Following reasons have been given in favour of the computer application in the Department's Library.

1 To have bibliographical control of published literature in the field of geology and its various branches.
2 To provide information quickly to the various specialists engaged in Research and Development activities in the Department and its sister institutions.
3 To avoid the duplication in the research work.
4 To provide quick library services to the users by utilising effectively the expertise of professional staff.
5 To share the available resources among sister institutions in the field of geology in the region.
6 Central library of our University has already got a computer installed for doing in-house jobs. We have also started thinking in terms of use of computer for the Department Library.

4 PROPOSED STRUCTURE OF DATA BASE

There are various packages available in the market. The authors proposed to D.base III+ package because they have seen its working in the A C Joshi Library, Panjab University, Chandigarh. This package can be run on PC/XT/PC/AT under MS-DOS operating system. The Central Library in the beginning used CDS/ISIS package but later on shifted to D base III+ package for various in-house jobs. This system is very easy to use. It is a fine menu driven programme.

5 FILE STRUCTURE DESIGN

The database will be named DO GEOMENU. The following two files will be created in the database :

1 BOOKS AND BOUND JOURNALS FILE
2 ARTICLE FILE

These files will cover various parameters which will be related to

each other. The chart in Appendix-I shows various aspects of files. Various options of the Main Menu are as follows :

(a) Data manager
(b) Back-up
(c) Re-installation
(d) Quit

The Data Manager will again have the following options :

1 Data entry (books and journals)
2 Data entry (articles)
3 Modifications (books and journals)
4 Modifications (articles)
5 Deletion (books and journals)
6 Deletion (articles)
7 Reports
8 Back to main menu

Data Entry (books and journals) will contain various parameters like TR No, Call No, Acc No, Author/title, Vol No, Year, Subject, Code Remarks. After the entry data is entered three options will be displayed on the screen—S : Save the data entry; A : to add and X to previous menu.

Data entry (articles) will cover parameters consisting of author's name, title, source, name of the journal, volume No, issue No, pages, year, subject codes and at the end three options will appear on the screen. Enter your choice.

Reports Generation Aspect : With the help of computer following reports will be generated from time to time :

1 Subjectwise (articles)
2 Alphabetical (articles)
3 Transfer Number-wise
4 Alphabetical (books)
5 Alphabetical (journals)
6 Subjectwise (books)
7 Subjeetwise (journals)
8 Borrowers (code-wise)
9 Issue of books
10 Back to data manager

6 CONCLUSION

A properly computerized library will be of great advantage to its users with quick and appropriate services. Various reports when generated will satisfy the increasing needs of the clients which include faculty members, research scholars, students and geologists working in the sister institutions.

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4 UNIVERSITY GRANTS COMMISSION (India). *Annual Report for the Year 1988-89.* New Delhi.

APPENDIX—'I'

MAIN MENU

1 Data Manager
2 Back-up
3 Re-Installation
4 Quit

Enter any Choice

Data Manager	*Data Entry Books and Journals*	*Data Entry Articles*	*Reports*
1 Data Entry (Books and Journals)	Tr No.....Call No..... ACC No.....	Title.....	1 Subjectwise (Books and Journals)
2 Data Entry (Articles)	Author/s.....	Author/s.....	2 Subjectwise (Articles)
3 Modification (Books and Journals)	Title.....	Source.....	3 Alphabetical (Books and Journals)
4 Modification (Articls)	Vol No.....Issue No..... Year.....	Name of JL.....	4 Alphabetical (Articles)
5 Deletion (Books and Journals)	Subject Code I.....	Vol No.....Issue No..... Year.....	5 Alphabetical (Author)

(*contd. on page* 52)

(*Contd. from page* 51)

Data Manager	*Data Entry Books and Journals*	*Data Entry Articles*	*Reports*
6 Deletion (Articles)	Subject Code II.....	Subject Code I.....	6 Alphabetical (Title)
7 Reports	Subject Code III.....	Subject Code II.....	7 TR Number-wise
8 Back to Main Menu	Remarks.....	Subject Code III.....	8 Borrowers Code-wise
Enter any Option	Issued/Not.....	*Options S* : Save	9 Issue of Books
	Borrower Name.....	*A* : Add	10 Back to Data Manager
	Catogry Code.....	*X*: To Data Manager	Enter any Option
	Date of Issue.....	Enter any Option	
	Due Date.....		
	Options S : To Save *A* : To add *X* : To Data Manager		
	Enter any Option		

COMPUTER APPLICATIONS FOR LIBRARY AND INFORMATION WORK AT THE DOCUMENTATION CENTRE OF NBSS & LUP (ICAR)

Y M PATIL*

1 INTRODUCTION

The National Bureau of Soil Survey (NBSS) and Land Use Planning (LUP) was established during 1976 following reorganisation of erstwhile All India Soil and Land Use Survey along with six Regional Centres located at Bangalore, Calcutta, Delhi, Jorhat, Nagpur and Udaipur. The major objectives of the Bureau are: preparation of soil resource inventory for developing land use plans; research on soil genesis, correlation, classification, cartography and image interpretation, research in developing interpretations for optimum land use planning and agrotechnology transfer, and organising need-based training programmes. In addition, under Natural Resources Institute, U K and NBSS and LUP Linkage Programme, the existing training programmes are strengthened and under UNDP Project in collaboration with P K V Akola, International Training Centre for Land Resource Management for post-graduate education and research has been established in 1987-88 to develop manpower in soil/land resource management.

With growth of Institute at the scientific front, it was felt that an organised information system was needed to support scientific research activities. As a result, the Documentation Centre was started in 1979 at the Headquarters of the Bureau with the main objective of serving the Institute's soil scientists and other user agencies in the country. The aim of Documentation Centre is to obtain all relevant scientific and technical information pertaining to soil survey programmes and other

*Documentation Officer, (T7), National Bureau of Soil Survey and Land Use Planning. ICAR, Post Bag No 426, Shankarnagar P O, Nagpur-440 010.

related aspects. Each Regional Centre is attached with a small library having core information material of regional interest. Centralised acquisition is done for Headquarters and Centre libraries.

The present library collection at Headquarters includes: scientific/technical books, back volume of journals, annual/soil survey reports, charts, atlases, microforms, slides, Institute publications and research papers, reprints and subscription to 72 scientific journals. The entire collection is organised on modern lines. The present library holding is about 5,000 items. About 12,000 bibliographic references are collected through manually produced monthly *Current Awareness Bulletin* since 1980. The main approach for information handling, storage and dissemination is through manually produced data—author, title and classified catalogues.

2 INFORMATION SERVICES

To keep Institute's scientists informed about latest scientific and technical information, the following services are brought out on a regular basis :

- O Current Awareness Bulletin, Monthly (1980+)
- O Soil Survey Newsletter (HY)
- O Serials Holding List
- O Compilation and updating of Soil Survey Reports
- O Compilation and updating of Institute Publications

3 REASONS FOR INTRODUCING COMPUTERISED INFORMATION SERVICES

Several factors have led us to apply microcomputer to some of the library routines for information storage and retrieval activities. Some of these are—

- O limited staff strength requiring more time for manually searching literature at a given time;
- O considerable wastage of time by researchers in searching catalogues and indexes, which do not have many access points and is labour intensive, and
- O the need for a system to bring together different catalogues, lists, indexes of the library to provide as many access points as needed, which could be efficient in its use of effective information handling.

In order to overcome the above, it was envisaged to go into computer applications for varied library routines.

4 LIBRARY INFORMATION SYSTEM

After review of the existing library requirements[8], it was recommended to have a microcomputer for developing a centralised bibliographic database at the Headquarters covering all information held in the library.

Under NRI (UK)-NBSSLUP (ICAR) Linkage Programme, the task of developing and strengthening the NBSSLUP Documentation Centre was identified. The British Council, Bombay, approved our Library for Overseas Development Administration's Book Presentation Programme and substantial number of books were received for use in Headquarters and Regional Centre libraries. The Bureau's information worker was trained in UK during Sept-Dec 1989 on various aspects of agricultural information system services; computerised information handling, on-line access to external databases, the CAIRS software system, design of inhouse database[1].

5 WHAT IS MCAIRS

Micro CAIRS (Micro Computer Assisted Information Retrieval System) is a flexible, low cost microcomputer based information retrieval software system. The programmes have been written in RTL2, a high level computer language, which allows MCAIRS to run on most popular microcomputers. It is designed by professional information scientists at the Leatherhead Food Research Association, UK for library information management requirements. This software is considered to have the most sophisticated searching power and flexibility and allows the customer to tailor it to his or her requirements.

Functional aspects of MCAIRS system are data entry, consisting of full bibliographic details including manually adding of keywords or descriptors. The bibliographic information is split into several discrete fields enabling retrieval in different ways by means of inverted file searching and searching by accession number. With these, one can produce various listings including acquisition lists, current awareness lists, index and bulletin production.

51 WHY MCAIRS?

MCAIRS is a powerful and flexible system with proven track record. Natural Resources Institute (NRI), U K uses CAIRS, a larger system on

34 New Executive Committee

The Council of the Association in its meeting held on April 7, 1990 constituted the Executive Committee for 1990-92 comprising the following:

Shri S C Biswas	President
Shri C P Vashishth	Sr Vice President
Shri M L Kachroo	General Secretary
Shri O P Sharma	Secretary
Shri Inder Deo	Secretary
Shri A P Gakhar	Public Relations Officer
Shri B B Vatsya	Treasurer
Ms Usha Mujoo Munshi	Librarian
Ms Kalpna Dasgupta	Member
Ms Veena Dixit	Member
Shri J K Anand	Member

35 Composition of Council for 1990-92

President	Shri S C Biswas	Elected	Delhi
Vice President	Shri C P Vashishth	,,	Delhi
,,	Dr J C Binwal	Coopted	Shillong
,,	Dr N K Sharma	Elected	Kurukshetra
,,	Dr G D Bhargava	,,	Ujjain
,,	Dr G Bhattacharyya	,,	Bangalore
,,	Dr P S G Kumar	,,	Nagpur
General Secretary	Shri M L Kachroo	,,	Delhi
Council Member	Shri M L Kashyap	,,	Delhi
,,	Shri S N Dwivedi	,,	Gwalior
,,	Shri Amitabh Chatterjee	,,	Calcutta
,,	Dr Sewa Singh	,,	Amritsar
,,	Dr M A Majeed Khan	,,	Hyderabad
,,	Shri S R Baheti	,,	Akola
,,	Shri A P Gakhar	,,	Delhi
,,	Shri B B Vatsya	,,	Delhi
,,	Shri B K Verma	,,	Delhi
,,	Shri J K Anand	,,	Delhi

Council Member	Shri O P Sharma	,,	Delhi
,,	Dr P K Jayaswal	,,	Delhi
,,	Shri Suresh Kumar Jain	,,	Delhi
,,	Ms Veena Dixit	,,	Delhi
,,	American Center Library	,,	Delhi
,,	Central Secretariat Library	,,	Delhi
,,	Indira Gandhi National Centre for The Arts Library	,,	Delhi
,,	National Library	,,	Calcutta
,,	Rajasthan University Library	,,	Jaipur

Past President	Shri B S Kesavan	Ex-Officio
,,	Shri P N Gour	,,
,,	Shri Sohan Singh	,,
,,	Dr B V R Rao	,,
,,	Shri D R Kalia	,,
,,	Shri B L Bhardwaj	,,
,,	Shri P B Mangla	,,
,,	Shri Girja Kumar	,,
,,	Shri Krishan Kumar	,,

CSC Chairman (Agrl.)	Shri A S Chandel	Nominated	Solan
,, (Govt Lib.)	Shri H J Upadhyaya	,,	Gandhinagar
,, (Engg & Tech)	Dr S S Murthy	,,	Delhi
,, (Health)	Shri S M Aggarwal	,,	Lucknow
,, (Edn & Trg)	Dr S G Mahajan	,,	Pune
,, (Public Lib)	Shri V Venkatappaiah	,,	Elluru
,, (School Lib.)	Smt Malti Kapoor	,,	Delhi
,, (Spl Lib.)	Dr T V A Murthy	,,	Delhi
,, (L & I Tech)	Shri A Lahiri	,,	Delhi
,, (Doc & Inf Sc)	Dr K G Tyagi	,,	Delhi
,, (Oriental Lib.)	Shri S Ansari	,,	Delhi
,, (Project)	Shri S Parthasarthy	,,	Madras
,, (University & College Libraries)	Shri N B Inamdar	,,	Hyderabad

4 BUSINESS MEETINGS

41 General Body Meeting

The Annual General Body Meeting of the Association was held on November 9, 1989 at 5 pm at the Aba Saheb Garware College, Pune with Professor Krishan Kumar in the Chair to transact the following business :

- to adopt the annual report on the working of the Association for the year ending 31 March 1989,
- to adopt the audited statement of accounts of the Association for the year 1988-89,
- to declare the results of the election for the various offices of ILA for the term 1990-1992, and
- to consider any other matter with the permission of the Chair.

At the outset condolence resolutions were adopted on the demise of the following professionals and a two minutes silence was observed for the peace of the departed souls :

1 Shri T S Rajagopalan (Past President);
2 Shri B N Sengupta (Calcutta);
3 Dr V N Misra (Bombay);
4 Shri P G Krishnamurty (Delhi);
5 Shri P M Joshi (Bombay);
6 Professor B C Jakati (Kolhapur); and
7 Shri G V Subbaiah.

Thereafter the President invited the General Secretary to proceed with the first item on the agenda. Accordingly, Shri C P Vashishth, General Secretary presented the Annual Report covering the period April 1988-March 1989. The report was unanimously adopted.

Shri A P Gakhar, Treasurer, ILA presented the audited statement of accounts for the financial year 1988-89. The Accounts were also adopted unanimously.

Discussion

Shri Nasib Chand: The budget for the next financial year be prepared

and got it approved at the Annual General Body Meeting. ILA should immediately approach RRR Library Foundation for financial assistance to the IFLA-1992 Conference to be hosted by ILA. Mr Ahmed Sultan's suggestion of not charging heavy registration fee be considered earnestly.

Mr David: The Annual Report should also give an account of action taken on the resolutions of the previous Annual General Body.

Shri Inamdar: Members of the Council be paid TA for attending the meetings. (This proposal was seconded by Mr S N Agarwal of Lucknow);

Smt Kalpana Dasgupta: Central Sectional Committees may take up some useful projects and their reports be published by ILA. (Shri Nasib Chand seconded this proposal).

Shri S Parthasarathy: Council Meetings be held in different regions instead of having them only in Delhi.

In reply, Shri C P Vashishth said that it will be a heavy burden on ILA to pay TA for all Council Members, as their number comes to near about seventy. However, payment to elected members can be considered. Holding Council meetings in different regions can be accepted.

Prof A C Tikekar: ILA may consider having 'Regional Offices'.

Shri S R Baheti: More centres are needed for conducting UGC Refresher Courses for College Librarians. ILA, may consider extending financial assistance to state level associations. 'Best College Librarian Award' be instituted. Government of India may be approached for giving a 'Best Librarian Award'.

Shri R Srivastava: ILA should be represented in different state library conferences and seminars. This will facilitate closer relation and affiliation.

Shri S R Natu: ILA should persuade state library associations to become members. ILA study circles be founded in different cities by extending financial support.

While thanking all the members for their valuable suggestions, Prof Krishan Kumar assured to look into all the valuable suggestions. He also

announced the results of ILA elections for the various offices of ILA for the term 1990-1992 which are as follows :

President		Shri S C Biswas (Delhi)
Vice-President	(UT)	Shri C P Vashishth (Delhi)
,,	(Central)	Dr G D Bhargava (Ujjain)
,,	(North)	Dr N K Sharma (Kurukshetra)
,,	(South)	Dr G Bhattacharyya (Bangalore)
,,	(West)	Dr P S G Kumar (Nagpur)
General Secretary		Shri M L Kachroo (Delhi)
Council Member	(UT)	Shri M M Kashyap (Delhi)
,,	(Central)	Shri S N Dwivedi (Gwalior)
,,	(East)	Shri Amitabh Chatterjii (Calcutta)
,,	(North)	Dr Sewa Singh (Amritsar)
,,	(South)	Dr M A Majeed Khan (Hyderabad)
,,	(West)	Shri S R Baheti (Akola)

Council Member (Open constituency)

1. Shri A P Gakhar (Delhi)
2. Shri B B Vatsya ,,
3. Shri B K Verma ,,
4. Shri J K Anand ,,
5. Shri O P Sharma ,,
6. Dr P K Jayaswal ,,
7. Shri Suresh Kr. Jain ,,
8. Ms Veena Dixit ,,

Council Member (From amongst Institutional members)

1. American Center Library (New Delhi)
2. Central Secretariat Library (New Delhi)

3. Indira Gandhi National Centre for The Arts Library (New Delhi)
4. National Library (Calcutta)
5. Rajasthan University Library (Jaipur)

Professor Krishan Kumar thanked Shri S Ansari (Election Officer) and members of his team, Shri B L Bharadwaj (Returning Officer) and the tellers for their valuable cooperation in the conduct of the elections. Thereafter he declared the Annual General Body meeting closed. The Annual General Body meeting ended with a vote of thanks to the Chair.

42 Open Forum Meeting

The Open Forum Meeting was held on November 9, 1990 at 4.45 pm :

Chairman : Prof Krishan Kumar
General Secretary : Shri C P Vashishth
Rapporteur General : Dr P S G Kumar
Rapporteur : Mr Abraham Philip

Dr P K Jaiswal (*Delhi*) : With the introduction of 'new technology' in libraries, types of duties and responsibilities of library professionals are likely to change drastically. ILA should take-up this issue for a detailed study and discussion and evolve suitable standards.

Shri Ahmed Sultan (*Hyderabad*) : Thanks to Dr Mahajan for the arrangements he made. The guests should have been received at the station.

Prof Krishan Kumar (*President*) : I have admiration for the delegates for their full attendance in various technical sessions and for their active participation. It appears that the quality of papers is increasing gradually. Sending papers within the stipulated time will help the Association in bringing all of them in the volume.

43 Council Meetings

The Council of the Association held its meetings on the following dates to transact its business :

23 June 1989	7 April 1990
7 November 1989	26 December 1990

44 Executive Committee Meetings

The Executive Committee of the Association met on the following dates to transact its business :

5 April 1989	28 March 1990
23 June 1989	7 April 1990
29 October 1989	14 July 1990
2 December 1989	25 November 1990
2 February 1989	9 December 1990

45 Amendments to ILA Byelaws

The Council of the Association in its meeting held on April 7, 1990 revised the membership subscription rates in respect of the following categories :

Ordinary member	—	Rs 40 per annum
Institution member	—	Rs 250 per annum
Association member	—	Rs 200 per annum
Life member	—	Rs 400

5 CONFERENCES, SEMINARS, LECTURES, WORKSHOPS ETC

51 XXXV All India Library Conference

511 *Inaugural Function*

The Jayakar Library and the Department of Library and Information Science, University of Poona, Pune (Maharashtra) hosted the XXXVth All India Library Conference of the Indian Library Association at the Abasaheb Garware College Campus in Pune during November 7-10, 1989. The Conference was held for the first time in Poona and after a lapse of four decades in Maharashtra. The occassion reminded many professionals that Indian Librarianship has traversed a long path and earned for itself a well recognised position in the tapestry of national development.

The lead to organize this Conference was taken by Dr S G Mahajan, University Librarian and Head, Department of Library and Information Science, University of Poona. The inaugural function was attended by

over 750 delegates and invitees. Over 450 delegates drawn from all parts of the country registered themselves for the Conference.

The Conference was inaugurated in the Abasaheb Garware College Auditorium which was chosen as the venue for the conference. Sarva Shri Dr S C Gupte (Vice-Chancellor of the University of Poona), Dr R A Mashelkar (Director, National Chemical Laboratory), Professor Krishan Kumar (President of the Conference and the Indian Library Association), Dr S G Mahajan (Organizing Secretary), Shri C P Vashishth (General Secretary, Indian Library Association), and Dr M B Konoor (Joint Organising Secretary of the XXXV All India Library Conference) were seated on the dias. Dr S G Mahajan thanked the Executive and Council of the Indian Library Association for accepting the invitation of the University of Poona to hold the XXXV All India Library Conference in Pune. Dr S C Gupte the Chairman of the Reception-cum-Organising Committee and the Vice Chancellor of University of Poona welcomed the delegates and wished rewarding time in Pune. He thanked the Indian Library Association for chosing "*Standardization in Library and Information Work and Services*" as the theme of the seminar which is very significant in the present day context. He was joined by Shri Bala Sahab Rout, Mayor of the city in extending a warm welcome to all the delegates. Dr R A Mashelkar, Director of the National Chemical Laboratory, Pune gave the inaugural address and declared the Conference open by lighting a lamp. Shri Madan Bafnaji inaugurated the Exhibition by cutting a tape.

At the inaugural function, eminent librarians and bibliographers in Pune were felicitated. They include editors of the Date Suchi Mandal Shri Shankar Narayan Barve, Shri N M Ketkar, Shri Anant Joshi, Dr V D Divekar, Professor K S Hingwe, Dr M P Pethe, Professor T H Lagu, Dr S G Mahajan and Professor M R Riswadkar. The felicitation was followed by the Presidential address of Professor Krishan Kumar who spoke on "Indian Librarianship on the Crossroads".

While elaborating on his theme he said that : "In our times, there has been unparalleled growth of information, unprecedented development in information technology, and cuts in library budgets. In the late 1980s, libraries are operating in a setting, which has become more complex than ever before. New information technologies have become available as a means to improve library services and operations. A large number of information services and products are available commercially for a library to choose from. In this environment, library's role in technology and information oriented society needs to be reexamined. The main concern is to find out how libraries can adopt themselves to new environment so as to fully support the nation in achieving its goals.

The 1990s shall be a decade of great challenge for Indian librarianship.

Library being a social organization has to operate in different kinds of environments both internal and external. It is affected by social, political, economic and technological factors. It must respond to the changing environment. In the years ahead shortage of funds will continue. Thus, there needs to be greater stress on provision of scrvices especially referral services, aiming to giving better value for money spent by the community being served. Resource sharing will gain added importance. Library and information networking would become order of the day. There is every possibility that libraries would be asked to earn a part of their funding through cost-based services.

Professionals will be increasingly expected to fight for their status, salaries, etc. They will have to compete with scholars/system analysts/ computer scientists for top positions in large libraries/documentation centres/information centres. In view of above, role of library associations will become extremely important. They shall have to pursue authorities, exert pressures, organize campaigns for preserving the interests of the profession and upholding of their dignity and status. It is only strong national and state associations which can make it possible for the profession not only to survive but also take it forward.

I have no doubt that Indian Library Association shall play an increasingly important role in the future scheme of things. I wish to inform the distinguished audience that in 1992, Indian Library Association shall be the host to 58th IFLA General Conference to be held at New Delhi. The theme shall be 'Library and Information Policy Perspective'. We expect more than 2000 librarians from abroad for the event. Incidently, 1992 is also the centenary year for the celebrated Librarian Dr S R Ranganathan, and indeed, doyen of the Indian librarianship. We intend to celebrate Ranganathan's centenary year in a befitting manner. Thus, great tasks lie ahead of the Association. These are big responsibilities, which would require your cooperation and goodwill for successful completion of the tasks".

The Presidential address of Professor Kumar was followed by the thanks proposed by Dr M B Konnur, Joint Organising Secretary of the XXXV All India Library Conference.

512 *Seminar on* : ' *Standardization in Library and Information Work and Services*"

The Seminar was Directed by Shri A K Dasgupta, Research Officer, *Eenadu* and *Newstime*, and formerly Librarian, Administrative Staff College, Hyderabad.

Prof Krishan Kumar, President, Indian Library Association welcomed the participants and introduced the Director, Rapporteur General and Rapporteurs of Session-I.

Session I 8 November 1989 **9.25 to 11.20 am**

Theme : General Aspects
Director and Chairman : Shri A K Dasgupta
Rapporteur General : Dr P S G Kumar
Rapporteurs : Ms A Amudhavalli and Mrs Neela Jagannathan.

Session II 8 November 1989 **12.00 noon to 1.35 pm**

Theme : Standards Relating to Intellectual Content of Documents
Director : Shri A K Dasgupta
Chairman : Shri N B Inamdar
Rapporteur General : Dr P S G Kumar
Rapporteurs : Dr (Ms) N Jagannathan and Ms A Amudhavalli

Session III 8 November 1989 **2.00 to 4.20 pm**

Themes : 1 Standards relating to bibliographic records;
2 Library and information systems;
3 Reprography and document reproduction; and
4 Mechanisation and automation.

Director : Shri A K Dasgupta
Chairperson : Smt Kalpana Dasgupta
Repporteur General : Dr P S G Kumar

Session IV 9 November 1989 **9.00 am to 12.00 noon**

Theme : Service Aspects
Director : Shri A K Dasgupta
Chairman : Prof A C Tikekar
Rapporteur General : Dr P S G Kumar
Rapporteur : Shri R M Kumbhar

Session V 9 November 1989 **12.15 to 1.15 pm**

Director : Shri A K Dasgupta
Chairman : Dr P A Mohanrajan
Rapporteur : Dr P S G Kumar

The Proceedings of the seminar were published separately and mailed to all the members of the Association.

Concluding Session

Prof Krishan Kumar, President, Indian Library Association presided the Concluding Session held on 10 November 1989 at 9.00 am, with Messers A K Dasgupta (Director), S Parthasarathy, P S G Kumar, Ms Kalpna Dasgupta, A C Tikekar, Philip Abraham (Rapporteur); and C P Vashishth (General Secretary, ILA) seated on the dias.

In the beginning the Chairman/Rapporteurs gave a brief resume of the discussion and resolutions adopted at the Central Sectional Committee Meetings that took place in the afternoon (2.00 to 3.30 pm) on 9 November 1989.

513 *CSC Meetings*

(i) CSC Meeting on School Libraries

The first to present the report was Mrs Kalpana Dasgupta, Chairman, CSC on School libraries. She gave the following recommendations of the Committee :

1 All schools should have a library and a full-time librarian.

2 *Finance* :

(*a*) A minimum of Rs. 10,000 should be earmarked for setting up of a school library.

(*b*) A recurring expenditure of Rs. 25 per student of Secondary and High school; Rs 15 per student of Middle and Primary school; and Rs. 100 per teacher should be provided in the budget.

(*c*) The amount be revised, if needed, every three years.

3 *Staff*

The following staff is suggested at different levels:

Higher-Secondary School
Senior Librarian
Librarian

Assistant Librarian	1
Library Attendant	1

Secondary School

Librarian	1
Assistant Librarian	1
Library Attendant	1

One post of Asstt Librarian be added per 34 library periods per week in Secondary and Higher Secondary schools.

Middle and Primary Schools

Librarian	1
Library Attendant	1

Qualifications—Senior Librarian must be holding Master's degree in one of the subjects and degree/diploma in library science, *or* MLISc.

Librarian must be atleast a graduate with B. Lib. Sc/Post-graduate diploma in library science.

Asstt Librarian must be Higher-Secondary/Senior Secondary and Certificate in Library Science, *or* Diploma from a Women's polytechnic.

Library Attendant may be a Matriculate with some library experience.

4 *Status* : The Librarian should have all facilities and privileges including promotional avenues enjoyed by teachers.

5 *Functions* : The general functions of a School Librarian are :

I Provide information to teachers and students;

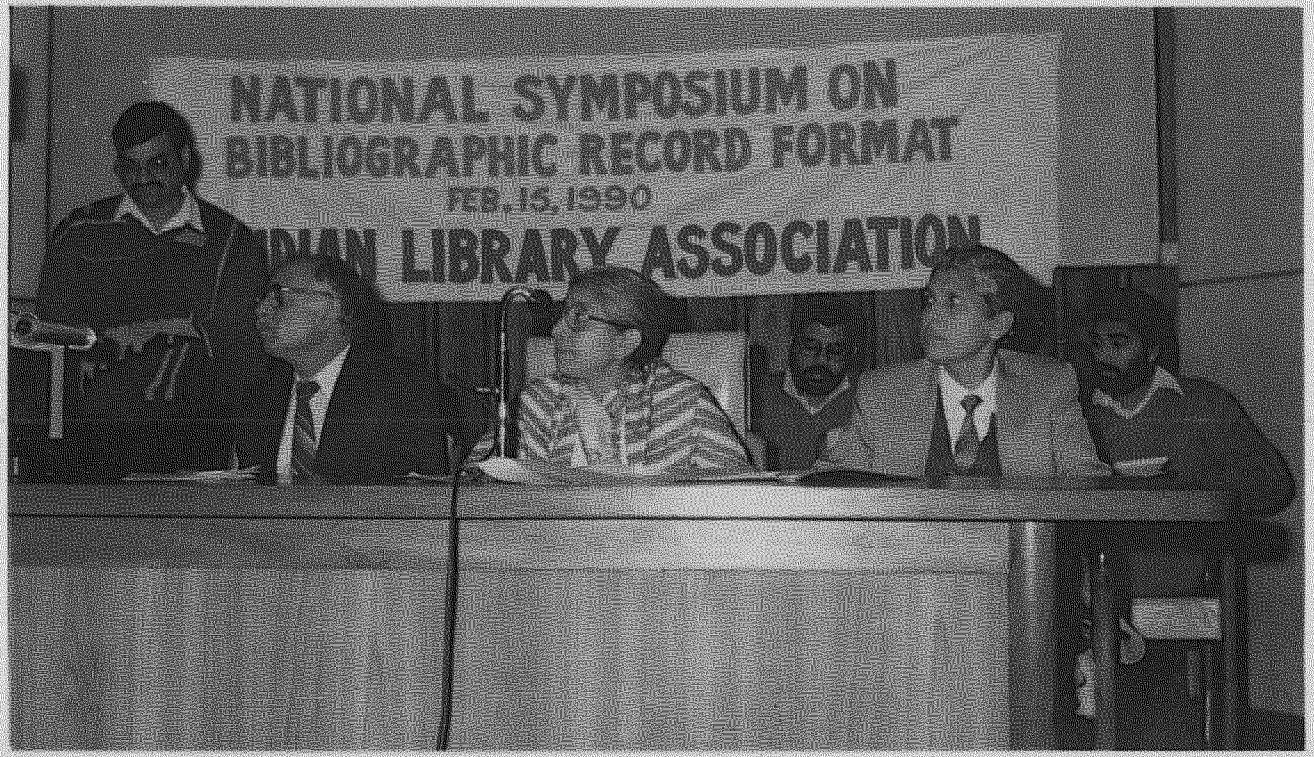
II Provide reading material to teachers and students;

III Encourage and assist teachers in adopting 'Library centered' teaching;

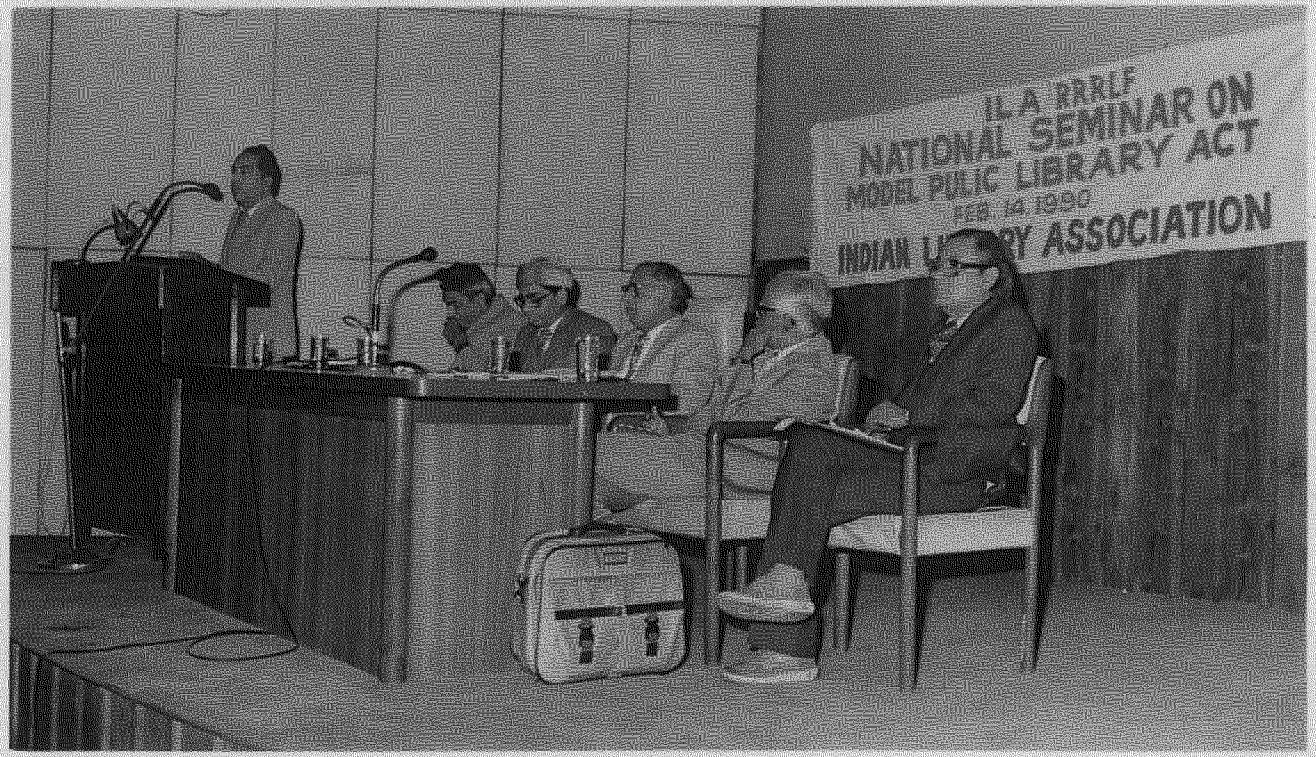
IV To create interest among students in libraries and inculcate reading habit;

V Provide suitable guidance to students in the use of reference works and facilitate independent learning.

35TH ALL INDIA LIBRARY CONFERENCE
7-10 NOVEMBER 1989



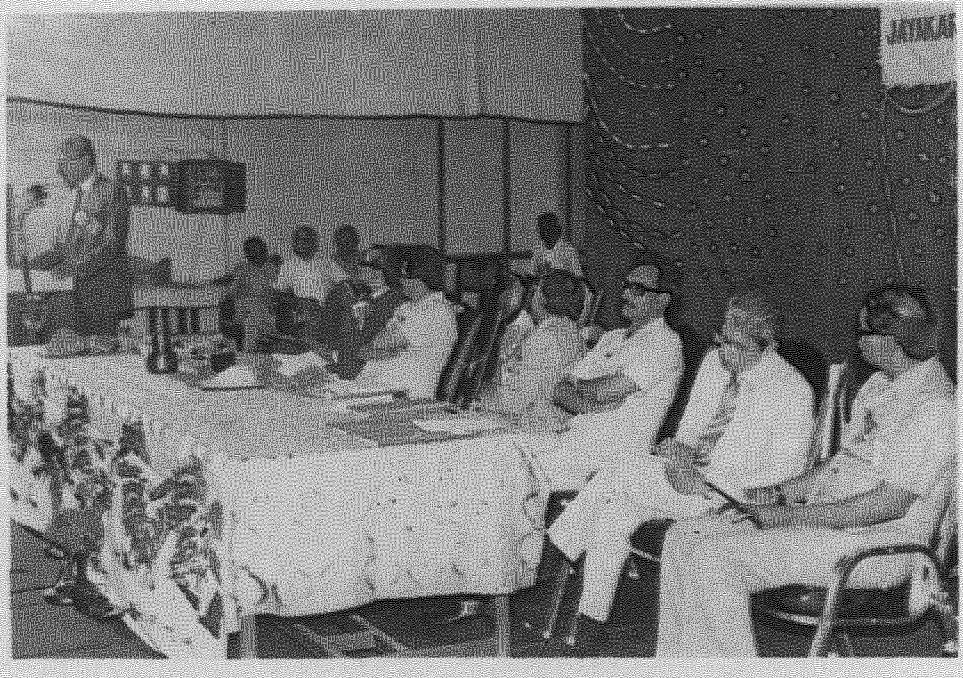
Mrs Kalpna Dasgupta, directing National Symposium on Bibliographic Record held at New Delhi on February 15, 1990



Dr P S G Kumar giving his views in ILA-PRRLF National Seminar on Model Public Library Act, held at New Delhi on February 14, 1990



A view of the audience of Seminar on Bibliographic Record Format



Dr R A Mashelkar (Director, National Chemical Laboratory, Poona) delivering the inaugural address

6 *Service* : Apart from general library services, special effort be made for organising book exhibitions, conduct story telling, prepare reading lists, etc.

Discussion

Prof Tikekar : Women's associations should start children's libraries. Special care is needed in illustrating children's books. Comic books develop reading habit.

Shri A K Dasgupta : Comic books do not develop good reading habit.

Shri A L Kapoor : A loss of 4 titles per thousand circulated be considered as norm.

Shri Nasib Chand : In view of special nature of children's books the general norm of 4 titles per thousand circulated cannot be applied. Wear and tear is bound to be more in children's libraries.

Dr Patel (Bombay) : Writers be encouraged for producing children's literature.

Shri Inamdar : There is need for cooperation between public library and school library in providing library service to children.

(ii) CSC Meeting on Library and Information Technology

Mrs Rhoda Barucha, Chairman, CSC presented the report.

The Working document which was prepared for developing Library Automation Standards was discussed in detail, Standardisation is essential in the following three broad areas: (1) Information Processing, (2) Communication, and (3) Software. Only the first area was discussed.

1 It was resolved that we should develop a common bibliographic record structure based on AACR2 and CCF, by taking into consideration international guidelines and standards.

The US-CIP data could be used for cataloguing and original cataloguing should be done, only when CIP data is not given.

Most libraries follow either DDC or UDC classification numbers. These could be taken from CIP data. The UDC numbers could be located either from the subject headings or from the DDC schedules.

Before the record structure is finalised the decision on retrospective

conversion should be taken, as the record structure for the new accessions will have to be the same.

For bibliographic description, each optional rule given by AACR2 was discussed separately. Optional Rule nos 1.1E5 to 4.5D2 were discussed. It was felt that librarians of specialist libraries should take a decision regarding rule numbers 5 to 10, since these rules cover Music Records, Motion pictures, Graphic material, Computer files and Three dimensional artefacts.

It was suggested that the First Level of description of AACR2 would suffice.

2 As the Common Communication Format (CCF) has been developed by incorporating features of both the UNIMARC and the Reference Manual, it was decided that CCF should be implemented.

Since several Database Production Manuals had been prepared in the country, this was not covered in great detail.

3 Authority files have to be created for rendering of personal names, subject headings etc, after identifyng the work that has been done.

4 Develop a database production manual, which will define in detail each data element of the record and also provide rules for the bibliographic description of all data elements.

5 As soon as the record structure and databse manuals are prepared, statewise intensive workshops need to be held, in which the record structure and rules should be discussed threadbare to enable libraries to follow them.

6 To eliminate the collosal technical processing wastage it should be made mandatory to provide CIP data in all books published in India in any language.

(iii) CSC Meeting on Academic Libraries

Prof Tikekar gave a summation on the deliberations in the absence of Prof M K R Naidu (Chairman).

1 *Library Budgets* : There has been a wide variation in the budgets of college and university libraries. Further, the budgets are shrinking from time to time. In view of this, the committee felt :

(*a*) Library budgets should not have salaries of staff as their components.
(*b*) There is need for special allocation for reference books.
(*c*) Separate budget allocation is also needed for A-V material.
(*d*) Non-recurring budgetary provision is needed for replacement of old equipment.
(*e*) 10% of the institutional budget be allocated for library.

2 *Modernisation* : Special funds are needed for modernisation of university and college libraries. Library automation, microfiling needs special attention.

3 *Maintenance* : Special as well as recurring grants are needed for building, extension, maintenance, binding, etc.

4 *Services* : Special attention need to be given for reference, documentation and user education.

Indigenous library equipment need to be developed for providing automated services.

Photocopying service should be encouraged and made cheap.

5 Librarians should be involved in teaching library science.

Discussion

Shri A L Kapoor : Private firms be given room in the university/ college libraries for providing photocopying service. Physically handicapped be employed in these areas wherever possible.

Shri Goutham : Librarians be designated as Professors in Library Services, Assoc Professors in Library Services, etc.

Shri Nasib Chand : All states should be compelled to implement the UGC scales within the plan period. Librarians should have facillties for medical, sebatical, academic, FIP, etc, like the teachers.

Shri Giridhari Singh (*Imphal*) : Minimum standards are needed for backward regions.

Shri B L Bharadwaj : It pains me when I look to the growing tendency among young professipnal, to the feeling of shyness to be called as

librarians and disassociating from the basic tenet of librarianship and ethics of the profession.

Shri K S Hingwe : I do agree with Mr Bharadwaj and feel sorry for the inferiority complex growing among young librarians.

Ms Bhawani : The problem of Medical College librarians with regard to scales and status is deplorable.

Dr Mohanrajan : There are instances where librarians are promoted as Registrars and Vice-Chancellors. We should not feel sorry of our profession and the status of a librarian.

(iv) CSC Meeting on Engineering and Technology Libraries

In the absence of Ms P G Joshi, Mr David (Dhanbad) presented a report on the deliberations.

1 There is a need for model staff structure of engineering and technology libraries.

2 There should be parity in pay scales among librarians of engineering and technology libraries in India.

3 The constitution of a 'Library Committee' be dispensed with. The librarian should be given a free-hand in running the library.

4 The librarian should be given more and more financial powers.

5 Merit Promotion Scheme be made applicable to librarians of engineering and technology libraries.

Shri A M Deshpande : ILA should send a copy of the standards decided for technical libraries to Indian Society of Technical Education for consideration.

(v) CSC Meeting on Public Libraries (Report not presented in the Session)

The Meeting was Chaired by Dr V Venkatappaiah, Chairman, CSC on Public Libraries. Shri M Kanakachary, Asst Librarian, CIEFL, Hyderabad acted as Rapporteur.

Table 1

Hardware	*Software*	*New Apptication Areas*
Fast local storage	Assembly Language	Specific and Technical
Improved logical functions	Subroutine Libraries	
Miniaturization and reliability (translators)	Batch operating systems	Business data processing
Fast backing storage on drums and discs	File handling utilities	
Large machines	High level languages	Multi-user, general purpose computing
Miniaturization and cheapness ('Chip')	(On-line operations Networks	Remote access
Cheap bulk storage	Problem oriented languages	User-oriented systems
Microcomputers	Artificial Intelligence	Adaptive and 'expert' systems

3 COMPUTER SYSTEMS DO NOT COPE AT ALL WELL (YET) WITH

- Indeterminate requirements (but watch for developments in artificial intelligence (AI);
- Highly complex processes handling small data volumes (because it is usually uneconomic in the software investment required);
- Tasks requiring judgement or "commonsense" (but again, watch for AI development).

A library is, therefore, likely to find its best application in one of three groups as follows:

Firstly, and probably, the most common project in special libraries, comes the use of the storage, indexing and retrieval functions to handle catalogues and bibliographic files, patent literature, reprints, standards and internally generated reference material; and experimental data.

4 MECHANIZED SYSTEM

A mechanized system will introduce significant changes in relationships among the library staff and its readers.

41 Objectives, Time Schedules and Budgets

The first most importaunt step in the management of a mechanization program is the definition of objectives for it, because program must be compatible with library policies, both as documented and as generally understood. The situations that led to the decision to undertake a modernization program should be analyzed. Usually, these include demands for change coming from higher governing bodies, requirements for new services in response to changing conditions, increasing backlogs that result from inadequate budgets, staff, of space; and intolerable time delays in processing. In any case, program objectives must be established that reflect both library policies and current and anticipated needs. A typical list of library computer applications, representing quite specific object is shown in Table 2.

Table 2 : Typical Library Cnmputer Applications

ACQUISITION	
Books	
Selection lists—duplicate checking	
Purchase orders	
On order list (or in process list)	
Expenditure	
Receiving	
Accounts recording and check issuance	
Call down cataloguing copy	
Catalog department expediting	
Desiderata list	
Financial status and forecast	
Historical file by	
1 Vendor	2 Date
3 Account Number	4 Author
Vendor performance analysis	
Criterion performance analysis	

Journals

Renewal notices (letter or list)
Renewal orders
Current status
Receiving reports—accounting records when appropriate
Check in cards claiming
Binding recall
Subscription summary by :

1 Vendor	2 Library
3 Group	4 User

Routing
Financial forecast
History
Cost increase analysis

Reports

Ordering	Assignment
Cards	Spine labels
Circulation records	Announcement Bulletin
Printed report Catalogue	Shelf list
Weeding list	Fund balances

CATALOGUING

Input to catalogues (Worksheets, Pre-cataloguing information)
Cataloguing production

1 Sets	2 Sorted sets

Classification schedules
Subject authority file
Shelf list
Printed book catalogue
Announcement bulletin
Book card, pockets, spine labels
Serial list

Table 2 (*contd. on page* 36)

Table 2 (*contd. from page* 35)

CIRCULATION

Overdue
Inventory lists
Reservices
Activity (e g do we need to order more copies)
Location of additional copies

REFERENCE

Bibliographic preparation

SERIALS

Union list of serials :
1 Alphabetical by title
2 Subject arrangement
Union list by library

DISTRIBUTION

Address labels

ADMINISTRATION

Management information :
Current cost and projected costs, effected of projected action
Exception reporting (absence, overtime)
Modelling techniques
Personnel information

FILM LIBRARY

Film scheduling
Delivery scheduling
Replacement prediction—also maintenance

CENTRALISED CATALOGUING INPUT

Catalogue work-sheets (proforma sheets)
Cataloguing cards (sets and sorted sets)
Book selection lists (by subject type, Classification type)
Lists of serials
Lists of foreign language translation (by Subject, Classification type)
Book catalogue unit.

The importance of this approach to library automation should not be underestimated. Because of these conditions, such a progression should be planned around a logical succession of systems that perform essentially the same functions but at increasing levels of sophistication. (Table 3).

Table 3 : Typical Time Schedule of Functions for Each Stage

Stage	*Time*	*Functions Continued*	*Functions Changed*	*Functions Added*
1	Present	All existing functions, all existing levels of activity		
2	In 4 years	Present methods of selection Cataloguing and Reference	Punched card systems for Circulation control, Punched card system for ordering. Substantial increase in library loan.	Computer book catalogue (as part of a Library system) TWX for inter-library loan, cost accounting
3	In 6 years	Present methods of selection and reference TWX for inter-library loan cost accounting	Batch Computer systems for serial record control. Circulation control, ordering and catalogue production	Facsimile transmission
	In 10 years		On-line Computer Systems for serial record control, Circulation control, Ordering, and catalogue production	Batch mechanized reference service—including 'Selective Dissemination' Computer file search

The management-planning task, assisted by the library system analysis staff, is to delineate the functions that are to be served at each stage in the progression.

The critical use in this planning process includes :

1 the economic value to be expected from including changing, or even deleting functions;
2 the logical progression in conversion from an existing function to another, more sophisticated one (for example, in transition from a Card-catalogue to a computer produced book catalogue to an 'On-line' Computer catalogue;
3 the need to relate with other efforts in other libraries;
4 the availability of budget and personnel;
5 the availability and reliability of the necessary hardware and software;
6 the flexibility and ease of change; and
7 the consistency with the ultimate objectives.

42 Management of Mechanized Library System

The importance of this approach to library automation should not be underestimated. Libraries, as operational agencies, require that throughout development there must be some level of system at all times in regular, fault scale operation in the library, even more significantly is the necessity that they be capable of sustained, economic operation indefinitely.

The management-planning task, assisted by the library system analysis staff, is to delineate the functions that are to be served at each stage in the progression.

The process of development and implementation of a mechanized library system is complicated and involves a large number of people. The tasks that are to be carried out must be assigned to a development staff, and time estimates must be established for each task with a target date for its start and finish. This process is shown in Table 4.

5 CONSIDER CHANGE-RELATED FACTOR

Organization can be considered as comparing tasks, tools and people and structures for these three elements. The introduction of change requires that the effect on the whole system and its sub-elements is considered. A key-area is the interface between machine and people. Activities which are additional, superfluous and altered must be identified and quantified together with any variations in human efforts.

Table 4

Sl No	*Steps*	*Objectives*	*Tasks*
1	Feasibility Analysis	Based on a statement of Library's requirements, an estimate must be made of the resources required for the project, a summary projection plan must be prepared, and cost versus benefits comparison must be made.	1 Need to determine the general requirements to be met. 2 Need to determine the necessary development activities including the numbers and identity of any subsidiary efforts. 3 Need to eliminate the development costs for each step on task. 4 Need to check the reasonableness of estimates. 5 Need to prepare a summary budget plan for development. 6 Need to estimate the costs of both existing and proposed application. 7 Need to prepare a cost-benefits evaluation of the proposed application. 8 Need to estimate the personal requirements.
2	Requirement Specification	This step consists of detailed study of the existing library system and the formulation of the opera-	1 Need to determine the Library's system requirements in detail. 2 Need to analyse the Library's environment including projects which must be compatible.

Table 4 (*continued on page* 40)

Table 4 (*contd. from page* 39)

Sl No	*Steps*	*Objectives*	*Tasks*
		tional requirements for the proposed system.	3 Need to determine the needed computer program character 4 Need to compare with similar systems. 5 Need to prepare performance specifications. 6 Need to assure concurrence of library policy makers with systems. 7 Need to performance specifications.
3	Detailed design	Based on the requirement specifications, this step proceeds to the definition of detailed design for both the computer system and the library personnel involved. It results in documents that detail the functions to be programmed as well as operating procedures for personnel.	1 Need to Interpret the requirement specification in terms of specific equipment, volume of activity, response times and operating environment. 2 Need to produce a system flow diagram. 3 Need to define 'interface' with other activities in the library on other libraries. 4 Need to specify computations, logical manipulations, and transformations within each part of the library function to be done by the machine. 5 Need to design the formats and organizations of all forms and files, including machine stored records.

			6 Need to develop requirements for editing, formatting, storing and updating of the machine stored data. 7 Need to produce documentation of detailed design. 8 Need to define test requirements. 9 Need to indoctrinate programming personnel.
4	Computer Programming	Based on the detailed design specifications, this step proceeds with all work necessary to produce, document, and test computer programs. It results in a completed computer program end product, tested for conformity with detailed specifications.	1 Need to flowcharting, each component computer program. 2 Need to specify all input and output forms. 3 Need to programs writing according to flowcharts or other program design documentation. 4 Need to compile and check the programme code, and make necessary error corrections. 5 Need test the programme of each individual program and of the total program system.
5	Computer Prog-functional test	This step covers demonstration test of the computer program system, for the library management, usually in a	1 Need to conduct the test according to plan. 2 Need to analyze the test results. 3 Need to intimate any modifications needed for computer programs. 4 Need to document the test results.

Table 4 (*contd. on page* 42)

Table 4 (*contd. from page* 41)

Sl No	*Steps*	*Objectives*	*Tasks*
		situated environment at the library. Included are the conduct of the demonstration tests and analysis of the test results.	5 Need to establish change procedurs.
6	Installation and implementation	This step covers all necessary work to install the system in the library. It includes training as well as activities for conversion from the existing manual operation.	1 Need to prepare documentation for the library staff. 2 Need to supervise the conversion of the data required make system operational. 3 Need to develop a training plan for the library staff. 4 Need to conduct a training programme.
7	Maintenance	System maintenance is required for improving, changing, and correcting operational programmes. Revisions are needed because operational requirements are continually changing during both the development and operation of the system.	1 Need to develop a maintenance plan and an organization. 2 Need to provide continuing communication between the library operating staff and the computer programmes.

6 AVOID PROBLEM AREAS

- Do not introduce new technology abruptly with minimum consultation.
- Avoid introducing new technology in one part of a unit in such a way that the special status of those involved breeds resentment in other parts thereby undermining future attempts to extended system.
- Recognise that the availability of new technology may lead to suitable transfer of power within the unit or even to others outside it, for example the computer specialists.

7 CONCLUSION

It would be useful at the outset to go back to basics and briefly review the reasons for considering the use of computers in library and information services. We are talking about information handling and information is derived from the assembly, analysis or summarizing of data into a meaningful form. Information can be stored in a variety of ways : in notebooks, in registry files, on index cards, on punched cards, can be stored mechanically and magnetic media (tape or disc) need a computer.

Now, for large or complex collection of data, a computerised system can provide greater speed and ease of access than a manual system. Handling information is easier and searching can be carried out in more sophisticated ways than is practicable by other means. In addition, it allows the information to be distributed and shared with remote users who can simultaneously access the same information over large distances.

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COMPUTERISATION OF UNIVERSITY LIBRARIES —A CASE STUDY OF UNIVERSITY OF HYDERABAD UNIVERSITY

E RAMA REDDY*
K NAGARAJA RAO**
MOHD BURHANUDDIN***

0 BACKGROUND

The University of Hyderabad was established by an Act of Parliament in 1974. The University started functioning since 1975. The attempts to automate library functions of the University Library started since the establishment of the School of Mathematics, Computer and Information Science, in the University. A number of MCA and DCA students have worked out previously projects on acquisitions, circulation, decision support systems etc., The studies included from the exploratory study to planning and evaluation of the systems to writing down computer programs to work out with sample data. These projects have provided an awareness of the complications involved in automating library functions on one hand and the flexibilities and benefits acrued out of them on the other hand.

With this background the University of Hyderabad Library procured a PC AT Intel 80286, with 80 Mb Hard disk, 3 MB memory in the year 1988.

1 INTRODUCTION

The priorities to automate the library functions are drawn. These priorities are established keeping in view (i) Reduction in manpower needs, (ii) Improvement in the efficiency of the system, (iii) Involvement

*University Librarian i/c.,** Documentation Officer, and *** Professional Assistant, University of Hyderabad, P O Central University, Hyderabad-500 134.

of all the concerned, (iv) Not to disturb the practices and conventions followed earlier, (v) Easy to automate and quickly to show the results to the management, and (vi) To sell the idea of total automation at a future date. The analysis quickly resulted in identifying cataloguing system as the priority area for computerisation. As a routine when a publication is received in the technical section it is catalogued on a 5 × 3 inch slip using *AACR I* and *Cutter Tables*. Then it is classified and handed over to the typist for making the multiple cards. The typist makes stencils of the catalogue slips which are proofread and corrected and handed over to the duplicator to make required number of catalogue cards. The catalogue cards are given back to the typist to add additional author, title, subject and series headings for filing in the catalogue cabinets/trays. The slips are back to the classifiers to include in the "Monthly List of Additions" of the library. Once the month's cards are accumulated they are again handed over to the typist after arranging them in the required sequence with proper Main and Sub Subject Heading for making the stencils to bring out the Monthly List of Additions.

Quite a number of times the catalogue slips and catalogue cards are passed between typist, classifier and duplicator etc, making the work to progress relatively slow. Hence there is always a back log of publications for processing at each of these stages. The error proneness in both the products, that is, catalogue and Monthly List of Additions is high.

11 Cataloguing Systems

It is felt that computerisation of the catalogue system will not only provide immediate relief to technical section but would also help in capturing the data in machine readable form for future use. The system was designed in d BaseIII + to do the following functions:

1 To enter data
2 To update entered data
4 To print a proof copy of data
4 To produce catalogue cards on continuous card stationery
5 To produce Monthiy List of Additions
6 To update data on to a Master database
7 To update indexes for searching
8 To search the data
9 To make special bibliographies
10 To quit the system

Sufficient care is taken to follow all the established library practices and local variation in the cataloguing. The system provided to clearly

identify various important fields in the description of a publication. The data entry is very easy, the same catalogue slips which were given to typist were brought along with the person and made to enter into the computer. Within a few hours of training the typists were converted to data entry operators. The data entered was prinied for verification and handed over to the technical section for corrections. The corrections are carefully brought into the data through update mode. The completely error free data is used to generate the catalogue cards in the required fashion. The programs themselves decide the number of cards to be printed and the heading to be included. Word wrap facilities are ncluded not to break the words in between, and the classification number also can be folded whenever necessary. The software has the facility to print continuous cards upto three for each publication, The headings are differentiated using a variety of print control characters. Then the process for Monthly List of Additions is initiated. The subject headings are standardised as major and minor with flexibility to add, delete, and modify at any place with 4.2 decimal structure. The total data is sorted according to class number and given to the technical section for providing group codes which automatically identify the subject headings. The data is updated to include group codes and once again sorted according to group codes and master copy is printed for duplication. Here the subject headings and call numbers are emphasized and word wrap facility is included. The number of entries in each page depends on the number of lines each entry occupied and no entry is broken into different pages.

The search system searches the data by author, keyword, accession number, class number and browses from a given class number. It is possible to bring out subject bibliographies using the results of the search software after sorting the data and eliminating the duplicates.

The total system is functioning since April 1989 and till now about 10,000 publications have been processed using this software. A flowchart showing the cataloguing system is given in Appendix-I.

2 PERIODICALS DATABASE

During the ordering of periodicals it was found that the same periodical lists are printed in a variety of formats at a number of times. Hence an analysis of the elements used for arranging the periodicals in various formats is carried out and the data is entered in the format. Thus periodical lists in a variety of formats having different data elements are produced to help the periodicals section in processing the periodicals effectively and efficiently. The outputs generated out of the periodicals database include:

1 Total alphabetical list of periodicals
2 Department-wise alphabetical list of periodicals
3 School-wise alphabetical list of periodicals
4 Vendor-wise alphabetical list of periodicals
5 Air mail periodicals data
6 Periodicals costing more than Rs 10,000
7 Periodicals with different rates of discount
8 Publisher-wise alphabetical list of periodicals
9 A combination of above lists

The data elements included are Serial number, Title of periodical, Publisher code, Delivery mode, Vendor code, Price in the Foreign currency, Currency Name, Price in Rupees, Discount, School code, Department code etc. A special publishers' address directory is created to call the information about the publisher and provide the same wherever necessary.

This database has helped in sending the periodicals lists to various departments for approval with cost estimates including escalation to send for the final approval of the competent authority, to order to individual vendors and also directly, to send final lists to individual departments, to bring out a consolidated alphabetical list for the use of the library along with publisher address and all other information.

3 UNION LIST OF CURRENT PERIODICALS

With the success of the above two databases it was thought necessary to know the periodicals available with other libraries of Hyderabad, which helps in building the resources and helps in library cooperation. A database was created consisting of 5,642 individual periodical titles representing 30 significant libraries of Hyderabad. The data contains the complete title of the periodical and the code of library subscribing to it. This database is also made available in printed form with two column printing and word wrap facilities. The copies are distributed to all participating libraries for their use. Plans are ahead to update the data and to include more number of libraries. The software developed can print alphabetical list of periodicals, for a given library or for a group of libraries. It is also possible to check up levels of duplication and identifying the duplicate titles between two or more libraries.

4 STAFF DATA

A small database is also created keeping the personal data of the staff working in the library to help in decision making regarding personnel

policy framing. It is possible to print the data on individual sheets, and also to print mailing addresses of the employees of the library.

5 INFORMATION RETRIEVAL

In the information retrieval area the library is coordinating the SDI services of National Centre for Science Information, Bangalore and SNDT Women's University, Bombay. The searching of the CD-ROM databases for Medicine, NITIS and CAB is coordinated in the Library, as they are available in Hyderabad. The DIALOG services are routed through INSDOC or NAL.

6 LIBRARY AUTOMATION

The authorities provided enthusiastic support to the activities carried out in the introduction of computer culture in the Library. Till now automation is used to provide printed products of the Library, but the real goal is to use the computers for on-line library function. The applications developed earlier are based on MS DOS operating systems which are basically single user oriented and sharing the same data over multiple applications and machines is difficult. A library software is identified which can lead to the goal of on-line library database without disturbing the existing data created. After going through various library application softwares, the Library has procured LIBSYS software to automate the library functions, which contain the following.

1 Acquisition system
2 Cataloguing system
3 Serial system
4 Public Access system
5 Circulation system

61 Salient Features of LIBSYS Software

Acquisition Sub-system : It deals with ordering of library material, receipts, monitoring, invoice processing and accessioning. It also maintains expenditure analysis by budget heads.

Cataloguing Sub-system : The cataloguing sub-system makes available various catalogues/indexes online for instant reference. It has a powerful data entry facility which also provides option to accept data in standard machine readable formats such as LC MARC, OCLC, etc. This system provides special facilities to generate special bibliographies, thesaurus

construction, current awareness services, SDI, and import/export of bibliographic database in standard exchange formats, meeting specifie requirements of a library.

Serial Sub-system : The serial sub-system provides control of periodical subscription and subsequent monitoring of the scheduled arrival of individual issues. It maintains record of budget sanctioned for serials under different categories, amount encumbered and expended, thus providing complete budgetary control. This also handles serials which may be on gratis or on exchange.

Public Access Sub-system : The Public access sub-system provides online facility to search the bibliographic database extensively which also includes keywords based search facility using Boolean operators by the library users.

Circulation Sub-system : The circulation sub-system maintains uptodate membership records and, the latest status of collection meant for circulation. It performs all the functions related to circulation providing suitable checks at every stage. It takes care of infrequent but routine functions such as bindery record management, display of recent additions and so on.

The greatest advantage of the LIBSYS is that it is an integrated multiuser system and a single database which can be shared by all the terminals. The data available on the machine readable form is also transferred into LIBSYS database for both catalogue and periodicals data. The implementation of the system for circulation is in progress, which would further reduce the routine needs of the Library in addition to improving the efficiency of the circulation system.

Till now all the records of authorised borrowers of the Library are entered. The information from the circulation records is being entered and updated to the database to cover the publications which have high probability of issue. Once such data is entered, then circulation system can be put to operation which requires only the borrower number and accession number to issue a publication and only accession number to return a publication. A few extra terminals in addition to the existing two terminals are being added to the system. It is envisaged that at least two terminals be provided with line drivers at circulation counter.

62 Future Plans

It is planned to implement the LIBSYS software on a real multiuser syetem with UNIX operating environment. The Library is looking for a system with about 16 terminals and and at least with 300 M B Hard

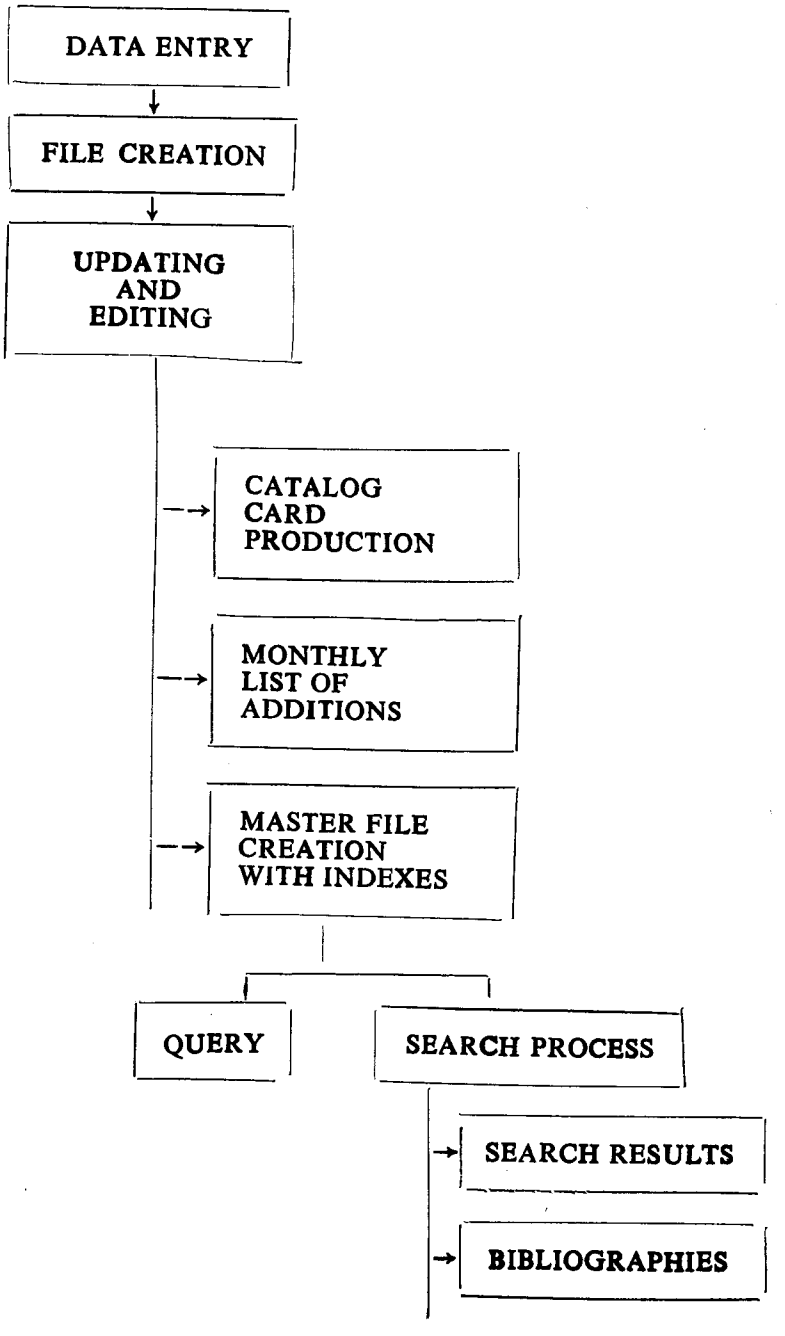
disks to store complete data of the library holdings. The new additions are automatically transferred into the database through acquisition and cataloguing sub-systems. The circulation system will also be strengthened with the integration of barcode system for check-in and check-out to the borrowers. The technology is available and experimentations are on to integrate the system into the LIBSYS modules. Plans are also ahead to procure a CD-ROM drive and make available the databases like maths science, Sociofile to thc users which are not available in Hyderabad. Within a short period the Library is also planning to access DIALOG directly through Modem and VSNL PAD for its information requirements.

7 CONCLUSION

Due to increase in technological developments the libraries in the developed countries have automated their library activities and are serving their users effectively. We in India should be in a position to study these facilities and introduce automation to suit our needs with our infrastructure like hardware and software, which would answer to our type of problems. The staff should be trained to gain confidence to handle new technology.

APPENDIX—I

CATALOGUING SYSTEM



COMPUTERIZATION OF RAMESH MOHAN LIBRARY DATABASE : ANALYSIS AND REVIEW

S S PRABHAKAR*

0 INTRODUCTION

It is a well established fact that in order to achieve progress, authentic data is an indispensable requirement. The *Weinberg Report* stresses on the vital importance of data collection and its presentation in various forms like tables, reviews etc, and which is usually done at specialised information centres, where experts can interpret and assess data, In such data centres computer techniques can be and have been most effectively used.

Database is defined as "A body of machine-readable records which is not created solely for a specific application, but may be regarded for some purpose as a homogenous collection." Databases are also called 'Data Bank'.

A database is essentially a file management system which comprises records and fields where a record is set of information of an individual or an item and distinct pieces of information are fields. A database must be a very good application generator to help the information specialist in achieving his goal of designing and developing in-house databases without programme assistance. A database is also a collection of stored operational data used by the application systems of some particular enterprises.

1 IMPORTANCE OF DATABASES IN ACADEMIC/RESEARCH WORK

A large number of research institutions and university departments are active in generating large amount of primary/secondary data as part

*Semi-Professional Assistant, Ramesh Mohan Library, Central Institute of English and Foreign Languages, Hyderabad-500 007.

of their research activities. Over the years most of these institutions have not only accumulated large volume of data but also have developed appropriate skills to handle the data processing and data organization problems with the help of computer technology. Therefore, it will be quite useful to involve important research centres in the task of data organisation and its effective utilization.

In any organisational set up such as libraries, information centres etc, it is essential for the librarian/information specialist to know the following:

- First hand information of the availability of databases and of centres providing services from them.
- Choosing the database most appropriate to any particular information need whether of current awareness or retrospective search purposes.
- Evaluation of various competing and overlapping databases.
- Knowledge of considerable amount of indexing techniques and vocabularies, as well as search strategies.
- Interacting successfully with users in order to determine the precise nature of their information needs.

For Science and Technology the range of databases available on the major online systems represents a more comprehensive selection of information sources than is usually contained in any one library, but the same is not true for the humanities. Though DIALOG has nearly 300 databases, only about 23-25 are classified as "Social Science and Humanities" databases. In 1988 these included *Linguistics and Language Behaviour Abstracts, MLA International Bibliography* etc. Such databases are a source of ready-reference to the research scholars.

3 RAMESH MOHAN LIBRARY DATABASE

The Central Institute of English & Foreign Languages, situated at Hyderabad is a deemed University registered under UGC Act in 1958. The Ramesh Mohan Library at the Institute caters to the needs of the staff and research scholars, specializing in the areas of Linguistics, Literature and Language teaching both in English and foreign languages. Documentation services here inelude monthly *Current Awareness Bulletin*, periodical compilation of select bibliographies and monthly additions list of books.

A good database consisting of books, periodicals, research reports, theses, guided by a well formulated document selection and acquisition policy should be available at any university/research institute which

contributes to the effective functioning of the information support services. The Ramesh Mohan Library database in principle, has all the above mentioned traits.

Whatever material is received in the Library is scanned and relevant documents are indexed. An indexing card is prepared usually for each indexed item and subsequently classified according to a broad subject head. Under a broad subject head, a sub-classification has to be developed. The Data Bank of Ramesh Mohan Library is a cumulation of Index cards used for compilation of bi-monthly *CIEFL DOC's: ELT, Linguistics and Literature* (a comprehensive documentation service) which started in 1981. The index cards are filed in the catalogue (under a seperate section) under different subject headings providing accecs to the journal articles published in the academic/research journals acquired in the Library.

Between January 1981 and July 1990, more than 3,500 documents including reports and periodicals articles have been indexed and subsequently a database/databank has been developed (Table 1).

Table 1 : Subject-Wise Break Up of Articles Included in Database (Jan 1981-July 1990)

Sl No	*Subject*	*Year*									
		1981	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*
	Linguistic	500	480	590	495	510	500	470	505	490	360
2	Literature	510	590	580	590	580	570	580	570	590	440
3	English Language Teaching	460	520	485	570	520	520	490	500	495	385

Any database may surely contain bibliographic units with any combination or permutation of the following elements:

1 Document Number
2 Bibliographic Information
3 Title (in original or translated language)
4 Author(s)
5 Indexing words or phrases
6 Abstract
7 Full text
8 Citations
9 Organisation originating the documents or author's address or both

However, these are not completely persent in the Ramesh Mohan Library database with only title, author(s), indexing words/phrases and

citations being included, with access to manual operation.

This technical service is presently operated manually and is provided to those who require necessary information relating to English language and literature with nominal charges.

There is no database yet constructed in foreign languages. However, the Nodal Agency for Foreign Languages, set up by the University Grants Commission in 1988 is carrying out some work in this regard which is still at an experimental stage.

4 SUGGESTIONS

Any new system when introduced for the first time is bound to face certain constraints, which are to be overcome in due course of time. These constraints are removed as and when certain factors like availability of manpower, funds etc, are made available.

The following suggestions are made regarding the Ramesh Mohan Library database:

- The databank located at the Ramesh Mohan Library (where maximum information is available in the fields of English Language Teaching, Linguistics and Literature) be recognised as a Nodal Area in the field of English and foreign languages. The Institute Library should be recognised as a National Information Centre for English Language, Literature and Linguistics as well as Foreign Languages to act as a clearing house for any relevant information.
- In any information system a single databank cannot provide exhaustive information on any raw material. Information should be collected and generated by including a few parallel institutions and such information should be accessed through linking the databank maintained at these institutions. This would be applicable to Ramesh Mohan Library database, which should be linked up with parallel institutions through computerized network throughout the country.
- The INFLIBNET project of the UGC as and when commissioned will act as computerized link for the Ramesh Mohan Library data base.
- The importance of computerization in the Ramesh Mohan Library has assumed significant importance which would enable among other activities, mechanizing the existing databank, operated at present manually.
- A common understanding on a Common Format for inputting the data and to establish a common pattern of information services should be evolved.

— In order to facilitate provision of patent information for the staff and research scholars, necessary backing up of micro-computers with available software packages like the CDS/ISIS should as an alternative be taken up. The selection of this system or any other suggested system is required to adopt this software so that it is easily operatable and is quite convenient to render the information services needed by the users.

The switching of the databases for computerization from manually operated service would save the time of the reader; enable the library staff/information specialist to render efficient service, and would be an effective tool for information retrieval.

6 CONCLUSION

From the disscussion, it is evident that the Ramesh Mohan Library database operated manually be now computerized preceded by a consensus among the related institutions, regarding all aspects of cooperation and linkages through network. It is imperative that some planning activity be initiated in this direction. In addition, necessary steps should be taken up for the creation of databases in foreign languages also.

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HYPERMEDIA AND IRS : A REVIEW

S GOPALAKRISHNAN*

0 INTRODUCTION

Rapid advancement in science, technological infusion into creative process and other intellectual activities lead to exponential growth in information generation. Information explosion necessitates the use of computers and other mechanical devices to ensure quick availability of right information to the right individual at the right time. Collecting, accessing and maintaining data in all its forms is the main concern of database management. Over the years this task has become established as one of the most vital computer applications. With advancing technology and the ever increasing dependence on computers, database management systems (DBMS) have expanded both in number and complexity. Present-day automated information systems often rely heavily on some type of database management system for support. DBMS attempts to represent a real-world information management situation within the framework of one of the traditional data models. These databases now encompass such diverse applications as distributed multimedia and manufacturing databases as well as knowledge bases for artificial intelligence system. Mechanisms are being devised which allow direct machine support references from one textual chunk to another. New interfaces provide the user with these chunks and enable him to establish new relationship between them. This technology is known as *hypertext*.

1 IRS

Information retrieval system is the study of how to find and extract from a large body of stored information, such portion as is responsive to particular information needs. Document retrieval system, one class of IR system is characterised by the fact that search of the stored information is not made directly on the information of ultimate interest, but

*Asst University Librarian, Madras Institute of Technology Library, Chromepet, Madras 600 044.

instead, representation of it.

Another kind of computer based informatlon retrieval system comprises the so-called database management system. Database managemet systems of more advanced design such as full text database management system have also been developed and still further designs have been proposed.

There has been an increasing interest in miscellaneous category of IR system which would fall somewhere between two extremes marked by document retrieval system and database management system that makes heavy use of Artificial intelligence technique. This has been variously described as *Expert Systems* and *Knowledge Based System.*

11 Generations in IRS

Information retrieval system has crossed four generations. Early IRS searched large database of records to retrieve items that satisfied a Boolean and keyword oriented query.

Second generation of information resources are made available in video tex system, through menu selection hierarchies. Large full-text databases explored with string search strategies to locate lines or paragraphs with desired pattern forms third generation in IRS.

A fourth familiar strategy is DBMS. retrieved according to the search logic of a procedural program or a precise query language.

An important aspect of information retrieval has been the exploitation of user interface commonly known as direct manipulation interface. Direct manipulation systems are highly interactive, since the user instantaneously observes the result of Involving an operation, which differs substantially from the traditional source-laguage model. By blending various numerous techniques including direct manipulation in an integrated environment, system designers make the user interface as a matter of choice, dictated by convenience or preference, a multiple representation document retrieval environment known as 'hypertext' being developed, as fifth generation IRS.

2 HYPERTEXT AND HYPERMEDIA

The word hypertext is not a new phenomenon and the same was envisioned by Vannevan Bush four decades ago.[2] Hypertext was first conceived in 1945 as a way to store all kind of information, both for ready access & cross referencing, Hypertext is a combination of natural languge text with the computer's capacity for interactive branching or dynamic display of a non linear text which cannot be printed conveniently on a conventional page [3,4]. There are now several commercial and research packages that have hyprtext capabilies.[5] Hypertext system allows to link

information together, create paths through a body of relative materials, annotate existing texts and create notes that direct readers to either bibliographic data or the body of the reference text. Hypertext overcomes human limitations by providing mechanisms for compact storage and rapid retrieval of enormous volumes of textual, numeric and visual data. Importance of this system lies in its potential capacity to augment and amplify human intellect. Using hypertext systems, the researchers can quickly follow trails of footnotes and related materials without losing their original context.

Hypermedia is simply an extension of hypertext, in which authors can create a linked body of materials that include text, static graphics, animated graphics, video and sound. Hypermedia and hypertext systems allow the users to traverse complex network of information quickly. It can easily link passages and references quickly; collapse or expand outlines; freely move among text fragments to find sources of quotations; journal articles, references, definitions and related passages.

Hypertext differs from existing on-line retrieval systems in which they encourage informal, personalised, content-oriented information seeking strategies and user can apply information during the retrieval process by noting context, during browsing by saving, linking or transfering text or images. Hypertext supports the end users through flexible and powerful human computer interface which balances browsing strategies with analytical strategies.

Hypertext, because of its ability to perform high speed branching transactions on textual chunk will certainly make this technology a tool for communication and in augmenting human intellect as for analysis and information processing.

Issues related to the retrieval of information from message store have been analysed, and are briefly desribed below:

1 Essence of retrieval process is primarily the transfer of meaningful information from the source to receipient.
2 Information transfer is directly proportional to channel, organisation of message, knowledge structure and the personal knowledge of the recipient.
3 Linking will be more effectively achieved only by understanding the complex structure of the knowledge of the recipient.
4 Information gap may consist of some felt void in the knowledge structure.
5 Precise non-definement of information wants by the recipient.

In order to have access to variety of knowledge and to have sophistication in processing ability, it is necessary to have interface between user and machine. This has been mentioned as 'intelligent front end,' a

user friendly interface. The user centered framework for information seeking has been the key decision in hypertext system.

The need for hypermedia arises because of exponentially increasing complexity and multidisciplinary nature of scientific, economic, medical and other information.

4 CLASSIFICATION OF HYPERTEXT

To-day different types of hypertext are available, some of which are shown in Table 1. Hypertext system that opens exciting new possibilities for using the computer as a communication and thinking tool, can be classified in an formal manner, according to their applications, as mentioned below.

- macro-literary system
- problem exploration system
- browsing system
- general purpose system

The classified list of hypertext system is given in Table 2.

Table 1 : Some Hypertext Systems

BOXER	SYMBOLICS
CREF	DOCUMENT
EMACS INFO	EXAMINER
IBIS	SYNVIEW
INTERMEDIA	TEXTNET
KMS	HYPERTISE
NEPTUNE	HYPER CARD
NLS/AUGUMENT	WE
NOTE CARDS	XANADU
OUTLINE PROCESSORS	ZOG
PLANE TEXT	

Table 2 : Classified List of Hypertext Systems

1 *Macro Literacy System*	
Bush's	MEMEX
Engelbert's	NLS/AUGUMENT
Nelson's	XANADU Project
Trigg's	TEXTNET
2 *Problem Exploration Systems*	
Horst Rittal	IBIS (Issue Based Information System)
David Lowe's	SYNVIEW
UNC's (University of North California)	WE (Writing Environment)
3 *Structure Browsing Systems*	
CMU's (Carnegie Mellon University)	ZOG as Knowledge Management System (KMS)
Emac's	INFO Sub System
Schneiderman's	HYPERTISE
Symbolic's	DOCUMENT EXAMINER
4 *General Hypertext Systems*	
Xerox Parc's	Note Cards
Brown University's	Intermedia
Textronix	Neptune
Disessa's	Boxer
Pitman's	CREF (Cross Referencial Editing Facility)
MACINTOSH	Hyper Card
MCC's	Plane Text

41 Macro-Literary System

It is one of the earliest visions of hypertext system, a study of technologies to support large on-line libraries in which interdocument links are machine supported. This system may be called as manual hypertext system. The advent of computer has brought this vision closer to reality—'Bush's Memex'.

42 Problem Exploration System

It is an highly interactive system which provides quick response to a small collection of specialised commands for the manipulation of information. In other words, it is a tool to support early unstructured thinkings on a problem when many disconnected ideas are to be put together. 'Issue-based information system' (IBIS) stands as an example of this category.

43 Browsing System

Hypertext under this category was defined primarily for application involving large amount of existing information or to facilitate easy access to information. 'Shneiderman's Hypertise' stands as an example.

44 General Purpose System

The hypertexts which have one or more applications are grouped under this category. 'Note cards system' developed at xerox PARC lies in this category.

5 ADVANTAGES OF HYPERTEXT

Though intertextual references are not a new concept, the machine supported hypertext interlinks the traditional literature in an efficient manner and they are organized hierarchically. Hypertext also offers new possibilities for accessing large and complex information sources.

The operational advantages of hypertext are :

- Ease of tracing the references
- Ease of creating the new references
- Information structuring is easy
- Global and local views can be mixed effectively
- Text segments can be threaded

— Same text segments can be viewed simultaneously from several places
— Consistency of information
— User can have several paths of enquiry
— Several authors can collaborate with the documents.

6 LIMITATIONS OF HYPERTEXT

Like all other systems, hypertext is also prone to limitations, which may be classified as :

1 Implementation
2 Disorientation
3 Cognative overhead

These limitations are resolvable through improvements in performance and interface decisions.

7 CONCLUSION

It is quite clear that a qualitative change in the nature of information retrieval has taken place. There is a perceptible trend towards end user computing based mainly on cheap and powerful systems. There is a tremendous potential for growth of computerised information retrieval, but the realization of this potential demands high level of user awareness and involvement. Days are no longer that the user is completely immersed in a virtual world of "Operating System", can move round and take different forms simply by willing it. Hypertext is just a first step to show that computer is a direct and powerful extension of human mind as envisioned by Gibson that one simply plugs the brain into machine and experiences the computer data directly as perceptual entities.[6]

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USER APPROACH IN DESIGNING OF INFORMATION RETRIEVAL SYSTEMS

P V RAJKUMAR*
S GOPALAKRISHNAN**

0 INTRODUCTION

The rapid development of information technology, qualitatively as well as quantitatively and its influence on libraries leads to confrontation with radical challenges. Increased rate of innovations and rapid development in high technology induce remarkable changes in information retrieval system. Information retrieval system must be designed with a view to support information user. This should be clearly kept in mind while designing computerised information retrieval system It is necessary to increase the efficiency in retrieving the information. Improved methods of information handling techniques/equipments are available to-day to increase the efficiency in information handling/retrieval system. Now-a-days the information system failure has become a major concept. There are limited number of reasons for system failure. The single most common cause for system failure is user rejection. Understanding the user needs and the use of information one could design effective information retrieval system.[1]

1 INFORMATION GENERATION

Innumerable stimuli that come to act upon the sense organs of a man create impulses which reach the objective mind and these impulses filter deep down to the subjective strata through the intervening layers of individual egocentric layer. The impulses thus reaching the subjective mind

*Asst University Librarian, College of Engineering, Anna University, Guindy, Madras-600 025.
**Asst University Librarian, Madras Institute of Technology, Anna University, Guindy, Madras-600 025.

of a person react with the existing impressions of his own past actions that are stored-up carefully in the subjective layer, and get themselves expressed to the world outside. At each moment every man meets with different patterns of these stimuli, and thus constantly gathers new impressions. Every set of these new impressions gets itself coloured into innovations. Granulations of these innovations ultimately result in a complex nature in accumulation of information. Reliance of this information has become increasingly important now-a-days in decision making process. Information is likely to cause social and emotional impacts on our society. Information system can provide the source for the change of attitudes, ideas and in general behaviour through persuasive methods. Non-availability of right information at the right time not only brings pains and pangs but also the calamitous agencies under which the world constantly heaves and sobs. Since decision will be flowing from every peace of information, necessity arises for organising and storing of information. Availability of relevant information can reduce the structure of finding solutions. Despite the accelerated growth of knowledge, well-designed information retrieval facility is necessary to extend the perceptivity and ability of individuals in taking right decision.

To maintain the integrity of information without reducing access to optimum information, attendant challenges, multiplicity of information leads to realisation of automated system in mitigation of explosion. Ingenuity and creativity are required to effectively identify and utilize the source material to meet specific and immediate needs. Computer, being a far more flexible and powerful tool than conventional methods, has greater potentials to relieve man of routine insignificant tasks in retrieving of information.

2 INFORMATION REQUIREMENT

Now-a-days information tends to dominate the scientists, engineers and technologists and it is necessary to analyse, optimize and dramatise the information. Reputations are built on the accuracy of information. But information can be elusive and misleading.

Nomally users are interested in obtaining proper and accurate information at the right time in the right form i e neither too much elaborate nor too concise. Moreover, users are interested in obtaining comprehensive and informative summaries, some of which might be termed knowledge or to acquire selectively detailed information some of which might be original data. They may be classified as :

(1) selection of information in the capsule form; and
(2) original documents.

3 USER GROUPS AND NEEDS

Carefully designed objectives are the basic needs of any system or theory. Among the numerous objectives, the primary objective is understanding the information user. The need to identify the user group goes beyond the need to identify the purpose for which they need the information. The identification of users also aids in defining user group characteristic which leads to the specific mode of information to be presented as well as the method of presentation. Quality of information rests on the following factors :

- to whom the information is to be disclosed
- purpose of information needed
- quantum of information to be provided
- type of information
- when should the information be provided.

4 SYSTEM FAILURE

Although information potentially represents a valuable resource, but it will be of no value unless its collection, processing, storage and retrieval are systematic. The information should have the following qualities[8]:

- Accessibility, i e ease and speed of information retrieval
- Comprehensiveness
- Precision
- Compatibility
- Timeliness
- Clarity
- Flexibility
- Verifiability
- Free of bias.

Many studies have concluded that one of the causes of information retrieval system failure is that software development professionals have a technical orientation, lack knowledge of human needs and motivation. Further information system failures can be classified into two types:

(1) Development failure, and (2) User failure.

The development failures can, however, be correctable. User failures

have many variables such as :

- lack of technical solution
- data problems
- conceptual problems
- complexity, and
- user reaction

It has been rightly stated that information system should ensure :

- that the substance offered by the system is indeed what the user needs;
- that the form of information offered by the system is that which the users find the most convenient and acceptable.[3]

5 USER ACCEPTANCE

User acceptance is the most visible component and even the most practical method in ascertaining a system. Acceptance, a subjective matter which cannot be easily measured, is a degree of willingness of an individual or group to utilize the computer-mediated information retrieval system. It is often mistakenly equated with usage. Usage can be considered a measure of acceptance only if the users

- are motivated to use the system,
- have access to terminals,
- are given complete freedom to access alternative systems for their information retrieval activities, and
- are made to understand what the system can do and how to operate it.

6 USER CONSULTATION

Humanization, accessibility and responsiveness are the most highly rated characters of an interactive system. Notion of support should not be restricted to the augumentation of existing process, but should be broad based enough to include the capturing of additional process which when blended with the existing process, yields positive and synergistic effect.[4]

User consultation is a vital element in library computerisation, Even if the best documentation facility and personal assistance are made avail-

able, a continuous rapport with the user is necessary. The feedback mechanism should enable the user to ask questions at any time, and receive response as quick as possible and give suggestions which may eventually be implemented.

The single most common cause of system failure is user rejection. This does not imply that the system design and performance are not the major factors for rejection. However, the way the system was implemented has caused most failures by not overcoming the threatening nature of the complex and instrusive technology. In some cases, rejection by potential users occurred before the technology even entered the organization.[5]

Perhaps the most important but the least considered factor in the design of information storage and retrieval systems is neglect of user needs. Regardless of what other parameters are considered in the development of a storage and retrieval mechanism, it is necessary to consider its potential use and mode of use by the persons or groups for whom it is intended; it is necessary to design the system to suit the user's needs, habits and preferences. Both approaches are possible, but the second one, involving education and re-education of the user, is evolutionary and futuristic. A system designed now should be able to serve the present users. Also it has pointed out some of the facets and they are :

- To distinguish the types of informational needs that scientists have and to determine in what respects they remain unsatisfied.
- To examine the means and occasions of scientific information exchange in order to single out the features that make them more or less able to meet the scientists several needs.
- To analyse characteristics of the scientist's speciality, his institution, and his outlook as the possible conditions that may influence his needs for information, his opportunities for satisfying them and hence his information gathering habits and satisfactions.[6]

User approach has the following effects, too :

1 Enhances ability and resistance to the risk factors
2 Activates or resurrogates the systematic function
3 Prolongs the span of life of the system
4 Assures effective use of the system
5 Model also has explicatory value
6 Encourages the system to excellence.

Towards magnitude it has the following utility also :

1 Local sociological paradigm, i e the entire constellation of beliefs, values, techniques and so on, is shared by users.

2 System functions to users social, ethical and behavioural development.
3 Narrows the differences in perception and assessments of the programmes objectives, and goals and expected rewards.
4 Also helps in user resistance and tolerance to change represented in the levels of parochial interests and trust.[7,8]

7 CONCLUSION

The major drawback of many present information systems is their lack of user friendliness. It is clear that there is a mismatch between the capabilities of many information systems and the ability of people to use the available facilities. The result is that not only such systems are underutilized, thereby wasting potential gains in productivity, but also users are disappointed with the new system which in the longer term, results in a lower utilization rate. To overcome these problems and enable full use to be made of today's and tomorrow's systems, the human interface needs to be considerably improved. Computer users are unwilling to tolerate an unfriendly operating system. Prompts, a fact that has led to the development of operating system's 'overlays'. Undoubtedly, the next few years offer exciting challenges in the field of information systems and the technologies on which they are based. The goal is to provide users with a system that helps them to perform routine tasks more readily and that offers them wide range of useful new services. If this is achieved, then the information technology on the sectional system would play an important part in the present era of information age.

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MANAGEMENT INFORMATION SYSTEMS FOR LIBRARIANS

DR P S G KUMAR*

1 COMPUTERISED INFORMATION SYSTEMS

The systems that use computers for producing information are called 'computerised information systems'. Data, procedures and people are the basic constituents of an information system. A computerised information system needs two more components, namely, computer and programmes.

A computer can be used not only as a tool for processing data to generate information, but also, as a data storage and retrieval device. It can also be used to disseminate information to any part of the globe through a network. In the same way it can serve as a terminal to receive information from another computer. There are programmes that can be used to present the data/information in a graphical form, as well as, in formatted documents.

2 SYSTEMS FOR LIBRARY AND INFORMATION WORK

21 NON-TRADITIONAL SYSTEMS

A good lot of work has been done, discussed in professional literature and is being put to use in the areas of in-house operations and bibliographical databases. There are a number of other information systems like Database Management Systems (DBMS); Management Information Systems (MIS); Decision Support Systems (DSS); Question Answering Systems (QAS), etc, which are of much use to library and information professionals.

*Reader & Head, Dept of Library & Information Science, Nagpur University, Nagpur-440 010.

211 *Database Management Systems (DBMS)*

These are the systems designed to manipulate and maintain control of any database. The procedures of concern in a DBMS are: (1) Storage and retrieval of data; (2) Updating and deletion of data; and (3) protection of data from unintentional or deliberate damage, or misuse or transfer, etc.

212 *Management Information Systems (MIS)*

A MIS is a DBMS tailored to the needs of managers. A MIS presents information in terms of ranges of values of particular attributes that helps a manager to make a choice among alternatives. Thus, MIS presents information in a specially processed form that is normally not available in a DBMS.

213 *Decision Support Systems (DSS)*

In a DSS, a variety of systems like IR systems, DBMS, computer graphics, etc are collectively provided to help in the decision making process. Thus it forms a powerful and versatile tool.

214 *Question Answering Systems (QAS)*

In a QA system, user query may be received in natural language form and system responses may also be furnished in a natural language formulation.

3 MANAGEMENT INFORMATION SYSTEMS (MIS)

An effort is being made in this paper to introduce Management Information Systems of relevance to LIS workers.

Kroenke[1] grouped various Management Information Systems by their use into :

1 Personal Information Systems (PIS);
2 Workgroup Information Systems (WIS); and
3 Organisational Information Systems (OIS).

31 Personal Information Systems (PIS)

These are the systems that are used by individuals to meet their personal needs and skills.

311 *Text Processing*

These systems are used to prepare, store and print documents.

Word Processing : A document can be entered, stored and subsequently printed. Entering a document on a disk has several advantages. It is easy to correct mistakes, insert and delete text, rearrange with ease, etc. The document can be formatted in any desired way for printing.

Desktop Publishing (*DTP*) : This system is used to produce professional quality page layout for printing. A variety of type styles, type sizes, graphic symbols, etc, can be introduced. The output can be printed on a paper, get the 'master' and printed by offset process; or, directly linked to a linotype machine.

Electronic Spreadsheets : Library statistics can be presented in the form of a spreadsheet. The data of a spreadsheet can be used to produce pie charts, bar charts, etc. The data can also be stored as a database.

There are integrated packages that combine word processing, spreadsheet and database management function.

Graphics Programmes : These are used to create visual displays of data beyond those built into spreadsheet programmes. These programmes create much higher quality graphics, more types, colour and also three-dimensional graphics. There are programmes that are used for producing logos, symbols, illustrations and the like.

Hot-Key Programmes : These programmes provide a menu of services with items like calculator, a calendar, telephone dialer, an alarm, etc.

32 Workgroup Information Systems (WIS)

McDavid and Harari[8] defined a workgroup as "an organised system of two or more individuals who are interrelated so that the system performs same function, has a standard set of role relationships among its members, and has a set of norms that regulate the function of group and each of its members."

There are two types of workgroups : Homogeneous workgroups where all members perform the same role; and Heterogeneous workgroups where different roles are performed by different individuals of the group.

321 *Workgroup Communicating Systems*

Electronic Mail (*E-mail*) : Each person in the workgroup is provided a file which is generally called as a *mailbox*. Message addressed to a person is deposited in the mailbox. Each person in the group is expected to check his mailbox periodically. E-mail systems can be *active* or

passive. In an active system the user is interrupted and the message is communicated immediately on receipt. Whereas, in a passive system the mail is just deposited in the mailbox.

322 *Group Conferencing*

Information can be exchanged in the format of conference proceedings, without members meeting physically. This is achieved in many ways.

Electronic Bulletin Board : Messages of interest to the workgroup are stored in a file for the perusal of the members. This is the simplest way of group conferencing.

Asynchronous Meeting : Through an E-mail system users are informed of the agenda. The 'attendees' record comments/opinions Comments on comments are also recorded. At the end the Chairman writes a summary statement and the proceedings are circulated.

Group Network : This is an extension of an asynchronous meeting. When the meeting is on, all the attendees have to remain present at their terminals. Members continually receive information on their terminals Each member can put-in their opinions/statements for consideration of the whole group. The Chairman controls the order of activity and voting when necessary.

323 *Group Decision Support Systems (GDSS)*

These systems support group decision making The GDSS supply critical information including problem definition, specification of alternatives, criteria selection for choice making, development of work models, financial analysis techniques, etc.

324 *Text Sharing Systems*

Word processing systems, hyper-text and hyper-media chunks like graphics, images, illustrations, audio, animation, etc, can be shared by groups.

325 *Workgroup Management Systems*

Example scheduling : Many a time, the work of different subgroups are interdependent. The delay of another subgroup or groups may result

in delay of another subgroup or groups. Thus, the progress of each subgroup needs to be monitored by the head. Further timely intimation of delays helps the subgroups to plan their work accordingly.

4 ORGANISATIONAL INFORMATION SYSTEMS

An organisational information system brings-in integration of the activities of various departments. It helps in strategies planning, operational control and management decision making, etc.

41 Personnel and Payroll System

This system deals with recruiting/hiring, payments, accounting and administering employees. This system generally has two subsystems—the personnel system that keeps track of jobs, people, assignments, employee reviews, pay scales, etc. The payroll subsystem deals with preparing paybills, leave, deductions, taxes, etc.

42 Asset Control System

This system manages the accounts of the assets of the organisation—equipment, building, land, etc.

43 Planning and Development System

This sytem performs the function of developing a plan of action that will accomplish the overall goals and objectives of the organisation. On integrating the data received from various sections, the annual budget is prepared.

44 Accounting Systems

A general ledger system is always essential, whether maintained manually or electronically. Such a system should have files of plans and budgets, accounts or receipts and payments, payroll, cash and finance, etc.

5 CONCLUSION

Thus apart from computerising in-house operations and information services, each library and information unit should develop systems that

help the individual member of an organisation, workgroups and overall management of the organisation. Some of the systems mentioned above are only illustrative. Many specific systems may be developed to suit specific requirements of the library and information unit.

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APPROACH TO LIBRARY AUTOMATION : SOME BASIC ISSUES

M KANAKA CHARY*
J YADAGIRI REDDY**
S SUDARSHAN RAO**

0 INTRODUCTION

The use of computers in almost all the fields of activities like Business establishments, Government Departments, R&D organisations, Railways, Banks, etc has been gaining more importance and libraries are not alien to this. In fact, certain libraries in general and special libraries in particular have already been automated to handle the huge amounts of information and data for effective, accurate and quick information services to their users. In the present context, library automation includes (i) computerization of library, and (ii) participating in networking.

The contemporary library profession is apparently very much concerned and also anxious to implement automation of library activities. The need, necessity and inevitablity of computerization in Indian libraries has been realized by the Goverment of India and subsequently emphasis was given during the Seventh Plan period. Some of the managements of different Library & Information Centres are extending adequate funds for modernizing LI Systems and Services. The librarians are also turned towards the introduction of computers in their LICs. But it is not so easy as it looks. It is also not a fashion to be followed without knowing the techniques and tribulations that are involved. One must think very seriously before a decision is taken on automation in libraries.

The primary factor in library automation perhaps, is the selection of suitable software. Most of the new library packages are designed to run on ubiquitous IBM PC or compatibles. However, IBM and Apple

*Asst Librarian CIEFL. Hyderabad 500 007.
**Lecturer, Dept of Library & Information Science, Osmania University, Hyderabad 500 007.

Macintosh are the two super powers in the micro world and now PC has become a *de facto* standard for libraries.

1 OBJECTIVES

Since the past decade, the librarians are greatly concerned about automation and are facing crucial situations in its implementation. Several factors viz the costs of computers (including printers), software packages, training library personnel, different varieties of computers (mini, micro, XT, AT), physical facilities including airconditioning etc are instrumental in deciding automation. Besides, some of the contemporary libraries have already been automated.

The willingness of some of the managements of LICs and the interests shown by the young professionals for acquiring the computers and for using them in llbraries is another factor of encouragement in the direction of automation. Under these circumstances the librarians are in a dilemma as to (i); how to computerise their LICs and where to begin; (ii) what real benefits would flow from it; (iii) what would be other consequences that arise?; and how to tackle such problems ?

Though there is a common talk among the professionals on computerization of library activities and in this direction several seminars, conferences, workshops etc have been organised by various professional associations and other government agencies, but still the library professionals are in a state of dilemma and some sort of phobia still exists with them in introducing computers. Probably, it is all because of lack of hands-on-experience and non-availability of clear guidelines. This paper makes an attempt to give an insight into the practical view in library automation.

2 ADVANTAGES OF LIBRARY AUTOMATION

There are multitype advantages in library automation. The important ones are:

(i) increased productivity in terms of both work as well as service;
(ii) extension of library services beyond the library peripherals;
(iii) participation into outside networking systems for the resource sharing;
(iv) economy in expenditure;
(v) proper and optimum utility of library materials.

However, there are a few disadvantages, too. But comprehensive planning and sound managerial tactics can overcome these disadvantages.

3 FEATURES OF LIBRARY AUTOMATION

Some of the important features of library automation are:

(i) library automation is a continuous process. One should not think that library automation is over if once computers are introduced;
(ii) it changes the total functioning of the library system;
(iii) it helps to keep the library professionals up-to-date in their activities;
(iv) it keeps the librarians aware of the latest hardware and software developments;
(v) it gives an idea of overall picture through networking process; etc.

4 METHODOLOGY

Comprehensive planning is the foundation for the success of automation in any kind of library. Before going to discuss it, it is worthwhile to know the main objectives of library automation, since the objectives lead to derive helpful steps that are involved in library antomation.

41 Objectives of Library Automation

Some of the chief objectives of library automation are:

(i) to maintain bibliographical records for all the materials;
(ii) to provide bibliographical details through a single enumerative access point of all types of materials;
(iii) to reduce the repetition (drudgery) in the technical process to library work;
(iv) to provide accurate information at a fast rate;
(v) to share the resources in the networking project;
(vi) to improve precision and scope of research activity;
(vii) to innovate new IT processes to provide high quality information.

5 PLANNING PROCESS

Comprehensive planning, in fact, is the activity of identifying, specifying and selecting the goals, objectives, and alternative courses of action for accomplishing the mission of the library. The planning process also indicates the methods of support (both internal and external), whether these be human, material, or financial, available to the library and link them with the costs to be incurred. The cost factor is the major component of the planning activity. The planning process identifies the tasks to be performed and those on whom this responsibility rests. It also in-

cludes the time duration. Hence, planning library automation includes each and every step from the stage of creation to the stage of functioning. The total planning is done by the librarian only with the help of his subordinate staff.

5I Principles of Planning Library Automation

Planning process in library automation should observe the following important principles for its success:

1 Planning for library automation must be comprehensive in scope and strategic in nature.
2 The planning activity must include the total departments/wings/sections/divisions/branches, etc in the proposed project.
3 This planning process must be supported by the management in all its aspects. First of all, the doubts which the governing body may have, should be cleared and convinced very well.
4 The planning process must include the actions from the beginning to the end at the same level of encouragement.
5 The planning activity must be forecasted and incorporate the necessary changes that may occur in its continuation of programme.
6 There must be a single responsible person—to coordinate. manage, integrate all the activities—with adequate supporting staff.
7 Powers to take any action against the setbacks, if any, must be vested with only one single top level executive.
8 Planning must be integrated with library administration and management to avoid any imbalance in budgeting, staffing, functioning, etc.
9 Planning should be made on the basis of a sound information base which includes the internal and external factors.
10 Planning must be based on the basis of existing systems, current trends, prevailing circumstances.
11 Planning must anticipate the future proposals.
12 Planning must be seriously thought of the resources to activate.
13 Planning of individual unit must keep the feasibility so as to accommodate in the integrated system.

To take all such steps as are Involved in library automation the Planning Officer should, solicit, identify, interpret and substitute various planning concepts with broad perspectives.

52 Functional Tasks

After Planning process is over, the next step to be taken in library

automation is proper implementation i e steps that are to be initiated for its actual functioning. This involves the following important components:

1 First of all to decide whether to go on-line or off-line. On-line is more advantageous. Once it is decided, it leads to select the useful hardware equipment and software packages.
2 To observe the financial provisions, with physical infrastructure.
3 To see the untrained and trained staff for their training and enhancement of the skills on deputation respectively.
4 To check up the hardware and select the appropriate one on the basis of reliability, flexibility and expandability. Also to verify the past history of its performance.
5 To go through the literature on software and select the one suitable, convenient and useful to the library needs.
6 What type of works are to be taken up on short-term (temporary) as well as long-term (permanent) purposes.
7 What works/activities are to be taken up have to be decided, thoroughly in the light of their interrelationship with other activities/works. While starting with one activity like acquisitioning, one has to foresee the other activities that can follow to the cataloguing activity, etc.
8 Whether to include all types of material such as audio-visuals, periodicals, maps, manuscripts and other material or only the books, with all bibliographical details.
9 To decide what type of records are maintained and for what purpose.
10 To decide the record structure in the light of the national and international standards available.
11 To decide whether the products are on free of cost or charge basis. If charged, the rates must be mentioned.
12 Evaluation procedures to review the overall functioning must be thought of.

6 CONCLUSION

In undertaking library automation one should keep in mind not only 'What is needed by the library' but also 'What is desired by the users.' For this purpose it is necessary to study the use pattern of the readers because the libraries which are going for automation are not new ones but already exist. Though a chain of steps are involved in library automation, there are ample options in developing hardware, software and humanware. However, instead of developing a new software, it is always better for the libraries to select the one from the existing softwares which will be more useful to its needs. There is a long diversification in

the practices of libraries and a lot of variations in their rules, procedures and functioning. Therefore, one should think seriously and systematically plan according to the needs so as to achieve the objectives in a realistic and meaningful way.

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NUCLEUS FOR LAN : FOR A UNIVERSITY CAMPUS

Dr Narinder Kumar*
Ajay Kumar Sharma**

"Essential thrust be given to the development of *Local Area Network* (LAN) with all modern infrastructural facilities such as equipment, manpower and other essential requirements"

(Res. No. 1 in the Fifth Annual Convention and Conference of SIS, IIT POWAI, Bombay, Dec. 9-11, 1985).

1 LAN

Local Area Network (LAN) is a systm introduced by several manufacturers in the data communication field with many a terminals with one computer located in the central constituent having Central Processing Unit—having networking capabilities of as many types as feasible within fairly a small geographical locality. Such a system has been found practicable as well as attractive for universities and institutions located in a single building or the same campus.

11 Essential Part

The essential part of a LAN is the use of data processing system through transmission equipment from remote processor to the central computer facility. The system should:

(i) allow a number of mini-computers or personal computers to be combined to form an operational data processing centre at more than one location. A network of these centres share com-

*Department of Library and Information Science, Kurukshetra University, Kurukshetra.
** District Informatics Officer, Kurukshetra.

puterised files through a powerful data processing unit as nodes at the centre of the locality;

(ii) provide for on-line data entry to the local database for current processing of independent multiple jobs at a high speed;

(iii) permit development of distributed application in Local Area Network constituents with accent on simplicity of operation; and

(iv) provide for reports within the LAN that give to the network operational management control.

12 Need

The western industrialized nations are witnessing revolutionary changes in information and management fields, with a fusing and merging of technologies of computers, telecommunication, media and electronic office, posing thereby a serious challenge to paper-print based recorded information and traditional channels of communication. Electronic publishing, telecommunication channels and word processors are already replacing primary activities at international level with global trends and developments. There is a need to develop local adaptability to use these developments in technology. Otherwise we may find ourselves in a rather helpless situation, wherein the electronic benefits in management and information dissemination would not be made use of by us and we will be handicapped to modernization and to have access to world information.

Microprocessors and minicomputers with their system configurations can store and process data and information at a great speed and accuracy and give a variety of outputs with a versatility not possible so far. With micro-processors becoming available at a comparatively cheap cost, they have gradually been coming within the range of every special/academic library and different departments of normal sized institutions. For LAN it is expected that these departments and libraries would opt for compatible hardware and use common software packages so that data base exchange is promoted. They can also be linked with larger computer systems removed from them through telecommunication networks, making it possible for the constituents of LAN to have an easy access to databases located anywhere on the globe through a national/international network.[4]

In this regard LAN as nucleus of a total information network of international level can strengthen the performance of regional and global sectoral centres oriented to discipline/product/mission/problem. It can function as a node to local information units and departments of a particular organization. Each unit of LAN, it is so envisaged, shall function as far as possible indepenently without any external administrative control. The inputs required for LAN are: (a) infrastructure in terms of (i) hardware, and (ii) software for information storage and retrieval; (b)

telecommunication channels to transmit information with speed and accuracy; (c) reprographic equipment for providing easily transportable copies of documents; (d) adequate finance, (e) continuous supply of manpower, etc. The components of the LAN should follow compatible standards for information techniques and methods and other managerial uses of a computer system. The LAN is to ensure smooth flow of information from local level to global through regional and national and from global level to every constituent of LAN.[1]

In order to meet the requirement of manpower development for LAN, regional, national and global network, the universities should start Computer Application Courses and include in the syllabii of the departments of Library and Information Science as well as in Management Discipline, the contents like: 'Computer and its application in libraries and information centres/general organizations and systems', 'Information storge and retrieval', 'Database : Their generation and management', and others as compulsory/optional so as to provide students courses suitable for their interests/specializations. For the existing teachers in various disciplines—especially science and technology, continuing education programmes shall be real answer to these challenges.

The working group of the Planning Commission on modernization of Library Services and Informatics has stated the following defects in State-of-Art of Informatics in India in its report:

"(i) Services provided are only reaching a limited circle of users, mainly scientists in institutions of higher learning and advanced research.

(ii) Lack of users' awareness and familiarity with information services available.

This calls for the need to provide training of users in traditional as well as modern techniques for information retrieval.

The aim of modernization and informatics is: readers should have access to comprehensive bibliographic system that allows them to identify and locate material and to obtain it at a reasonable cost without delay. The application of computer and telecommunications technology is rightly considered as a means to achieve this aim."[6]

2 HOW OF LAN : CASE STUDY OF A UNIVERSITY CAMPUS

Before planning and implementing a LAN information system an overall analysis of the institutional activities departmentwise is an imperative thing, The application of computer in the departments/branches of a university campus can be grouped into:

(i) House Keeping routines : Electronic Office.
(ii) Information Storage and retrieval routines

The major canstituents of a LAN system for the compus of a university that can easily be identified are:

A—*Administrative Block*: Electronic Office

Branches

(a) Establishment
(b) Accounts
(c) Academic
(d) Registration
(e) Scholarships
(f) Examination
(g) Colleges

Further detailed activities are :

(a) *Establishment*		(i) Recruitment (Personal Files) (ii) Profiles for progress and administration of individuals.
(b) *Accounts*	(i) Income	Central State Fees, etc.
	(ii) Expenditure	Salaries P F Stores Purchase Misellaneous.
(c) *Academic*	(i) Calender updating	
	(ii) Meetings	Faculty A C E C Finance Courts/Senate.

(d) *Registration*
- (i) Post-graduate
- (ii) Under-graduate
- (iii) Research Scholars

(e) *Scholarships*
- (i) Entrance
- (ii) Maintenance

(f) *Examination*
- (i) Conduct
  - (I) Practicals
  - (II) Theory
- (ii) Secrecy
  - (I) Paper setting
  - (II) Evaluation
  - (III) UMC
- (iii) Re-evaluation
- (iv) Results

(g) *Colleges*
- (i) College Returns
- (ii) Recruitment
- (iii) Inspection
- (iv) New Courses

B—*Library*

(i) Housing keeping
- (a) Serial Control
- (b) Circulation Control
- (c) Cataloguing
- (d) Acquisition
- (e) Management Statistics

(ii) *Information Retrieval*
- (a) Reference Service
- (b) Current Awareness : Current Titles; Research in Progress : SDI; and Newspaper clippings

(iii) Information Analysis and Products

	(iv) Abstracting Service	Technical and Patents; Extracts; Data Service: State-of-Art Report; Critical compilations and Reviews; Technical Enquiry services; Management Digest and Information Services for Institution's developmental plans
C—*Technical Departments*		Use of computer system for their projects involving heavy data and for the education of students, researchers and faculty members i e computer education/consciousness.

3 SELECTION OF MICRO-COMPUTERS

The selection of micro-computer system depends upon many factors. The choice, however, is ultimately governed by monetary factor. It is therefore important to recognize the total costs involved and not only initial costs of the acquisition of new hardware and software but also costs involved in maintenance, operation and personnel. A detailed proposal is therefore necessary in order to know the total financial involvement. The major factors to have a Central Computer System for LAN and smaller systems for the constituents are:

"(i) Clear definition of jobs to be performed at the central unit or on behalf of the constituents.
(ii) Survey of hardware and software that are persently being used.
(iii) Notify these jobs to the micro-computer vendors. Vendors may be asked to submit proposals in detail giving function of each sub-system.
(iv) The choice, if any, of a specific software to be informed to the vendor.
(v) To make comparative study of proposals received from the vendors and to prepare a proposal regarding current usage and projected needs.
(vi) To place a firm order with the vendor and obtain the system.

The purchase of computer system involves huge amounts, the market being competitive, the following questions are must to be asked from the vendors:

(i) What are the drawbacks or limitations of the hardware ?
(ii) What are the names of three current users of the system for the same or similar jobs ?
(iii) Is there an institutional commitment to support the product once it is sold ?
(iv) Is training facility for the use and maintenance of the system available ?
(v) Are the manuals of the system available and how well they are produced ?
(vi) What is the average turnover of this model ?
(vii) How well does it interface with other equipment ?
(viii) Can more peripherals be added later if so required ?
(ix) Is there any procedure existing through which buyers of the system are kept informed of new developments."[5]

The system chosen for implementation in a LAN should be multi-terminal micro-computer at the Central unit with all peripherals and all terminals elsewhere in the building or in other buildings of the University Campus having Personal Computers having capacity to perform individually, and compatibility to function as terminal for the main system installed in a centrally located Computer Centre of a University. These applications initially may not require high processing power but the computer configuration should be as such that it could provide a reliable and efficient service to the user community.

"For networking in our context consists of:

(1) Management Personnel
(2) Information Users
(3) Information Sources
(4) Teaching
(5) Research programmes and projects.

Here a node shall be devoted to the entire campus. The links within the node reflect:

(a) Affiliation and common objectives.
(b) Shared operations with all the participants both individually and collectively.
(c) Compatibility among common operations.
(d) Practical working arrangements within LAN and with outer world information systems for collaborative efforts to increase and accelerate information.

(e) Each participants while maintaining autonomy through PCs/ terminals, shall have access to several sources in the network as and when need there be"[2]

4 NEW TECHNOLOGY : ADVANTAGES

With the availability of micro-computers at very economical prices, the day to day routine operations have been considered for computerization in most of the universities. The development of LAN has also been possible in most of the campuses due to establishment of Computer Science Departments with their basic requirements of getting installation of a fairly big computer system with network compatibilities. The basic advantages envisaged are:

"(i) Cost effective information storage and maintenance.
(ii) Optimum utilization of existing university computer system.
(iii) Provision of information services with minimum delay.
(iv) Maintenance of union inventories/catalogues/students or faculty profiles.
(v) Inter-constituent interaction.
(vi) Cooperation among constituents.
(vii) Access to national and international information system through the nucleus of the LAN.
(viii) Evolution of national standards for information/data handling.
(ix) Promotion, research, development and innovation in information technology.
(x) Provision of document transmission facility.
(xi) Maintenance and operation of the network.
(xii) Adoption of new techno-economical solution to the LAN problems.

Above all it is a cost sharing system both in case of hardware as well as software."[3]

For a library with a collection of more than 40,000, the management and control application being complicated the Planning Group envisaged in its report "a computerised system for providing an efficient service to users of the library. Further the system is to be expected to utilize mechanized online bibliographic data from international agencies. For such a work load we require around 100 MB of storage, a medium speed line printer, two tape drives, a floppy disk and about 20 interactive terminals—located at all users' areas including the various sections of the library—providing a fast response enabling retrospective search in certain applications."

The Group suggested a sanction of Rs 25 lakhs as the cost of such a computerised system.

The following four key areas of management are necessary for effective LAN management:

(i) Fault Management	:	For problem identification followed by event logging automatic recovery procedure etc.
(ii) Configuration Management	:	Determines the number, type and location of all devices alongwith expertise in the LAN.
(iii) Performance Monitoring	:	Timely reporting of performance and errors on a given part, node and network.
(iv) Management Reporting Facility	:	Average error rate; peak traffic loading, number of data packets transmitted from a port over a given time, interval etc.

Standard security methods such as password protection can be applied to confidential data to prevent unauthorised access as well."[8]

5 CASE STUDY AND CONCLUSIONS

Under different schemes of UGC for modernization of the work in university offices, to disseminate computer education and also to demonstrate the computer application in library routines, information storage and retrieval, substantial funds are being provided to the universities in India.

In our own university, i e Kurukshetra University we are having ND-10 Super 32 system installed in our computer centre. Its book cost is Rs 32 lacs. It has primary memory of 3 megabites. Presently we are having one disc and one magnetic tape whereas the system can have 4 disc drives, with 8 magnetic tapes. For the students of courses being run by the Computer Centre, there are in all 16 terminals functioning. The capacity of the system is 128 terminals.

Recently the Departments of Mathematics, Statistics, Physics, University Scientific Instrumentation Centre and Library Science were sanctioned 1 to 2 lac Rupees each to purchase their own computer systems. Further, University Library can also get about Rupees 25 lacs sanctioned from UGC for this purpose as per their norms. It has been well taken up by our Vice-Chancellor to ask them to house them in the

University Computer Centre itself. Another approach could be that as the main system can have spreaded terminals within a radius of 2 km and no user is presently located at a distance of more than 1,000 metres from the main system, the planning of Local Area Network be made and the money sanctioned individually be utilized for telecommunication equipment or for the purchase of some peripherals required by the constituent departments. Thus, LAN planning requires analysis of the activities of the constituents—with clarity of objectives directed towards resource sharing and job sharing followed by details of LAN equipment—nucleus, terminals and micro/personal computers, linking equipment etc, also a well stated standard for various configurations alongwith checks, balances and possible modifications. It is actually having the sole aim of sharing of cost both of hardware as well as software. By way of example, configurations of the computer installed for the District Information Centre also open for LAN collaboration are given in Appendix—I.

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APPENDIX—I

Configurations of the Computer Installed for the District Informations Centre also Open for LAN Collaboration

HARDWARE

ND-550 supermini range of computer with following hardware features.

(i) *CPU* : 32-bit byte oriented architecture with thrust of 1.3 MIPS. It has excellent virtual memory organization featuring full 32 bit logical address space divided into 4.3 GB of data space and 4.3 GB of instruction set. It also has full BCD arithmetic processor and array processor instruction set.

Floating point processor uses both 32 bit and 54 bit operands.

Main memory of system presently installed is 3 MB and is expendable upto 32 MB. Cycle time of the memory is 120 ns. Bandwidth of I/O unit is 4 MB per/sec.

(ii) *Peripherals* : At present 3 × 450 MB fixed disk has been installed. This can be expanded by removal disk of 70 MB or Winchester/Fixed disk of 140/450 MB with a maximum of 8 drives on two controllers. Two magnetic Tape Drives of 50/100 IPS, 1600/6250 BPI. One line printer of speed 650 LPM. The system can support upto 128 terminal/PC as terminal. Graphic terminal, plotters and digitizers also can be connected with RS 232 C interface.

SOFTWARE

(i) *Operating System* : Operating system is SINTRAN which provides for simultaneous time sharing, real time, local and remote batch, file transfer and terminal access through an integrated communication network.

(ii) *Language Processors* : FORTRAN, COBOL, BASIC, PASCAL, C, ADA, SIMULA, compilers are available.

(iii) *Utilities* : It has facilities like ISAM, SORT/MERGE, Editor (Screen and Text), Symbolic debugger.

DATABASE AND RELATED UTILITIES

SIBAS is database management system of ND-550 which provides description of data item, type etc, and supports adhoc query.

ACCESS is an information retrieval system from a small or large database.

UNIQUE is an end user system tool for development of applications and improve programming efficiency.

FOCUS is screen handling system designed to facilitate a dialogue during transaction processing environment.

DATA COMMUNICATIONS

COSMOS is the data communication system for communications between family of ND machines in Local Area Network (LAN) or Wide Area Network (WAN).

ND/PC LINK software enables users of ND-100, ND-500 and ND-PC or IBM-PC compatibles to transfer files between PC/ND and back and also use PC as NOTIS terminal.

BIBLIOGRAPHIC RECORD FORMAT

PREM LATA KATYAL*
ABIDA VAJAHAT*
RAMA TEJPAL**
SUDHA GAMBHIR**

0 INTRODUCTION

For effective retrieval and use bibliographic data must be organized. The first step in this process is the creation of records. The bibliographic record may be viewed as a package of data, the precise content of which varies according to the specific purpose for which it is intended. When it is not possible to base the selection of data element for the bibliographic record on known user needs, general guidelines must be drawn up.

Bibliographic record has also been defined as the sum of all the areas and elements which may be used to describe, identify or retrieve any physical item (publication, document) of information content.[1]

Bibliographic record can, therefore, be made for collection of items, for whole items or for parts of items.[2] For each designated item, a bibliographic record is constructed according to the agreed rules and standards of the system. Various approaches are taken to the identification, organization and storage of data in machine-readable form.

1 BIBLIOGRAPHIC RECORD FORMAT

The main aim of computerization of bibliographic data is rapid and efficient retrieval and manipulation of data. Bibliographic systems have many unique features, but they also have much in common with other data processing applications, sharing concepts, terminology and methods. It is necessary to know about the key concept for an understanding of

*Deputy Director, NASSDOC, ICSSR, New Delhi.
**Documentation Officer, NASSDOC, ICSSR, New Delhi.

bibliographic data formats.

11 Records, Fields and Subfields

A record is a group of related data element treated as a unit by a computer programme designed to perform a specific procedure. Each record contains data which refer to a separate entity, object or unit recognized by the system. In a bibliography and library applications the units are books, journals, articles, library clients, book suppliers, etc. Fields and subfields may contain one or more data elements, depending upon the designers of the system who choose to treat the data.

12 Character/Character Sets

Records can also be described as strings of characters. A character is any symbol representing a letter of the alphabet, a digit, or a sign (including punctuation and diacritical marks). A record described as 500 characters in length may be regarded as a string of 500 characters. A character set is a group of the machine (binary) equivalents of the total number of characters that can be exactly represented within a given computer system.

13 Record Format

The terms record structure, record format and readable form/format are all used to refer to the arrangement and identification of data for computer handling. A machine-readable bibliographic record is arranged according to a particular format.

Record structure may be fixed or variable. Fixed records contain the same number of fields and the fields are always of a prescribed length. In case of variable records the length can be adjusted to suit the bibliographic data. The records may not be of the same size, as some will have more fields than others and some fields will contain more data than others. Some record structures make use of a combination of fixed and variable-length fields.

14 Files, File Storage and Access to Data

A file is a collection of related or similar records, for example a file of catalogue records, a file of records of library clients and their addresses. The two best-known storage media for computer files are magnetic tape and disk, including the floppy disk associated with microcomputer and the more recent CD-ROM (compact disc-read only memory).

Files of records can be stored on disk in a number of ways, serially, sequentially or in random storage locations or addresses, and accessed directly, either by an address key, or by means of one or more indexes. Direct access systems are the norm in online information retrieval and make use of inverted files to provide fast access to record content. They allow free text searching as well as more structured searching.

2 EXCHANGE FORMATS : STRUCTURE AND CONTENT

Bibliographic data formats consist of three basic components in exchanging data:

(a) A defined physical structure : Rules for the arrangement on a computer storage medium of data to be exchanged.
(b) content designators : Codes to identify the different data elements in the record (e g author, title, scale of map, starting date of journals, etc).
(c) The data elemnts separately identified by the codes in the exchange format have to be defined, not only in terms of content but also in form.

21 Structure

Bibliographic Exchange Formats usually avoid fixed length formate because of the large number of different kinds of data elements, their repeatability and the fact that many appear only infrequently in records. They employ content designators to denote the entity of each data field instead of identifying data fields by position within a record.

211 *Directory*

The directory consists of an entry for each field present in the record.

212 *Content Designators*

Most exchange formats employ a three-digit identity known as a 'tag', but some internal system formats employ two digit tag. In order to be compatible with ISO 2709, a three-digit tag must be used. Most formats use numeric tags. The *UNISIST Reference Manual* format uses alphanumeric tags and these have been adopted by the MINISIS software system, with one alphabetic and two numeric characters making up the tag.

Many exchange formats, in particular based on the MARC II format use indicators and subfield identifiers to define further the data into separate categories.

213 *Content of The Reecords*

The content is the data recorded in the fields and subfields on the machine-readable record. Content is determined mainly by three factors:

(a) the nature of the bibliographic item recorded;
(b) the use to be made of record; and
(c) The standards used in the records : The code of cataloguing rules used for author, title and descriptive data; the classification scheme used for classifying the item; the list of subject headings or keywords used for verbal subject data.

Differences in national cataloguing practices have made it difficult to reach agreement on a wholly standardized communication/exchange format at the international level. The greatest advances have been made in bibliographic description, with the widespread acceptance of ISBDs and their incorporation into national codes such as *AACR 2.* ISBDs set out standard data elements, and distinctive punctuation to separate data elements.

3 CONCLUSION

Effective exchange of bibliographic data between agencies can be accomplished only if the records of agencies exchanging data conform in respect of three components, i e the structure, the content designators and the data element definitions.

The universal acceptance of the ISO 2709 record structure as a basis for exchange formats has enormously benefitted the information community. It is accepted for the exchange of bibliographic data on magnetic tape, and in its logical aspects it is also being used for the formatting of bibliographic data sent online and stored on other media such as diskettee (floppy disk) and CD-ROM.

The second component is the content designators which are represented in most bibliographic formats by tags, indicators and subfield codes, in short, codes which define the different elements in the record There is no universally accepted standard for these. Hence the existence of different formats such as the MARC formats intended for use by libraries as well as formats developed by or used by abstracting and indexing services like the *Chemical Abstracts*. Bibliographic records contain much

the same data elements, and it is possible to convert the content designators automatically in order to convert data from one format to another.

The last component, the form and content of the data elements, varies according to the 'cataloguing rules' used, and the way the different data elements prescribed by the rules are divided up and separately identified by the format. All bibliographic information-retrieval systems need cataloguing rules of some sort to ensure consistency of the data they contain.

Most MARC formats depend for the definitions of their data elements on the national cataloguing rules. *UNIMARC* assumes the use of a cataloguing code based on ISBD. The *Reference Manual* contains its own cataloguing rules to define its data elements. The *Common Communication Format* does not assume any particular cataloguing code because the intention was that it would serve as a vehicle of exchange between systems which held data formulated according to different traditions.

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INTERNATIONAL STANDARDS FOR BIBLIOGRAPHIC DESCRIPTION : BRIEF REVIEW

S SUDARSHAN RAO

0 INTRODUCTION

Standardization is becoming increasingly important to ensure greater effectiveness of information services in all the countries and the use of information and information systems across national, regional and institutional borders.

"Standardization is the setting up by authority or common consent of a quantity, quality, pattern, method on unit of measurement for adoption as a common minimum or as an example for imitation. Standards are indispensable aids to library authorities and librarians. These can be helpful in developing and adequate book stock, employing trained staff and occupying suitable quarters."[2]

The documentalists need standards in the matter of presentation of information or data in various types of documents, which they have to handle as sources of information; and as producers of various services like reading lists, documentation lists, SDI notifications. They have felt the need and usefulness of standard practices in the matter of description and presentation of bibliographic records meant for transmission of information.[3] The importance of standards in libraries can best be understood as :

(i) to bring uniformity and order;
(ii) guide for establishment of new libraries and for the improvement of the existing libraries :

* Lecturer, Department of Library & Information Science, Osmania University, Hyderabad, 500 007.

(iii) guide to the level of financial, material and human support necessary to ensure that libraries will be able to fulfill their responsibilities to the users;

(vi) essential for planning and evaluation of library services; and

(v) to upgrade libraries, providing sub-standard institutions with yardsticks by which to measure their deficiencies.

1 STANDARDIZATION IN CATALOGUING

Standardization of author-title cataloguing (even to a great extent of subject cataloguing) has been a way of life in U.S libraries, especially since the Library of Congress took over the printed catalogue card service in 1901. The oldest international standard for libraries seems to be the catalogue card of international format (75×125 mm).

In UK the progress towards standardization was much slower for several reasons. But when BNB started to issue printed catalogue cards in 1956, its cataloguing achieved greater acceptance among the libraries. (However there were still libraries which resisted, partly because they had reservations about use of *DDC* in BNB.)

Eventhough Americans accepted AA Code of 1908 and later ALA revisions of 1941 and 1949, many of them were not happy with these Codes. Their dissatisfaction was voiced by Andrew Osborne (The Crisis in Cataloguing *in* : *Library Quarterly*. 1941); R K Olding : *Readings in Library Cataloguing* 1966 : and mostly by Seymour Lubetzky in 1953 in his '*Cataloguing Rules and Principles*'. This helped to pave way for the International Conference on Cataloguing Principles, 1961 (Paris), at which there was a general agreement on the desirability of international standardization. These rules which were agreed upon at Paris in 1961, are the Lubetzky's *Cataloguing Rules and Principles*.

11 DESCRIPTIVE STANDARDS

"The need for easy and universal access to bibliographic information and the development of cooperation between information units resulted in standardization in the description of the catalogue records... The use of computers made standardization more necessary than ever particularly since the records, in order to be read by the machine had to obey strict intellectual rules but also follow an extremely precise and uniform presentation using conventional characters and a fixed length. These rules and their material presentation constitute a format."[1]

Towards the standardization in the format for description of the docu-

ments, International Federation of Library Associations and Institutions (IFLA) played an important role through its two important programmes viz, Universal Bibliographic Control (UBC) and Universal Availability of Publications (UAP), both of which are closely related. An International Working Party was set up by the International Meeting of Cataloguing Experts (IMCE), which was held in Copenhagen in 1969, to study the possibilities of standardization at international level for the description of documents. Later, in 1971 IFLA's Committeee on Cataloguing held at Liverpool adopted the International Standard Bibliographic Description. And the Working Group published its final recommendations in 1971 under the title *ISBD*, followed by several national bibliographies like, *BNB*, *Australian National Bibliography*, *Bibliographie de la France*, *Deutsche Bibliography* etc. The ambiguities and deficiencies that were found after adoption by the national bibliographies, are fulfilled. Further, the same were discussed at IFLA's Conference held in Grenoble in 1973 and the first edition of *International Standard Bibliographic Description* was published in 1974.

12 Scope of Isbd

ISBDs are designed primarily as an instrument for the international communication of bibliographic information, i e, bibliographical description. *ISBD* prescribes the type, order and composition of access points, of all bibliographic information in a library record, with exception of access points, suggested classification and certain control codes placed on records by a national or local cataloguing agency (e g Library of Congress Card Number). The type, quantity and shape of subject headings in unit card entry and additional entries are not governed by the *ISBD*. Therefore, *ISBD* covers only the body of an entry and the other information such as collation, notes and ISBN Number.

The sources, shape, position and punctuation of these elements is precisely dictated by *ISBD*. It makes possible to create a complete bibliographic record for a monograph without any knowledge of headings or classification.

Precisely, the *ISBD* is designed primarily as an instrument for the international communication of the bibliographical information by specifying the elements which should comprise a bibliographic description and by prescribing the order in which these should be presented, and the punctuation by which they should be demarcated.

13 Objectives of Isbd

The basic objectives of *ISBD* are:

(i) records produced in one country or by the users of one language

can be easily understood in other countries and by users of other languages;

(ii) that records produced in each country can be integrated into files or lists of various kinds containing also records from other countries; and

(iii) records in written or printed form can be converted into machine-readable form with minimum of editing.

The *ISBD* is intended to provide the data required in various bibliographical activities, like library catalogue announcement of new publications, for acquisition and distribution of books and their handling both in libraries and by the book trade, i e, to meet the requirements of different interests and users.

14 ISBD (M) INTERNATIONAL STANDARD BIBLIOGRAPHIC DESCRIPTION FOR MONOGRAPHIC PUBLICATONS

The first edition of *ISBD (M)* was published in 1974, and its revised edition in 1987. *ISBD (M)* specifies seven clear areas and the order of elements in them with the punctuation symbols for description of printed monographic publications. The following are the seven areas under *ISBD (M)*:

1 Title and statement of responsibility
2 Edition
3 Publication, distribution etc (Imprint)
4 Physical distribution (Collation)
5 Series
6 Notes
7 Standard Number and terms of availablity

The following are the punctuation marks used in the description according to *ISBD (M)*. Equal symbol (=), Diagonal Slash (/), Ampersand (&), Square Brackets [ ], Ellipses (...), 15Full stop, space, dash space (—).

15 ISBD (G) : GENERAL INTERNATIONAL STANDARD BIBLIOGRAPHICAL DESCRIPTION

ISBD (G) was developed by an agreement between JSCAACR (Joint Steering Committee for the Revision of *AACR*) and the members of IFLA Committee on Cataloguing, and Chairmen of IFLA's specialised ISBD Working Groups. The *ISBD (G)* serves as a single framework for

the description of all types of media (material), thereby ensuring a uniform approach in bibliographic description.

Therefore, *ISBD* (*G*) covers all kinds of documents and it is intended for use by IFLA Working Groups in formulation of other specialist *ISBDs* but not as a working tool for cataloguers. It can be used by librarians in compilation of Catalogue Codes. It is aimed at greater compatibility in future Catalogue Codes and also as a standard framework for all kinds of documents. The second feature of *ISBD* (*G*) is the provision of an area of details, which are special to particular class of material (e g, periodical publications, cartographic materials) which is called as Material (or type of publication) Specific Details.

On the basis of *ISBD* (*G*) (for format see Appendix A) IFLA brought out specialised *ISBDs* dealing with specific types of materials. The following are the standards issued by the IFLA's Working Groups:

ISBD (*S*) for Serials

ISBD (*CM*) for Cartographic Material

ISBD (*Old Books*) for older printed books/Antiquarian Materiats (A)

ISBD (*PM*) for Printed Music

ISBD (*NBM*) for Audio-visual material

ISBD (*CP*) for Component Parts

ISBD (*CF*) for Computer Files

A library depending on its requirements may omit certain elements of the description from the *ISBD* (*G*) format. It is not difficult for the libraries following *AACR*-1 to shift on to the *AACR*-2 which is revised, incorporating into it the provisions of *ISBD* (*G*) and other *ISBDs*. It is also expected that *ISBD* standards would be internationally adopted.

3 CONCLUSION

ISBD (*G*) is the best format todate available for all libraries and indeed for all institutions engaged in listing sources of information. It is fully adaptable to computerised procedures. Combined with ISBN (a method of identification), it solves the bibliographic control of documents. Because of computerization of cataloguing operations, a standard format for recording data has also beeome very essential and *ISBDs* are compatible to this.

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APPENDIX—A

FORMAT OF ISBD(G)

Sl No	*Prescribed Punctuation*	*Element*
1 Title and Statement of Responsibility :		Title Proper
	[ ]	GMD (General Material designation)
	=	Parallel Title
	:	Other title information
	/	First statement of responsibility
	;	Subsequent statements
2 Edition		Edition Statement
	=	Parallel edition statement
	/	First statement of responsibility relating to the edition
	;	Subsequent statements
3 Material (Type of Publication) Specifie details		
4. Publication distribution etc		First Place
	;	Subsequent place
	:	Name of publisher distribution etc.
	[ ]	Statement of function of publisher, distribution etc
	'	Date of publication, distribution
	(	Place of manufacture
	:	Name of manufacturer
	,)	Date of manufacture

RETROSPECTIVE CONVERSION IN UNIVERSITY LIBRARIES

M S DEOGAN*

0 INTRODUCTION

ALA Glossary of Library and Information Science defines 'retrospective conversion' as "the process of converting to a machine-readable form the records in a manual or non-machine-readable file that are not converted through day-to-day processing". When the university libraries were established, cataloguing of books, no doubt, was based on some catalogue codes and local practices. It was not envisaged at that time that the automation of libraries will become imperative in future and computers, the wonder machines, will open new vistas of library co-operation by their speedy, more accurate and complete information retrieval qualities. The library co-operation has become inescapable due to individual library's diminishing resources and increasing output of information material in various forms. But co-operation with the help of computers needs standardization as a prerequisite. Moreover, downward revision of computer prices with increased storage capacity has put these machines within the reach of libraries. Out of 179 university level institutions, 13 university libraries are using computers for one or the other housekeeping operations at present.

The Government of India has conceived an ambitious Information and Library Network (INFLIBNET) project during the Eighth Five Year Plan at a cost of Rs. 15,068.45 lakhs during the first four years. This will link 170 university libraries, 500 college libraries and 200 R&D centres all over the country. Thus, by the turn of the next century, the users will search the titles in the library collection by Online Public Access Catalogue (OPAC). But for this purpose, conversion of library catalogue into machine-readable form has appeared as a stumbling block.

*Asstt Librarian, Panjab University Library, Chandigarh.

Although retrospective conversions have been taken up all over the world in fits and starts, the experiments have not been very encouraging.

The retrospective Conversion Project (RECON) which was started by the LC in 1969 and Cooperative MARC (COMARC) in 1970 could not be continued due to various reasons like lack of finances, unsupportive attitude of library professionals and administrators etc. More emphasis was laid on new records and retrospective conversions were only taken up by MARC for those libraries which showed definite inclination for it.

The various ramifications of retrospective conversion are:

(i) Nature of collections;
(ii) Total workload; and
(iii) Financial outlay.

1 NATURE OF COLLECTIONS

Due to the various teaching departments and their requirements, the collections of a university library are hetrogeneous in nature. The books are not only in Engligh language but in Oriental and other European languages also. That means if books other than in English language have also to be covered then their transliteration into Roman is essential. Similarly, on the bases of textual matter, the books vary from simple text-books for graduate level students to research material for the scholars, backfiles of newspapers, bound journals, manuscripts, maps, rare books etc.

2 TOTAL WORK LOAD

In determining the workload the following aspects have to be taken care of:

(i) Whether the whole of the collection has to be covered;
(ii) Whether the retrospective conversion is to be taken up only for those books which have been received after a certain date,

As mentioned above there are some collections in every library which are meant only to be used as text-books at graduate levels and such books are neither very costly nor sparable on ILL to other libraries because these are frequently required by the student community. Similarly every library has a certain percentage of books which have epheme-

ral nature of their contents. Then there is a sizeable oollection of books which have become outdated due to their data. Again, there is a major portion of the collection which has not been borrowed by the clientele for the last five years or more.

Now all the above mentioned categories are such that even if the retroconversion of their card catalogue is held back in the first instance it does not cause much inconvenience. Of course, this is a presumption that except for text-books (which the students know by heart) other books will not entail many inquiries and searches and their retroconversion can be held back. Similarly, bibliographical details of Oriental language books and those in other European languages will have to be written first in Roman for which standards will have to be developed. Therefore, these can also wait.

The second method is to decide a cut out date after which the retrospective conversion is to be taken up.

But both the above-mentioned decisions of taking up retroconversion in phases have one big drawback. A reader will never know that the collection has been bifurcated on these lines and what is the total collection of the library in a subject and as a whole. Then, there is the tedious job of separating collections into various categories which is time consuming.

Once the decision about the coverage of material for retrospective conversion has been taken the next step is to determine the approximate work load of converting the handwritten data into machine-readable form. For this purpose, help can bc taken from MARC, OCLC, WLN tapes by down loading them and comparing with library collections but standardization of library names, place names, etc has to be taken up locally. The Bureau of Indian Standards (BIS) can co-operate with International Standards Organisation (ISO) for laying down these and other bibliographical standards as needed.

The conversion can take place either from the Public Catalogue or from the shelf-list. Since the Public Catalogue has many added entries like joint author, compiler, translator, subject, series, analytical entries etc, the exact amount of data cannot be estimated. If a catalogue card is taken as a unit bibliographical record, the total number of shelf-list cards can give an approximate number of entries. Even in a shelf-list card sometimes more than one cards are available for multiple copies of text-books, new editions, bound volumes of journals etc, which have to be taken care of.

Usually every library maintains separate shelf-list for periodicals; there-

fore, it is not difficult to find out the approximate total number of entries. Similar is the case of annual reports, annual directories and other periodical publications, each of which will constitute one bibliographical unit of record but will be spread on many catalogue cards.

After determination of approximate workload the next step is entry of data which can be undertaken in two ways:

(1) by the library professional staff; or
(2) by some outside agency.

1 In this case since professional staff is fully familiar with the catalogue the chances of mistakes are less in the entry. The staff feels more involved in the work because the record has been created by them and they have to use it later on.

But the greatest disadvantage is that the libraries are already understaffed and the staff will have to attend to this job in addition to their normal duties. The progress of work will be very slow and the completion of project will take many years. The best method is to appoint extra staff exclusively for this project.

2 Alternatively, the entry job can be entrusted to some outside agency which specialises in data entry. This involves extra expenditure and lot of work of editing. Since they are professional people they can complete the work much earlier but the chances of mistakes are much more.

3 FINANCIAL OUTLAY

As discussed above the retrospective conversion is a huge project which needs years to complete. The cost of hardware, software, computer stationery and salaries of staff employed for the job have to be calculated. The non-recurring expenditure on hardware and software can be met with once but the recurring expenditure on staff salaries (if a separate cell is created or the work is got done through an outside agency), stationery etc, will have to be made depending upon the work load. Before the project is started the financial provisions must be made for the entire period of operation, otherwise there is every likelihood of its remaining incomplete.

4 CONCLUSION

Libraries have always borne the brunt of financial handicaps and no library can boast of self-sufficiency. The only remedy appears in library

co-operation through networking and for that "Complete conversion of our retrospective catalogues has become not so much an *ideal as* a necessity."[1] This will help in keeping up the ideal of information as an individuals right and the responsibility of the society. The government must release special assistance to university libraries for these projects and basis of grants should be the collections of the library which determine the workload.

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ROLE OF THESAURUS IN ON-LINE INFORMATION RETRIEVAL SYSTEM

Ms VANDANA RANJAN*

0 INTRODUCTION

The advanced technology and informatione xplosion have ushered in a new concept in information retrieval which is known as on-line system. It proves to be a very precious and convenient tool for libraries and information centres. In an on-line system the user is in direct communication with the computer through a terminal; so speedy and accurate retrieval of information counts a lot in its success.

The fundamental aim of any information retrieval is to extract and furnish those bits of stored information that best match the request. But simply the use of computers is not a guarantee for the success of information retrieval system. In fact, the entire structure of information retrieval system depends upon the intellectual organisation of document content and logical processing of request i e searching. The skillful handling of these two is the most challenging work.

1 THESAURUS : THE LANGUAGE NORMALISATION TOOL

In the on-line information retrieval system use of natural language searching capabilities enhances the performance of the system. Now, when the natural language is the primary input to an information system, any content analysis must include means for consistent language normalisation. A well-defined terminology adds to the clear perception of any given topic. Any subject is identified by various symbols attached to it. These symbols take the concrete form of thesaurus. The thesaurus is an organised representation of this symbolism and it is also the most effective tool for providing language normalisation. It is the most essentially

*Librarian, Uptron Colour Picture Tubes Ltd, Lucknow.

required feature of any information retrieval system and specially on-line system.

According to UNISIST "A thesaurus may be defined either in terms of its function or its structure."[1]

> "In terms of function a thesaurus is a terminological control device used in translating from natural language of documents, indexers or users into a more constrained system of language."
> "In terms of structure a thesaurus is a controlled and dynamic vocabulary of semantically and generically related terms which covers a specific domain of knowledge."

2 THESAURUS—THE INTELLECTUAL AID

In an on-line system the searcher is entrusted with a very heavy responsibility of intellectual burden[2] because the primary input is in natural language. So, at the search level, all possible entry points have to be thought of and searched to retrieve the relevant information. Thesaurus is the most effective tool to lighten this intellectual burden and to help the searcher in standardising the language. In fact, rather than in the controlled vocabulary indexing system, a thesaurus proves to be much more beneficial to the searcher in a natural language system. Here it functions as a search tool only. Since it exercises control over synonyms and brings together the related terms in one place the generic search operations become easy. It is one of the most essential aids of searching profession.

3 TYPES OF THESAURUS

There are mainly two kinds of thesaurus:

1 *Regular Thesaurus.* It comprises of definitions composed of descriptions of terms. It may bear any of several relationships to the entry. Most common are synonymity, inclusion, sub-ordination and conditional forms of these. A relationship of near equality is often used more frequently expressed as "see also". Terms are well connected by "see" and "see also" cross references, so as to avoid duplicacy and provide accuracy. It provides the best features of both hierarchical classification and fixed key words.

2 *Stem Thesaurus.* It consists simply of a list of word stems, by using the words included in a particular document collection, each distinct word stem being furnished with a different sequence number. The sequence numbers in the stem thesaurus are then equivalent to the concept

numbers included in the regular thesaurus, with the exception that each sequence number has only a single correspondent (word or word stem) in the null thesaurus, compared with the possible multiple entries in the regular thesaurus.

4 PURPOSE

The major purposes of a thesaurus include the following :

1 To provide a map of a given field of knowledge indicating how concepts or ideas about concepts are related to one another thus providing complete understanding and composite knowledge of the structure of the field.
2 To provide a standard vocabulary for a given subject field which will ensure consistency and standardisation of language.
3 To provide a system of references between terms which will ensure that only one term from a set of synonyms is selcted as search term, and to provide guides to terms which are related to any indexed term in other ways, either by classification structure or otherwise.
4 By providing 'see' 'see under' and 'see also' cross references the terms are properly linked together so as avoiding duplicacy of term in search process.
5 To locate new concepts in a scheme of relationships with existing concepts in a way which makes sense to the users of the system.
6 To provide classified hierarchies so that a search can be broadened or narrowed systematically, if the first choice of search terms produces either too few or too many references to the material in store.

The thesaurus thus has to provide specific terms, general terms to which the specific terms are related and a secondary network of other terms which may from time to time be related in the subject literature.

A search thesaurus as described by Lancaster "exists to lighten the intellectual burden on the searcher, to reduce the possibilities of human error and to improve both effectiveness and the cost effectiveness of the search operation".

Besides being a time saver and diminishing the cost any fairly standardised thesaurus provides a lot more amplitude and liberty in the type of retrieval operations that can be implemented.

5 MERITS

The following principal advantages are evident:[3]

1 Retrieval procedures can be extended to collections in many different

areas, since the thesaurus problem no longer constitutes an impediment.
2 It becomes possible to investigate differences in vocabulary between different subject areas.
3 It removes any possible differences in retrieval effectiveness between different subject areas due to disturbances introduced by varying methods of thesaurus construction.
4 It becomes possible to investigate the retrieval effectiveness of a variety of thesauri for a given collection, including variation in the thesaurus size, in the number of concept classes and in the correspondents assigned to each class.

6 CONCLUSION

Thus to conclude the thesaurus as an indexing and searching aid for librarians and information scientists represents the latest landmark in a long series of works which strived to encode the natural language of communication for the purposes of information storage and retrieval. It is true that infinite intellectual endeavour is involved in the construction of a thesaurus. Nevertheless this searching tool can immensely enhance the performance of on-line information retrieval systems. In the long run it repays the cost manifold in saving time of searching and thereby making the on-line system cost effective. In this age of even growing information need and new spheres of knowledge coming into existence ever frequently, we need to have thesauri on each and every subject area. Only when the thesaurus covers the entire subject fields we can be sure of satisfying the information needs of all and providing effective on-line information retrieval system.

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CHEMICAL REACTIONS INFORMATION SYSTEM

R S SINGH*

1 INTRODUCTION

Most of the scientific disciplines use their own languages. Chemistry is no exception. Chemists use their own vocabulary and nomenclature. In addition, they use a very peculiar expressions called 'chemical reactions.' There are over 8 million known chemical compounds. The compounds can be transformed into a large number of others through suitable chemical reactions. Thus, the number of chemical reactions is increasing at a very rapid rate.[5] The researchers in chemistry find it difficult to get their desired information easily. But in spite of this great need very little has been done in organising and providing access to chemical reactions data. Only few efforts are visible in 1980's.

Indexing of chemical reactions data offers many problems. The chemical reaction's main participants are molecules which are unique entities. These reactions possess many characteristics which warrant proper handling in information dissemination. These are as follows :

(a) starting materials;
(b) products;
(c) reaction sites;
(d) catalysts;
(e) yields;
(f) mechanisms;
(g) experimental conditions;
(h) bond changes;
(i) by-products.

The handling of these characteristics for information retrieval is not

*Scienttst E II & Area Coordinator, National Information Centre for Chemistry and Chemical Technology (NICHEM), National Chemical Laboratory, Pune-411 008.

so easy. The development of modern computing devices particularly the graphics representation have made this difficult task manageable to certain extent.

2 NEEDS

Chemistry forms a major subject amongst scientific disciplines. It plays a vital role in the industrial and economic development of human society. Chemical products find their use in all spheres of human activities. Naturally it attracts a large number of persons from (i) R&D activities, (ii) manufacturing of products, and (iii) imparting training to workers and students. All these workers use the knowledge of chemical reactions in one or the other forms.

21 In India

There are two sectors involved in chemical research activities in India. These are (i) National Government, and (ii) Private and public sector industries.

211 *National Government*

(i) *Research organisations.* The national government supports many research institutions through its various departments and ministries. About 42 organisations are engaged in R&D activities in Chemistry.[6]

(ii) *Educational institutions.* National government also provides financial support to universities and other educational institutions for higher studies. There are 179 universities and institutions of higher studies in India. Out of them at least 136 are involved in imparting higher education and research in chemistry.

212 *Industries*

Industries engaged in the production of chemical products are equally involved in R&D work. About 150 units are recognised by the national government as R&D centres in chemistry in private sector.[7]

Industries in public sector also contribute their due share in the R&D work in this subject field.

213 *Overall*

The amount of R&D efforts, in research laboratories, academic institutions and industrial organisations in chemistry and chemical techno-

logy indicates that there are several thousand scientists and technicians working in this discipline. Most of these persons need information on chemical reactions. There are very few/nil efforts to fulfil this need in the country.

3 EXISTING PRODUCTS AND SERVICES

There are some efforts to fulfil this need in developed countries. Some excellent softwares are also available to manage chemical reactions. Most of them are run on either large IBM mainframes or on VAXes. Molecular Design Ltd, has developed packages like Chembase and Chemtext which run on IBM-PC. But unfortunately VAXes are not easily available in India and companies like Molecular Design Ltd, are not willing to sell their products to countries like ours.

Some databases are accessible for on-line searching through database vendors. These are (i) *Chemical Abstracts*, (ii) *Beilstein Handbook of Organic Chemistry*, and (iii) *Chemical Reactions Documentation Services* (CRDS) of Derwent Publications. In India, due to lack of proper telecommunication facilities, it is not possible to use the databases available on-line. These databases are described briefly in the following paras.

31 Chemical Abstracts Reactions Database (CASREACT)

This database has over 49,000 records, containing 7,40,000 single-step reactions. These records are derived from 100 journals reporting chemical reactions in *Chemical Abstracts* from 1985 to the present. This database covers both single-step and multi-step reactions. Its basic index contains (i) CA Registry Number, (ii) Reactants, (iii) Products, (iv) Reagents, (v) Solvents, (vi) Catalysts, and (vii) Single words from reaction information.[3]

CASREACT files are available for on-line searching from STN International, through mainframe computer.

32 Beilstein Handbook of Organic Chemistry

Beilstein Institute needs no introduction to chemists. It produces the famous *Beilstein Handbook of Organic Chemistry*.

Beilstein has been computerized recently. It is a major structure and factual database which contains 3,50,000 heterocyclic substance records.[2] These records contain the critically reviewed and evaluated information covering the literature from 1830 to todate. Each record contains, the Beilstein Registry number, chemical name, molecular formula, formula weight, lawson number and structure diagram. It also contains general

and chemical data of specific substances. All these elements are searchable and displayable.

Beilstein file is available for on-line searching from STN International through mainframe computer.

33 Chemical Reactions Databases of Derwent Publications

Derwent provides two databases on chemical reactions. These are described below.

(i) *Markush DARC.*[5] This is a chemical database system using graphics for input, storage and retrieval of compounds having generic structures commonly used in patents. Markush structure covers all individual compounds as well as generic chemical descriptors like alky, aryl. The system is based upon the commercial generic DARC provided by Telesystem Questel.

The system runs on a mainframe computer and is available for on-line searching through Telesystem Questel, France.

(ii) *Chemical Reactions Documentation Service (CRDS).*[4] This database covers the organic reactions reported in (i) *Theilheimer's Synthetic Methods of Organic Chemistry*—an annual publication, and (ii) *Journal of Synthetic Methods*—a monthly publication. This database covers information reported in literature from 1942 to todate and contains over 75,000 reactions.

The database provides two retrieval procedures as detailed below :

(a) *Coding* : This was developed in 1960's. With this system, the key reaction parameters starting materials, products, reagents, bond breakages and formations and reaction conditions are inputed and retrieved through 3 digit codes.

(b) *Keywording* : This system was introduced in 1978. A controlled keyword list has been developed comprising of some 1,000 terms for starting materials and products and around 700 for generic reagent classes, reaction conditions and reaction types. Right hand truncations are also permitted in searching.

CRDS database is comprehensive and up-to-date. But retrieval is somewhat cumbersome.

Both the databases are available on-line.

34 Organic Reactions Accessed by Computers (ORAC)

One of the popular commercially available chemical reactions system,

ORAC has been developed by Dr P Johnson at Leeds University. The system provides for searches on the products, reactants keywords, reaction types and structural changes. The program is very well human engineered and is menu driven. It uses graphics for input and output.

There are currently about 80,000 reactions (including Theilheimer) available in ORAC.[10]

There is also a companion program OSAC for structure searches. It provides for full as well as substructures search facilities.

Both ORAC and OSAC run on VAXes.

35 Molecular Access System (MACCS)

This system provides graphical input, storage, retrieval and substrucutre searching of molecular information. This has been developed by Molecular Design Ltd. ICI has been using this system for their inhouse use. MACCS runs on VAX machine. The inhouse database of ICI contains over 3,01,500 structures.[1]

36 Chembase

This is a database management system for creating, storing and retrieving chemical structures and reactions. It runs on IBM-PC or compatible machines. It is capable of down loading from and uploading to MACCS databases. This package has been developed by Molecular Design Ltd, USA, and is available commercially.

Hardware configuration needed for this package is IBM-PC/XT, AT with 640 K RAM, two floppy disk drives, a hard disk of 20 MB or more, EGA and mouse.

37 Chemtext

This package is an image and text processor for the chemical and pharmaceutical sciences. It allows chemists to prepare chemical reports, papers on a PC. The software is capable of creating and retrieving complex molecules and reaction schemes and mathematical equations. It also accepts data and graphics from many other MDL programs and from analytical instruments. This package has been developed by Molecular Design Ltd, USA and is available commercially.

Hardware configuration for this software is IBM-PC/XT,AT with 640 K RAM, a hard disk of 10 MB or more, one floppy disk, EGA and a mouse.

4 EFFORTS IN INDIA

A national facility named National Information System for Science and Technology (NISSAT) was created in June 1977. This system was charged with the objective of managing scientific and technical information for the best use of the developmental efforts in the country. Several sectoral information centres to cater to the information requirements of various disciplines are thought of under this facility. Some of these centres have already become functional. One of them relating to chemicals is functioning at NCL since 1986. It is called National Information Centre for Chemistry and Chemical Technolgy (NICHEM).

41 Resources at Nichem

NICHEM possesses a minicomputer and suitable trained personnel capable of creating chemical reactions database system. The centre also procures over 90% literature on synthetic chemistry. A detailed programme has been prepared to develop a microcomputer based chemical reactions database at this centre. This system will use Unix operating system.

42 Collaborative Arrangements

Some efforts are initiated to have collaborative arrangements with ORAC of Leeds University, UK. Although ORAC runs on VAX machine, but Prof P Johnson has indicated that they have plans to develop this programme for Unix environments in very near future. If this effort materialises, the system would be operational within one and half years time.

43 Functions of the System

The chemical reactions database will attempt to fulfil the following objectives :

(i) *To provide information on* : Starting materials, products, catalysts, reaction sites, mechanisms, yields, bye-products, experimental conditions, bond changes and references to literarture;
(ii) To provide structural search facility;
(iii) To provide access through natural language index terms;
(iv) To provide factual information like melting points, boiling points, molecular weights etc;

(v) Database will provide multiuser facility;
(vi) It will run on a microcomputer using Unix;
(vii) To provide regular update;
(viii) Database will cover overall core reactions of organic compounds.

44 Indigenous Development

To create the database indigenously, the centre will have to develop a suitable software. Further it will develop expertise to compile the factual information for inputting in the database. No doubt it may entail more time but it will have definite advantages as detailed in the subsequent paras.

45 Advantages

(i) Adaptable to local conditions such as computing machines, operational environments.
(ii) Less costly. The cost of procuring systems available commercially is very high and is almost prohibitive for developing countries like India.
(iii) *Expertise* : While creating the system inhouse, the organisation develops expertise which is very useful later on.
(iv) Source code is available with the centre,
(v) The database may become a source of income when fully developed.

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COMPUTER-AIDED INFORMATION ACCESS IN AGRICULTURE

K RAJASEKHARAN*

0 INTRODUCTION

The relationship between information, wealth and progress is particularly apparent in agriculture as the process of agricultural development is crucially dependent on availability of information and transfer of technology. In this age of information, intellectual capital, in the form of published scientific and technical literature, has assumed greater significance. But agricultural universities in the third world, in spite of heavy spending on libraries, have only gained limited access to published literature and innovations made outside. This happens in an academic environment in which the body of literature in agricultural science is becoming immense and growing fiercely. The magnitude of the problem of information explosion can be assessed if we glance through an indexing journal. For example, the indexing journal *Bibliography of Agriculture* which provided only 10,000 citations in 1940's now caters to 2,00,000 citations. The total number of journals in agriculture alone has exceeded 12,000. But even in this critical situation efforts to build up information systems and libraries in the field of agriculture have not been successful in the third world countries. In this context, it has become necessary for agricultural libraries of the third world countries to look into the potentialities of the computer and allied technologies in order to have better information access.

1 COMPUTER AND ALLIED TECHNOLOGIES

The introduction of computer technology has ushered dramatic developments in the information transmission process in agriculture during the

*College of Agriculture, Vellayani P O-695 522, Thiruvananthapuram, Kerala.

past two decades. Now highly sophisticated information services ranging from elaborate abstracting and indexing services to computerized databases in the field are in wide use all over the world. The information contained in the form of printed abstracting services and journals is now available in machine-readable form also. The conversion of the printed services in machine-readable form and the increasing easy access to these information centres through electronic media has revolutionized our information seeking habits and the way we run our library and information activities.

With the introduction of advanced computer technology in the printing process, abstracting services can be made available readily in machine-readable form well before the production and distribution of primary journals on which the abstracts are based on. As well, the demand for highly sophisticated information services in agriculture will certainly be gaining momentum in the world over with the prolific production of agricultural literature.

Information technology is now capable of improving access to information. Recent developments in the use of computers for the storage and retrieval of information and the use of telecommunication network to transmit data over long distances, offer exciting possibilities for agricultural libraries in the third world.

Of late, the advent of optical disc technologies has enabled the end users to store and have direct access to large databases in their own libraries by using micro computers and without depending on on-line vendors.

The giga dic—a sort of compact disc with vastly increased stores capacity—could be used as a back up information store of original articles abstracted by secondary information services in order to provide document delivery service.

All these developments suggest that computer and allied technologies are now becoming an indispensable tool in agricultural libraries in the third world which offers excellent possibilities in the speedier information dissemination process.

2 EXPLOITING COMPUTER TECHNOLOGIES

The unprecedented decline of computer cost and their easy accessibility has made it desirable for every small library to have a computer and the accessories. But, ease in availability of a computer and its use in library routines, in many a case, does not mean that the full capability it offers has been fully utilized in providing exhaustive information services to the users. In such a situation, the process of computerization of information activities will turn out to be a mere wastage of men and materials.

The availiability of a computer and concomittant facilities in a library offers the following possibilities in providing client-oriented information services :

—on-line access to external databases;
—development of local databases based on locally available materials;
—creation of local databases tailored to local needs from large external databases; and
—use of CD-ROM for local information services.

3 ON-LINE ACCESS TO EXTERNAL DATABASES

The alliance of computers and telecommunications has dramatically improved the potentialities of the computer in the information transmission process cutting across geographical boundaries. As a result, several national and international networks have become available for data transmission. These computer networks make available a large number of on-line databases existing elsewhere in the world, to the users of our specific libraries.

The earlier attempts in computer-aided access to databases have become successful with the establishment of MEDLARS on medical sciences by National Library of Medicine of United States in the mid-sixties, which has later turned into on-line under the name MEDLINE.

The on-line access to databases on commercial basis was introduced by Lockheed under the name DIALOG and subsequently by Systems Development Corporation (SDC) under the name ORBIT. Both of these provide a large number of databases. Bibliographical Retrieval Services (BRS) is yet another commercial on-line host originated in 1976 in United States. Among these on-line hosts, DIALOG is the outstanding and most successful on-line system and the principal leader in the on-line services.

Several databases, nearly 4,500, are now available through on-line systems. These are also accessible from India through computer-communication infrastructure.

4 IMPORTANT DATABASES IN AGRICULTURE

AGRICOL 4. This is a database developed and maintained by the National Agriculture Library (NAL) of United States Development Agency (USDA) covering world literature in the field of agriculture. It contains citations prepared by cataloguing and indexing section of NAL and Food and Nutrition Information Centre (FNIC) of USDA and American Agricultural Nutrition Centre (AGECON). On-line searching of this database is available through DIALOG, ORBIT and BRS.

AGRIS. This is another database on agriculture literature corresponding to 'Agrindex' of the International Information System for Food and Agricultural Sciences. This database is a cooperative effort of agriculture information centres around the world. Records are merged by AGRIS coordinating centre in Rome and put on tape which is used to produce 'Agrindex'. Copies of the monthly tapes are made available to cooperating organizations who can then use it for computer searching.

5 AGRIS IN INDIA

From July 1974 onwards, India has been participating in AGRIS programme through Agricultural Research Information Centre (ARIC)—the national input centre. The input is gathered from many research stations and research workers in India and passed on to the coordinating centre at Vienna.

The database of AGRIS is available to the users in two forms :

—as 'Agrindex', and
—an output in magnetic tape.

In addition to the AGRIS programme, there has been a plan for worldwide network for agricultural libraries (AGLINET) to promote collaboration and to develop coordinated inter library loan. Unfortunately, India has not been fully exploiting the potentialities of AGRIS programme or similar networks.

In India, there is no single agency to monitor and cover all the scientific information generated in the country comprehensively and exhaustively. Realising this many agricultural institutions are trying to organise themselves to form networks to control information in their field in the limited way.

6 CAB ABSTRACTS ON-LINE

Commonwealth Agricultural Bureau (CAB) abstracts database contains the contents of more than 50 international abstracting journals since 1973. The database contains over two million records available for on-line search either as a complete file or as separate subfiles corressponding to each abstracting journal. On-line searching is a highly cost effective way of carrying out literature searches and provides users with a print out of bibliographical records, the majority with informative abstracts, on their specific subject.

CAB abstracts database is publicly available through a number of major on-line hosts and is easily accessed from most countries using low cost data communication networks.

The principal on-line hosts of CAB are :

-- BRS information technologies, USA;
—CAN/OLE, Canada;
—DIALOG information services, USA;
—DIMDI, FRG;
—ESA-IRS, Itlay; and
—JICST, Japan.

Some of these host organisations offer an on-line order service with CAB to supply photocopies of original documents.

61 Magnetic Tapes

Organisations who prefer to use their own mainframe or minicomputer system can have CAB abstracts database on magnetic tape. The magnetic tapes may contain the complete CAB abstracts database or a subset of database. Many national information centre and universities are using magnetic tapes for providing information services to groups of users simultaneously.

62 Making On-line Connection

In order to make an on-line system accessible, our computer will have to be linked through telecommunication system. So a good data communication infrastructure is required. About a year ago, this facility has also been established in India which connects us to international data networks such as TYMNET or TELENET. Alternatively local network like INDONET or NICNET also provides international connection through local or STD calls.

A computer terminal with a modem is all that is essentially required to connect the user through the local telephone system to the on-line network.

An on-line search for information is speedier than manual search and the user can cover a wide range of related and relevant databases within a short period. Databases are updated periodically more frequently than their printed equivalents and the users at the terminal directly interacting with the computer database can fruitfully alter the search strategy. As well, an on-line search costs far less in terms of man-hours than an equivalent manual search of printed sources.

The charges for on-line access comprise three components :

—the telecommunication charges;
—the on-line host connect time charge; and
—a citation charge for each output from the database.

The search cost usually depends on the search strategy and the number of the records printed out. A typical search of CAB abstracts taking between 5-10 minutes and printing out 20 records will cost approximately US $ 15.

Establishing on-line connection to a good database host and judicious use of it could be practicable and economically feasible for a small information centre.

Subscribing magnetic tapes and using them for local information services can only be done by a large institution having at least a mini computer. A small library which can afford to have only a micro computer cannot avail of such facility. The recently emerged opitical disc technology is a solace for such libraries.

7 COMPACT DISC-READ ONLY MEMORY

Many Internationally reputed databases in agriculture are now available in the form of compact disc (CD-ROM) and the recent developments in optical disc technology have made it possible for any small library having a micro computer to utilize the CD-ROM for information services.

CD-ROM is very easy to set up and all that is required to provide CD ROM based information service is an IBM/PC compatible, with 64 OK RAM MS-DOS or PC-DOS version 2.1 or higher and a CD-ROM player.

CD-ROM is a high capacity optical disc approximately 12 cm in diameter. This extremely durable and transferable information carrier is capable of containing enormous quantity of information. A standard lightweight pocket sized disc can hold approximately 660 megabyte of data i e 3 lakhs 30 thousand type-written pages or 1,841 single sided floppy disketts.

CD-ROM technology certainly offers manifold advantages particularly because many computer databases such as CAB, AGRICOLA etc, are available in the form of compact disc.

The cost of setting up CD-ROM is extremely low and within the affordable limit of any agricultural library, eventhough the production of it involves several thousand dollars.

CD-ROM search can be less time consuming than search made through indices of the printed abstracting services and would be much easier for retrospective searches covering past few years. As well, it requires very little shelving space. Above all, the CD-ROM are updated more frequently and hence provide most current information.

CD-ROM has certain advantages over on-line search also. It is less costly and easier to learn than on-line equivalents. CD-ROM allows readers to concentrate more on the content rather than the actual search-

ing process. In addition, the users can search at their own pace without worrying about on-line charges or connect time. Above all, a fixed one-time payment provides unlimited use of data stored in CD-ROM aiding correct budgeting and extending information to a wide range of users.

In spite of decreasing cost of computers and rapid advancements in the information related technologies, our libraries have been unable to catch up with the trend mainly because of the ignorance of the working librarians about the new technologies and their reluctance in exploiting their potentialities. The pace of development of information related technologies in India, in spite of certain great strides, has been disappointing when it is seen in the light of worldwide developments during the past two decades.

In future, CD-ROM as a publication media will become widespread for primary and secondary publication. So it has become necessary to develop facilities for utilizing the recent developments in the optical disc technologies for information storage and retrieval in our agricultural libraries.

8 CD-ROM PRODUCTS IN AGRICULTURE

The important international databases available for agricultural information seekers in CD-ROM are :

—AGRICOLA;
—AGRIS; and
—CAB Abstracts.

AGRICOLA provides coverage from 1970 to the present. The current disc starts with 1985 and contains important sources of agricultural information. The discs are updated quarterly.

AGRICOLA contains important sources of agricultural information. The discs are updated quarterly.

AGRICOLA contains citations of publications relating to all aspects of agriculture as compiled by NAL. From 1990, *Current Research Information System* (*CRIS*) will also be added to the AGRICOLA disc. It contains description of nearly 30,000 current publicly supported agriculture and forestry research projects.

CD-ROM of AGRIS database will be brought out by silver platter in 1990.

CAB Abstracts are available on CD-ROM from 1984 onwards. Volume one covers three years from 1984 to 1986 and volume two the subsequent three years from 1987-1989. This would be the most useful information

service for third world countries as CAB still continues to be the world's principal publisher of agriculture and related information.

91 FUTURE OF PRINTED ABSTRACTING SERVICES

The electronic media and related technologies are in many a case compensating for their printed equivalents, but they cannot replace the latter.

Agricultural libraries utilizing the recent computer-based technologies for information retrieval cannot avoid the subscription of printed abstracting services like that of CAB products.

In academic libraries concerned with agriculture, the printed abstracts cannot be avoided as it still continues to be a major channel of information through which the post-graduate students and new researchers acquaint themselves with the world of agricultural information and do the bibliographical search for information.

But, for comprehensive and exhaustive literature searches, computer-based information access would be more suitable.

92 CONCLUSION

The impact of computers in library and information world has been extensive and has often triggered fundamental changes. With the extension and diversification of the application of computers, it becomes even more important for all library and information workers to be aware of the contribution that computer can make in library and information activities.

In agriculture, computer-based information retrieval offers more convenient, more flexible and more comprehensive retrieval than manual information retrieval process.

The information revolution in agriculture is in its infancy and many new electronic technologies are going to appear in future that go well beyond the computer applications.

In this 'third wave' environment, access to literature should be treated as an intellectual investment and the the third world countries, like India, should make earnest efforts to concentrate more on developing new technologies that provide better access to information.

CD-ROM TECHNOLOGY : ITS MERITS AND DEMERITS

VINOD KANWAR*

0 INTRODUCTION

The term database was defined by William (1974)[1] as an "organized set of machine readable records containing bibliographic or document related data." These are often classified as reference database and source databases.

The techniques of storing and retrieving bibliographic data on computer systems were developed during 1960s. A series of such developments in the computer technology brought changes in the systems for capturing, storing, retrieving and distributing the information to the users. The widespread availability or low cost mini and micro computers, the introduction of word processing packages, text retrieval systems and database management systems have changed the whole scene.

On-line searching is now an established method of retrieving information in the library and information community. The vast databases can be accessed 'on-line' and searched interactively. While a large percentage material is created electronically today, very little of it is stored or distributed elecronically because of the lack of standards in computer environment and the limitations of magnetic storage media.[2]

1 CD-ROM

CD-ROM stands for compact disc-read only memory. CD-ROM is a form of laser disc, 4.75 inches in diameter, that holds roughly 600,000,000 characters. The disc itself is sturdy and plastic coated so that no special handling and care is required. The information is stored on the disc by a high-powered laser that burns a series of microscopic pits into the surface of the disc. The disc is 'read' by a CD-ROM reader that is linked

*Assistant Librarian, Panjab University, Chandigarh-160 014.

to a standard micro computer. The reader contains a laser whose light is directed onto the surface of the CD-ROM disc. The pits and flat areas of the disc's surface reflect the laser light differently. These two different reflections represent the binary 1 & 0 of the digital information storage. Once mastered, the disc can not be changed, hence the term ROM for read only memory.

The first read only optical disc to become available commercially was the 12 inch optical video disc in 1978, followed by the 8 inch optical video disc and the 4.72 inch compact audio disc in 1982 and the 4.72 inch CD-ROM in 1985.

2 CD-ROM DATABASES

The CD-ROM databases started to appear in the mid-1980's and by late 1988 there were 390 products.[3] The capacity of CD-ROM disc is currently about 550 Mb but work on high density discs is in progress. This means that ERIC database of 600,000 or so records on education published since 1966 currently requires three CD-ROM discs.

Many organizations in on-line industry, including on-line search services (such as BRS and Dialog), database producers (like the Library Association and CAB International) and software producers (such as STATUS and BRS/Search) have entered the CD-ROM market. Many in the publishing world see CD-ROM technology as being revolutionary especially when CD-ROM and CD-audio/video players are combined to provide a reference source including the written word, the spoken word, music and picture. Originally, databases on CD-ROM could only be searched by a single user at a time. *Cambridge Scientific Abstracts*, publisher of medical and scientific information, developed in late 1988 a multi-platter facility that enables four CD-ROM disc drives to be linked for simultaneous searching and an American company, Meridiam Data has developed CD-ROM disc built especially for use with local area networks. A number of projects involving CD-ROM technology are currently being funded by the CEC.

21 CEC Projects

1 The ADONIS Project[4] which involves links between publishers and librarians particularly with regard to the supply of copies of previously published articles that are protected by copyright.

2 The production of a CD-ROM database containing monthly updates of three medical databases: MEDLINE, EMBASE and PASCAL. This project known as Medata-ROM involves Telesystems, CNRS and Inserm (France) and *Excerpta Medica* (Netherlands). The database will

be accessible in French and English, and will be searched using the Questel-Plus software.

3 The Bio-ROM project which will offer biotechnology patents abstracts and journal literature on CD-ROM.

4 An encyclopaedic work on chemistry which will be available on CD-ROM will access menus in either French, German or English and facilities for full text searching and for chemical sub-structure searching.

It appears that many users of CD-ROMs are in the medical field.

22 DEC Databases

According to Tenopir[5] DEC (Digital Equipment Corporation) is distributing ten databases (eight subsets of large bibliographic databases, one complete bibliographic database, one directory), namely :

1	COMPENDEX	:	Aerospace Engineering
2	COMPENDEX	:	Electrical and Computer Engineering
3	COMPENDEX	:	Chemical Engineering
4	NTIS	:	Computer, Communication and Electronics
5	NTIS	:	Environmental Health and Safety
6	NTIS	:	Medicine, Health Care and Biology
7	NTIS	:	Aeronautics and Astronomy
8	Chemical Abstracts	:	Health and Safety in Chemistry
9	Royal Society of Chemistry	:	Current Biotechnology Abstracts
10	Fraser Williams	:	Fine Chemical Directory

DEC has created a standard format for structuring on CD-ROM called Uni-File.

23 Silver-Platter

Silver Platter Information Inc has several CD-ROM Databases, such as psyclit, ERIC, PAIS, EMBASE (*Excerpta Medica*) and LISA (*Library and Information Science Abstracts*). All these databases are updated quarterly. The library market is the primary target for these databases.

24 UMI Databases

University Microfilm International (UMI) is now testing both CD-ROM and 12 inch optical disc databases prototypes. Products include the 1984 issues of 42 Journals of the Institute of Electrical and Electronic Engi-

neering (IEEE), an index extracted from INSPEC database and the *Dissertation Abstracts* databases.

3 SELECTION OF CD-ROM PRODUCTS

Now the question is to choose between an on-line search on a remote database and an in-house search of the same data on CD-ROM, Despite the impressive storage capacity of a CD-ROM—currently 550 megabytes or about 200,000 pages of A4 text, the larger databases are still too big to fit on just one disc. Furthermore, on-line databases can be much more easily updated than CD-ROM databases. The high annual subscription cost of CD-ROM will probably ensure that only those databases as are likely to get heavy use will be purchased.

CD-ROM eliminates the need to cope with uncertainties of telecommunication networks. As regards the retrieval facility, CD-ROM offers menu-driven searching instead of command driven searching. It simplifies the searcher's task; CD-ROM is therefore likely to prove particularly attractive to end-users. Some of the remote search services have entered the CD-ROM databases. The decision relating to whether or not to acquire a CD-ROM database is affected by various factors as discussed by Hatvany[6], who compares searching on CD-ROM and via the remote search services in terms of capacity, currency, cost, response time and data rates. The general conclusion is that if a searcher uses a given database infrequently, it is usually more cost-effective to use a remote service whereas if much use is made of that database then it might be best to acquire the CD-ROM version. In order to read CD-ROM discs it is necessary either to buy a CD-ROM drive to link into an existing microcomputer or to buy an integrated CD-ROM work station. It is necessary to ensure that any CD-ROM drive acquired is capable of reading discs written according to the International Standardisation Organisation (ISO) standard 9660.

To help in the decision relating what databases should be acquired, there are various directories (for example, Emard, (1988)[7] ; Day (1987)[8] describe the experience of using LISA on CD-ROM; Brunnel (1988)[9] of the Bibliographic Centre Research in Denver, states the four main factors to be considered when choosing a CD-ROM product :

(i) Data files—How far back does the information on the CD-ROM database go ? What is the record structure ? What fields can be searched ? How often is the database updated ?

(ii) Search software—Are beginner and expert modes available ? Can it be searched in a simpler way to that adopted for searching the remote services ? Does it respond within acceptable time limits ? Can it link with other software ?

(iii) Hardware—most CD-ROM databases require a hard disc and 640 Kb of RAM, some also make significant use of colour on the screen. Thus the possibility of upgrading existing equipment may add to the cost of setting up the CD-ROM database.

(iv) Cost and terms of subscription/purchase—With some databases now being made available on CD-ROM by a variety of suppliers, the selection process may become more complex. MEDLINE, for instance, is available from Silver Platter, Dialog, OCLC, Ebsco and *Cambridge Scientific Abstracts*.

4 CD-ROM APPLICATIONS

CD-ROM is already being used in-house by a range of public and private organizations for data distribution, distributing procedures manual, telephone directories, reference works, technical manual, parts catalogues etc. It is being tested in a wide range of technical publishing applications in the aerospace, aircraft automotive, ship building and many more manufacturing environments for distributing parts catalogues, training manuals etc.

CD ROM is already being tested to distribute software and user documentation by the computer companies and third parties and is being used to distribute graphics databases in the CAD desktop publishing and scientific computing fields.

The most publicized application for CD-ROM to date has been the distribution of commercial databases that were previously made available on-line. There are close to 100 such databases now available on CD-ROM and suppliers are developing terminals that can be used to search on-line databases and backfiles of the same data-bases stored locally on CD-ROM in the so-called hybrid work stations. A number of innovative publishers are making available subsets of a number of databases that relate to particular topic or discipline on one CD-ROM with a common search software and are targetting them at particular groups of the professionals in the financial and medical market places.

Bibliographic databases are now distributed on CD-ROM for retrospective cataloguing in libraries or for bibliographic checking and book ordering functions as with Whitaker's *British Books in Print* and Bowker's *Books in Print*.

Reference works are also being published on CD-ROM including trade directories, telephone directories, dictionaries, textbooks and technical encyclopedias. Lastly, products targetted at the domestic marketplace are appearing, including Microsoft's Bookshelf and Grolier's Encyclopedia.

5 CD-ROM AS A MEDIUM

51 ADVANTAGES

1 Standards—CD-ROM was conceived as a standard medium. The High Sierra Group has laid down standards for it. Physical specifications are standardized in the Yellow book. The standard deals with volume and film structure. The National Information Standards Organization has proposed ANSI standards for CD-ROM. Now any compact disc could be played on any CD-ROM drive.

2 High capacity—The capacity of a CD-ROM is now 660 Megabytes. The entire *Encyclopaedia Britannica* fits on one compact disc.

3 Software controlled—Data on the disc can be accessed randomly; every word on the disc is potentially addressable. Data stored on CD-ROM can be searched interactively just like on-line database.

4 Low unit cost—The initial mastering of a disc is expensive but economy is realized by making multiple copies of the master at the production site. The consumer has to pay low entry price to use the medium.

5 Mixed media capability—CD-ROM is a digital medium, it can carry any data which can be encoded. Text, images and sound can be mixed on the same disc.

6 Small size/light weight—A CD-ROM is 4.72 inches in diameter and approximately 0.047 inches thick, weighing 25 grams. It is capable of being transported via postal services. Storage and mailing costs are minimized,

7 Robustness—Optical discs are more durable. Each disc has a protective coating. They are physically almost indestructible, with an estimated life over ten years. Data are thus not easily corrupted and are immune to magnetic fields.

CD-ROM is based on an established mass produced audio consumer medium, hence drive and media costs can be kept low. The technology is proven and mastering, replications facilities already exist.

CDrROM like all optical storage media is just at the beginning of its life and hence further improvements in storage capacity, drive performance, price reduction and additional facilities can be expected.

52 DISADVANTAGES

1 Relatively slow access times—CD-ROM is recorded in CLV mode and hence access times in computing terms are relatively slow.

2 Currently the data preparation, pre-mastering, replication, checking, packaging and distribution cycle is a long and complex one. But many experiments are being done to solve this problem.

3 Mastering and replication facilities are extremely expensive. How-

2 CD-ROM TECHNOLOGY

Basic features and capabilities of CD-ROM are briefly described as under :

1 The use of CD-ROM presupposes the presence of a micro-computer and a special CD-ROM drive for a complete and interactive session.

2 The disk can hold over 550 MB of information, the equivalent of seven hundred 800 KB floppy disks. The information can be text, graphics, sound or motion pictures.

3 Capacity to hold vast amount of data is immense because of optical storage technology.

4 The data recorded on the disk cannot be erased or modified, but only can be read. The disk is said to have life of a hundred years. Besides being small and of light weight, it is easily transportable.

5 The content of CD-ROM is searched with a specially written software, which may be on the same disk or on a seperate floppy disk depending on the design preference.

6 It is estimated that in 1987, around 300 databases were available on CD-ROM, current figures would have increased quite substantially.

3 ONLINE DATABASE SEARCH

Online database search in its simplest term means that a library/information centre can gain access to vast stores of information in computers located anywhere in the world and retrieve the required information in shortest possible time. Online database search presupposes availability of a telephone, a terminal normally a microcomputer and a modem which connects the terminal to the telephone llne. The on-llne access to external databases can be either direct or through a vendor. It was estimated that in 1987, there were around 547 vendors providing access to 3487 databases. Large[1] has categorized these databases into (a) bibliographic or referral, and (b) source databases which are either numeric or full text.

31 Utility of Online Search

(a) Allows the user to interact with the external databases located at far off places in shortest time. It is said that CA database containing 8 million chemical references can be accessed in about 10 minutes.

(b) The databases are updated at regular and shorter intervals enabling the user to get up-to-date information.

(c) Besides getting printout of search results, the local computer can also download the data from vendor's computer.
(d) Online search provides multiple access, i e in addition to retrieving information on the basis of index terms, data such as specific terms in the text, abstract or title can be retrieved.

32 Drawbacks

Despite its many benefits, the system suffers from certain defects namely.

(a) Online search costs are normally quite high. This forces the librarians to interact with external databases only on selective basis. Online search costs usually include,

(i) telephone call to the nearest data network mode;
(ii) the data network rate, i e cost towards time taken and amount of data downloaded;
(iii) vendor charges; and
(iv) maintenance of communication system.

(b) Technical problems, such as machine breakdown at local, vendor or at database level greatly hinders the smooth search. In 1987 EUSIDIC(European Association of Information Services) monitered over 5000 calls made during one week and found a failure rate of almost 30%. Further, Online search facilities are sometimes not available round the clock. Holidays, office timings and other related factors prevent online search.
(c) The user ought to know search strategy and is required to possess certain amount of skill to operate the system.
(d) Related to high cost is managerial problems. As online search costs heavily, its use must be made selectively. Sometimes the scientists/academics might pressurise the librarian to get them online search, even when such search is not necessary. Obliging only a selected few would create awkward situation for the librarians.

4 CD-ROM TECHNOLOGY—EFFECTIVE INFORMATION STORAGE AND RETRIEVAL SYSTEM

Effective functioning of the library system is ensured if it is analysed at regular intervals, flaws identified and the system is redesigned to meet effectively the stated objectives. In the present day information storage and retrieval systems, online database search is widely practised to satisfy the users' information needs. This service, as stated earlier, has

certain defects. Thus library professionals are forced to think of viable alternative to online searches.

It is felt that CD-ROMs with huge data storage capacity and which can be updated at regular intervals, can substitute for online database search. Mahakuteswar[2] has rightly stated, "impact of CD-ROM on Library and Information Service would indicate that it might act as initial substitute for host online services, such as DIALOG, ORBIT, ESA-IRS etc." Castro[3] who agrees on this issue states, "CD-ROM is now generally considered not just by end-users but even by information providers and electronic publishers as better and commercially viable alternative to hardcopy references and Online databases."

Factors supporting CD-ROM as a possible alternative for online searches are briefly discussed as under :

(a) *Economical.* The microcomputers which are used for technical functions can also be used for CD-ROM application. However, an additional equipment namely CD-ROM player would be required. CD-ROM player in true sense cannot be considered as additional equipment, because almost every research/university library would need this equipment to play the data recorded on this disk, eventhough they are using online method for external database searches.

(b) *Convenient.* When the external database is recorded on CD-ROMs and the same is available in the library, the use of such disk for interrogation is very convenient. None of the conditions required for online database search is required for its use. As no cost towards interrogation is charged, the user can make use of the database at his convenience and can feel fully satisfied with the search.

(c) *Reliable.* Contrary to online searches, searching databases using CD-ROM technology are highly reliable. Best results are always assured as no external element is involved in its use.

(d) *Simple.* The CD-ROM disk is quite simple to operate. Once the user understands the logic of the system, he/she can design his/her own search without having to rely on the librarian explaining him what sort of information is required.

5 INFLIBNET AND CD-ROM

INFLIBNET[4], a brain child of the UGC, New Delhi, is a cooperative network of libraries for effective utilization of scanty resources. This project is expected to provide catalogue based services, database services, document supply services, and communication based services. To

effect these services the libraries are organized hierarchically under the different scales :

Level 1—National Centre—supervising and coordinating the affairs of the network and four regional centres.

Level 2—Regional Centres (4) — maintain the union catalogue of holdings of libraries in their respective regions .

Level 3—UGC Information Centres (3), NISSAT Sectoral Centres, Subject specialized information centres (45)—responsible for maintaining bibliographical databases in their areas of interest.

Level 4—University Libraries — responsible for maintaining union catalogue of holdings in their respective library system.

Level 5—College and Department Libraries—responsible for maintaining their own library catalogue and uploading their data to their respective library system.

51 Network Services

Each Regional centre, in addition to its own union catalogue, also possesses union catalogue of other regions. An individual user can ask for document/information not available in his library to the respective University Library, if the latter does not possess the document, the request is forwarded to the regional centre which checks its own union catalogue and, the library possessing the document(s) is revealed. If the document is not traced at the regional level, the union catalogues of other regional centres are interrogated to spot the library possessing the document. After identifying the library(s) formal request is made for the documents on ILL. Thus an individual sitting in his small library can have access to University, Regional and other Regional centres' collections. Similarly, various nodes in the INFLIBNET system can have direct access (for information) to the UGC SIC's and other SICs bibliographic databases.

52 Drawbacks in the Network Systems

Except for vendor charges, all other problems mentioned under online services are applicable here. Besides, Government of India, owing to its various socio-economic priorities may not be in a position to provide required amount of Satellite time for the project.

53 SUGGESTIONS

To overcome these flaws, the following suggestions are made :

(a) Union catalogues maintained by Regional libraries and databascs maintained by the SICs and other information centres be recorded on CD-ROM disks. These be updated at regular intervals. Such disks be distributed at all levels in the system. Availability of such disks facilitates easy, trouble-free and quick access to the required information.

(b) Although CD-ROMs can take care of most of the services envisaged under INFLIBNET, there are two services which still need network system. They are document delivery (FAX) and communication based services. Using network to accomplish these services is not only expensive but also ineffective. The UGC report itself has stated that FAX system is expensive, suffers from copyright problems and the paper used is not durable. It is thus suggested that non-FAX for document delivery be adoptcd. For communication based services, telephone or telex services be utilized.

It is clear from the above discussions that by using CD-ROM technology, the services envisaged in the INFLIBNET can be accomplished more effectively.

6 CD-ROM AND RESOURCES SHARING

The concept of resource sharing means not only sharing the documents but also sharing the secondary storage devices. There is great amount of price variation in the CD-ROM products. Large[5] states that "some CD-ROM cost no more than a few hundred pounds, but some carry a very high price tag in excess of £ 1000. Only relatively heavy use could justify their purchase." In case of CD-ROM products which are beyond the reach of university/research libraries or in the event two or more CD-ROMs covering different databases are required in a library, investment in terms of CD-ROM products will bc very high. Sharing these secondary storage devices among various libraries could serve as a viable solution to the cost problem. For instance, in Hyderabad city, there are about six universities and around 40 research laboratories. Co-ordination among these libraries can effect proper distribution oi CD-ROM products and their optimum utilization.

7 SUGGESTIONS

For effective and efficient information storage and retrieval system following suggestions are made;

(a) University/special library need to computerize its library services. Besides micro/mini computers, CD-ROM drives be acquired for effective utilization of the CD-ROM products.

(b) Information providers and electronic publishers need to consider CD-ROMs utility and convert hard copy references and databases onto CD-ROMs.

(c) Regional Centres and SICs under INFLIBNET should convert their databases into CD-ROMs and make them available to the libraries at various levels.

(d) UGC Information Centres for Science, Social Sciences and Humanities, be made centralized agencies for collecting external databases on CD-ROMs and be required to provide necessary information from these sources to the end-users at nominal charges.

(e) Resource sharing of this secondary storage device would facilitate optimum utilization of the system.

8 CONCLUSION

Certain inherent defects in the online database searches, such as technical/communicational failures, management problems, high costs etc, have forced the professionals to think of a viable alternative to the online system. It is proposed CD-ROM with vast storage capacity if used for storing the information contained in the external databases, and made available to the end-users, the required information can be aecessed effectively. Initial high cost of the CD-ROM disks will be gradually compensated by its effective utilization.

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5 *Op.* cit. P 65.

COMPUTERPHOBIA : ARE LIBRARY PROFESSIONALS REALLY AWARE OF HEALTH HAZARDS CAUSED BY COMPUTERS?

RAJEEV VIJ*
S N MEHTA*

0 INTRODUCTION

Librarians have saught technological aids to facilitate and enhance their services. The introduction of the typewriter into libraries was a revolutionary concept in 1880's. Innovation ranging from microcomputers and CD-ROMs to hypertext has affected a wide variety of library operations, extending from information acquisition and processing to information dissemination.

In the past decade, automation and networking in libraries and information centres has become so pervasive that no area of library/information centre operations has been left untouched. The computer-based library functions can be broadly classified as :

1 Online database searching
2 Word processing
3 Administration
4 Database management systems

The impact of automation on librarianship has long been an inviting subject for discourse at library conferences, seminars and in professional literature. A majority of the enthusiasts have projected an electronic future void of paper. Though the health and safety of those who use computer terminal is an important issue, affecting many people in the library and information profession, yet very little has been reported in the professional literature.

*DESIDOC, Metcalf House, Delhi-110 054.

Today, the librarians and information scientists are eager to embrace new technologies. In recent years, however, a number of observers including psychologists, counselors, consultants, and others have investigated and commented upon some of the negative aspects of high technology. Fears, physical disorders, and social and psychological difficulties have been observed among those who spend much of their working day in interaction with computers. The term 'technostress' is widely used to describe these conditions.

1 THE PROBLEM

The Video Display Unit (VDU) of the computers has been reported a number of times as causing a variety of medical complaints, including eye strain, headache, bodyache, and adverse reproductive outcomes. The purpose of this survey is to examine the known evidence for these complaints among library professionals in order to confirm the threat posed by the use of VDU to health.

The survey aims at : (a) ascertaining whether there are health hazards caused by the use of computers among library professionals; (b) surveying the types of health hazards among library professionals; (c) examining if any relationship exists between physical discomforts faced by the respondents and their age, sex, experience, etc; and (d) suggesting ways to minimise—if not totally eliminate—such health problems.

2 METHODOLOGY

In order to identify sources of various health hazards faced by the library professionals, participants were randomly selected to represent a variety of tasks including high-tech activities in a special library. Information was sought by the questionnaire method. The aim, as already indicated, was to explore the health hazards caused by use of computers in libraries/information centres. For this purpose, a questionnaire (Appendix—"A"), consisting of both open and closed type of questions, was developed and copies were distributed to a random sample of 60. Taking 57 as the real effective sample and offsetting the 56 satisfactorily completed questionnaires received, the response rate was 93 33%. Thus the response was gratifying, indicating considerable interest among the professionals in this area.

3 DATA ANALYSIS

The information gathering phase of the study was, on the whole, quite

fruitful. The data collected for the present study was first analysed according to identity variables such as age, sex, status, etc of the respondents. Thereafter, the data concerning various health discomforts faced by the respondents were analysed.

During the course of this study, special attention was paid to give adequate representation to the female library professionals in the sample surveyed. The break-up of the sample by their sex, shows that 32.14% of the respondents are female.

The break-up of the respondents by their age is fairly distributed. A majority of respondents (62.50%) are between 21 and 30 years of age, as they are new entrants to the service. Little more than one-quarter (28.58%) of the respondents are between 30 and 40 years old. The percentage of the respondents who are between 41 and 50 years old is 7.14%. The remaining (1.78%) respondents are over 51 years old. Table 1 highlights the sample distribution among all age groups.

Table 1 : Break-up of the Respondents by their Age

Age (in years)	*Number of Respondents*	*Male*	*Female*
21—30	35 (62.50)	22 (57.90)	13 (72.22)
31—40	16 (28.58)	11 (28.94)	5 (27.78)
41—50	4 (07.14)	4 (10.52)	0 (00.00)
51—60	1 (01.78)	1 (02.64)	0 (00.00)
Total	56 (100.00)	38 (100.00)	18 (100.00)

In response to the question of 'skills of work in hand', a high proportion (62.50%) of the respondents responded that they were engaged in non-programming type of work, whereas remaining 37.50% of the respondents are reported to be engaged in computer programming related activities.

The data in Table 2 reveals that an overwhelming majority (94.66%) of the respondents is not having any qualification in the field of computer science/applications. A majority of the respondents have gained knowledge either by reading current literature or by undergoing in-house

The respondents were asked to state the computer language and software most commonly used by them. The data gave varied responses. The break-up of the data reveals that CDS/ISIS, Page Maker and MacWrite are the most commonly used computer software packages. With regard to computer languages, COBOL, PASCAL, C, PROLOG and dBASE are most often used by the respondents. A considerable number of the respondents are also using FORTRAN computer language.

With regard to the average frequency of use of computer by the respondents, the results reveal that a majority (67.88%) of the respondents use the computer daily. The percentage of those who use the computer several times a week and once a week is 25.00% and 5.34%, respectively. Only a negligible percentage (1.78%) of the respondents use computer once a month.

Table 5 : Frequency of Use of Computers

Frequency	*Number of respondents*	*Male*	*Female*
Daily	38 (67.88)	25 (68.42)	12 (66.67)
Several times a week	14 (25.00)	9 (23.68)	5 (27.77)
Once a week	3 (05.34)	3 (07.90)	0 (00.00)
Once a month	1 (01.78)	0 (00.00)	1 (05.56)
Total	56 (100.00)	38 (100.00)	18 (100.00)

The respondents were asked, "How much time do you spend on the computer terminal on every visit"? The data in response to this question reveals that only 5.34% of the respondents spend less than one hour, 46.45% spend one to three hours and 41.07% spend four to six hours on computer terminal on every visit. A considerable percentage (7.14%) of the respondents spend more than six hours on computer terminal on every visit. The respondents working in database management systems spend comparatively more time on the computer terminal than those engaged in other activities.

It is observed that the health problems are more prone amongst those respondents who use computer terminal for more than three hours on every visit. It is observed that the respondents engaged in database

Table 6 : Time Spent on Computer Terminal on Every Visit

Time spent (in hours)	*Number of respondents*	*Male*	*Female*
Less than 1	3 (05.34)	3 (07.90)	0 (00.00)
1—3	26 (46.45)	23 (60.52)	3 (16.66)
4—6	23 (41.07)	9 (23.68)	14 (77.78)
More than 6	4 (07.14)	3 (07.90)	1 (05.56)
Total	56 (100.00)	38 (100.00)	18 (100.00)

management systems and word processing spend considerably more time on the computer terminal and thus are more vulnerable to various health hazards.

The health problems caused by use of computers are numerous. The types of health hazards caused by the extensive use of computer, as outlined by the respondents are listed in Table 7. A majority of the respondents faced more than two health hazards. During the survey, the respondents reported the problems of eye strain, blurred vision, burning eyes, headache, backache, neck pain, shoulder pain, arms pain and wrist pains.

It is observed that a majority of the respondents are facing eye-related health problems. Some of the respondents attributed their weak eyesight (spectacles) to the extensive use of computer. While few others feared that they shall lose their eyesight in later age. The eye-related problems faced by the respondents include : eye strain (83.93%), burning eyes (60.71%) and blurred vision (57.14%). This is mainly caused by the reflections from VDU. This problem was found to be more common among the respondents engaged in data input and word processing related jobs, as they have to sit and work on computer terminal for more than three hours at a stretch.

A little over one-fifth (21.42%) of the respondents reported backache, whereas 14.28% of the respondents complained of wrist pain. This problem is mainly attributed to the unergonomically designed computer furniture.

Table 7 : Health Problems Caused by the Use of Computers

*Health problems**	*Number of respondents*	*Male*	*Female*
Eye strain	47 (83.93)	31 (81.58)	16 (88.89)
Burning eyes	34 (60.71)	18 (47.39)	16 (88.89)
Blurred vision	32 (57.14)	22 (57.90)	10 (55.56)
Backache	12 (21.42)	10 (26.31)	2 (11.11)
Wrist pain	8 (14.28)	4 (10.53)	4 (22.22)
Neck pain	7 (12.50)	7 (18.42)	0 (00.00)
Headache	6 (10.71)	3 (07.90)	3 (16.66)
Arms pain	5 (08.93)	4 (10.53)	1 (05.56)
Shoulder pain	3 (05.34)	3 (07.90)	0 (00.00)

*Many respondents gave more than one answer.

Few other problems reported by the respondents are neck pain (12.50%), headache (10.71%), arms pain (8.93%) and shoulder pain (5.34%). All the problems except the headache are reported to be caused by uncomfortable furniture and poor lighting system. Whereas, the respondents who felt headache reported it to be caused by 'noise' emitted by the computer printer. Few respondents complained of more than one type of health hazards caused by the use of computer in a library/information centre.

In some of the studies concluded abroad the investigators have also noted migraine, photosensitive epilepsy, stress, skin rashes and a host of other medical problems.

The effects of VDU on pregnant women have been subjected to intense research, discussions and debate. During the survey, no female respondent dared to make a mention of it because of shyness and Indian social and cultural set-up. The reports on 'clusters' of miscarriage and birth defects among female VDU operators have led to the fear among female VDU users. Recently, the US researchers have found doubling of miscar-

riages among women workers who worked at computer terminals during early weeks of pregnancy. Experiments with mice and chick embryos have established a link between the weak electromagnetic fields emitted from VDU and development of abnormalities and foetal deaths. Among the studies going on in this specific area are those by the National Board of Occupational Safety and Health and National Social Welfare Board of Sweden. Since these surveys may take some more time in publishing their findings, it is generally recommended that as far as possible the pregnant women should avoid use of computers.

4 CONCLUSION AND SUGGESTIONS

Work on a computer terminal does make people sick. The villains—polluted air, poor lighting, glare-prone video display terminals, distracting computer printer noises, and uncomfortable furniture—can cause a variety of ailments, such as eye strain, headache, nausea, respiratory ills, lethargy, inattentiveness, backache and stress. Fortunately, the dangers are finally being taken seriously by library managers, who can do a lot to eliminate them.

VDUs have quite justifiably been implicated in a wide range of health hazards. These health hazards however, can largely be prevented if good ergonomic practices are followed. Many of these problems could be avoided at the planning and implementation stage but unfortunately these problems are often neglected. It is suggested that library staff should be informed, educated and involved in the introduction of new information technology to minimise the harmful effects of this revolutionary change.

From the observations made through various foregiven tables and discussions, it can be concluded that most of the library staff members do face some or other health hazards caused by use of computers. However, a majority of such problems faced by the library professionals can be overcome by buying appropriate computer systems supplemented with cosy and comfortable furniture. On the basis of information derived from the present survey, the following suggestions are made to minimise the health hazards caused by use of computers among the library professionals.

1 Majority of the respondents reported eye strain (83.93%), blurred vision (57.14%) and burning eyes (60.71%). Such health hazards could easily be overcome. Since incorrect lighting is one of the major causes that lead to eye-related problems among the computer user, provision of proper lighting arrangements in the computer environment is suggested as priority item.

2 A majority of the respondents complained of reflections on th

screen especially in the summer. It is because in summer most of the computer users wear lighter clothes which causes reflections on the computer screen. The placement of computer VDU aligned with the source of light will reduce the amount of reflections on the computer screen to the minimum.

3 Some other suggestions related to VDU are :

(i) the image on the computer screen should be stable without flicker;
(ii) the VDU should be adjustable so that it could be moved up, down, left and right;
(iii) the VDU screen should have anti-glare filters;
(iv) the VDU should always be placed at a position below the eyes level;
(v) the working environment should be draught-free and the room temperature should be stable;
(vi) if a colour monitor is used, then the combination of dark colours like dark blue, dark green etc should be avoided;
(vii) sufficient user-orientation of VDU should be given to librarians before they independently start working on the computer terminal; and
(viii) last but not the least, it is suggested that the computer users should avoid working for long durations at a stretch on the computer terminal. There should be sufficient time breaks in such cases.

4 The research suggests that the computer workers with unergonomically designed computer furniture maintain poor posture and have a corresponding high rate of potential ailments. There is a room for improvement in the quality of computer furniture. Yesterdays desk and tables were simply not designed to accommodate computers. Today, furniture is designed to work hand in hand with the PC. As a result, furniture for the electronic environment such as ergonomically-designed adjustable seating, adjustable VDT stands with lower keyboard surfaces and VDT turn tables should be procured.

5 It is observed that a lot of noise is caused by computer printers. This noise leads to headache among few computer users. This problem can be easily solved by keeping the computer printer in acoustically sound-proof enclosures.

6 Finally, computer terminal orientation programmes should be undertaken for the benefit of the library professional before someone is asked to work independently on computer.

Today, most of the library managers acknowledge the link between

comfort and services. An increasing number of them also understand that the ergonomic accessories that support the link, increases the usefulness of the PC. Today, computer users in the libraries and information centres are becoming conscious of the computer accessories which include, copy-holders, antiglare filters and eye glasses, antistatic mats and book supports and footrests. As the things stand today, with the pace of technological advancements taking place in the development of new models of VDU, the health hazards of the VDUs will peter out.

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APPENDIX—A

QUESTIONNAIRE

1. Name (optional)

2. Sex : Male/Female

3. Please tick your age group:
   21—30
   31—40
   41—50
   51—60

4. Have you attained any of the following qualifications in the field of Computer Science/applications?
   Certificate
   Diploma
   Degree
   None

5. How much experience do you have in using computer?
   Less than one year
   One to five years
   Six to ten years
   More than ten years

6. What is the skill of work in hand?
   Programming
   Non-programming

7. What is the library related work in your hand?
   Online searching
   Word processing
   Administrative
   Database management system

8. Which is the computer language/software most commonly used by you?

9. Please record average frequency of use of computer by you?
   Daily
   Several times a week
   Once a week
   Once a month

10. How much time do you spend on the terminal on every visit?

Less than one hour
One to three hours
Four to six hours
More than six hours

11. Kindly tick mark the health problems caused by use of computers?

Eye strain
Blurred vision
Burning eyes
Headache
Backache
Neck pain
Shoulder pain
Arms pain
Wrist pain
Any other (please mention)

12. Suggestions to overcome such health hazards, if any.

L&IS MANPOWER DEVELOPMENT : SOME SOCIAL, PSYCHOLOGICAL AND ORGANISATIONAL CONSIDERATIONS AND CONSTRAINTS

Dr (Ms) Shalini Rewadikar*

0 INTRODUCTION

Computer is only an extension of human brain function of data processing and its manipulation by a specially designed machine. These machines are capable of handling vast information and making that available as per user's needs. The latest computers, called the fifth generation computers are capable of artificial intelligence. Audio commands are also accepted by a model of Japanese computer.

At international levels the databases in science and technology are available on-line. Many of these information services are available in printed versions as well, e g *Index Medicus*, *Biological Index*, *Science Citation Index* etc. The services are increasingly covering Art, literature and music as well. Many of these services are utilised by India either directly on-line as in Defence and Agriculture research or in printed form. Some of the services have visual terminals and others are tele-printer terminals with printing facilities.

1 INFRASTRUCTURE

India has a developed network of communication system of Radio, TV, Telephone and microwave sysrem. Besides Telex and Telegraph and postal services a new service called Fax service capable of transmitting text aad graphic information is also made available to public by P & T department. The information technology and techniques are capable of transmitting direct telecasts from any country to Indian homes on TV screens via the satellite. India has the infrastructure requisite of a developed nation for use of on-line information services and the number of

*Professor, Deptt of Lib & Inf Sc, Govt MLB Arts & Comm, College Gwalior (MP).

these services is bound to increase as years pass by. India has already entered the world network. Among the developing nations India is called a developed nation.

11 Importance of Information and Manpower Development

Information is a resource which is as fundamental as energy or matter and affects all human activities. This is an irreplaceable resource. The need is to make the L & IS professional aware of the vital importance of this resource. There is an urgent need to develop their abilities, attitudes and skills for proper utilisation of the existing library and information network. Computer and its utilisation has already been visible in many walks of our life, and in travel (particularly). The government and commercial organisations and industries have generated a climate of growth and development by utilising computers. Computer literacy is the target in schools, colleges and universities. Computer coaching is a common place sign board like typewriting Institutes. In this citybred climate the public and academic librarians are still lagging behind. The district and village level academic and public library professionals still have book-centred ethos. In their perceptions computers still appear a distant possibility to enter their work-place. There is an urgent need to change their attitude from a static linear contact between the book and the reader, to a dynamic role of entering the information network at any point to acquire the needed information. To-day society is 'informationised' as Rauch calls this. In other words society has developed an 'intellectual industry'. For efficient and effective information transfer and utilisation there is a constant need to update the L & I S professional's abilities and skills. Instead of feeling depressed one has to visualise that there is an increased need of libraries and information in today's world. One has only to grab the opportunities by utilising the existing infrastructure in an aggressive way like a salesman.

111 *Concepts Underlying Manpower Development*

(i) The basic concept underlying manpower development is that the human resource can be trained and retrained and age is no bar in learning.

(ii) The new technology and technique help expedite the learning process.

(iii) Distance is not the problem. There are various methods of continuing education and open universities are a strong medium.

(iv) Everyone can learn at his own place and select learning to suit his interest.

(v) It is the initiative, character and skill of the individual which determine to a large extent how the resources of a nation will be utilised.

(vi) Pre-enterance education in any profession is not sufficient for the whole career. There is need for updating the knowledge and skill from time to time at all levels.

2 DECISION-GROUPS WHICH INFLUENCE MANPOWER DEVELOPMENT IN L&IS PROFESSION

Eventhough demand for education is a private demand and is determined by various economic, social and psychological attitudes, other groups can influence and channelise the aggregate social will in the desired direction. These groups are (a) L & IS education system, (b) the L & IS associations, (c) the L & IS organisations in which they are employed and (d) the government and the management. Their impact is briefly given below in this regard:

(i) Government has taken and implemented computerisation and information network which has generated the climate of growth and development.

(ii) Many scientific, technological, commercial and industrial organisations have started using computers for their information processing needs.

(iii) Most of L & IS education departments have introduced computers for library and information networks in the courses.

(iv) Since 1980's many efforts have been made by ILA, IASLIC, DRTC, INSDOC and L & IS teaching departments to update the professionals through short courses, workshops, and seminars. With this climate surcharged with computer utilisation, the L&IS professionals and individuals are trying to enter the library and information science profession with new hope and enthusiasm.

21 Contradictory Situations

However a large number of professionals already employed in libraries, particularly in academic and public sectors who are away from big cities do not perceive computers to enter their work place during their career or in the near future. In many specialised libraries even those who had gained competence and were managing the computerised library networks with international databases, lost control to non-professionals in India. For want of well-defined professional duties some enthusiastic profes-

sionals perform repetitive jobs on mechanical equipment. In one university library a professional was operating xerox machine as his daily duty. Such contradictions occur because of lack of well-defined boundaries.

112 *Warning to Professionals*

However a prolonged resistance to change is bound to result in giving up control both of the work place and the profession to the newly emerging skill groups, particularly the computer experts. A less drastic step would be to share control of the computerised L & IS centres and grasp the opportunities which come in their way.

3 CHANGE : SOME SOCIAL AND PSYCHOLOGICAL ASPECTS

As discussed earlier education and developmental needs are individual's choice. Unless and until the individual in geueral and the prime movers of change in particular i e the managers and supervisors of L & IS centres are convinced that change can occur as a result of individual action and have desire within them to bring that about, change can not take place. For this purpose an innovative attitude and ability is essential.

31 INNOVATION

Innovation is not necessarily inventing some thing new. This is an imaginative faculty of responding and accepting the new developments. That also means an ability to gainfully apply these developments to their own work situation. An important characteristic of the developed nations and societies is social, cultural and psychological ability to respond to innovation and technological change. The developing nations and societies have to make an extra effort. This is the duty and responsibility of L & IS education system to develop such attitudes and impart initial education. Otherwise they will be producing students who are obsolete in the job market.

4 FACTORS UNDERMINING MANPOWER DEVELOPMENT

It has been observed that those who are placed in automated L & IS system gain competence on-the-job. In general, most of the public and academic library personnel who are away from the big cities are unable to perceive the advent of computerised information services and centres. Most of these professionals are still struggling for the primary needs of good, well lighted and spacious library buildings. They provide the

meagre minimum essential services for want of supporting staff and lack of appreciation of library service by the users. Many of them are still struggling for parity of pay scales. Even where such equality is granted, social parity of the academic counterparts is still not easily accepted. As long as they are struggling for primary needs the higher self actualising needs are not percieved by them.

The social and psychological factors which influence change and encourage developmental needs are:

(i) Individuals' desire to rise in social status.
(ii) Acquiring influence.
(iii) Establishing prestige and position.
(iv) The organisational climate is also major influencing factor.
(v) A good placement and counselling service to put the right person at right place is essential.
(vi) Availability of continuing educational facilities on the job and leave with pay.

41 Obsolescence : Its Causes

Obsolescence sets in mostly due to:

(i) low utilisation of the talent of the fresh and on-the-job professionals;
(ii) performing sub-professional duties; and
(iii) wrong placement.

5 NEED FOR PROPER PERSPECTIVE

There is confusion and overlapping of professional, non-professional as well as para-professional duties in transitional period. There is a need to get a proper perspective of computer both in the professional as well as in educational system.

Just as the advent of typewriters helped to expedite writing and give multiple copies, a new job of typist was recognised. In a similar way, computer related jobs can also be performed by other than L & IS professionals.

In library science, course of book binding was studied but the actual binding was not a professional duty, similar is the case with computer. However, a knowledge of working of computers, its components, machine acceptable language, and knowledge of programming will enhance the confidence of the professional to get things done as per the requirements of the L & IS centre. This is like acquiring the know-

ledge of library building for interacting with the architect without being an architect.

6 PARALLELS IN OTHER PROFESSIONS

The medical profession is able to delegate many duties which it used to perform earlier. There is a constant rise in recognising a new para-professional field and holding these under firm control to assist the medical profession. Specialisation, mechanical and technological developments have been pressed to diagnose and even perform operations.

In a similar fashion, the L & IS profession should be able to delegate and obtain a firm control of computers and information channels in the socio economic development of the nation. Specialisations in medical profession, e g anaesthesia which was once administered by sub-professionals, has now assumed the dimension of a new science and professional specialisation. X-ray, pathology, physio-therapy, nutrition and psycho-analysis have been pressed to assist the health service. Nursing has gained status by allocating physical care of the patients to less educated sub-professionals as *ayahs* and wardboys etc.

What is needed in L & IS centres is to delegate sub professional duties and also accept the para-professional fields in a computerised system with a firm conrrol to serve L & IS profession.

7 CONCLUSION

There has been introspection and search in L & IS profession in recent years to demarcate the professional boundries and categorise various cadres with necessary general and L & IS education components in computerised system.

Library Science departments, Associations, particularly ILA, IASLIC, DRTC, INSDOC have conducted many short duration courses, workshops to make the L & IS professionals aware of the possibility and to develop the essential basic abilities and skills for computerisation and information networks through arranging visits to on-line information centres and with hands-on experiences in some cases.

Education is the largest supplier of the necessary abilities and the L & IS departments have tried to incorporate the developments in their courses.

Public and academic library professionals should be able to perceive and grasp the opportunity in a well-planned information network and incorporate computer service to their work-piace in the modern Indian situation.

However, to actively participate in the national development the professional placed in the remotest corner of India should be able to assume

the dynamic role of entering the communication network and move in all the possible directions to satisfy the newly created information hunger in the 'Informationised Society'. A little imagination, the innovative characteristic and initiative can make the profession an indispensable one whatever technological developments take place. An aggressive salesman spirit needs to be inculcated in building up a firm control by accepting the para-professionals as assistants in achieving the objective.

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LIBRARY AUTOMATION VIS-A-VIS THE MANPOWER PRODUCTION : A CASE STUDY OF LIBRARY AND INFORMATION SCIENCE EDUCATION IN ANDHRA PRADESH

L S RAMAIAH*
M KANAKACHARY**

0 INTRODUCTION

Information is a mjor resource for a country's progress and development. It is the raw material for truth, beauty, innovation, productivity and freedom. Those that have it abundantly shall triumph and those that haven't it lose. Due to Guttenburg's technology during the past five centuries, the ebb and flow of information has enormously increased.

Now, there is an explosion of information. To harness and retrieve it, is the present day problem. The traditional mediums no longer hold good. Modern technology has produced a variety of mediums such as computers, laser discs, telematics, CD-ROM, Video discs, Video tapes etc for the fast collection, transfer and retrieval of information. The technological breakthrough made it possible to have automated databases and on-line information broking enabling information to reach to every one everywhere. Wilson Dizard has visualized a 'global knowledge grid' turning the world into a 'global village' and an 'electronic cottage'.

Rich and developed countries are already utilizing the modern technology for their information needs. There are now available nearly 4,500 machine-readable data bases and 500 on-line information vendors in these countries with an annual business turnover of $ 10 billions. Winds of change in information technology have not left India unaffected. Computer culture is currently taking roots in India. From 1984 to 1988 the

*University Librarian, Ramesh Mohan Library, Central Institute of English and Foreign Languages, Hyderabad-500007.

**Asst Librarian, Ramesh Mohan Library, Central Institute of English and Foreign Languages, Hyderabad-500007.

number of computers has increased ten-fold, the computer industry's revenue increased four-fold and computer software exports increased five-fold. Thus high technology development in India is seriously starting to get underway with strength and speed. This is evident in the establishment of databases and networks such as PSTN, GPSS, EASYNET, NICNET. INDONET, VIKRAM, BTISNET, CALIBNET, DELNET, CSIRNET, DESINET, ERENT, TIFACLINE, BIBLIONIC, INFLIBNET etc.

In spite of the developments in the high technology in the country, the computer-based activities in our libraries and information centres are far from satisfactory. Our libraries and library professionals by and large are deep rooted in traditional ways. The recommendations made by the Working Group of the Planning Commission on 'Modernization of Library Services and Informatics' during the Seventh Plan period have largely remained on paper. The position needs to be changed soon to catch up with the developments that have been taking place world over. The most important requirements for the automation and networking of our libraries and information centres are (i) hardware, (ii) software and (iii) humanware.

Hardware: There are atleast more than 30 well-established micro-computer vendors in the country. Computers are today less expensive than the yesteryears. Computer Maintenance Corporation (CMC), Hyderabad is working for the development of less expensive hardware. DRDO has developed a super-computer named 'Anurag' which can handle 250 million pieces of information per second. The hardware industry has signs of fast development. The Department of Electronics is of the opinion that the growth of personal computers during 1989-90 was 25 percent higher than the previous year.

Soft ware: User friendly, portable software packages such as CDS/ISIS Micro-version and MINISIS may satisfy the requirements of our libraries. CMC Hyderabad is also trying to acquire UNISOFT from UK. Some of our libraries have developed software for certain applications. Indian skills relating to computer software have already won recognition abroad. These efforts should be sustained and augumented in the years to come.

Humanware: The availability of the trained library humanware or the manpower is the most important problem for the computer-based library activities. The hardware and the software, if needed, can be imported but not the humanware. This is to be produced in our country itself. The progress and development of our library automation largely depends on this factor. The computer literate manpower only will make or mar our libraries in the years to come. The breeding grounds of library and

information science professionals in this country are: (i) INSDOC; (ii) DRTC; and (iii) Deparments of Library and Information Science in our universities. The manpower produced at INSDOC and DRTC are minimal when compared with the university departments of library and information science. This paper proposes to examine the resilience of the departments of library and information science in the country in producing the library and information science professionals with sufficient quantum of theoretical knowledge of computers, computer-based activities and hands on experience.

1 SCOPE

In view of the vastness of the country, it is proposed to make a symptomatic study of the problem only. The scope of the study is, therfore, restricted to examine the library and information science education imparted at BLISc and MLISc levels in the universities of Andhra Pradesh.

2 OBJECTIVES

It is proposed to —

(i) find out whether the syllabi of the BLISc and MLISc courses provide sufficiently for the automation theory and practice;
(ii) find out whether the faculty are trained to teach such programmes;
(iii) examine whether the departments are provided with necessary physical infrastructure to undertake such programmes.

3 METHODOLOGY

The study is based on—

(i) the syllabi of the BLISc and MLISc courses;
(ii) information received from the heads of the departments of library and information science; and
(iii) interviews with the teachers.

4 CASE STUDY

The aim of education is utility. The universities being public institutions should provide environment suitable for the training of high calibre manpower in various fields. It is their duty to foresee the requirements of the society. The departments of library and information science have

the moral responsibility to train and provide such manpower which would eminently fit into the libraries without any friction.

The BLISc and MLISc courses are offered at six and four universities in Andhra Pradesh, respectively. Their average annual intake for BLISc is 400 and for MLISc it is around 60. Hence, a total manpower of 460 professionals are trained every year. Most of the trained people take up jobs in different types of library and information centres. These professionals are unaware of the computer practices. Hence, they find a big gap between what they have learned and what they have to do with modern technology. In this context, we are discussing in this paper the following three areas :

(i) present syllabi—modern technology;
(ii) faculty—their apathy to update; and
(iii) physical infrastructure—financial crunch.

41 Present Syllabi—Modern Technology

The syllabi of the BLISc and MLISc courses offered in Andhra Pradesh universities are shown in Table 1.

A glance at the papers given in Table 1 at the BLISc shows that there is not even a single exclusive paper concerning automation and networking techniques. Mostly, they deal with the traditional activities of the library and information science. At the MLISc level, only Sri Venkateshwara University has an exclusive paper—Paper VI on computers. In remaining universities, computerization forms a small portion of one of the papers. Somehow or other, the syllabi is not compatible with the syllabi suggested by the Working Group of the University Grants Commission for the Seventh Plan period. The syllabi both at BLISc and MLISc courses have not shown any progressive inclusion of the modern technology. However, they have included the words 'Information Science' both in the name of the departments and in their papers. In the words of late Sri T S Rajagopalan, ex-President of the Indian Library Association, "Information Technology is the hard core of Information Science. To teach Information Science without Information Technology is meaningless." Even the University Grants Commission did not set up a Curriculum Development Centre for the Library and Information Science discipline whereas it has set up Curriculum Development Centres for other disciplines. Hence, the syllabi at BLISc and MLISc courses are not able to produce the suitable professionals in the changed context of the Library and Information Centres activities.

Table 1 : BLISc and MLISc Courses Offered in Andhra Pradesh Universities

Sl. No.	Name of the University	Papers I	II	III	IV	V	VI	VII	VIII
		BLISc course							
1	Andhra Pradesh Open University Hyderabad	Lib. Society & Community	Library Manage-ment	Lib. Class. and Lib. Cat. Theory	Bibl. and Ref. sour-ces & ser-vices	Docn. and Inf. ser-vices	Spl. Libra-rianship	Lib. class (Pract)	Lib. Cat. (Pract)
2	Andhra University Visakhapatnam	Lib. & Soc.	Lib. Admn. & Mgt.	Lib. Class. (Theory)	Lib. Class. (Pract)	Lib. Cat. (Theory)	Lib. Cat. (Pract)	Inf. source	Inf. Services
3	AU PG Extension Centre, Srikakulam	—do—	—do—	—do—	—do—	—do—	—do—	—do—	—do—
4	Kakatiya University Warangal	Inf. & Society	Inf. Orgn.	Inf. Proc-I (Pract)	Inf. Proc-II (Pract)	Inf. Ret-rieval Methods	Mgt. of Inf. Centres	Inf. sources & services	Inf. Systems & Progms.
5	Osmania University Hyderabad	Lib. & Society	Ref. & Inf. Sources & Services	Lib. Class. (Theory)	Lib. Class. (Pract)	Lib. Mgt.	Bibl. Orgn. & Control	Lib. Cat. (Theory)	Lib. Cat. (Pract)
6	Sri Krish a Devaraya University, Ananthapur	(syllabus not received)							
7	Sri Venkateshwara University, Tirupati	Lib. & Society	Ref. & Inf. Sources & Services	Lib. Class. (Theory)	Lib. Class. (Pract)	Lib. Mgt.	Bib. Orgn. & Control	Lib. Cat. (Theory)	Lib. Cat. (Pract)

		MLISc course						*Electives*
1	Andhra University Visakhapatnam	Fundamentals of Inf. & Communication	Adv. Lib. Class. (Th & Pract)	Adv. Lib. Cat. (Th & Pract)	Orgn. of Special Material	Plg Inf. Systems	Inf. Transfer & Dissemination	1 Acad. Lib. Syst. 2 Pub. Lib. Syst. 3 Indl. & Busi. Lib. System
2	Osmania University Hyderabad	Univ. of Knowl: Its structure & growth	Mgt. Tech. & System Analysis	Class & Cat. (Adv. theory)	Depth Class. & Adv. Cat. (Pract)	Pub. Lib. Syst. or Acad. Lib. Syst. or Spl. Lib. Syst.	Inf. Systems & Programmes	Indexing and Abstracting & Reprography
3	Sri Venkateshwara University, Tirupati	Comm., Inf. Systems and Services	Inf. Proc. & Retrieval (Theory)	Inf. Proc. (Pract)	Research Method	Inf. System Plg. and Mgt.	Appln. of Comp. in L & I Storage & Retrieval	1 Acad. Lib. In. Syst. and Serv. 2 Pub. Lib. Inf. Syst. and Serv. 3 Indl. Inf. Syst. and Serv. 4 Health Sc. Inf. Syst. and Serv. 5 Comparative Studies in Librarianship 6 System Analysis
4	Sri Krishnadevaraya University, Ananthapur	(Syllabus not received)						

42 Faculty—Their Apathy to Update

The total strength of the faculty who are teaching both BLISc and MLISc courses is given in Table 2.

Table 2 : Strength of the Faculty

Sl No	*University*	*Professors*	*Readers*	*Lecturers*	*Total*	*Remarks*
1	A P Open University, Hyderabad	—	—	1	1	Counsellors take classes
2	Andhra University, Waltair	3	1	4	8	
3	AU PG Extension Centre, Srikakulam	1	1	1	3	
4	Kakatiya University, Warangal	—	—	—	—	No regular teachers
5	Osmania University, Hyderabad	1	2	3	6	
6	Sri Krishnadevaraya University, Ananthapur	—	—	—	—	No regular teachers
7	Sri Venkateshwara University, Tirupati	1	—	3	4	
	Total	6	4	12	22	

The total faculty is 22. Some of these universities do not have regular faculty. They depend upon the working librarians and teachers of library and information science. Out of 22 faculty members, it is found only six are trained in computer methods to some extent. These six faculty members have acquired the qualifications on their own. No short term courses in automation have been provided by the University Grants Commission. Further, they did not get any encouragement from their universities, too. The Departments of Library and Information Science are given step motherly treatment by the concerned university authorities in updating the requirements.

43 Physical Infrastructure—Financial Crunch

All the six universities where the Library and Information Science courses are offered, the Departments do not have any modern equipment. They are not provided even with a PC AT/XT. Hence, the students who are trained do not have any hands-on experience. They are not provided with funds to acquire latest equipment. Eventhough, they are given some theoretical knowledge as it is done at Sri Venkateshwara University, the absence of physical equipment makes the theoretical instruction a meaningless exercise. It is high time that all the Departments of Library and Information Science are forthwith provided with computers.

5 CONCLUSION AND SUGGESTIONS

After reviewing the whole situation, the following suggestions are made.

1 As per the present needs of the Library and Information Centres, the curricula should be planned systematically, modified according to the latest requirements, developed in a more realistic, objective, purposeful and meaningful way for the present and future needs.

2 The University Grants Commission should appoint a Curriculum Development Centre forthwith.

3 Some of the papers as suggested by the Working Group of the UGC under the VIIth Plan should be included in the syllabi.

4 University Grants Commission should run short-term intensive courses for the faculty in automation.

5 Universities should motivate their faculty members to update their knowledge in automation by deputing them to various courses.

6 The future vacancies for the faculty should be filled in with people trained in modern technology.

7 Universities should provide computers both in their libraries and the Library and Information Science Departments.

8 The students who undergo the MLISc courses atleast should be attached to an institution where computers are available for a period of two months on apprenticeship. The financial expenditure may be borne by the concerned universities.

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STAFF FORMULA FOR THE AUTOMATION AND TECHNICAL SERVICES SECTION OF THE UNIVERSITY LIBRARY : A PROPOSAL

A SRIMURUGAN*
J P S KUMARAVEL**
S C SHUNMUGANATHAN**

0 INTRODUCTION

Library is a trinity of staff, books and readers. According to Dr S R Ranganathan, of the three, staff only arrives on the scene first. He arrives on the scene first in order to identify the target users and their specific information requirements, then begins to procure and build a relevant collection. Manually operated document oriented library systems are giving way to information-oriented computerised information systems. Computers are pervading into libraries and each university library is trying to equip itself with a PC atleast conveniently placed at the librarian's chamber. Some librarians have acquired skills to operate it and some others have trained personnel to operate it. But it is a fact that computers can not be kept idle any more. The librarian has to come out of his shell and admit some one to sit on it and work for commissioning the computer in the promotion of various services, lest the computer will slip off from the hands of the librarian into computer science specialist.

1 NEED FOR COMPUTER SECTION

Harney[1] predicts that "new technological applications are geared up in such a speed that in 2006 esotoric texts are less likely to be issued in conventional book format. It would rather become more economic in producing conventional books in machine readable form than the volumes could

*Sr Lecturer, Dept of Library and Information Science, Madurai Kamaraj University, Madurai-625 021.
**Asst (D), Dr T P M Library, Madurai Kamaraj University, Madurai-625 021.

be printed and bound. Not only cataloguing records and abstracts but also full texts will be available in the electronic form. The librarians must keep in pace with these developments to alter the method of computers."

As such, in Indian context, all university libraries are at infant stage in the use of computers in library services. Almost all university libraries have already brought in atleast a PC in their premises. It may be a PC/ PC XT/PC AT or a mini computer. As a starting point, some of the documentation work and serial control have been computerized. Information storage and retrieval is only in verbal plane mostly. It is certain that the day is not far off to computerize the whole services of a university library. Hence it is high time to think about the appropriate manpower requirements in a well-balanced way so that the library practice and services are not lost in the importance of computer. As such, a separate section manned by personnel qualified in library science and computer application is inevitable.

2 LIBRARY COMPUTER SECTION—MANPOWER REQUIREMENTS

Various practices show that the PC allotted to the university libraries mostly lie with the computer centre or the computer science department due to the absence of knowledgeable persons to divulge them for library operations. This is an unhappy trend. The university library should prepare itself to face the situation. At the same time the university libraries in their process of automating the system and services should not become subordinate to the computer centre or the computer science department of the university. "Effective operation of the various components of information systems and services requires that specialists of many kinds should be available—subject specialists, information professionals, system designers and others."[3]

To start with, university libraries in India will have to plan for staffing the computer section in such a way that it may develop in order to encompass all the activities of the university libraries, say in a matter of one or two years right from now.

3 COMPUTER DIVISION—NOMENCLATURE

There exists a name for each section in a university library. As such, the computer section should also have a name and it can be "Automation and Technical Services Section".

31 Automation and Technical Services Section—Location

The automation and technical services section of the university library should necessarily be located within the premises of the Main Library. In no case the section can be in the computer centre or the Computer Science Department. It should form the nucleii of the university library.

32 Automation and Technical Services Section—Staff Formula—A Proposal

Before prescribing a staff formula, let us have a glance at the staff pattern of the Computer Section in the North Western University Library, USA during the 1980's.[2]

North Western University Library
Technical Services Division
1985

Assistant University Librarian

Acquisition monographs	Serials acquisition and cataloguing	Cataloguing dept including marking
2 Professionals	3 Professionals	12 Professionals
18.44 Support staff	7 Support staff	20 Support staff
	Total 17 Professionals	
	45-44 Support staff	

Harney reports that the technical services division of the North Western University Library, instituted in 1970, has made a lot of development over a period of 15 years. The above chart reveals that the computers have brought all the divisions and activities of the Library under its umbrella. Even while accessioning and cataloguing, a master file is created and the same database performs various functions and provides all types of services required. In view of the existing Indian standards, a proposal to work out the staff formula is given in Chart 1.

The manning of the computer section should be on the line of the staff formula shown in Chart 1. The structure of the staff should be as shown in Table 1.

The strength of staff in the above proposal may be increased on the advice of the Librarian considering the various developmental aspects. Such of the staff should be given periodical opportunities for 'continuing professional education' in order to update their knowledge and skill.[6] In

addition, they should be allowed to participate in refresher courses, seminars, symposia, etc.

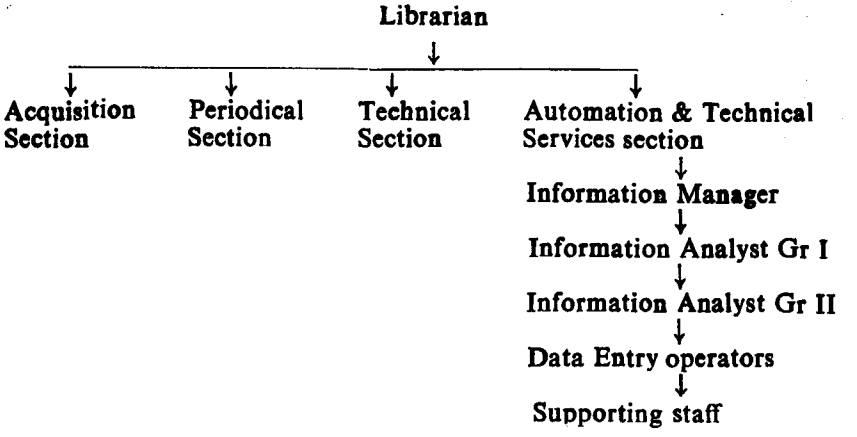


Chart 1.

Table 1 : Preposed Staff Structure

Designation	*Equivalent to*	*Qualification*
Infn Manager	Dy Librarian	MLIS with computer science —5 years experience
Infn Analyst Gr I	Asst Librarian Gr I	MLIS with 3 years experience in computer application to library practice
Infn Analyst Gr II	Asst Librarian Gr II	MLIS with one year experience in computer application to library practices
Data Entry operator	Library Asst	BLIS with knowledge of computer applications to library practices

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UNIVERSITY LIBRARIES COMPUTERISATION : MANPOWER DEVELOPMENT

JYOTIRMAYA PANIGRAHI*

1 INTRODUCTION

Man is the medium of every thing. He is the maker of the information world. Manpower is an important national resource. Its power utilization will guide the destiny of any country in the development of all its facets. Creation of the required manpower in the required areas in the required proportion is the basic objective behind all manpower planning. Manpower is one of the most important and vital inputs in the economic development of a country. The efficiency and effectiveness of the libraries, information centres would largely depend on the competence of the staff and on the facilities and environment provided for their work and development. The success or failure of any institution or system will largely depend upon human resources. Information scientists like T S Rajagopalan and T N Rajan have rightly emphasized the need of human resources. They are of the opinion that "Human resources that provide leadership, technical skill, managerial control and evaluation of performance have to be systematically built up."[1]

The development of human resource is as important as development of material resources of libraries. In the proceedings of the 35th All India Library Conference held at Pune it has been recommended that " . . . computer applications to library and information activities would be an extremely important area for consideration. In order to achieve successful application of computers, it would be essential to give first priority to education and training of manpower. It is the man on the job who matters. If we succeed in giving excellent education and training to existing library professionals and potential professionals, then there is every possibility that they would be able to deliver goods."[2] Manpower

*Assistant librarian, Berhampur University Central Library, Berhampur-760007, Orissa.

is a vital input for development, and as such, its supply and demands are to be assessed scientifically and balanced scrupulously. "Thus manpower is to be considered as the most valuable asset of an institution. Therefore, investment in human resource development is to be regarded as the most significant element in library organisation. In the changing environment the professionals are required to possess enhanced managerial, professional and technical skills, adequate knowledge and right kind of experience. The manpower must be so trained that they can anticipate changes and respond to them, sieze opportunities at the right time and take initiative whenever necessary. They must possess flexibility of attitude, imagination and scientific bent of mind."[3] "Above all, availability of the right kind of manpower in appropriate measure and quality at various levels, is a *s'ne-qua-non*, if any meaningful achievements are to be expected."[4] Such is the manpower planning. The education and training of information professionals is, therefore, an issue of growing significance.

2 ROLE OF COMPUTER IN UNIVERSITY LIBRARIES

University library constitutes the heart of the university. It provides information and documents of the twin functions such as (i) study and teaching, and (ii) research. The exponential growth, increasing complexity and multidisciplinary nature of scientific and other forms of knowledge have exposed human limitations in handling such information. In order to meet the challenge posed by the information explosion and help the users to exploit information at much faster rate and at less cost and with greater accuracy, we need computers. The ultimate solution lies in modernising our library operations and services. Lots of library jobs are repetitious in nature, whereby these are fit to be handled by a computer. The UGC has given valuable suggestions in this regard in its Annual Report for the year 1988-89, which are as follows :

> "The cost of books and journals published both in India and abroad is rising day-by-day and it becomes extremely difficult for a university/college to maintain the current level of subscription inspite of increase in the allocation for books and journals by the funding agencies. While it is ideal to equip all the libraries in the country so that they are self-sufficient to cater to the needs of the academic community, in view of the huge expenditure involved, it is not feasible. The only alternative, therefore, is to inter-link the libraries so that they could optimally utilise their resources."[5]

The library professionals have to master the computer knowledge for this purpose. The Working Group on Modernisation of Library Services and Informatics of the Planning Commission also has made significant

recommendations on the application of computers in library and information area. University libraries in the developed countries have realised the need for adoption of computer technology in library and information activities. University libraries in India, however, have been slow to react to developments in computer technology. This is probably due to :

— lack of overall computer environment in the country; and
— lack of emphasis on this area in our manpower development programmes.

In order to computerise university libraries in India, we need adequate and highly skilled manpower. There are two aspects of library manpower development : (i) the manpower required to run the university libraries in India, and (ii) the manpower required to run the library schools in view of proposed computerisation and network.

3 MANPOWER DEVELOPMENT PROGRAMMES OF LIBRARY PROFESSIONALS WORKING IN THE UNIVERSITY LIBRARIES OF INDIA

At present most of the personnels working in the university libraries in India lack computer knowledge. They should develop their computer knowledge and skill in view of the proposed computerisation and network, being introduced in libraries. The following suggestions in this connection are important :

(a) In the present era, no education is complete with acquisition of a mere degree. It is a continuous process. Life-long learning is necessary to keep the individual up-to-date. Inservice training is necessary to the completeness of continuing education. Thus training is another vital phase of manpower development in libraries. It is through training that the aptitudes, skills and abilities of employees to perform specific jobs are increased. The education will facilitate the task of increasing knowledge, understanding or attitudes of employees, so that they are better adjusted to their working environment. The inservice library personnels be deputed to study BLI Sc, MLI Sc and computer cources like DCA, short-term courses etc, so that they can increase their skill and knowledge to meet the changing library systems and services.
(b) The working library personnels be deputed to summer/winter courses conducted by various institutes to study computer application to library and information field.
(c) As far as possible the maximum number of library professionals be deputed to professional conferences, so that they can partici-

pate, discuss and learn better in the changing context of information systems and services.

(d) Computer workshops for the inservice professionals be arranged with the cooperation of such organisations as INSDOC, DESIDOC, NASSDOC, DRTC, NISSAT, ILA, IASLIC, etc, with the help of personnel drawn from suitable organisations and institutes. Such training programmes can be easily arranged statewise, regionwise in universities where computer facilities are presently available.

(e) Librarian, Dy librarian, Asst librarians and other senior library professionals be deputed to visit other computerized libraries in India and abroad to gain better practical and supervisory knowledge in this field.

4 MANPOWER DEVELOPMENT PROGRAMMES IN INDIAN LIBRARY SCHOOLS

The success of any system depends on the adequate and continuous supply of qualified manpower at all levels. Our library schools should be adequately equipped with resource persons, materials and equipments to train the high level information manpower required for the country's development. The library schools carry an important responsibility to prepare professional manpower for the present and future needs of the country. Teachers are the life blood of the educational system. So their improvement is necessary in the changing context of teaching. The following measures may be adopted in this regard:

(a) At present most of the library and information science teachers working in different library schools in India are lacking computer knowledge. They should first develop their computer knowledge. For teaching computer applications to library and information science, short term courses should be provided to library science teachers.

(b) In order to cope up with the recent developments in library and information science continuing education programmes like computer workshops/seminars/refreshers courses can be imparted to library and information science teachers.

(c) The teachers of library and information science be deputed to professional conferences, so that they can participate, discuss and learn better in the changing context of teaching.

(d) The library science teachers be given opportunity to visit different library schools, computerised libraries in India and abroad to gain practical knowledge on the subject.

(e) Teacher training programmes in computer science on zonal basis be conducted to facilitate the library and information science teachers.

(f) More computer literature pertaining to library and information science be procured in library schools, so that the faculty members could improve their teaching knowledge.

5 SUGGESTIONS

1 In order to cope up with the recent developments in library and information science, continuing education programmes like computer workshops/seminars/refreshers courses can be given to library and information science teachers and working librarians.

2 Each library must spend at least 6% of the library budget on staff development as recommended in the proceedings of the 35th ILA conference.

3 A National Training Institute be established for library and information science professionals. The primary objective of the National Training Institute will be to maintain and improve the standards of library and information science education, library operations and services in the changing context of information technology.

4 A Manpower Commission be formed.

5 It is high time that the library schools should give more emphasis on the use of computers for information processing including systems analysis and programming.

6 Each library school be provided with a computer and audio-visual equipments for their practical teaching.

7 The establishment of a Library Council like Agricultural Council, Medical Council and Bar Council is highly imperative. Its function should be multifarious : (i) to fix the number of seats for various library schools, (ii) to assess manpower needs, (iii) to maintain the standards of the library and information science teaching, and (iv) to cope with exact requirement of libraries.

8 The library and information science curriculum is to be modified from time to time in order to meet the manpower requirements of libraries, information centres etc in changing context of information technology. It is suggested that a compulsory paper like computer applications to library and information science be introduced at BLISc and MLISc level.

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COMPUTER AND LIBRARY NETWORKING

Ms D Rajeswari*

1 INTRODUCTION

The world is passing through a revolution in the growth of information and its dissemination. The number of titles being published the world over has been increasing phenomenally. As such no library can afford to buy every book and journal even in the area of its specialization. No library can store all that is published and no library can possibly provide efficient service with its age old manual operations. In this world of information explosion, the techniques of storage and retrieval are changing fast. With the information explosion and the limited library finances, librarians are facing several challenges such as the following:

(a) they have to differentiate between knowledge and information and keep track of both of them;
(b) they have to provide at least sufficient reading and research materials to their users;
(c) they have to anticipate the demands of their users; and
(d) they have to see that some of their own collections which are less used or not used at all are made available to users of other libraries through cooperation.

As the time is changing, sharing of resources is becoming more and more important and so the inter-dependence on the other libraries. The use of computer in libraries in the developed countries has been of great help in the acquisition, serial control, cataloguing and circulation besides keeping tracks of stocks and users. When a group of libraries using computers decide to exchange information through the computer applications a network is developed.

*Assistant Librarian, Sri Padmavati Mahila Visva Vidyalayam Library, Tirupati.

2 LIBRARY NETWORKS

"A network can be defined as a group of individuals or organizations that are interconnected. The linking must include a communications mechanism, and many networks exist for express purpose of facilitating certain types of communication among their members. In the library world, institutions form networks primarily to achieve better sharing of resources —resources consisting of bibliographic information and of collections— and better service to patrons." It must be emphasized that the particular focus in this gathering will be on online networks, those using computers and linking members to the computer resources by means of telecommunication connections.

A library network is a description of an activity which existed before the nomenclature was devised. When any two libraries talk to each other, we have the fundamental condition for networking, that is exchange. When one library provides a service to another we have the rudiments of network behavior. Inter-library-loan or bibliographic exchange in any form, is the chief justification of a network. "Do you have what I don't and how can I get it" is the precondition for networking. Networking is a system with a predominant flow of service and a reverse flow of demand. When a librarian asks his neighbour for a book or a citation and his request is honored networking begins. Librarians now tend to view a collection as not merely what they possess in their institution, but all materials they have access to through photocopying, inter-library loan and reciprocal borrowing privileges. As costs of library services have skyrocketed, libraries have realized that in cooperative arrangements, there is the possibility of providing new services whose cost would be spread over many institutions. Hence the justification for library networks.

3 THE AIMS AND OBJECTIVES OF LIBRARY NETWORK

The main aims and objectives of library network are;

(a) to promote sharing of resources by inter-library loan among the libraries through computerised networking for maximum use of resources and better facilities for researchers and users;
(b) to assist member libraries in cataloguing of books, serials, non-book materials and catalogue production;
(c) to facilitate and promote delivery of documents manually or mechanically;
(d) to coordinate efforts for suitable collection development and reduce unnecessary duplication wherever possible;
(e) to establish referal centres to monitor and or facilitate catalogue search and maintain a central on-line union catalogue of books,

serials and non-book materials of all the participating libraries;

(f) to develop a specialist bibliographic database of books, serials and non-book materials for search and access;

(g) to create a database of projects, specialists and institutions for providing on-line information service;

(h) to implement computerisation of operations and electronic services in the libraries for fast communication of information;

(i) to coordinate with other regional, national and international networks for exchange of information and documents for the use of libraries and users; and

(j) to evolve standards and uniform guidelines in techniques, methods, procedures, hardwares and softwares, services and so on and promote adoption in actual practice by all libraries, in order to facilitate pooling, sharing and exchanging resources and facilities towards optimisation.

4 LIBRARY AUTOMATION AND NETWORKS IN INDIA

There have been many attempts in the country in the last two decades in computer application to library and information activities. During the last 5 years libraries and information centres have become more earnest to computerise their operations and services. While NISSAT has been promoting an integrated approach in library automation in the country, the efforts have been by and large, at the institutional level. Nearly 50 to 60 library and information centres are known to be computerising their activities. Some of the major organisations engaged in computerised information handling are:

INSDOC	—	Indian National Scientific Documentation Centre, New Delhi
DRTC		Documentation Research and Training Centre, Bangalore
IISc	—	Indian Institute of Science, Bangalore
IIT	—	Indian Institute of Technology (Madras, Kanpur)
NIC	—	National Information Centre, New Delhi
BARC	—	Bhabha Atomic Research Centre, Bombay
TIFR	—	Tata Institute of Fundamental Research, Bombay
PRL	—	Physical Research Laboratory (Ahmedabad)
DESIDOC	—	Defence Scientific Information and Documentation Centre (Delhi)
NISSAT	—	National Information System for Science and Technology, New Delhi

NISSAT is engaged in promoting the development of sophisticated all-purpose library application software packages. The UGC National Centre for Science Information (NCSI) at IISc (Indian Institute of Science) Bangalore has been undertaking a major effort of offering of computerised SDI service from foreign databases, such as INSPEC, CA-SEARCH, BIOSIS and MATHSCI to more than 3,000 users in academic and research institutions.

The Department of Electronics, the Department of Telecommunication, etc, have established or have been engaged ia establishing data communication networks such as NICNET for government information by NIC, INDONET for commercial use by CMC, VIKRAM, a packet switched public data network of India by the Department of Telecommunication and SBRTN, a satellite based rural telegraph network for North East India by Space Application Centre/DOT. There are possibilities of mounting bibliographical databases on these networks for providing on-line access to users.

An academic and research network, known as ERNET, which could address data communication at various levels—local area, wide area, metropolitan area and rural area is also operating since 1986.

5. LIBRARY AUTOMATION AND NETWORKS ABROAD

International programmes like UNISIST of UNESCO, Universal Availability of Publications (UAP) and Universal Access to Information (UAI) of IFLA and a few others have helped in promotion and coordination of information services throughout the world. Global information systems, characterised by decentralised input, centralised processing and decentralised distribution, such as INIS, AGRIS, and DEVSIS have been evolved towards universal bibliographic control and dissemination of literature. International information networks/centres such as Lockheed/DIALOG, SDI/Orbit and ESA/IRS hold 100 or more databases in several disciplines and offer on-line services to users throughout the world.

51 Library Networks in USA

The Library networks in USA are in a most advanced level of development. Three foremost bibliographic utilities and networks in USA are the On-line Computer Library Centre, Dublin, Ohio (OCLC), Research libraries and Information Network, Stanford, California (RLIN) and Washington Library Network, Olympia, Washington (WLN). In addition, there are networks of different types, levels etc. The library networking

is baesd on three major areas of technology, viz, creation of bibliographic information in machine readable format for storage and retrieval, hardware, and telecommunication mechanism for transmission of information. The major point of success of library network depends upon availability of machine readable catalogues in the constituent units. A great progress has been made by USA in this regard.

The OCLC, established in 1967, and having a staff of 812 persons as in 1987 is a non-profit organization and supports resource sharing among more than 6,700 libraries in USA, besides countries in Europe, Saudi Arabia and Australia. Its Union catalogue database contains 13 million records. Some 30,000 records are added every week.

RLIN, established in 1978 and having a staff of 81 persons, supports the cooperative prpgrammes of Research Libraries group, comprising 36 major libraries and other research institutions. It maintains 6 databases on-line. The catalogue database holds more than 20 million records. The WLN, established in 1972 and having a staff of 51 persons, provides more than 250 libraries in seven states of USA, on-line computerised services to promote resource sharing and automated library functions.

52 Library Network in Canada

The best known, library network in Canada is UTLAS International CANADA, formerly University of Toronto Library Automation system. UTLAS was the first library network utility in North America to go private by becoming a subsidiary of International Thomson Library Services (ITLS). UTLAS, established in 1971 has a staff of 215. UTLAS is a computer based service organisation for Libraries and Information Industries.

6 INFLIBNET

Information and Library Network (INFLIBNET) launched by the UGC, is a computer-communication network of libraries and bibliographic information centres. It is a cooperative network and will contribute to pooling, sharing and optimisation of resources, facilities and services of libraries and information centres in university system as well as in the R&D complexes in India. INFLIBNET is a major programme towards modernisation of Libraries and Information centres in the country, with application of computer and communication technologies.

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UNIVERSITY LIBRARY NETWORK : A BROAD SPECTRUM

B S SWAROOP RANI*

1 INTRODUCTION

Because of governmental emphasis on modernisation and efficiency as well as rapid advancement in technology world-wide, computerization has become a buzzword and has taken the status of national priority. The four quantitative attributes of computers, viz, increasing computing speed, reducing size, reducing energy consumption and reducing cost have made it the main topic for discussions across the world including the library field.

Today, the wealth of a nation is money or oil. Tomorrow, it will be Information and to reach that tomorrow will take a systematic intensive internalisation of computer into the economic infrastructure. Losing this opportunity will cause a chasm between the information-rich and information-poor. A chasm that will be far more traumatic than the gap that differential 'money-wealth' has caused.

Variousl technologies have made this century the 'century of speed'. Perhaps the 'century of speed' has been possible due to the fusion of computer and communication. Anthony Octlinger[1] has suggested that the computer communication phenomena deserves a new name 'communication'. The computer and its communication-circuit links to other computer or to terminals constituting an integral information machine. It is also termed as 'Telematics' by Siman Nora and Alain Minc[2]. It is 'Telecommunity' to Alvin Toffler[3]. Communications, Telematics or Telecommunity whatever the hybrid, is called it has no doubt upset libraries in storing and transmitting information. The above technology introduced the 'Network system'.

*Lecturer, Department of Library and Information Science, Bishop Heber College, Trichy-17.

2 NETWORKING

The term 'network' is used to cover several related but different developments. There are local, or campus networks connecting the individual microcomputers on the desks of academic staff or library staff to a central facility or to each other. There are wide networks linking together the large files of libraries and other databanks.

Among the various prophets of the future, Yoneji Masuda projects his views on realizing the importance of networking to libraries[4]: "These new library systems are the result of the establishment of network communication systems between libraries and library users. The network system of library activities is already partly realized, but so far it is limited to the level of specialist libraries, and as yet there is no example of a remote access system from home to library."[5]

The universities in each state can have a database linking all the affiliated colleges. Through routine work automation it will offer a considerably more efficient reservation and recall service and thus give an opportunity to have

—access to the library's holdings information and to files of general information about the libraries services, and its bibliographies and reading list; and
—the ability by the user to establish the exact location of books in the library system.

The main or central university library can set up databanks with bibliographical information, reading list, etc of affiliated college libraries along with its own list and bibliographical details. Affiliated colleges can be connected to the center for free flow of information, thus forming a network. LAN (Local Area Network) can also be set up by each affiliated college incorporating some existing resources as well as new equipment.

21 Network Alternatives

There are a number of different network alternatives available which can be used by university libraries.

211 *Remote Networks*

This involves the use of telecommunication between a central computer and database and the terminals or the microcomputers used for instructional delivery or development.

212 *Local Networks*

Local networks do not need telecommunication and usually connect terminals / microcomputers in the same building or campus of the university.

22 Protocols

There are a number of different local network architectures and transmission protocols. The most common are terminals and micro-computers cabled directly to mainframe controllers by means of coax cable and using high speed synchronous protocols.

23 Processing

If remote or local networks are adopted by university it can be either time shared or distributed systems. In a time shared system, all processing is done on the central computers and the other terminals/microcomputers in the network simply act as input/output devices. Whereas in a distributed system, processing is done locally by the terminals/microcomputers and data is downloaded/uploaded between the central processor and the terminals.

24 Inter-connecting Networks

To connect two local networks (affiliated colleges) a telecommunication link is established between any two servers/terminals in the network. These two links are called the gateway nodes. The link may be directly connected between the two local networks or it may pass through a mainframe host (university). In addition, a local network can be linked to a main frame, either directly or via telecommunication.

3 UNIVERSITY LIBRARIANS ROLE—INTERMEDIATE

The new technology offers many opportunities to the librarian to act as one who filters information, concentrating the user's mind on that which is relevant, and saving his time and his power of assimilation from information overload. The new technology enables the establishment of connections between people and data and between people and people. The role of 'intermediary' smooths the path through the networks.[6]

4 THE FUTURE

There is interest among academic librarians in exploiting the wider

networks. The potentials for direct access to the files of other libraries would aid co-operation among universities all over India, in the areas of loan and location of stock, and for downloading bibliographic records. The promise of networking was summed up by Collier in his contribution to a meeting in 1982 on information technology in polytechnic libraries which reads—

> "What is being suggested, therefore is an environment in which library services are very closely integrated with the information activities of the institution as a whole, receiving and transmitting information in a wider manner. Thus greater accessibility will imply less emphasis on the physical location of the library but probably a greater dependence of the community on the services it provides."[7]

The computer is a natural evolution in man's eternal quest to create artifacts that remove constraints that he is born with. Should he attempt to slow down this evolution? This new technology is coming straight at us. We can either take it head-on and bring it under our control to exploit it to our advantage or we can step aside and let it pass by? To what degree are we willing to modify our ways in order to accommodate the new technology—is the question that is to be answered by every librarian.

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BIBLIOGRAPHIC DATABASES AND NETWORKS : THE INDIAN SCENARIO

SUDHA GAMBHIR*
SARITA KAPOOR**
MAM CHAND*
N NAGAJYOTSNA RAO***

0 INTRODUCTION

The development of computer communication network is an important technological advancement of the modern age, which uses the telecommunication facilities for data transmission. The computer network aims at resource sharing and in achieving economy in hardware, software and manpower. The scenario of telecommuncations in india is expected to change radically in the near future. The future telecom scenario will be dominated by computers and microprocessors. Department of Electronics (DOE) and Department of Telecommunication have launched networks as follows:

NICNET	—	For governmeet information (DOE)
INDONET	—	A commercial network (CMC)
VIKRAM	—	Packet switched public data network of India (DOT)
SBRTN	—	Satellite Based Rural Telegraph network for North East-India (SACWDOT)

Several long-range initiatives have been taken by various organizations and these may bc classified into three categories:[1]

*Documention Officer, NASSDOC, ICSSR, New Delhi
**Assistant Librarian, Research and Information System for Non-Aligned and Other Developing Countries, Lodhi Estate, New Delhi
***Documentation Assistant, NASSDOC, ICSSR, New Delhi.

(i) General Network Service Facilities : NICNET; INDONET; VIKRAM.

(ii) Specialized Networks: CALIBNET; DELNET; INFLIBNET; ERNET; VIDYANET; BTISNET.

(iii) Specialized Network Carrying large Business Data/ Information: SAILNET; BANKNET; COALNET; RAILNET: TOURNET.

1 GENERAL DATA/INFORMATION NETWORK SERVICES

NICNET

The development of the NICNET network was piloted by the National Informatics Centre. It has been set up to link government deparments for decision optimisation. Presently one satellite channel links the master micro earth stations. A distributed Database Management System (DBMS) is being implemented on the network to provide a uniform DBMS environment for the network users.

This network aims to facilitate flow of information among the four national/regional nodes, 32 state/union territory nodes and 439 district nodes.

INDONET

The INDONET is the first commercial computer based network commissioned by Computer Maintenance Corporation Ltd (CMC), Hyderabad. It comprises a network of computers located in many cities and connected by data communication links.

Thc user will have access to the network through terminals located at CMC computer centre or through terminals located remotely and connected to the local computer system through voice grade P&T lines at a speed of 300-1200 bps, the access points being in the cities of Bangalore, Ahmedabad and Pune.

By end 1990, the number of INDONET centres is expected to grow to 100. It would operate as a STAR Network with control point at Delhi, using rooftops 3m earth stations and packet-switching technology for routing of data from central station to other INDONET centres. Besides the IBM protocol, the network will also utilize X.25. For intra-city transmission, a novel cost effective, reliable and faster (9600 bps) digital packet radio scheme has been innovated. The Bombay node of INDONET has been connected to the international gateway of Videsh Sanchar Nigam Limited, thereby facilitating entry to public data networks of other countries.

VIKRAM

Vikram is the packet-switched public data network operating in packet switching node under development by the Department of Telecommnication. All data switching facilities as per international standards (CCITT) will bc provided through this network. The initial network would consist of 8 switching nodes and 12 remote access points with its network management centre at Delhi. While nodes in the four metros, namely, Calcutta, Bombay, Delhi and Madras will mesh at 64,000 bps, the other nodes and access points will be connected in 9600 bps. The interface standards of the network will be based on X.3, X.25, X.28, X.29. X.32 and X.75 CCITT recomendations. Some experiments have already been undertaken in the cities/towns where VIKRAM centres are located.

This network has a potential for several applications for independent corporate bodies. computer facilities, banking industry. airlines and transport sector and for telematics services like electronic mail. videotext, telex etc.

2 BIBLIOGRAPHIC APPLICATIONS IN GENERAL DATA NETWORKS

NICNET, INDONET and VIKRAM have displayed interest in the field of bibliographic applications. NIC is working with ICMR to offer services to MEDLARS database and several other CD-ROM. NISSAT is working with NICNET to mount *Chemical Abstract* database on NICNET. Both NICNET and INDONET have undertaken exercises to put the NUCSSI database online. Apart from this INDONET is collaborating with INSDOC and the NISSAT centre at CMTI, Bangalore to create facilities for SDI and retrospective search services on COMPENDEX. Besides providing communication facilities for the NACID, INDONET may eventually acquire one computer system large enough to run few off-used commercial databases. VIKRAM has offered its infrastructure to NISSAT for pilot experimentations on library networking.

There are differences in the utilization pattern on these three networks. The bibliographical databases created on NICNET, will not be accessibles by users in private enterprises and majority of public enterprises, whereas the other two would be open for use by the public including government users.

The NICNET has been created specially to cater to management information systems required by government. By and large, bibliographic information is in public domain.

Cost would be the major factor in network utilization in NICNET. The entire lot of equipment is owned by NIC and placed at customers'

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premises at NIC's cost. The cost of connect time is also subsidized. In comparison INDONET costs are likely to be higher.

3 SPECIALIZED INFORMATION NETWORK

BIISNET

BIISNET is a S&T network linking at present 10 Micro Vax II computers which form the core of a distributed information system. It is set up by the Department of Biotechnology, Government of India. The 23 user centres situated at different locations in educational and R and D institutions across the country would have PC/AT computers and will be linked to principal nodes through satellite or terminal links.

The entire system would be superimposed on the NICNET system to take advantage of the telecommunication facilities and the powerful computing systems of NIC installed in places at Pune, Hyderabad and Delhi. The network will follow the X.25 communication protocol with the presently estimated maximum configuration of 500 nodes in NICNET, the response time will be 1.5 records. The nodes of BITS and the user centres will be provided with facsimile facility and core staff to man the centre.[3] Under the BITS programme, the computerised services will be available for retrieval of information related to bibliographic information—research articles, reports, books, patents covered by *Biotechnology Abstracts.*

CALIBNET

NISSAT took the intiative for the development of this network to ensure better utilization of S&T information resources . CALIBNET is envisaged as a metropolitan network linking 38 libraries in the Calcutta metropolitan area. The applications are to be supported by electronic mail, file transfer, remote log-on and database and document access.

Within individual libraries, the functions to be automated are cataloguing, serials control, acquisition and fund accounting, circulation and local user services. The networking provides for global user services of current awareness, SDI, union catalogues, partial databases, and access to national and international networks. Each participant would collect, process and hold information on local computers, connected with one another through X.25 packet-switched network. Standardization may be based on UNIX operating system.

In the first phase, all institutions within the Jadavpur University cluster and some no desof Razabazar cluster such as the Department of Radio Physics, Bose Institute and Saha Institute of Nuclear Physics have been included.

In the second phase, the other libraries, such as the Ballygunge Science

College, Medical libraries, National Libraries, and ISI would be included.[4]

DELNET

NISSAT took initiative for the establishment of DELNET also. The aim of establishment of DELNET is—

(a) To promote sharing of resources by inter-library loan among the libraries in Delhi through computerised networking for maximum use of resources and better facilities for researchers and users.
(b) To assist member libraries in cataloguing of books, serials, non-book materials and catalogue production.
(c) To coordinate efforts for suitable collection development and reduce unnecessary duplication wherever possible.
(d) To establish referal centre to monitor and/or facilitate catalogue search and maintain a central on-line union catalogue of books, serials and non-book materials of all participating libraries.
(e) To develop a specialist bibliographic database of books, serials and non-book materials for search and access.
(f) To develop a database af projects specialists and institutions.
(g) To possess and maintain electronic and mechanical equipments, for fast communication of information and delivery of electronic mail.
(h) To coordinate with other regional, national and all international networks for exchange of information and documents for the use of libraries and users.
(i) To undertake, facilitate and provide for the publication of newsletter, and/or journal devoted to networking and sharing of resources.
(j) It was decided to divide the networking activities into the following three phases:

Phase I : Creation of databases at local centres; and exchange of floppies.
Phase II : Linking of these databases by physical (telephone) links.
Phase III : Creation of network database collection of all databases to be accesed by all.[5]

CSIRNET

CSIR is planning to set up a computer communication network for exchange of information among its 40 and odd laboratories. The CSIRNET would help in organizing indigenous on-line database services on subjects such as leather technology, food technology, natural products,

chemistry, radio physics and medicinal plants. It would provide bulletin boards and set up teleconferencing facilities through the network apart from facilitating flow of routine administrative and financial information and exchange of library resources.

Apart from accessing international databases through NACTIIs, efforts are also underway to develop databases on the expertise and sophisticated instruments available in various CSIR units which would be of interest to users outside it also.

DESINET

DESINET is a proposed bibliographic information network for Defence, covering only unclassified scientific and technical information. It would also have close links with other similar networks like NICNET for exchange of information on mutually agreed terms. DESIDOC would take the initiative in planning and implementing the DESINET as a partially distributed network.

ERNET

The ERNET commenced in 1986 with the objective of setting up an academtc and research network based on the seven OSI model, international standards, national capabilities in the field of computer networking and telematic services. ERNET would address data communication at local areas LAN (conforming to IEEE 802.3 standards and a satellite based wide Area Networks (WAN), Metropolitan Area Network (MAN) and Rural Area Network (RAN), levels with the capabilities and involvement of the selected academic and research institutes.

In the first phase communication services offered would include electronic mail, file transfer, remote lay-on, database access and bulletin board. Access protocol/WAN would be X.25 and with other networks through X.75 protocol. It would be implemented in four years with the support of UNDP.

In the second phase document and graphics exchange, voice/computer video conferencing activities would be addressed.

INFLIBNET

INFLIBNET is to be a cooperative computer-communication network for linking libraries and information centres in universities, deemed universities, institutions of national importance, UGC information centres, R&D institutions and colleges. The main objectives of INFLIBNET are[6] :

(a) to evolve a national network, interconnecting various libraries and information centres in the country and to improve capability in information handling and service;

(b) to provide reliable access to document collection of libraries by creating on-line union catalogue of monographs, serials and non-book materials (manuscripts, audio-visuals, computer media, etc) in various libraries in India;

(c) to provide better access to worthwhile bibliographic information sources, with citations and abstracts, such as periodical articles, conference papers, preprints, technical reports, standards and specification, patent, monographs etc through indigenously created database of the Sectoral Information Centres of NISSAT and UGC Information Centres and such others and by establishing gateways for online accessing of international databases held by international information networks and centres;

(d) to optimise information resource utilization through shared catalologuing, inter-library loan service catalogue producton, collection development and avoiding duplication in acquisition to the extent possible;

(e) to implement computerisation of operations and services in the libraries and information centres of the country, following a uniform standard;

(f) to facilitate scientifie communication amongst scientists, engineers, researchers, social scientists, academics, faculties and students through electronic mail; bulletin board, file transfer, computer/audio/video conferencing etc.

(g) to create database of projects, institutions and specialists, for providing online information service;

(h) to evolve standards and uniform guidelines in technique, methods, procedures, hardwares and softwares, services and so on and promote adoption in actual practice by all libraries, in order to facilitate pooling, sharing and exchanging resources and facilities towards optimisation.

INFLIBNET proposes a hybrid version of satellite and terrestrial network communiction system with a star configuration for interconnectivity of the nodes. Inbound carrier to the central hub would be through satellite and use the slotted aloha technique, while outbound carrier from the central hub to the nodes would use satellite and time division multiple access (TDMA). Interconnection of nodes in a city, if they are many, is through a LAN. The networking protocol for INFLIBNET would be similar to the HDLC protocols.

The INFLIBNET project is proposed to be taken up during the Eighth Five Year plan (1990-95).

VIDYANET

VIDYANET is a proposed dedicated communication/computer network to meet the needs of scientists and research workers in the laboratories/institutions of excellence in the country. The first phase of VIDYANET would link up about 10 institutions such as—All India Institute of Medical Sciences, Indian Agricultural Research Institute, Indian Institute of Technology (IIT), Indian Statistical Institute, and National Physical Laboratory in New Delhi, and Bhaba Atomic Research Centre, Indian Institute of Geomangetism, IIT, National Centre for Software Technology and Tata Institute of Fundamental Research in Bombay. Subsequent phases of networking would cover leading institutions in Ahmedabad, Bangalore, Bhopal, Calcutta and Madras.

It aims to link up institutional computers (CYBER, VAX, DEC, etc) via telecommunication lines and provide its users facilities like transfer of files of any type-data, programmes and documents, electronic mail, exchange of immediate message, access to remote applications, database and libraries.

A major VIDYANET objective is to stimulate cooperative research, day-to-day exchange of research information and the execution of joint projects and publication. It also intends to allow users to develop databases on specialized areas like biotechnology, superconductivity and supernova research,

Besides, VIDYANET aims at providing rapid means of communication by linking computers at various institutes in India with similar networks like EARN (European Academic Research Network, Geneva) and BITNET through a gateway.[7]

1 INDIA'S PARTICPIATION IN INTERNATIONAL DATABASE DEVELOPMENT ACTIVITIES

India has all along been a keen participant in international initiatives, especially those promoted by the UN System. Besides being active in promoting the UNISISTI/ASTINFO concepts in the information area, India's role has been significant in INFOTERRA, UNDP, AGRIS/FAO, INIS/IAEA and APINMAP/UNESCO. India has also been active in networks like TIPS and database ventures like FSTA. In all such cases, India gets the international compilation free in lieu of inputs provided by the country.[8]

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MANAGING INFORMATION : NEED FOR THE PLANNING OF SOCIAL SCIENCE RESEARCH INSTITUTE'S NETWORK (SSRINET)

DR S FAZLE RAB*

0 INTRODUCTION

Social sciences are now gaining fast popularity in the developing countries. To-day these disciplines are no longer confined to conventional roles of academicians and arm-chair scholars within the academic institutions, rather they have expanded their avenues in different fields like business, health, administration, management, planning etc. There is increasing demand to include them in the policy domain resulting in the expansion of the frontiers of social science knowledge as well as rise in the number of hetrogenous clienteles. Broadly speaking, the very objective of social sciences is that of developing a body of knowledge contributing to our understanding of the problems that beset our society and help us to design ways and instrumentalities of overcoming them and improving the quality of life.[1] Thus, it invites us to evolve a 'model of knowledge research' and a 'model of knowledge utilization'. The former refers to the 'development of knowledge' and the latter to the 'use of knowledge'.

The quest for knowledge is an endless process but it is always looked up as an 'instrumentality for achieving certain ends' or whether it could be an end in itself. Considering this point of view, it must be argued that the social scientists must have commitment to produce knowledge which could be practically useful in the promotion of development of our society. This kind of activity is known as 'development related' research which received a great impetus in India in the seventies. Earlier, the research activities in social sciences were mainly carried on by the universities. Of course, there were a few research institutes also, many of

*Head, Library & Documentation Division, ANS Institute of Social Studies, Patna-800001, and General Secretary, Bihar Library Service Association.

them privately founded, which promoted research activities in this field of knowledge.

1 GROWTH OF RESEARCH INSTITUTES IN INDIA

The increasing demand for engaging more and more social scientists in development related or policy/action oriented research led to the growth and development of research institutes outside the purview of universities. Till 1927, there were only two such research organisations in India. One of them was in the field of Public Administration and the othrr had an interdisciplinary character. In 1935, two more research institutes were set up, one for economics and other for statistics. Then came institutions in the field of Political Science (1943), Anthropology (1945), Commerce (1945), Psychology (1949), Management (1949), Demography (1956), Law (1959), Criminology (1962) and Defence Studies.[2] Now there are more than 100 social science research institutes of varying size and strength in India.

In order to promote better utilization of research findings for policy planning purposes, an autonomous national organisation known as the Indian Council of Social Science Research (ICSSR) was set up in 1969 on the recommendation of a committee under the chairship of Professor VKRV Rao, then member of the Planning Commission incharge of Education. The ICSSR provides financial assistance both in matter of those institutes that are not either affiliated or constituent institutions of statutory universities in India. At present 24 research institutes of all India character and importance engaged in research activities in social sciences are provided maintenance and development grants by the ICSSR. Table 1 shows the expenditure made on research institutes in India during different plan periods.

Table 1 : Expenditure during Vth, VIth and VIIth Plans

(Rupees in lakhs)

	Expenditure during		
	V Plan	*VI Plan*	*VII Plan*
Research Institutes	252	549	1168

Over a few decades the number of research institutes in India has increased at a faster rate. According to Yogesh Atal, these institutes are

"multi-disciplinary in their composition, some of these are department based while others are inter-disciplinary in their concern and approach."[3] Table 2 shows the number of discipline-wise social science research institutes in India.

Table 2 : Discipline-wise Social Science Research Institutes in India[4]

Discipline	*Number of Institutes*
Anthropology	3
Archaeology	2
Demography	1
Economics	13
Education	4
Geography	1
History/Indology	6
Law	1
Linguistics	2
Management	4
Mass Communication	1
Political Science	4
Psychology	2
Public Administration	4
Social Sciences (Comprehensive)	3
Sociology	3
Town and Country Planning	1

Over the years, these research institutes have developed special character by performing research rather than teaching and have a high level of competence leading to the professionalisation of research in the field of social sciences in India. The size of the social science community is increasing at a faster rate resulting in the growth of the volume of social science knowledge and information. Recently, ICSSR has prepared a profile of 10 years research activities of 21 research institutes in India (Table 3).

Table 3 : Ten Years Research Output of Social Science Research Institutes in India (1978-88)[5,6]

Institutes	*Faculty strength*	*Total output of publications (including books, reports, articles)*
ANSISS (Patna)	28	867
CUDS (Trivandrum)	24	661
CESS (Calcutta)	21	38
CPR (New Delhi)	11	76
CRESSDIA (Calcutta)	22	120
CRRID (Chandigarh)	7	19
CSS (Surat)	17	478
CSS (Calcutta)	21	311
CWDS (Delhi)	4	31
CSDS (Delhi)	33	428
CSD (New Delhi)	4	105
GIS (Varanasi)	17	141
GIDS (Lucknow)	7	145
GBPSSI (Allahabad)	13	76
IIE (Pune)	13	35
ISEC (Bangalore)	30	152
IDS (Jaipur)	9	40
IEG (Delhi)	9	
IPE (Hyderabad)	17	809
MIDS (Madras)	9	154
SPIESR (Ahmedabad)	17	385

2 ICSSR REGIONAL CENTRES

In order to strengthen the activities of research Institutes, the ICSSR also established regional centres, namely (1) Western Regional Centre, Bombay (1973) covering Gujarat, Maharashtra, Goa, Dadra and Nagar Haveli, (2) Southern Regional Centre, Hyderabad (1973) covering Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Lakshadweep and Pondicherry, (3) Eastern Regional Centre, Calcutta (1973) covering Bihar, Orissa, Sikkim, Tripura, West Bengal, and Andaman and Nicobar Island, (4) North-Eastern Regional Centre, Shillong (1977) covering Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram and Nagaland, (5) Northern Regional Centre, New Delhi covering MP, Rajasthan, UP and Delhi and (6) North-Western Regional Centre, Chandigarh covering Haryana, HP, J & K, Punjab and Chandigarh.

Besides, there are a few national institutes in India engaged in the promotion of research activities in different fields of social science such as National Institute of Rural Development (Hyderabad), National Council of Educational Research and Training (New Delhi), Indian Institute of Mass Communication (New Delhi), National Labour Institute (New Delhi), Indian Institute of Public Administration (New Delhi), Gokhale Institute of Politics and Economics (Pune) etc. All these organisations have a vast store of information which needs to be disseminated and shared by other similar organisations in the country.

3 THE USE OF SOCIAL SCIENCE KNOWLEDGE

The effective use of social science knowledge is extremely important to both academicians as well as the practitioners. Researchers make use of vast store of available information in their research pursuits and the practitioners are interested in the application of it in policy-making for tackling numerous problems of the society. Recently in a seminar on 'Policy Relevance as a Goal of Development-related Social Science Research' organised by IDPAD at The Hague, 24 November 1989, the social scientists stressed the need of effective application of social science knowledge in development. For both these purposes—generating as well as application of social science knowledge requires an easy access to available knowledge. Atal[7] rightly observes : "In order to generate new knowledge and new information, it is necessary to have easy access to information that already exists. New knowledge is built on the foundations of the existing stock of knowledge . . . Without knowing where we are, we cannot move forward, we cannot chart out our path. Information provides the countours of our cognitive map".

In India, a considerable volume of information is generated by different

social science research institutes but in the absence of a mechanism the major portion of such information is hardly even used by the scholars as well as the practitioners. The NASSDOC has taken some commendable steps in the collection, organisation and dissemination of such information but it is yet to achieve satisfactory results because this kind of centralised activity needs more financial resources as well as huge complex of infra-structure. Especially for developing countries like India, these ventures do not prove much success. While reviewing the activities of NASSDOC an expert committee observed that "the Social Science Community in general does not seem to be aware of the services that this centre provides. There is need to give wider publicity to the availability of these services. At least the libraries and other documentation centres must be informed of the materials and services that it offers.[8] More or less, the same situation prevails in the research institutes also where there is hardly any communication among them. As a result a good deal of information remains unutilised as it is not disseminated among the scholars and practitioners of various organisations. Keeping this fact in view, the necessity is now realised to lay greater emphasis on resource sharing through multilateral arrangements between the members of the various research institutes of similar character. Stone[9] has rightly observed : "it is desirable that any attempt to address Third World information needs must be based upon resource sharing and cooperation." Consequently, the desire for evolving a machanism to share the resources of different organisations on cooperative basis has led to the development of networkings.

4 CONCEPT OF INFORMATION NETWORK

The concept of information network is very popular these days. It has become rather a fashion to use the term 'network' at any seminar or sympsoium on information. This concept is usually referred to describe a form of arrangement or/and administrative structure that links a group of individuals or organisations who have agreed to work together and/or share resources.[10] The information networks are essentially a voluntary structure where those who have information want to share it in the fulfilment of the purposes for which they exist.[11] Thus, the very objective of networking is to promote avenues for the effective utilization of information through sharing resources by a group of libraries. The increasing popularity of information networking has brought about qualitiative changes in the services of the libraries by promoting greater accessibility to information.

41 Features of Information Networking

(1) It is a decentralised multilateral arrangement for tho flow of information.
(2) It is completely a voluntary arrangement.
(3) It enjoys complete autonomy.
(4) It does not require a huge complex of infra-structure.
(5) It promotes motivation for collaboration.
(6) It establishes linkage between information gatherers and the users.
(7) Its coverage is broad based.
(8) It promotes greater accessibility to information.
(9) It is more user oriented.
(10) It brings 'information economy'.

5 GROWTH OF NETWORKING IN INDIA

In the eightees some positive steps were taken to plan networking in the field of social sciences in India. The concept of information networking was further strengthened with the development and promotion of cooperative ventures by various nations including India in different areas of mutual interests.[18] For instance, India joined APINES (Asia-Pacific Information Network in Social Science) launched in 1986 and supported by UNESCO. Similarly, DEVINSA (Development Information Network in South Asia) is another example of cooperative information networking by India, Bangladesh, Nepal, Pakistan and Sri Lanka. SAARC is also developing similar cooperative flow of information in different areas of mutual interests in Asia and Pacific. In a workshop organised by ESCAP in December 1986, the social scientists stressed the need for developing a Women's Information Network for Asia and Pacific (WINAP). India took lead in this direction and organised two workshops at Devlali (1988) and Hyderabad (1990) to explore the possibilities of developing 'Women and Development Studies Information Network' by involving different organisations of the country. In all these efforts India is very much involved. In 1988, the University Grants Commission (UGC) constituted a committee under the chairmanship of Professor Yash Pal to suggest measures to set up a National Network System for universities/libraries known as INFLIBNET (Information and Library Network) so as to share the literature resources towards optimum utilization. Apart from these efforts, now city based networkings are being planned for promoting effective utilization of a vast amount of available resources of different libraries of metropolitan cities through DELNET (Delhi Libraries Network), CALIBNET (Calcutta Libraries Network) etc.

So far as social science research institutes networking is concerned, the ICSSR has already done a lot of spade work in this direction. As early as 1973, the ICSSR jointly with the Jawaharlal Nehru University established Inter-Library Resource Centre (ILRC)—a purely cooperative venture of which the number of participating libraries has now risen to 38. Similarly, the establishment of six regional centres has paved the way for promoting collaborative motivation among the members of the various research institutes of different regions. The ICSSR also took certain initiatives to promote cooperative ventures such as the compilation of Union Catalogues and Area Studies bibliographies by involving research institutes of different states and union territories. Thus the ICSSR has got enough experience in this direction and now there is an opportune time to appoint a high power committee to evolve ways and means for developing networkings of the research institutes so as to utilise the enormous volume of information.

5.1 Barriers to Networkings

Of course, the idea of networkings seems to be quite romantic in itself. It is always pleasant to think of cooperation, collaboration, involvement, participation etc. But when these fascinating ideas are translated into practice, a lot of problems arise. This is true of networking also, because the very success of networking largely depends upon the willingness as well as the extent of co operation among the target groups. In India, unfortunately, the present scenario of social science research institutes presents a very gloomy picture, as very little formal network of research information exists across institutes. It clearly indicates that in spite of NASSDOC's efforts, the majority of such research institutes could not develop cooperative ventures to exchange information to the extent it was expected. This is because of non-involvement of libraries/documentation centres which form the most important component of the research institutes. The quality of research largely depends upon the quality of the library. But, in most of the cases, the libraries of research institutes are still poorly managed by inferior category of personnels, mostly in the rank of a lecturer or so. Out of 24 ICSSR financed research institutes, there is hardly any librarian in the rank of a professor. Does it not show the partisan view of the academicians ? If different divisions of an institute can be headed by professors then why not the library—the most important division of the institute—be headed by a librarian in the rank of professor. Librarians are equally performing the task of promoting social science knowledge but they are yet to be recognised as social scientists. Consequently, this has created a wide gulf between the academicians and the library personnels who are now divided into two classes—superior and inferior classes. If social scientists desire that the results of

their painstaking research could be utilised properly in the pursuit of further knowledge as well as their application in tackling problems which beset our society, the greater emphasis should be given to improve the quality of different categories of library personnels involved in information handling. This will also improve the quality of research. Otherwise, in the absence of qualified personnels any attempt to provide avenues for promoting communication among the social scientists and policy makers will remain an unfulfilled dream.

Unfortunately, the role of ICSSR has not been very encouraging in this regard. So far no step has been taken to formulate any norms or guidelines for different categories of research institutes financed by the ICSSR. There are five yearly visiting committees of the ICSSR that look into various matters when recommending grants to each institute for a plan period but hardly any matter relating to the libraries/documentation centres of the research institutes has been taken up. This committee usually consists of academicians alone but no care is taken to include any senior library and information scientist in this committee when ICSSR is spending a huge amount on NASSDOC for effective utilisation of information across institutes. Moreover, there are ICSSR's nominees in almost every Governing Body of the ICSSR's financed research institutes but, even then, there is hardly any uniformity in the status and pay scales of the library personnels. What needs to be done now is to appoint a high powered committee by the ICSSR to look into the conditions of the existing libraries and documentation centres of research institutes and suggest norms and guidelines for improving the efficiency of library services as well as the status and pay scales of library personnels. This will ensure uniformity in the pattern of services and enable the library personnels to build up their capabilities in information handling across institutes. By doing so we can remove great obstacles in the way of establishing networking.

6 NEED FOR ESTABLISHING SSRINET

At present, the ICSSR is funding 24 research institutes of varying strength and size in India. All these institutes are basically interdisciplinary in nature engaged in both fundamental and applied research in the field of social sciences. In order to make effective use of the enormous volume of social science information and also to expand the frontiers of knowledge, the ICSSR may design a network for establishing multilateral linkages between the members of the 24 research institutes of the country. This model of networking. (see Appendix I) could be known as SSRINET (Social Science Research Institutes Network). The list of the Council supported research institutes is given in Appendix II.

61 Objectives of SSRINET

1 To promote smooth and speedy exchange of information through multi-lateral arrangements.
2 To facilitate optimal use of information resources.
3 To strengthen the search strategies.
4 To facilitate maximum autonomy to each participating institue of the network.
5 To motivate cooperative ventures of the network.
6 To avoid the duplication of work.
7 To minimise the cost of maintenance in the flow of information.
8 To develop standardisation of services.
9 To ensure smooth communication among the members of the participating institutions in the network.

62 Structure of SSRINET

The structure of SSRINET will be the combination of the directed as well as non-directed types of networkings. The 24 ICSSR financed research institutes located in six major regions will form the components or nodes of the SSRINET structure. These nodes will operate according to freely interacting multilateral arrangement. The NASSDOC will act as a central agency for coordinating, motivating and monitoring the activities of the target groups. The Regional centres of the ICSSR will assist the NASSDOC in this venture at the regional level. The structure of model is given in Appendix I.

63 Computerization of SSRINET

Rapid and accurate communications are becoming exceedingly important for the proper functioning of the networkings. If information is processed manually, it takes much time. Moreover, with gradually increase in the volume of information, things may start to go wrong. Information may be misfiled by staff working under pressure. In this way, the whole system will gradually degenerate because of increasing volume of inaccurate, inaccessible and redundant information. For this reason the installation of computer must be taken as an opportunity to change the old pattern of information handling. A well-designed computerisation of the information networkings will increase the accessibility to relevant information at the right time besides reducing costs on staffing and resources. Each class of computer has rapidly become faster and of longer capacity and at the same time the cost has been reduced to the point at which a useful microcomputer, with printer, can be purchased for a few thousands of rupees.

Fortunately, some of the ICSSR supported research institutes have already computer facilities and some of them are also making efforts to get such facilities in coming years. What needs to be done is to provide computer facilities to all other remaining institutes so that the networking could be developed at a faster rate. The ICSSR has also started training programmes in using computers in information processing and management. The proposed networking of social science research institutes can get benefits from these experiences. Let us think in this direction and get ready to move towards the 21st century.

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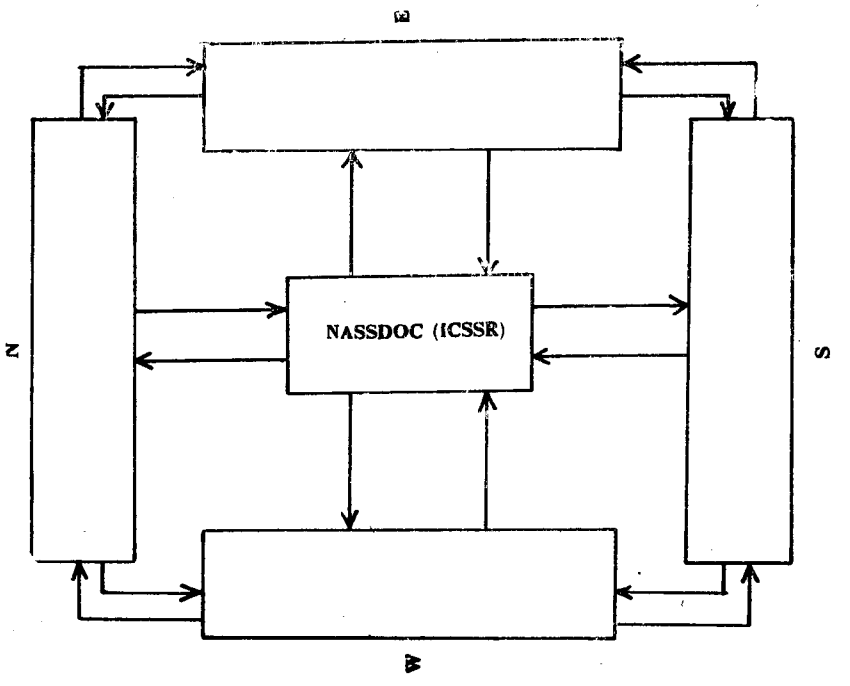
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APPENDIX—I

SSRINET MODEL



PARTICIPATING INSTITUTES

APPENDIX—II

LIST OF THE PARTICIPATING RESEARCH INSTITUTES IN THE PROPOSED SSRINET

1 ANS Institute of Social Studies (ANSISS), Patna
2 Centre for Development Studies (CDS), Bhubaneshwar
3 Centre for Development Studies (CDS), Trivandrum
4 Centre for Economic and Social Studies (EESS), Hyderabad
5 Centre for Policy Research (CPR), New Delhi
6 Centre for Regional, Ecological and Science Studies in Development Alternatives (CRESSIDA), Calcutta
7 Centre for Research in Rural and Industrial Development (CRID), Chandigarh
8 Centre for Social Studies (CSS), Surat
9 Centre for the Studies in Social Sciences (CSSS), Calcutta
10 Centre for the Women's Developmeot Studies (CWDS), Delhi
11 Council for Social Development (CSD), New Delhi
12 Gandhian Institute of Studies (GIS), New Delhi
13 Giri Institute of Development Studies (GIDS), Lucknow
14 Govind Ballabh Pant Social Science Institute (GBPSSI), Allahabad
15 Gujarat Institute of Area Planning (GIAP), Ahmedabad
16 Indian Institute of Education (IIE), Pune
17 Institute for Social and Economic Change (ISED), Bangalore
18 Institute for Studies in Industrial Development (ISID), New Delhi
19 Institute of Development Studies (IDS), Jaipur
20 Institute of Economic Growth (IEG), Delhi
21 Institute of Public Enterprise (IPE), Hyderabad
22 Madras Institute of Development Studies (MIDS), Madras
23 Sardar Patel Institute of Economic and Social Research (SPIESR), Ahmedabad
24 Centre for the Study of Developing Societies (CSDS), Delhi

NATIONAL NETWORK FOR THE TRANSFER OF CITATION DATA : A PROPOSAL

P PICHAPPAN*

0 INTRODUCTION

Citation data is used to measure the contribution of one country to the growth of knowledge, The international citation data bases like *SCI* have less coverage of Indian journals. Hence the citation data of Indian journals are inaccessible. If a nationai network takes ths responsibility of collecting, storing and disseminating citation data of Indian journals, this will help in scientometric studies.

The organisation and utilisation of information resources by mutual transfer is not new. What is new is a wide spread interest in the possibility of improving operation by interconnecting information systems and services as well as library operation.[1] During the last couple of decades we have seen a renewed interest in interaction and mutual involvement, especially at the national and international levels. The interlink between various related systems has given birth to the network. Networking is a viable alternative to cope with the alarming information flow. Applying of network concept is necessciated due to economic factors.

A country's contribution to the growth of science can be gauged in a number of ways. The data derived from the citation files have been among the many indicators used to show the position of one country's science relative to that of other countries. For example, Institute for Scientific Information is offering a full range of international science indicator services based on multiyear files. These services enable us to make assessments of countries, institutions, laboratories, disciplines and specialities both comparatively and longitudinally.[2]

Based on *SCI* data, the percent of annual change in productivity for selected countries in the major divisions of science is estimated as fol-

*Lecturer, Department of Library and Information Science, Annamalai University, Annamalainagar-608 002.

lows: US—3.93 %; UK—3.95 %; USSR—3.79 %; Japan—9.81% and India—0.64%.[3] It is obvious that Indian science is lagging much behind. This data was taken from *SCI*, which does include only very few Indian journals.

Indian science community should know their relative position in international standing. Growth of science depends on several factors like avoiding of imitating or extending known trend,[4] improvement in the quality of work (thus Indian journals may get their due recognition) etc. Creating the records of citation data of Indian journals, transfer of the collected data and study of such data will help to know the present day Indian science.

1 NETWORK CONFIGURATION

Which is the appropriate type of network configuration for the transfer of citation data? A directed network which has link with international citation data banks (like ISI) may be a suitable one (Diagram 1).

This network diagram has 8 links and nodes in which 6 nodes are at the national level and 2 nodes are at the international level.

In the above network configuration, several independent centres are linked with one switching focal centre. The focal centre can maintain communication links with international centres.

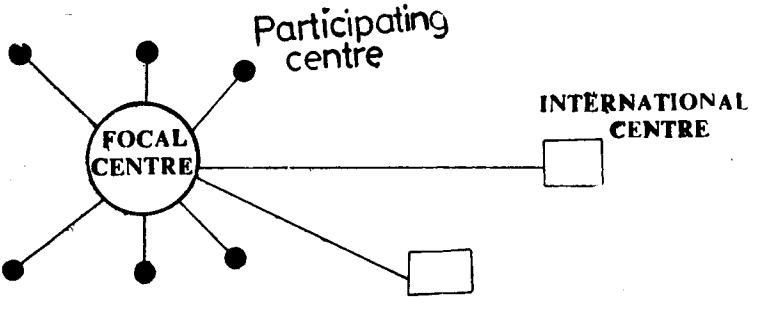


Diagram 1.

In Diagram 2 the switching centre is explicated clearly. The switching focal centre itself has two nodes, viz, contributive node and distributive node. The simple concept is that these nodes enable us to represent data flow in terms of concentration of information flow terminating at the node 'C' and the distributing node 'D' issue the data flow.

The contribution node 'C' of the focal centre has less communication links with other centres, since the collection of citation data may mainly

be done from the documents. The independent nodes play a limited role in supplying the citation data. The distribution node 'D' of the focal centre performs the function of data dissemination to the participating centres.

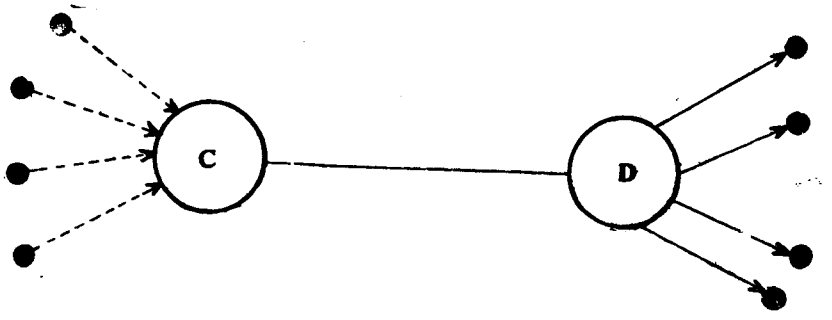


Diagram 2 : Two Nodes as the Switching Centre

2 CONCLUSION

This network facilitates the supply of citation data generated by various literature and is channelled to the regional users. If this is done the impact of this network undoubtedly be to the benefit of the Indian scientific community.

The transfer and comparison of Indian journals citation and international journals citation may lead to a great improvement of quality. The high measure of output and esteem would certainly suggest that a country has the potential to become a leader in research.

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NATIONAL PUBLIC ADMINISTRATION INFORMATIN SERVICES NETWORK (PAISNET) : A PROPOSAL

M C RAGAVAN*
SURESH KUMAR**
SUNITA GULATI**

1 BACKGROUND

Public administration is becoming a field of practice based on applied sciences. Public administration, relatively a modern discipline is notorliously difficult to define accurately and concisely. As an aspect of government activity, public administration has been co-existing with every political system as the action part of government for the fulfilment of the objectives set by the political decision makers. In general it means the decision making, planning the work to be done and formulating the objectives and goals.

Field of public administation possesses many of the characteristics of an academic discipline. Though it is being increasingly practised, yet it is not exactly a profession nor precisely a discipline. Certainly public administration relies upon the contributing disciplines of economics, political science, sociology, psychology, philosophy, history, mathematics and fields such as computer science, architecture, law, business administration, education, and industrial relations.

To provide the information support to the planners, policy makers, legislators, executives, researchers, academic personnel and citizen organisations, need is increasingly felt for the setting up of a national information system in public administration. There is no single information centre at the national level which can cater to the needs of all the recognised public administration institutions and individuals.

*Librarian,
** Assistant Librarian, Indian Institute of Administration, I P Estate, New Delhi-110002.

2 OBJECTIVES

1 The primary objective of the proposed Public Administration Information Services Network (PAISNET) is to interconnect various libraries and information centres with a view to pool together the nationwide information resources, to improve access to and utility of the available information, and to meet the information needs of the public administration community at all levels. The objectives may be further elaborated as:

(a) Provision of information relevant to and adequate for meeting present needs and capable of development to meet future needs of the planners, policy makers, administrators, research workers, faculty members and trainers concerned with public administration.

(b) Optimum utilisation of the existing information sources and services in the field of public administration and development of new ones, to provide precise and exhaustive information with minimum delay and at reasonable cost.

2 To promote the exchange of information, experience and expertise in public administration and allied disciplines.

3 Computerisation of operations and services in the libraries and information centres following a uniform standard to have quick access to the large number of data bases.

4 To evolve standards and guidelines for information handling and information services and products.

5 To promote the application of modern technology specially microcomputers, telecommunications, audio-visuals and reprographics in information handling.

6 To equip the centre with suitable manpower to manage and plan policies and implement the decisions effectively.

7 To prepare a common disbursement platform for the available information through the centre, through the regional centres to obtain the effective use of material.

8 To organise seminars and group discussions to exchange the views and to have latest developments in the field.

9 To prepare union catalogues of books, serials, conference proceedings, non-book materials like manuscripts, audio-visual materials, computer media, etc. Mention should also be made of any special type of collection.

10 To develop and strengthen existing information system networks at the national level and to promote effective participation in all aspects of national development.

11 To encourage and promote women's participation in the various fields of public administration.

3 ORGANIZATIONAL STRUCTURE AND MODEL

The proposed network will link together the libraries and information centres of Central Training Institutions, State Training Institutions, National Level Training Institutions, specalised training institutions, Ministries and Departments of the government, universities, Deptt of Public Administration, Institutions engaged in Public administration etc, as detailed in the organisationl chart (Appendix-A).

It is useful to summarise the objectives, functions and activities of the groups mentioned in the oraganisationl chart.

31 Central Training Institutions

These institutions have more or less the common objective of imparting training to the officers of higher civil services of the central government. This is done by conducting post entry foundational training to the officers of the All India and Central Services (Group A). Professional training programme is conducted for the IAS probationers which is of a longer duration. Besides, some refresher courses for senior IAS officers, and some management development programmes for all India and Central Services are also conducted.

32 State Training Institutions

These training institutions impart training to senior and middle level civil services officials of the state government. Short term and long term courses of varying duration from a single day to few weeks are conducted. Some of these courses are of longer duration of upto 90 days or more. These courses cover a wide range of subjects with an emphasis on their practical application, embracing a veriety of basic subjects like economics, sociology, law, political science, paychology etc. Almost every state of India has a training institution.

33 National Training Institutions

The national training institutions impart training to senior and middle level civil servants of the central and state governments including union territories and public sector undertakings. They conduct short duration training programmes called management orientation programme and special programmes. The short duration training programmes vary in duration from one day to few weeks and longer druation upto 9 months.

The management orientation programmes are meant for (i) officers of All India Services (IAS, IPS, IFS), (ii) Group A (Class I) officers of central/state governments, (iii) Officers of Group B (Class II) gazetted services of central and state governments. The special progrmmes are meant for officers of All India/Central Services (organised and non-organised; technical and non-technical).

National training institutions play a very important role in the manpower development as well as career advancement of persons in the discipline for which purpose they have been established.

34 Other Training Institutions

They impart training in modern management techniques to entrepreneurs and technologists and exceutlves of enterprises—large, medium and small in private, cooperative, public and joint sectors. Some of these institutions undertake training programmes for IAS officers and senior officers of the departments, while others impart in-service training to junior assistants and district level officers in administrative line.

Practically all the training institutions undertake assignments of the nature of research projects, consultancy, case-studies etc. Publication of books, periodicals and newsletters, and research and consultancy reports are the other activities.

35 Ministries/Departments of the Government

Some of these impart training and career advancement to both generalists and specialists. Libraries attached to various ministries and departments provide information service to their administrators and other officials. Their information needs are not confined to a particular discipline or a subject. However, some of the staff members designated as research officers, programme officers, analysts etc are specialists in their respective areas who use the libraries effectively.

36 Universities/Academic Institutions

They conduct academic courses in public administration and management leading to the award of degrees and diploma etc, provide facilities for research, consultancy and advisory services. Some of these institutions provide in-service training to the government and semi-government institutions.

37 National Policy Formulation

Their functions and services include, establishment of national goals

and operational policies, top level coordination and administration, enactment of legislation and decrees and control.

4 ROLE OF LIBRARIES IN THE ABOVE INSTITUTIONS

While the importance of a well organised library and the library services in these institutions is quite often emphasized, little is done to provide the needed funds, the expertise and trained personnel. The establishment of a library is a cost-intensive project, hence cost sharing and resource sharing are but one solution. No library big or small can meet the information needs of its clientele from its own sources and dependence on the libraries in the locality or neighbourhood becomes a necessity. This implies good coordination and cooperation. For this, the seting up of a national coordinating centre as a nodal agency is an imperative need.

5 ROLE OF IIPA AS THE NATIONAL COORDINATING CENTRE

Indian Institute of Public Administration was set up in March 1954 on the recommendations of Dean Paul H Appleby, consultant in public administration, Ford Foundation. The main aim of the institute is that it should stimulate a proper study of public administration and train a number of persons in the discipline, art and practice of administration, to act as a catalyst in various fields of administration in the country through a programme of training and research, consultancy, conference and seminar, case study, publication of journals and volumes devoted to specific fields of administration.

The institutes' training courses are drawn up to enable senior and middle level administrators of central/state/union territory governments and public enterprises to appreciate recent developments in administrative management services and to equip themselves with new techniques and cultivate new values. The institute also undertakes research and consultancy and case studies. Besides these, it publishes several publications in the form of books and brings out periodicals and newletter.

51 IIPA Library

Established in 1954, the library has a specialised collection pertaining to public administration and allied areas such as Economics, Sociology, Psychology, Political Science, Philosophy, History, Law, Business Administration. It has a special section on public documents and is made up of acts and statutes, gazettes, gazeteers, departmental annual reports, reports of commission/committee of enquiries, census reports, selected

documents of international organisations such as UN, UNICEF, ILO etc. It is also designated as a depository library of World Bank publications and Habitat. It provides information support services to a wide range of clientele comprising the faculty and the staff, participants to training programmes, members of IIPA, students, research scholars and academicians, and others with interest in public administration. The library and information services include:

Current awareness service
Reference and referral services
Bibliographic services
Indexing and abstracting services
Reprographic service
Inter library loan service
Newspaper clippings service

IIPA Library has adequate infrastructural facilities in terms of document collection, equipment, building and information services and manpower. The Institute has a computer centre and in near future the library operations are also going to be computerised. The IIPA Library is in a positlon to act as a national coordinating centre in addition to its role as national information centre for public administration.

6 ORGANISATIONAL STRUCTURE AND MODEL FOR THE NATIONAL PUBLIC ADMINISTRATION INFORMATION SERVICES NETWORK

61 An Information Network

A network is any arrangement or any structure that links a group of individuals or organizations, who have agreed to work together and/or share resources on an information in an organised basis to a certain degree. However, efficient sharing of resources requires coordination. Therefore, an organised structure or arrangement is needed, usually in the form of a network. Information nerworking involves sharing resources to meet the information needs of current and potential users of information, from the local to the national level, and for all network participants

UNISIST in its main working document defines 'Information network' as "A set of integrated informational systems associated with communication facilities, which are cooperating through more or less formal agreement, in order to jointly implement information handling operation with a view to pooling their resources and to offer better

services to the users. They generally follow identical or compatible rules and procedures."

62 Objectives of an Information Network

The basic objectives of any information network are to identify and establish better ways for improving the flow of information among the members and member institutions.

63 Interdependent Relations in a Network

In an information network more than two participants are engaged in common patterns of information exchange through communications that are specific, limited, functional and understood by all members/ participants. For example, people in a number of organizations get together, nominate a coordinator from among themselves and agree on a programme of activities and a system of operation. Then every member contributes according to the rules they have made together.

64 Characteristics of a Network

Network members may be individuals or organizations located in different places, but bound by an agreement to work towards common, agreed goals within certain defined limits. These questions help define the network:

—Why does the network exist ?
—Who is qualified to join the network?
—What costs are to be shared and on what basis?

The members of the network must negotiate in order to have mutually acceptable agreements and policies in order to make the network operate. A network usually has three basic characteristics:

(i) The members are located in different places (regions, states, provinces, districts or agencies/offices in a government).
(ii) The members have ways to organise and transmit information and data. For example, data collection is based on a standard classification system or a computerized system which all members accept.
(iii) There is two-way communication and transfer of information among members.

65 Working Together in the Network

Network involves managing people and resources, both within the network itself and within the individual network members. Various groups who provide information services must organise together, arrive at common objectives and then assemble and direct the use of resources by using management methods and skills.

For successful network operations, working together interdependently needs certain essential elements :

(a) A significant level of financial and organisational commitment is needed from all members;

(b) Members must reach consensus on policies, objectives, operations, rules and contracts to make sure there is balanced distribution of the workload, as well as equal access to network information and services;

(c) Members must show flexibility and the ability to conform to group discussions and efforts;

(d) Members may be very similar in nature, or may be quite different (e g in size, composition, location, emphasis or resources). Such differences may in fact, strengthen the network, provided that their essential nature and functions complement one another, and ways are found to make sure their unique capabilities or services can work well together;

(e) Members must agree on assigning roles and tasks and on specific guidelines for participants in line with members commitments and capabilities;

(f) It is better to categorize information users and their need and then to assign responsibilities;

(g) Communication capability must be provided among members to promote mutual assistance. Compile a directory or inventory that identifies the expertise of each member. Send individual requests for expertise or assistance through the centre/focal point which in turn, forwards the request. Several channels of communication such as the mail, messenger services, telex, and on-llne computers make the process more efficient;

(h) Common standards should be developed for organising data collection, information storage and retrieval;

(i) Guidelines should be formulated for selecting items to be included in the network collection of information;

(j) Resources should be developed collaboratively, for example by co-operative acquisition, storage and borrowing, rotating collections and keeping all members information on available resources;

(k) A central bibliographic file or catalogue should be established to locate in the network quickly and easily;
(l) Evaluation criteria and procedures should be formulated so there is feedback about how to improve operations and services; and
(m) Training programmes must be provided.

66 Types of Network Structures

Of the different types of network structures that can be thought of for effective coordination and functioning, it is felt that the combination of directed and non-directed network type may be found to be more suitable for the National Public Administration Information Services Network (PAISNET)

67 Combination of Directed and Non-Directed Network

This consists of a combination of clearing house or co-ordinating unit mode and the freely interacting bilateral/multilateral arrangement. (The different models of directed network can still exist as the basis of this combination network structure). See Figure 1.

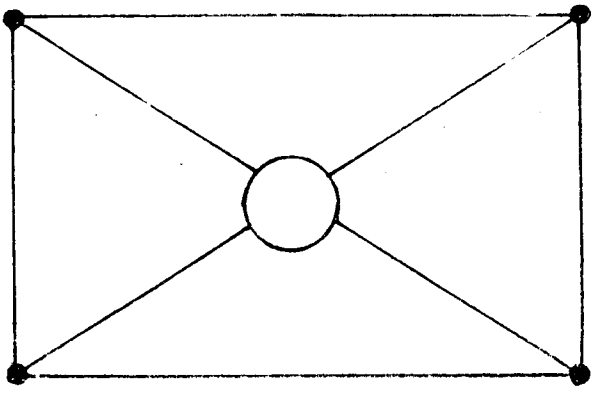


Fig. 1. Combination of directed and non-directed network

7 NETWORK ACTIVITIES

The proposed network will be responsible for coordinating, organising and providing public administration information service to its participants. The activities as a whole will include the following :

1 Development of a data base for literature on Public Administration and allied fields.

2 Establishment of a data bank for quick dissemination of information on data.
3 Preparation of standards for informational handling and for information services and products.
4 Compilation of directory of all the participating organisations.
5 To make available the reprographic as well as the translation service.
6 Provision of computer facilities for quick access to large number of data bases.
7 Adopting latest education and training programmes for the trainees.
8 Liaison with other national and international organisations and information systems for cooperative exchange of information.
9 Identification of other beneficiaries who are not directly related to public administration but deal with substantial information relevant to public administration.
10 Compilation of a procedural manual for effective coordination of the network components.
11 Effective communication system among components of the network through union catalogues, bibliographies, current awareness service, indexing and abstracting services, newsletter, etc.
12 Facilitate interlending of information resources.
13 Attainment of expertise for providing education and training to different levels of personnel.
14 Organisation of meetings and seminars, workshops in the field of library and information science for acquaintance with the latest developments going on in the field.
15 Development of a system of cooperative acquisition, processing, storage, and retrieval and dissemination of information.
16 Use of efficient tools and techniques of informational handling.
17 Compilation of thesaurus in public administration.

Basic tasks of the above services

(a) *Union Catalogue* : No library can be self sufficient in their resources. They have to depend on other libraries, and this is mainly because of the following reasons: lack of funds, storage space, expansion of activities, etc. Union catalogue is the only tool which can solve all the above problems and can be helpful in providing efficient services.

(b) *Accession Lists* : Accession lists are the most important tool for book acquisition. It will be very helpful for the participating libraries for acquisition of materials.

(c) *Reference and Referral Services* : National coordinating centre will act as the central clearing house for all sort of information needed by the participants. The local centres will however attend to local reference queries.

(d) *Selective Dissemination of Information* : The SDI service will be available to all the centres through users profiles. The services that are part of SDI might all be considered as forms of repackaging. These kinds of services are also labour intensive, so may be limited by number of staff and financial resources, and this service will be available to centres through national informational centre.

(e) *Technical Processing* : After the public administration information centre has developed the basic collection of materials, then the materials must be organised in a way that makes it easy to store and retrieve them. Technical processing such as classification and cataloguing should be done at one place i e at the National Information Centre, and common scheme of classification and standard format of cataloguing should be followed.

(f) *Documentation and Bibliographical Services* : The abstracting and indexing services will be provided in common by the national documentation centre. With the advancement of technology it is now possible to make available the above services through the media of magnetic tape which can be sent to participating institutions, and the proposed centre will prepare a thesaurus in public administration and allied subjects to keep control of terms for documentation.

(g) *Cooperative Storage* : All forms of materials, books, periodicals, journals, newsletters, pamphlets, booklets, and instruction kits should be collected by the national information centre. Also it will acquire materials from international organisations. It is difficult to decide about the size of a library and institution should have. Today what has been acquired may not be useful tomorrow, there may be material which is duplicate for a particular library, also revision and change of editions make the material surplus. The best remedy to cope up with the storage problems is to have a cooperative storage for the component organizations. The most suitable centre will be the national information centre.

(h) *Computerized Information Retrieval* : Many different computer software packages are used for library, information and bibliographic purposes, and some of them are :

1 CDS/ISIS (mini-micro version free from UNESCO);
2 CAIRS (Micro-CAIRS);
3 INMAGIC;
4 SIRE.

No single software package offers all the features and jobs that a national public administration information centre might need.

(i) *PAISNET Newsletter*: A bi-annual publication will be brought out to provide articles about current issues concerning public administration in the region, announcements of national, sub-regional and regional meetings, news from national focal points and announcements of recent publication concerning public administration.

Liaison work : The National coordinating centre will maintain close liaison with other national and international information systems like NISSAT, AGRIS, INFOTERRA, ENVIS, PMIS (Project Management Information System) etc, and will also maintain liaison with national and international professional organisations and associations like IASLIC, ILA, ASLIB, FID, IFLA etc, with a view to exchange documents, information and expertise in information handling and participating in the progress of information handling.

8 CONCLUSION

The success of the networking will be achieved only when there is mutual understanding, voluntary cooperation and the most important is faith on the organising authorities. There is need for several infrastructural facilities for the effective organisation of the proposed activities of the centre i e collection development, manpower development, technical knowhow, information services. IIPA is considered to be well and adequately equipped to assume the role of national coordinating centre of the proposed PAISNET.

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NATIONAL PUBLIC ADMINISTRATION INFORMATION SERVICE NETWORK (PAISNET)

NATIONAL COORDINATING CENTRE, IIPA

Central Training Institutions	State Training Institutions	National Training Inst.	Other training Institutions	Ministries/ Depts of the Govt.	Universities engaged in Pub. Admn. Teaching	Libraries & Documentation Centres	National Policy Formulation
—BPRD	—AA	—ASCI	—IAMA	—CSO	—ANU	—BIS	—Cab Sectt
—CIRTES	—ASCI	—AIILSG	—BIM	—DARPG	—HPU	—CSL	—Parliament
—CLI	—ATI (C)	—BIS	—BIRD	—DRG	—KUU	—ICWA	—Press Sectt
—CSTRI	—ATI(K)	—BPST	—CBI	—DOD	—LU	—NCAER	—PM Sectt.
—DTCCE	—ATI(M)	—CAB	—CDE	—MCS	—MU	—NLT	
—FSTI	—AIM	—IARI	—CO	—MEA	—NAU	—NASSDOC	
—IAASSC	—AASC	—IASRI	—CSTI	—MHA	—NAGU	—NMML	
—ICFS	—DIWS	—IIFT	—DDA(TRO)	—MPA	—OS		
—ISTM	—DTUTCS	—IIM(A)	—FCI	—MPPGP	—PU		
—LBSNAA	—GAA	—IIM(B)	—HSMI	—MP	—PUU		
—NADT	—HCM	—IIM(C)	—IIPM	—MPI	—RU		
—NCDC	—HIPA	—IIM(L)	—IIPO	—MUD	—SGU		
—NCRB	—HPIAA	—IIPA	—IPE	—PC			
—NIMA	—IA	—IIT(B)	—IRM				
—SVPNPA	—IMPA	—IIT(K)	—IMI				
	—IMD	—IIT(D)	—IBIMS				
	—IMTG	—ILI	—MDI				
	—MIDA	—ISTD	—NMIMS				
	—PSIPA	—IAMR	—NIC				
	—SPIPA	—ICPS	—NIPFP				
	—SAT	—IEG	—NEPA				
	—SSATI	—NCCE	—PECCE				
	—SPI	—NITIE	—RIIPAA				
	—UPAA	—NIEPA	—SRCIRHR				
	—UPSFBSC	—NIHFW	—SIRD				
		—NIIT	—STI				
		—NIPCCD	—TNILS				
		—NIPFD	—TERI				
		—NIRD	—TMTC				
		—NISIET	—WLMI				
		—NIUA	—XLRI				

A—CENTRAL TRAINING INSTITUTIONS

BPRD	Bureau of Police Research and Development, New Delhi.
CIRTES	Central Institute of Research and Training in Employment Services, New Delhi.
CLI	Central Labour Institute, Bombay.
CSTRI	Central Staff Training and Research Institute, Calcutta.
DTCCE	Directorate of Training Customs and Central Excise, New Delhi.
FSTI	Foreign Service Training Institute, New Delhi.
IAASSC	Indian Audit and Accounts Service Staff College, Shimla.
ICPS	Institute of Criminology and Forensic Science, New Delhi.
ISTM	Institute of Secretariat Training and Management, New Delhi.
LBSNAA	Lal Bahadur Shastri National Academy of Administration, Mussoorie.
NADT	National Academy of Direct Taxes, Nagpur.
NCDC	National Civil Defence College, Nagpur.
NCRB	National Crime Record Bureau, New Delhi.
NIMA	National Institute of Management and Accounts, Meerut Cantt.
SVPNPA	Sardar Vallabhbhai Patel National Police Academy, Hyderabad.

B—STATE TRAINING INSTITUTIONS

AA	Academy of Administration, Bhopal.
ASCI	Administrative Staff College of India, Hyderabad.
ATI (R)	Administrative Training Institute, Ranchi.
ATI (C)	Administrative Training Institute, Calcutta.
ATI (K)	Administrative Training Institute, Kohima.
ATI (M)	Administrative Training Institute, Mysore.
AIM	Anna Institute of Management, Madras.
AASC	Assam Administrative Staff College, Gauhati.
DIWS	Defence Institute of Work Study, Mussoorie.
DTUTCS	Directorate of Training, Union Territories Civil Services, New Delhi.
GAA	Gopabandhu Academy of Administration, Bhubaneshwar.
HCM	HCM Rajasthan State Institute of Public Administration, Jaipur.
HIPA	Haryana Institute of Public Administration, Chandigarh.
HPIAA	Himachal Pradesh Institute of Public Administration, Shimla.
IA	Institute of Administration, Hyderabad.
IMPA	Institute of Management and Public Administration, Srinagar.
IMD	Institute of Managemcnt Development, Lucknow.
IMIG	Institute of Management in Government, Trivandrum.
MIDA	Mabarashtra Institute of Development Administration, Pune.
PSIPA	Punjab State Institute of Public Administration, Chandigarh.
SPIPA	Sardar Patel Institute of Public Administration, Ahmedabad.
SAI	State Academy of Training, Imphal.
SPI	State Planning Institute, Lucknow.
UPAA	Uttar Pradesh Academy of Administration, Nainital.
UPSEBSC	Uttar Pradesh State Electricity Board Staff College, Dehradun.

C—NATIONAL TRAINING INSITUTIONS

ASCI	Administrative Staff College of India, Hyderabad.
AIILSG	All India Institute of Local Self Governmet, Bombay.
BIS	Bureau of Indian Standards, New Delhi.
BPST	Bureau of Parliamentary Studies and Training, New Delhi.
CAB	College of Agricultural Banking, Pune.
IARI	Indian Agricultural Research Institute, New Delhi.
IASRI	Indian Agricultural Statistics Research Institute, New Delhi.
IIFT	Indian Institute of Foreign Trade, New Delhi.
IIM (A)	Indian Institute of Management, Ahmedabad.
IIM (B)	Indian Institute of Management, Bangalore.
IIM (C)	Indian Institute of Management, Calcutta.
IIM (L)	Indian Institute of Management, Lucknow.
IIPA	Indian Institute of Public Administration, New Delhi.
IIT (B)	Indian Institute of Technology, Bombay.
IIT (K)	Indian Institute of Technology, Kharagpur.
IIT (D)	Indian Institute of Technology, New Delhi.
ILI	Indian Law Institute, New Delhi.
ISTD	Indian Socicty for Training and Development, New Delhi.
IAMR	Institute of Applied Manpower Research, New Delhi.
ICPS	Institute of Constitutional and Parliamentry Studies, New Delhi.
IEG	Institute of Economic Growth, New Delhi.
ISEC	Institute of Social and Economic Change, Bangalore.
NCCE	National Centre for Cooperative Education, New Delhi.
NITIE	National Institute of Training in Industrial Engineering, Bombay.
NIEPA	National Institute of Educational Planning and Administration, New Delhi.
NIHFW	National Institute of Health and Family Welfare, New Delhi.
NIIT	National Institute of Information Technology, New Delhi.

NIPCCD National Institute of Public Cooperation and Child Development, New Delhi.

NIPFP National Institute of Public Finance and Policy, New Delhi.

NIRD National Institute of Rural Development, Hyderabad.

NISIET National Institute of Small Industry Extension Training, Hyderabad.

NIUA National Institute of Urban Affairs, New Delhi.

NLI National Labour Institute, New Delhi.

NPC National Productivity Council, New Delhi.

VMNICM Vakunth Mehta National Institute of Cooperative Management, Pune.

D—OTHER TRAINING INSTITUTIONS

AIMA	All India Management Association, New Delhi.
BIM	Bharathidasan Institute of Management, Tiruchirapalli.
BIRD	Bihar Institute of Rural Development, Ranchi.
CBI	Central Bureau of Investgating Training Centre, New Delhi.
CDE	Centre for Development Education, Bangalore.
CO	Centre for Organisation, Hyderabad.
CSTI	Civil Services Training Institute, Bhavnasagar.
DDA (TRO)	Delhi Development Authority (Training and Research Organisation), New Delhi.
FCI	Food Corporation of India, Central Training Institute, New Delhi.
HSMI	Human Settlement Management Institute, New Delhi.
IIPM	Indian Institute of Port Management, Calcutta.
IIPO	Indian Institute of Public Opinion, New Delhi.
IPE	Institute of Public Enterprise, Hyderabad.
IRM	Institute of Rural Management, Anand.
IMI	International Management Institute, New Delhi.
JBIMS	Jamnalal Bajaj Institute of Management Studies, Bombay.
MDI	Management Development Institute, Gurgaon.
NMIMS	Narsee Monjee Institute of Management Studies, Bombay.
NIC	National Information Centre, New Delhi.
NIPFP	National Institute of Public Finance and Policy, New Delhi.
NEPA	North Eastern Police Academy, Barapani.
PECCE	Public Enterprise Centre for Continuing Education, New Delhi.
RIIPAA	Rajaji International Institute of Public Affairs and Administration, Hyderabad.
SRCIRHR	Shri Ram Centre for Industrial Relations and Human Resources, New Delhi.
SIRD	State Institute of Rural Development, Nadia.
STI	Survey Training Institute, Hyderabad.
TNILS	Tamilnadu Institute of Labour Studies, Madras.
TERI	Tata Energy Research Institute, New Delhi.
TMTC	Tata Management Training Centre, Pune.
WLMI	Water and Land Management Institute, New Delhi.
XLRI	Xavier Labour Relations Institute, Jamshedpur.

E—MINISTRIES/DEPARTMENTS OF THE GOVERNMENT OF INDIA

CSO	Central Statistical Organization
DARPG	Department of Administrative Reforms & Public Grievances
DOD	Department of Ocean Development
DRD	Department of Rural Development
MCS	Ministry of Cabinet Secretariat
MEA	Ministry of External Affairs
MHA	Ministry of Home Affairs
MPA	Ministry of Parliamentary Affairs
MPPGP	Ministry of Personnel, Public Grievances and Pensions
MP	Ministry of Planning
MPI	Ministry of Programme Implementation
MUD	Ministry of Urban Development
PC	Planning Commission

F—UNiVERSITIES ENGAGED IN PUBLIC ADMINISTRATION

ANU	Andhra University, Waltair
HPU	Himachal Pradesh University, Simla
KUU	Kurukshetra University, Kurukshetra
LU	Lucknow University, Lucknow
MU	Madras University, Madras
NAU	Nagarjuna University, Nagarjunanagar
NAGU	Nagpur University, Nagpur
OSU	Osmania University, Hyderabad
PU	Panjab University, Chandigarh
PUU	Punjabi University, Patiala
RU	Rajasthan University, Jaipur
SGU	South Gujarat University, Surat

G – LIBRARIES AND DOCUMENTATION CENTRES

BIS	Bureau of Indian Standards, New Delhi
CSL	Central Secretariat Library, New Delhi
ICWA	Indian Council of World Affairs, New Delhi
NCAER	National Council of Applied Economic Research, New Delhi
NLI	National Labour Institute
NASSDOC	National Social Science Documentation Centre, New Delhi
NMML	Nehru Memorial Museum and Library, New Delhi

H – NATIONAL POLICY FORMATION

CAB SECTT	Cabinet Secretariat
PARLIAMENT	Parliament
PRES SECTT	President's Secretariat
PM SECTT	Prime Minister's Secretariat

TECHNICAL EDUCATION LIBRARIES NETWORK (TECHNET)—GUJARAT: A PROPOSED PLAN

JAYSHREE JOSHI

1 THE ROLE OF LIBRARIES IN TECHNICAL EDUCATION

Libraries play a very vital role in educational, industrial and technological progress of a county. Economic development of a country depends entirely on the advancement of its science and technology. Large sums have been allocated for research and development activities in various branches of science and technology in our country, which are essential for advancement in these fields. Collection and rapid dissemination of scientific and technical information is prerequisite for such development. Communication of such specialized knowledge is possible only through well-equipped and well-organized technical information centres. It is therefore quite essential that libraries attached with various research and development organisations, industrial establishments and higher educational institutions, functioning in the field of science and technology should be given top priority in allocating suitable and proportionate budget allocation for acquisition of various types of library materials, for equipments, for recruiting suitably trained staff and for specious storage and reference areas. Information is no doubt an essential commodity in all modern activities because of its value in decision making. Individual organizations and communities use information in every aspect of their work. Every organization has some sort of information system for its requirements. The national resources need to be developed and made available at the right time to the right person in right way. Efforts should also be made to minimise duplication of efforts and avoid wasting of national resources.

There is virtually an explosion of knowledge in the present century due to intensive and extensive research work. So the result is increase in production of printed material. It is impossible for a single library or information centre with limited finance to procure all the incoming research materials and disseminate the information among the users. So some

alternative arrangement is required for optimum utilization in most economical way. For this purpose it is essentially desirable to implement concepts like networking or resource sharing.

Among libraries throughout the world cooperation is assumed to be a positive force in enabling libraries to accomplish their goals. This assumption common in the developed countries where cooperative activities originated, is particularly important in library planning in the developing countries, where resources are limited and needs are many.

Various definitions and explanations have been given for the concept of cooperation and networking. In a broad sense, library cooperation is a joint effort taken up by two or more libraries to improve their resources and to provide better facilities and services to their users and decide ways and means of reducing cost in their library functions. "The words 'Cooperation', 'Centralization', 'Consortium', 'Network' and 'Resource Sharing' could be used as synonyms and interchangeable."[1]

A network[2] is a form of arrangement or an administrative structure that links a group of individuals or organizations who have agreed to work together and share resources. Information networking entails the sharing of resources so that the information needs of both actual and potential users of information from the local to national level of all network participants are met.

In an information network[3] more than two participants are engaged in common patterns of information exchange through certain types of communications for purposes which are specified, limited and functional, for example, a number of libraries get together, nominate from among themselves a co-ordinator and agree on a programme of activities and their system of operation. Then every member provides the contribution according to the rules devised together. A common network is created because of their perceived benefits. Institutions work as a group, rather than individually. The common problems get solved easily, more quickly and effectively. Thus, several organizations engage themselves in a common pattern of information exchange, through communication links, for common objectives.

A formal dictionary definition[4] of network implies a physical connection between the component parts. In library field the term has been used for a broad range of cooperative activities.

Library revolution as a result of computer-based networking begets change in network services. The economic crisis could destroy network in two ways: (i) occurrence of financial constraints, and (ii) the reduction of library facilities. Thus such crisis affects networking services. The network budgets are related to library book budget.

In India, the UGC constituted a committee, in April 1988[5], on National Network System for University Libraries to suggest measures for a national network of libraries and information centres, covering all universities,

colleges, research institutes and other such national organisations in the country, with reference to OCLC, INFLIBNET, BOSLA and specialized subject local centre NICTAS.

Realising the importance of networking an attempt has been made to prepare a 'Network' plan for libraries under the Department of Technical Education in Gujarat.

2 GUJARAT ECONOMY AND TECHNICAL EDUCATION

Gujarat is relatively a small State accounting for less than 5 percent of the country's population and 6 percent of the country's area.[6] It is the second most industrialised State of India. Gujarat is one of the few States in India undergoing a process of rapid industrialisation. During the last 2½ decades, the State has made very rapid progress in the industrial field. Another feature of the industrial development is that much of the expansion and diversification has taken place in the direction of chemical dyes, pharmaceuticals, fertilisers and allied industries.

Till 1960 the industrial economy of Gujarat rested primarily on the textile industry and industrial development was concentrated around the city centre Ahmedabad, Vadodara, Surat and Rajkot. Now the State has become a major producer of petrochemicals, electronic items, fertilisers, dyes, diesal engines, pharmaceuticals, fibers etc. Moreover, the State has good natural resources, including natural oil. This has given boost to technical education and a need for co-ordination. Under Department of Education, Government of Gujarat a full-fledged Directorate of Technical Education was established in 1960. The Directorate has overall administrative control and is also in charge of identifying and shaping new areas of technology and formulation of courses and studies. It has been making endeavours to fulfill the increasing need for technical and specialised manpower in the State. The State has concentrated on consolidation and improvement of quality of technical education through curriculum development, diversification of courses and introduction of new electives through need-based training programmes. The requirement to supply engineers, technologists, technicians and skilled artisans at all levels, has also been kept in view. The growth of technical education has kept pace with the growth of the economy.

There are 9 engineering[7] colleges and 27 polytechnics in the State. The main users of polytechnic libraries are faculties, students and also industrial users like GITCO, EDI, CED, INDEXT-B, GIDC and other research institutions.

The geographically distributed technical libraries in different institutions in different areas may be interlinked by the networking approach. All technical libraries will be distributed in four zones having zonal

network. Main network centre will be a focal point. The Ahmedabad Polytechnic Library would function as the main centre. All technical libraries in the State would be the members of this main network centre. Reading material will be procured and processed locally. The database would be localised to meet local services. This decentralised approach is from functional point of view but from service point the approach is centralised. The network centre would provide for all services such as current awareness, SDI, union catalogue and access to national and international networks. The individual library will take necessary initiative to start application on their local machines for database. This will help speedy implementation.

The technical libraries information network structure has been planned hierarchically. All technical libraries services have been assigned at local levels. The local level centre will coordinate with regional level. The system will have decentralized function and centralized services. Local weightage may be given to the specific specialization. The main network will co-ordinate functions of various centres and provide services. This will require adoption of common programme at all libraries. Commercial D'base or some such institutional D'base may be used for this purpose.

3 EXISTING SYSTEM

All technical libraries are generally organised to carry out the following main functions:

1 Selection and Acquisition;
2 Cataloguing and Classification:
3 Stack room;
4 Circulation; and
5 Reference Service.

Many of the libraries are small in terms of number of volumes and manpower, hence they can not perform all the functions mentioned above. The total collections of books by respective libraries are given in Table 1

The libraries do not follow similar classification system. Some follow Dewey Decimal Scheme, whereas others follow UDC. In cataloguing specific codes are not followed. Most of the libraries follow local methods, on the basis of certain specific user requirements, like current awareness, reference service, inter-library loan service etc. Most of the technical libraries employ four levels of staff : (1) Librarian, (2) Assistant, (3) Clerical staff, and (4) Helper.

The above system existing in technical libraries is not in a position

Table 1 : Details of Library and Book Service Centres[8]

Sr No	Category of Institutions	Books as on 1-4-1984		Books added during the year		Total Books as on 1-4-1985	
		Number	Value (Rs)	Number	Value (Rs)	Number	Value (Rs)
Part-I : Library							
1	Engineering Colleges	1,90,339	75,16,073.15	6,490	12,02,364.06	1,96,829	87,18,437.21
2	Polytechnics/ Diploma Institutions	1,69,354	31,86,798.48	7,978	4,31,959.07	1,77,332	36,18,757.55
3	Technical High Schools	34,895	2,82,287.20	2,694	22,114.58	37,589	3,04,401.78
Part-II : Book Service Centre							
1	Engineering Colleges	28,579	6,95,404.74	3,256	63,967.23	31,835	7,59,371.97
2	Polytechnics/ Diploma Institutions	29,944	5,89,162.45	2,225	1,57,434.17	32,169	7,46,596.62

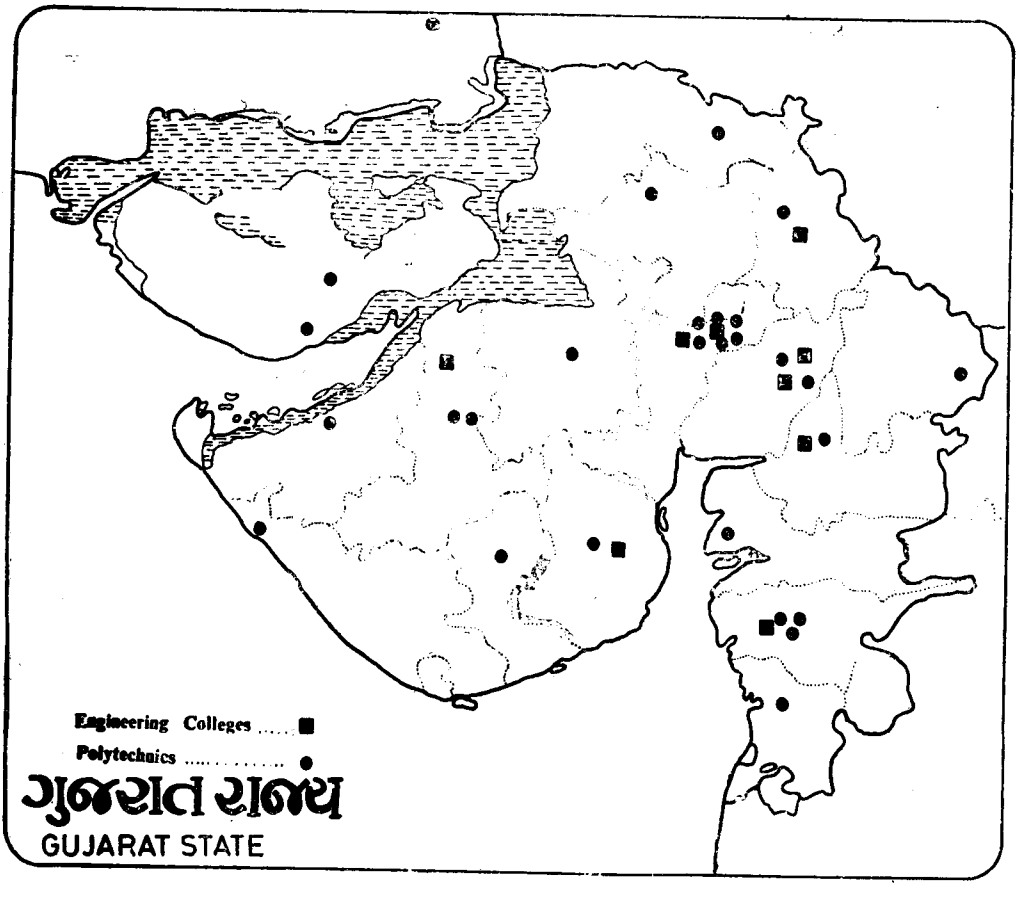


Fig. 1 Engineering Colleges and Polytechnics in the Gujarat State.

Fig. 4. Gujarat Technical Libraries Network Services and other Inputs.

to meet fully the requirements of their users. The changes from administrative and technical points of view are necessary for automation and networking. Some libraries are better off in respect of collection, user service, organisation of service and the like. Thus, there is no required uniformity.

In reference to development of technical institutions, the technical libraries network is essential. The cooperation among technical libraries has become a necessity for following reasons:

1 It is impossible for any library to procure the full range of library resources.
2 The low level of library financial support makes it most difficult for an individual library to provide services from its own collection.
3 Day by day increase in the cost of purchasing library materials has gone beyond the capacity of an individual library to acquire all the documents.
4 The information explosion causes gap between what a librarian desires and what can be acquired.

The authenticity and standardization should be established in all technical libraries, in acquistion of reading material. Standard cataloging code for libraries such as *AACR* 2, should be followed. Standardization in machine-readable formats—MARC and resource sharing is also required.

4 NETWORK'S GOALS

From service point of view, the ohjectives of 'Network' are as follows:

1 to develop collection by mutual co-operation;
2 to achieve an effective bibliographic control of library materials;
3 to promote co-operation activities among libraries; and
4 to stimulate, promote and co-ordinate research and training programme for library staff and network members.

5 MAIN OBJECTIVES OF TECHNET

1 To improve resource utilisation and service level to patrons at the individual libraries by providing automation facilities in the following areas:

(i) Acquisition and Fund Accounting
(ii) Serials control
(iii) Cataloguing

(iv) Circulation
(v) User Services.

2 To operationally enhance resource sharing by providing individual libraries and their access to composite database:

(i) Union catalogue
(ii) Current awareness and SDI
(iii) Newsletter.

3 To provide efficient and reliable means of resource sharing, e g:

(i) Inter library user services
(ii) Document Delivery services
(iii) Manpower training and refresher course facilities.
(iv) Access to national and international Databases.
(v) Communication link through publication and inter-personal communication.
(vi) Procurement of micro-document.

6 LIBRARY NETWORKS MAJOR COMPONENTS

1 Organisation and Management of the technical libraries collection
2 Financial Planning
3 Computer Facilities
4 Machine readable database (Lib holdings union catalogue).
5 Reprographic Facilities
6 Communication links.

7 GUJARAT TECHNICAL LIBRARIES NETWORK SERVICES AND OTHER INPUTS

1 Catalogue Based Services
2 Database Services
3 Document Supply Services
4 Collection Development
5 Communication Based Services
6 Manpower and Training
7 Infrastructure requirement.

1 Catalogue Based Services :

(i) Shared catalogue of monographs, serials and non-book materials
(ii) Union catalogue of books, serials and non-book materials
(iii) Catalogue production in card, book, magnetic tape/floppy, book processing and preparation.

2 Database Services :

(i) Bibliographic database services SDI, CAS
(ii) Database of non-bibliographic information.

3 Document Supply Services :

(i) Inter library loan request processing
(ii) Document delivery.

4 Collection Development :

(i) Acquisition and assistance in selection and procurement.

5 Communication based Services :

(i) Referral Services
(ii) Bulletin Board
(iii) Computer/Audio/Video, conferencing
(iv) Newsletter, informative brochures
(v) Exchange of manpower.

6 Manpower and training:

(i) Suitable trained manpower for efficient network is required at the central network organisation and at the participating library levels.
(ii) Qualified and competent librarian should be in-charge of central network.
(iii) Staff development programmes such as in-service training continuing education.
(iv) Introductory and advanced level course in library automation.

7 Infrastructure requirement :

(i) Computer system :

The individual libraries will have to be provided with sepa-

rate computer facilities. Main frame computer with the Micro-computers at regional and local level should be given.

(ii) Reprographic equipment :

For dissemination of information it is necessary to have proper reprographic facilities. To meet the future requirements of document transfer and sharing at least one plain paper copier should be available at every library.

(iii) Preservation equipments :

For the preservation of valuable documents like micro-document, microfilms and Video discs will be appropriate. Appropriate space and other resources should be provided for that.

8 RECOMMENDATIONS

1 The Government should undertake necessary administrative and economic measures needed for the network.
2 Every library may be given computer help.
3 A proper link with other networks may be established.
4 NISSAT, the Department of Science and Technology and Indian Library Association should take the responsibility to formulate a policy for co-operative network.
5 Government of Gujarat may approach the appropriate international agencies like World Bank for financial aid for this network for an essential period of five years. Then onwards Government of Gujarat Education Department should incorporate network expenditure in department budget.
6 Government should assign the task of preparing a feasibility report for this network to an experienced and trained librarian.
7 The plan for a cooperative network among technical libraries in Gujarat is only a hypothetical one. It requires further research to modify and improve. Such a research project may be taken up by the department.
8 Industrial users may be made members of this network by paying appropriate charges. This will reduce economic burden on the department.
9 Consultation services may be given to industries by charging appropriate fees.

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THE LIBRARY NETWORKS IN UK AND SPAIN : THE PROJECTIONS FOR INDIA

H K KAUL*

0 INTRODUCTION

The paper is the result of my visit to the important librariesand networking centres in UK and Spain in June and July 1990.** It was written with a view to get more knowledge about some of the existing library automation projects in Europe that are being promoted under varied financial limitations. The selection of the two countries resulted in a pleasant experience.

1 NETWORKING IN EUROPE

The library automation has been progressing in Europe during the last three decades, but most of the present achievements especially in networking have been realised in the past decade as library networks in the United States became permanent features of information storage and retrieval. We notice that library automation with a view to network to share information resources progressed in UK, France, Netherlands, Portugal, Spain, Italy, Federal Republic of Germany, Finland, Sweden, Denmark, and the Socialist countries. These countries realised that the world had entered the information age through library automation and networking. From the recommendations on retrospective conversion of library catalogues made by the Council of Europe, Committee of Ministers in 1989, it was clear that through networking they expected:

(a) increased cooperation among libraries;

*Librarian, India International Centre, New Delhi. Member Secretary, Coordination Committee, DELNET.

** The visits were arranged with the assistance of the Ford Foundation, The British Council Division and Ministry of Culture, Government of Spain under the cultural exchange programme.

(b) enormous data available in the libraries would be accessible to as many as possible and as quickly as possible;
(c) control on the library system would be established;
(d) conversion of existing library cotalogues into machine-readable form would be speeded up;
(e) economic solutions to the conversion of catalogues through cooperation would be evolved; and
(f) funding of automation, networking and retrospective conversion through concerted efforts may become available.

Thereafter the CE Committee made following recommendations to the national authorities in Europe:

1 the primary object of retrospective catalogue conversion is to increase access as widely as possible to the collections already catalogued;

2 libraries should be encouraged and stimulated to the retrospective conversion of their catalogues through cooperation and by other means;

3 in funding projects for retrospective catalogue conversion, priority should be given to the catalogues of those collections whether general or specialized which make the greatest contribution to the country's own cultural, scientific, educational, and information interests; but some consideration is also to be given to the catalogues of those collections which, by virtue of their subject of language, facilitate the study of, or relations with, other parts of the world;

4 on the basis of reciprocity, converted catalogue records should be able to circulate unrestrictedly within and between library networks, without legal or contractual constraints on their use by other members of those networks;

5 the common bibliographic data and formal rules to which converted catalogues conform should be the minimum required to enable the catalogue records to be consulted effectively and exchanged within and across national boundaries;

6 costs of retrospective catalogue conversion should be kept within reasonable limits by taking advantage of existing and emerging computer and communication networks in Europe in order to allow as much use as possible of bibliographic data already existing in machine-readable form in other catalogues and databases; this would imply common European planning of different steps to be undertaken as well as reciprocity.

Besides this growing CEC support to networking and retroconversion projects in Europe, one notices that there is a greater demand:

(a) to increase the quantity of machine-readable records and the number of libraries producing them (it is expected that this might

reduce the cost of exchanging data);
(b) to improve the quality of bibliographic records;
(c) to allow communication networks make certain affiliated, demand oriented or specialised databases to be connected for mutual use without merging them together; and
(d) to expand the library networks that were established as cooperatives.

I would now like to present an overview of the bibliographic networking centres I visited in UK.

2 THE NETWORKS IN UK

In UK mostly over the last two decades several databases and networks have grown. No national database has so far been created. Merging of the databases of libraries has resulted in the creation of union catalogues. Mostly research libraries, public libraries and more than 90% of the university libraries have cooperated in the creation, exchange and use of their databases.

The British Library has been working on its automation programme since the late 1960's. It has by now produced the *British National Bibliography* since 1950 on CD-ROM. In it more than one million records are produced of high standards by professional cataloguers and now, between 6000-7000 records are added each month. The library has recently developed Online Public Access Catalogues (OPACs) which are likely to be of great use. The British Library created over the years British Library Automated Information Service (BLAISE). This service provides a mainframe facility for catalogue record processing of current acquisitions and online transmission of bibliographic records and information to the library community. It provides access to ten million records of items. This project was followed by the Monograph Record System (MARS) and Automated Request Transmission (ART). Online access is provided by the library to more than 300 external databases and databanks in science and technology, business, patents and trademarks, and Japanese information. At its branch at Colindale for newspaper users online access to the principal indexing and full text services is made available. At Boston Spa 200,000 serial titles are automated. The British Library has done considerable work in automating its services and I need not go into further details, but in the field of networking, online network relationships have been slower to develop. The interchange of bibliographic machine-readable data has been done with the United States. A number of initiatives and projects in online networking are there and the British Library will be able to show more results in this field too. One of its major achievements would be to get its catalogue

converted into machine-readable form by 1993, the time it will shift its library to St. Pancras. The published *British Library Catalogue* is produced in 360 volumes and to convert it would be a major achievement. The library proposes to offer access to their catalogue through online retrieval system and established ongoing editorial and routine maintenance of the database. The British Library has adopted a two-pronged strategy. Data capturing is given to a commercial organisation and on-going maintenance is carried out by the library itself. Maintenance of standards is becoming an ardous job for the staff as the bibliographic descriptions in the printed catalogues are not uniform or complete in detail and the bibliographic structure differs from the design of the MARC format in which the database is being created. To overcome this obstacle the library has adopted procedures and manipulations so that a single record is produced with descriptive and controlled access point data and the records are held in standard MARC fields with simple sub-fields. As the library wants to complete the conversion by 1993, the procedure adopted may result in the creation of some entries which would remain incomplete. Thus, the staff are given clear instructions not to correct or enhance the data at this stage.

It may be appropriate to conclude the British Library's automation programme by referring to the British Library Wide Area Network (BLWAN) which is operated by BL Computing Telecommunications Directorate. At present it enables terminals and computers within the British Library to communicate more easily with each other and have access to outside services also including BLAISE mainframe computer in Harlow and National Library of Medicine in Washington. The services of this network need to grow a great deal further to enable it to become an online cooperative network.

Having given an overview of the British Library's automation programmes it may be important to watch the positive course it is likely to take in the years to come. Following are the key areas it plans to pinpoint its efforts on:

(i) conversion of its catalogues;
(ii) online public access to catalogues;
(iii) automated book requesting system for St Pancras;
(iv) electric storage and delivery;
(v) CD-ROM products and services;
(vi) direct data entry for cataloguers;
(vii) serials and monographs control;
(viii) network capabilities for shared cataloguing;
(ix) upgrading the infrastructure from inside and outside.

Besides getting an overview of the British Library's programmes it

would be important to mention that several such databases in research, public and academic libraries grew in UK in the near past. The best thing that happened in such an environment was that these databases were simply linked together, as merging them all into one database was difficult in the absence of uniformity in hardware, software and the formats adopted. JANET, the United Kingdom Joint Academic Network that came on the scene in 1984 did this job. JANET was established by the Computer Board for Universities and Research Councils. It is a communication system and does not hold any database. It links all types of databases and those of the libraries as well. JANET is an X.25 packet-switched network with gateways to other networks especially in Europe and North America. The network is completely open and can be easily consulted by means of British Telecom's Public Switch Stream (PSS) network. The libraries using the network prefer registered users. It may be important to note the following library facilities which JANET provides:

(a) Electronic Mail

It supports:

(i) library mailing,
(ii) inter-library requests and lending,
(iii) questionnaires, and
(iv) professional contacts.

(b) File Transfer

(i) pull regular updates of standard directories into place, e g software catalogues, library directories ;
(ii) acquire public domain software;
(iii) place work in remote services, e g typesetting; and
(iv) transfer catalogue records.

(c) Access to British Library Services, especially to ARTTEL (for transmitting requests to the BL Document Supply Centre); and BLAISE (for information retrieval, mainly of Marc records).
(d) Access to PSS/IPSS for Telecom Gold, Dialog, Datastar, and other hosts for searching and downloading of data.

JANET has become so popular that wherever you go in UK, you see JANET is being used. It now links users all over UK to the facilities of over a thousand computers on more than a hundred sites.

As more than 90% of the university libraries are automated, it

may be ideal to give an overview of one of the major ones. Cambridge University Library which is a depository library also has been trying to promote automation over the last thirty years. By now the size of the records created in machine-readable form is 310,000 records with about 50,000 cross-references Every weak about 1000 records are added to it. The present CATS on-line catalogue system has been in operation in the library since 1982. It supports the library's earlier on-line catalogue system begun in 1978. The records are made in UK–MARC format and are coded according to *AACR* 2 with the library of Congress subject headings. The software supports both a cataloguing service whereby the staff can create or amend records on-line, and an on-line public access catalogue.

The CATS software programme of the Cambridge University Library, a sample of which has been obtained for IIC Library, was produced indegenously by the Library. It was written in FORTRAN 77. The Library has created eight separate databases without merging them as they are of different levels of coding. This happened as the conversion of data was done at a high speed at different centres in the University.

The beauty of this software is that it can search all databases simultaneously when a search is made but it has its limitations and needs revision However, Chart 1 prepared by Mr W D S Motherwell of the Cambridge University shows the type of records created and retrieved by the University.

The hardware used is a Perkin-Elmer 3230 computer with 2 MB memory and 760 MB total disc storage. There are 56 ports for serial lines of which 8 are connected to the University Data Network with facilities for remote access via JANET, etc. Catalogue searching for public access is by keywords taken from author, title and subject headings of the MARC record. Facilities for experienced users to switch to concise command driven mode of searching are also available. The Library also maintains well planned Circulation Control System which has been in operation since 1985.

The creation of sizable databases by the universities and the potential for cooperation has resulted in several cooperative projects. Reference may be made to the Consortium of University Research Libraries (CURL) established to pool the bibliographic record resources of the existing member libraries, namely the Universities of Cambridge, Edinburgh, Glasgow, Leeds, London, Manchester and Oxford. This network has been funded by UGC as a pilot project for 2-3 years to promote library automation through JANET. CURL is using the software 'CATS' developed by the University of Cambridge. The purpose of this project is to help the library staff. Cataloguers can check books against database record of about 2 million download selected records to a local system. At present the current database represents al l available records

Chart 1

Name	*Contents*	*Records*	*Level of Coding*
CAT	Books and periodicals C U L 1978-	520,000	Full UKMARK, AACR II
BIR	Books, Borrowable Classes C U L pre-1978	600,000	Brief (Auth/Title/ Place/Date)
DEP	Books, periodicals in Depts and colleges	200,000	Brief (mostly) and UKMARC
SER	List of serials C U L, Depts, colleges	110,000	Serials format (not AACR)
AXS	Foreign Books on order at C U L	12,000	Brief plus order events
IPF	In-Progress File Bibliographic record pool	300,000	MARC and brief
CCS	Circulation Control System	1.4 million 40,000	Book records Borrower records
NAF	Name Authority file	200,000	MARC BNB headings

from the contributing libraries, including the BNB records of the last 3 years. The project is in its earlier stages of growth and it has to establish full compatability with regard to file transfers etc.

An excellent example of commercial viability of automated databases is well exhibited by Commonwealth Agriculture Bureau International (CABI). CABI abstracts more than 12,000 journals from all parts of the world. CABI abstracts database comprises the resources of research on agriculture, forestry, irrigation, social sciences and allied subjects including Agronomy, Biotechnology, Crop protection, Dairy science, Genetics and Herbicides. CABI produces these abstracts in print form

as well as in CD-ROM. The database has more than 2 million records. About 130,000 bibliographic records with abstracts are added to it each year and the entire database is available for searching online through different communication networks including JANET. CABI uses Silver Platter software as a result of which every significant term in the database is searchable. CABI is presenting its database in CD-ROM in two volumes comprising data from 1984 to 1989.

The last but not the least, rather the most important set of networks that would be in order to refer are those that are truly cooperative in nature. There are Scottish Libraries Cooperative Automation Project (SCOLCAP), South West Academic Libraries Cooperative Automation Project (SWALCAP) and Brimingham Libraries Cooperative Mechanization Project (BLCMP). Of these, BLCMP merits special mention as it is the type of network we should be interested in, keeping in view the limitations of our finances.

BLCMP (originally the Brimingham Libraries Cooperative Mechanization Project) was established in 1969 by the Universities of Aston, Birmingham, and the Birmingham Public Libraries. Financial assistance was given by the Office for Scientific and Technical Information. BLCMP maintains now an online database of 6 million MARC records which include *BNB catalogues* post 1950, *Library of Congress Catalogue* from 1975, *Whittakers Books in Print* and the records produced by about fifty BLCMP member-libraries. BLCMP members produce over 140,000 records a year which include a large number of audio-visual items, music and serials.

Now BLCMP, besides providing service to its members is accessed by libraries throughout the United Kingdom through a Cambridge telecommunications network which is maintained with regional centres to minimise risks. This network enables the members to communicate with each other and with BLCMP. Access to the network is also possible through JANET. It provides gateway access to external services such as BT Gold.

An IBM mainframe holds the BLCMP database and processes all batch work and microfiche-catalogue production. It offers stand alone (BLS) or choice of shared systems (BOSS). The stand alone system runs on Data General computers which are owned and operated by user libraries while as the Shared System runs on hardware located at BLCMP. Subscribers to the shared system are provided with terminals and telecommunications equipment by BLCMP.

BLCMP members have to take hardware through BLCMP. It supplies mini-computers from the Data General range. Configurations are made available to suit libraries of all types and sizes with systems supporting from 8 to nearly 1000 terminals. BLCMP undertakes to cuordinate the maintenance of the equipment by the relevant manufacturers. The fifty

seven member-libraries of BLCMP are from public libraries, polytechnic libraries, university libraries, college libraries and special libraries.

Member libraries have to pay a fee from 5,000 pounds sterling to 25,000 pounds sterling per year depending upon the size of the library and the use of BLCMP database. Small libraries are not encouraged to join BLCMP as it is considered that they would pressurise the central database. In the past from 1969 to 1985 the charges from member libraries were recovered on the basis of per use charge but now subscription system is introduced and it is calculated on the size of the minicomputer models used by the library and the number of terminals attached to it.

Each member library uses the database for the purposes of :

(a) Acquisition;
(b) Cataloguing;
(c) Inter-Library loan; and
(d) Reference.

BLCMP maintains a team of four persons in its Bibliographic Support Unit. This unit is contacted by member libraries whenever they find any difficulty in the preperation of the entries. This helps in maintaining a standard database. A parallel way is also used to maintain standards. If a library creates an imperfect and incomplete record in the central BLCMP database online it remains in the database as such. The instructions are given to member libraries that they can correct a record they find incomplete while creating records online. The BLS acquisitions module makes book ordering and pre-order searching possible online. Also, a file of suppliers is maintained and consulted online.

The entire BLCMP Database can be searched in a single step. Its Online Public Access Catalogue (OPAC) is fully integrated with its acquisitions, cataloguing, serials and circulation systems. Searching is possible via :

— author
— corporate body or conference name
— title
— author and title
— subjects, using the following three ways :

  (a) by keyword
  (b) by subject index
  (c) by class mark

— series

— ISBN (which is the unique control number)
— BNB number
— LC number

It is important to note that BLCMP service includes the maintenance of a central database and it expects that all members taking cataloguing services add locally created bibliographic data to this database according to the standards set from time to time by BLCMP.

Also, BLCPM installs on the user's computer certain computer programmes, grants the user a non-exclusive licence to use such programmes and allows the user a non-exclusive licence to use BLCMP's database under a host of conditions. A few of them are listed as follows.

The user shall use the System Materials solely for processing its own data for its own internal purposes only and not pass it on to any other user or use it for any business purposes. The user shall not without the permission of BLCMP use the System Materials at any place other than the location agreed to the user. The user will pay an Initial System Licence Fee to BLCMP and an annual licence fee which may be altered from time to time. The terms and conditions also touch upon proprietory rights of Systems Materials, copying and security, maintenance and alterations etc.

BLCMP Library System (BLS) in brief provides :

(a) a circulation module comprising sophisticated issue, return, trap, reservation and overdue facilities;
(b) a serials system with subscription control, automated claims and sophisticated check-in facilities;
(c) an online BLCMP database for cataloguing with full screen editing;
(d) the acquisitions system which includes fast online ordering and receipt of all types of library materials with the ability to handle prepaid, urgent, confirmatory, deferred and on approval orders;
(e) an excellent range of search facilities for users;
(f) a flexible management information system;
(g) access to BLCMP database from any terminal connected to it for backup local library operations;
(h) an electronic office of Data General for ongoing support.

It is interesting to note that the participating libraries of BLCMP achieve a hit rate of 80% while searching BLCMP database for cataloguing purposes and the network which is purely cooperative in nature continues to flourish.

3 THE BIBLIOGRAPHIC NETWORKS IN SPAIN

It was in the fitness of things to present the bibliographic networks in UK alongwith those of Spain for arriving at deductions suitable to India, for we find many administrative similarities between India and Spain. Spain has 17 autonomous communities like the states in India. The National Library and important public libraries of national importance are financially supported by the Ministry of Culture as in India, and the Consejo Superior de Investigeciones Cientificas (Higher Council for Scientific Research) like the Council of Scientific and Industrial Research in India promotes automation in the libraries of research, and learned institutions.

Library networking in Spain could be discussed under the following heads :

1 Ministry of Culture and the role of the National Library;
2 Public Libraries;
3 University Libraries; and
4 Specialised Libraries.

Ministry of Culture in Spain is responsible for promoting automation in the National Library and the public libraries. The National Library in Madrid began automation work in 1986 on a software called SABINA which later proved slow and had to be abandoned after three years. The library was till now using the computer of the Ministry of Culture through online terminals. But now the library has acquired FUJITSO 760 main-frame and has established a computer division of its own. The library has played an important role in the creation of bibliographic databases. It has produced *Bibliographia Esponnol* (National Bibliography) in machine-readable form since 1979. It contains about 250,000 records of books, 20,000 serials, 19,000 cartographic material and about 12,000 video records. Besides the National Bibliography, the Bibliotheca Nacional took up the work to compile the database on bibliographic heritage of Spanish books comprising a union catalogue of incunabula, and 16th, 17th and 19th century publications available in 1700 Spanish libraries. In this work the library has been getting cooperation from ten out of seventeen autonomous communities. Some autonomous communities take more interest in libraries than the rest and have been promoting automation. For instance in VIZCAYA, northern Spain a network of libraries has been developed. But some autonomous communities do not spend much on them. For instance in the State Public Library in Toledo only two professional staff do technical work when the library has more than 100,000 rare volumes including incunabula and it acquires about

8,000 volumes per year. They are also far behind in the automation work.

For the heritage project the Bibliotheca Nacional has been collecting in MARC format bibliographic records from all libraries either on tapes/ floppies, or the libraries simply send input sheets filled in after comparing their catalogue entries with the printed versions of the union catalogue. The Bibleotheca Nacional arranges to convert the input sheets into machine-readable form. As the library has only twelve persons working in its computer division it gives the conversion work to a commercial agency at about 200 pasetas (about Rs 33) per entry and arranges to edit the data itself. It has as such created a union catalogue of 200,000 records besides 100,000 authority records. Of this union catalogue about 60,000 records are made available on CD-ROM.

The new computer division now launched by the Library is based on a specifically devised database management system (with a relational interface) and a fourth generation language. All databases that are present in the Ministry of Culture mainframe will be reconverted and transfered, and made available in CD-ROM.

The automation process of public libraries is also progressing. So far, twelve DOBIS/LIBIS systems have been installed in ten Provincial Public Libraries. There is a node for the Spanish collective catalogue for integration into Europe. DOBIS/LIBIS operates in 23 libraries including 14 University libraries. Not all libraries are happy with DOBIS/LIBIS. However, all libraries with 386 microcomputers are now required to have CD-ROM readers and a utility that will facilitate the downloading of the records. Bibliotheca Nacional being on top of the Spanish Library System as passed by the Royal Decree in 1989 will slowly develop a network of public libraries on national level.

Among the public libraries, Catalonian Public Libraries have developed a network and thus created a catalogue of over 70,000 records in machine-readable form with OPAC facility. As reported earlier, Vizcaya has also created a network of public libraries.

Twenty six universities have their own softwares for library management but only 20 have trained staff. One university library has over 200,000 records computerised. Two have more than 60,000 records and 1 has about 15,000. The remaining have less than 15,000 computerised records. Nevertheless, the universities are moving very fast towards automation and networking.

Catalonian libraries have acquired VTLS, as this system handles authority, bibliographic and holdings records in a differentiated way. Six of the fourteen university libraries using DOBIS/LIBIS have created a network with the node located at the University of Ovieda. At present this network contains 500,000 bibliographic records. Another change that is coming up is a shift towards integrated systems. This is being done at the University of Barcelona. Universiiy of Barcelona Library has

been pioneer in automation in Spain. Until now it has created 400,000 records in a non-integrated system called DUBIS, using CATMARC format (similar to UK MARC). Among the other university libraries reference may be made to the University of Cantabria's library which is creating bibliographic records with the Spanish system SABINA. Also, university libraries have begun using EARN network for electronic mail.

It may also be mentioned that the Secretaria de Estado para las Universidades y la Investigacion (State Secretariat for Universities and Research) is exploring inter-connecting of the different existing databases in order to share resources and to facilitate cooperative cataloguing, acquisition, interlending etc.

In the field of science and technology, humanities and social sciences, Consejo Superior Investigaciones Cientificas (Higher Council for Scientific Research) (CSIC) has developed an online network of 85 institutions, from more than 20 Spanish cities where each institution is devoted to an area of specialization. It has created five databases, one for medicine, one for humanities and social sciences, one for science and technology and two for the catalogues of CSIC. It does not use MARC format for the purposes of simplicity and speeding up of the creation of records. Its field numbers are mnemonic and are presented below:

Field Codes

RecordNr.	SYSNO	Series	SU	Country	PS
Author	AU	Series	SPR	Libr. not	NE
Unif. Tit	FT	Ser. Nr.	NU	Error-c	XX
Title	TL	Note	NN		
Title-p	PT	Note-bib	NB		
Sub tl	ST	Author-a	AE		
Add. Info	RS	Title-a	AT		
Edition	ED	Printer	PR		
Spec. Mat	ME	Subject	SH		
Place	PL	Key-Word	KW		
Publish.	PB	Abstract	RES		
Year	YR	U.D.C.	UDC		
File-YR	FY	ISBN	BN		
Printer	IPR	Depo. Leg	DP		
Collat.	CO	Codes	COD		
Series	SR	Lang	LN		

Type code and press ENTER to get explanation on code
Press ENTER to return to previous screen

It may be noted that the database officials at the Bibliotheca Nacional are not happy with this format as they cannot merge the databases created by CSIC with the Bibliotheca Nacional's database. But, on the other hand, CSIC men incharge of the network are happy as they could create a large database at less cost at a fast speed and develop the online national network which the Bibliotheca Nacional has not been able to do.

CSIC have created 100,000 records of books and 30,000 records of serials in the central database which is connected online to 50 institutions. These institutions not only specialise in science and technology but also in subjects such as philosophy, history, economics, information science etc. However, a copy of this database in microfische form was obtained by the author for study and use at IIC Library.

Creation of entries is done online by the institutions direct in the central database. With VAX digital computer system they use the networking software ALEPH (Automated Library Expandable Programme) created by an agency in Israel and BASIS created by an American agency. With the use of Online Public Access Catalogue (OPAC) the system is user friendly. However, CSIC has estimated about 800,000 more records to be created in the near future in this network.

Besides this, several institutions have tried to download data from important world databases such as OCLC and the Library of Congress Bibliofile. Merging of data has also been successfully done by the libraries in Madrid such as Museo Espannol de Arte Contemporaneo and the Centro de Arte Reina Sofia. It is also decided to establish SIBI which is similar to JANET and to link IRIS network of CSIC with JANET. The costs involved are minimum as payment is to be made only for the time JANET is used. However, JANET can at present be accessed in Europe on PTT networks only. Recent developments in JANET are likely to make it suitable for search and retrieval of documents in Europe on other protocols too.

4 THE BROAD PROJECTIONS

1 Larger number of documents are now published in electronic form, some in addition to the printed version and some without. It is likely that in the years to come the number of documents published only in electronic form will increase and getting them through networks will become a necessity.

2 Within the financial constraints, it would be ideal to start networks like BLCMP. NISSAT is already supporting network projects like CALIBNET AND DELNET. It may be worthwhile to look into what we can learn from BLCMP before we go too far. It would be ideal to aim at creating networks that are cooperatives in actual sense with necessary and sufficient financial support from the government in the begin-

ing. That is how BLCMP has developed and that is how our networks like DELNET and CALIBNET should develop.

3 It would be appropriate if UGC supported a communications network like JANET with reasonable support to the universities, and institutions in the creation of databases. The support for the creation of databases would vary from university to university and institution to institution depending upon the interest taken by each institution. UGC should support the communication network making communication links available at the doorsteps of the institutions that have created bibliographic databases. This way costs would drastically come down and growth would be evolutionary in nature. INFLIBNET started by UGC could at least serve this purpose. And also it should be possible for UGC to develop links with networks like JANET so that searching and downloading of records is done at a fast speed and at less cost. If Spain which has most of its literature in the libraries available in Spanish could find links with JANET useful, India which has more than half of its publications available in the libraries in English should find it much more useful.

4 With the advent of the information age it is essential that library networking be given prority by the Government of India and regional and international cooperation be promoted in the fields of exchange of data and software.

5 The National Library should establish fast its computer division, create a national network of public libraries and give the job of retroconversion to commercial agency as is done by the Bibliotheca Nacional in Madrid. The National Library should maintain an editorial team to maintain standards.

6 The National Library should also, like Bibliotheca Nacional in Madrid, create a union catalogue of rare books and manuscripts on India. This could be done by compiling data from the depository libraries and the libraries of national importance. As these libraries are not automated, the National Library could simply ask these libraries to fill in input sheets and pass them on to the National Library for conversion purposes.

7 The National Library should also begin producing the National Bibliography in machine-readable form and later make CD-ROMs of it available for sale. This job could also be given to commercial agency with editorial supervision made available at the Library.

8 A national committee on automation, networking and bibliographic databases should be established by the government with representatives from the Ministries of Human Resource Development, Science and Technology, Communications etc besides experts from the library, communications, computer hardware and software fields. The guidelines given by the Committee would help networking on standard lines and

better results could be achieved fast.

9 National priorities in database creation should be defined and access to international databases such as OCLC, BLCMP, BLC or BNB etc, for downloading purposes established through a national agency for maximum use and circulation in the country.

10 Computer based information services should be given incentives for providing information on all sorts of topics and subjects to the public, scholars and researchers.

11 Public Library System needs to be strengthened and wherever its services are available, automation be introduced with immediate effect and incentives provided to the library staff who learn and execute automation skills. Requisite budgetory allocations should be provided with future projections.

12 The Ministry of Communications should offer a communications network to link databases of all types including bibliographic at a very low price for some period to promote communication through electronic mail.

13 Separate attention will have to be paid to retroconversion of documents in libraries and sufficient finances made available for the purpose. The aim in doing so should be to create a national bibliographic database in addition to the bibliographic databases to be created by the National Library.

14 It would be ideal if cooperation is established in the use of already tested softwares in the developed countries for networking and library purposes with reasonable financial inputs instead of committing the same mistakes which the libraries in the developed countries have been committing during the last three decades. It is not the networking alone that needs to the achieved but also a system that integrates it with the other operations in the library that need to be automated and coordinated with the network.

As the automation programmes in India in the special and university libraries are in their early stages and as they do not exist in the public libraries, automation programmes and projects need to be given priority for it is the control of information for effective use which the country needs today in this age of information revolution. The suggestions made above are the broad logical projections from the well-organised and planned automation networks that are growing in manifold forms in the West today.

AUTOMATION AND PUBLIC LIBRARIES

Dr V Venkatappaiah*
A R D Prasad**

0 INTRODUCTION

The rapid and exponential growth of information has made it necessary for librarians and information scientists to employ new techniques to cope with the massive proliferation of literature in all subject fields. Research in the sciences and social sciences has led to high productivity in document publication. To bring this vast amount of information under bibliographic control and to render it useful and accessible to potential users is a task of great magnitude which the 'information people' face. Applications of communication techniques and electronic data processing of information have made a great impact on libraries and information centres, and the computer and associated facilities have come to be recognised as indispensable for study and accurate storage, processing, retrieval and dissemination of information.

Librarians can no longer be silent spectators of the computer revolution. The induction of automation in the traditional activities of a library has long since shown its many advantages in the libraries and information centres of the West. It is time that we in India keep pace with the changing scenario and acknowledge and utilise the computer as an integral part of library house keeping and services. Libraries in the industrial and academic environment as well as public libraries in the UK, and Japan and other countries are making full use of the computers and its potential. We in India are lagging behind especially in the area of public libraries. The public library in the West has developed into a true community information and reference system with such computerised data access and facilities as Prestel and View data for providing a variety

*Chairman, CSC for Public Libraries of ILA, 28-1-78 Shanthinagar, Eluru-534 006 (AP).
**Lecturer, DRTC, Bangalore-560 059.

of information to the general public from housing and social security to legal and medical aid and temperature and travel schedule.

If the public library is to really reach the public and achieve the status of a national network system, the adaptation of new sophisticated techniques and technologies is a highly important prerequisite. We must change with the times and learn from latest trends. The first step in this direction would be the introduction of micro/mini computers in a few selected public libraries in the State along with setting up of training facilities for personnel in the handling of computer equipment and software.

1 AREAS OF LIBRARY AUTOMATION

Computers are used in libraries to assist in a number of library routines necessary for efficient day-to-day functioning. These library tasks fall into the area of 'house keeping' and consist of procedures for acquisition, cataloguing, circulation control, and serials control. Computers are also used for formatting and generation of indexes.

Computer-based library systems were developed in the early sixties, when several libraries in the USA and UK began experimenting with using computers in information processing. These were in the main punched card data processing systems. With improvements in computer technology and libraries becoming more acquainted with computers, the computer came to be viewed in the late sixties as a tool for aiding routine procedures and activities. Most of these systems were developed locally in academic, special and public libraries.

The 1970s saw the development of the cooperative systems phase, when resource sharing and library networks came to be established, and many mechanised cooperative projects such as the BLCMP (Birmingham Libraries Cooperative Mechanisation Project, UK) and the OCLC (Ohio College Library Centre) were started. In the eighties, of course, this trend towards computerised library and information network has gained momentum with the highly effective and speedy communications technology coupled with sophisticated computer hardware and software developments.

2 ADVANTAGES OF COMPUTER-BASED LIBRARY SYSTEMS

1 *Speed* : The computer can process information much faster than human beings, and this permits better work flow through the library.

2 *Accuracy* : The degree of precision and accuracy in processing information is high—however, it is dependent on the accuracy of

information fed into the system. (There is a computer proverb that reads 'garbage in garbage out'.)

3 *Costs* : Operating costs can be reduced if the system is well-designed and well-managed.

4 *Library workloads* can be reduced, as the the computer can do vast amounts of work and processing in keeping with the large amount of information being published.

5 *Improved services* to users.

6 *Easier access* to external databases.

There are also arguments against computer-based systems in libraries on the grounds that many of the so-called advantages of using computers are only fallacies. Some of the points argued against are that (1) using computers does not make everything so simple or effortless, (2) computers are costly, (3) they do not save time, (4) implementing systems on new computers is difficult, (5) better service is not achieved, (6) integrating systems into a network is difficult.

Perhaps, there is also somewhere a hidden fear that computers may replace librarians, or prove them to be incompetent.

However, it is perhaps ultimately a question of using the capabilities of the computer and electronic data processing to help librarians and information scientists in their work. The computer is an example of man's ingenuity and intelligence, and a computer system can only be as good or as bad as are the persons who design, implement and operate the system.

3 HOUSE KEEPING ACTIVITIES

Housekeeping procedures in a library are those routines or tasks that are required for everyday management and functioning of the library. They are broadly—

1 Acquisition;
2 Cataloguing;
3 Circulation control; and
4 Serials control.

31 Acquisitions

Acquisitions and ordering systems in libraries cover the selection,

ordering and accessioning of items into the library's collection. Computers are used : (i) to send order slips and 'chasers' for unacknowledged or overdue orders to the booksellers; (ii) to produce lists of books on order; (iii) to keep accounts of money spent; and (iv) to produce accession lists of recently acquired books.

The detailed input to an acquisition system covers—

(a) new orders;
(b) amendments to existing orders;
(c) booksellers' reports; and
(d) acknowledgements of receipt of items in the library.

Selection of new books can be done from commercially available services which disseminate information about forthcoming documents, or directly from MARC tapes or any local inputs.

Two files are maintained in a computer-based acquisition system. One is the main file containing records of all current orders. The second is a file with the names and addresses of booksellers used by the library. A code number for each bookseller links the two files, so that booksellers information is not repeated in the order file.

The system prints out the orders addressing the appropriate supplier. Printing of orders can also be done on special pre-printed stationery that can be sent directly to the bookseller.

By checking with the date of entering the order record into the file, 'chasers' can be sent to the booksellers, if no information regarding the order has been received within a predetermined time.

When the item is received in the library, the order record with the bibliographic details becomes the basis of the catalogue record. The edited record is merely added to the catalogue file in an integrated system.

Other processes that can be performed by a computerised acquisitions system are :

1 listing items on order, by author, department or subject;
2 new accessions listing;
3 notifying individuals who have recommended a particular book about the receipt of that book;
4 control of accounts; and
5 production of relevant statistics to help management decisions.

32 Circulation Control

This is one library service that is most amenable to computerisation. The advantages are especially seen in the amount of time saved in issue

and discharge routines, and the avoidance of bottlenecks which are the bane of any library. In very large libraries, users may be asked to fill up slips in duplicate at the circulation desk, and later at the end of the day these slips can be entered into the computer. Or, a terminal at the circulation counter, with an operator entering the data directly is another way of doing it. Broadly, circulation systems using computers, have the details of the book issued and the person borrowing it is entered on files. Dates of return are on the basis of the period of loan (one week, a fortnight etc). Daily check of the files will identify what books are due or overdue and notices can be typed and sent to the users who have borrowed them. Provision for reservation data will make it possible to pick out those books for which there is a request and a user can be asked to return that particular book.

The circulation process in a computerised system depends on giving unique identification codes to books and to users. An accession number, or a call number can be used as this is a unique identification key for a book. Users can be given individual identity codes.

33 Cataloguing

Cataloguing includes the job of describing, recording and displaying details of the holdings of the library. Computers are used to aid in the production, maintenance and updating of catalogues. The quality of the catalogue depends ultimately on the cataloguer. In other words initial input data is still the cataloguer's work.

Bibliographic details are gathered from relevant sources, or from the acquisitions system. Usually there is one main or master file for the holdings of the library, and a temporary file for cumulating the additional records, because printing the master file is done only once in a while.

After initial input of the records, the computer can perform simple tests on the record structure, and errors can be located and checked. Again, if a basic record structure of a package format as that of the CDS/ISIS is used (as is now being done at the Centre), entry of data becomes a very simple process. The computer can be asked to generate added entries if required, which can later be sorted into the main file. Separate listings for authors, subject and key points of access can be created. A postings file and an inverted index helps the computer search and display records relevant to a specific query.

34 Serials Control

Serials control through the use of the computer is perhaps one of the most complicated tasks of housekeeping. This is perhaps because of the

literally unpredictable nature of serial publications. Some of the functions of the serials control system that can be handled by the computer are :

(i) listing of serials holdings; and
(ii) accessioning of serials (which includes selection, ordering, checking-in, renewal of subscriptions, sending notices when issues are not received).

(i) Listing of serials holdings is basically producing a catalogue of serials. However with serials there are problems relating to change in title, periodicity etc. A listing system will depend on the bibliographic record for each serial being available in machine-readable form. From a master file of such serials records, individual listings can be made based on title, subject, publishers/suppliers etc. Union lists of serials holdings by librarians within a geographic region can also be produced by computer.

(ii) Accessioning of serials must take into account receipt of issues, and periodicity of the serial, likely date of receipt in order to be able to send claims notices to suppliers for items not received, and to update the holding file. To predict the arrival of periodical parts each record must contain information about the publication pattern of the serial. This relates to the number of volumes per calendar year, number of parts per volume supplements, if any, the pattern of numbering parts, and the frequency of publication. Algorithms can be written with reference to the real calendar, which use information on the details given above, to predict the arrival of each issue. Prediction cards called 'chaser' notices can be sent to the suppliers when an issue is overdue.

Details of the suppliers and the price per volume are necessary for the system to handle subscription, renewals and accounting functions.

4 INFORMATION SEARCH AND RETRIEVAL

The search process on a computerised database has many advantages over search from a catalogue by manual methods, in terms of speed, and accuracy. Any library or information centre can create first a set of machine-readable records of its holdings, based on a structured format, or using a database package like the CDS/ISIS.

Users can search the database through key terms of author, subject or title, which are formulated into a search expression using Boolean operators (logical connections AND, NOT, OR). Computer will display relevant terms/records, that match the terms of the user's request. Current Awareness listings, Selective Dissemination of Information

(SDI), and retrospective searches are the services where the computer capabilities can be used very effectively.

Index generation is another area where computers are generally of use. Computers can be used to format the entries in a permuted index, and also to generate the entries for an index. Key words can be derived from the bibliographic description, or assigned to describe the document (subject keys) and then put into the required format. KWIC indexes, for instance, can be produced from titles of documents, with keyword and context generation performed by the computer. Stop lists or puffword lists prevent words like 'a', 'the', 'of' etc from being used as the key terms. Fully automatic indexing can also be done through statistical analysis and word frequency counts with weighting, provided the text is in machine-readable form.

5 REQUISITES OF COMPUTERISATION PROGRAMME

Three important requirements which call for earnest consideration to enable the libraries to switch over to computerisation are hardware, software and manpower.

Availability of inexpensive, locally made microprocessor system has practically reduced the problems in acquiring the hardware. There are at least twenty or more well established microcomputer vendors in the country at present. Some of the brands are already tried and tested for library applications. Most of the micros are IBM PC compatible machines.

Some of the software packages for library application developed abroad are compatible with IBM PC alone. It is, therefore, desirable that the local IBM PC alone are acquired. User-friendly, portable software packages such as CDS/ISIS, Scimate, etc are now available.

NISSAT is considering measures for development of software packages for library and information application. Software packages for library applications are also available commercially abroad. UNESCO has brought out an inventory of software packages available for library applications. However, commercial software are usually costly.

The foremost problem is the training of manpower for computer-based library activities. Library professionals need not be experts in computer programming. What is required is computer literacy, that is, to know how to operate a computer with a given software for certain library applications. One must have fair knowledge of what a micro processor can do and what kind of specifications would meet library purposes. Also, one should know what are the essential characteristics of the software that should be developed for library application. All this can be achieved by sponsoring the library personnel interested in com-

puter application to different computer application courses, training and seminars.

6 DESIGN FEATURES TO BE CONSIDERED FOR AUTOMATION

This should take into consideration the present as well as the expected say five years' growth of the library. The design features to be considered are described below:

(i) *Means of inputting*—Nature of data, one way/conventional input, input device to be used, single/multiple input, external input sources (database on tape, e g MARC).

(ii) *Types of output products*—Hard copy upper and lower case, special forms display, hard copy/display (screen print) machine readable output.

(iii) *File structure and size*—Structure (sequential) ISAM, direct, LBMS size (number of characters, number of characters required at one time).

(iv) *Application characteristics*—Sorting/data manipulation (numeric/bibliographic, number of records), searching (batch, on-line interactive, access points, number of users), special I/O devices, responsive time.

7 A SAMPLE COMPUTER CONFIGURATION FOR LARGE LIBRARIES

A sample computer configuration for LA/IR is given below. This can be used as a model while formulating the hardware/software specifications for a particular library.

71 HARDWARE

1 CPU: 16/32 bit word length.

2 Memory: 512 KB, with provision for expansion to 1 MB. Minimum of 256 KB should be program addressable.

3 I/O: High speed I/O channels for holding devices like disks and tapes.

4 Disk storage: hard disk: minimum 10 MB on-line disk storage on 1 to 2 drives. Provision for expansion to 1 GB with additional drives. Two DSDD floppy disk drives.

5 Tape storage: streamer tape drive for handling 800/1600 BPI, 2400

feet tapes. Mainly for backup/restore.

6 VDU Terminals: provision to support at least 8 terminals. Two of these may preferably be PC compatible when used stand alone, with adequate local storage for word processing and off-line data entry. User terminal should have sufficient cable length to place them in actual operational point.

All terminals should have interface with dot matrix/LOP printers for local printing. The terminals should support screen (forms) design and cursor control and function keys for forward/backward (scroll) etc, should be capable of printing screen images using a function key.

7 Printer: 600 LPM heavy duty line printer, 132 columns and 96 ASCII character set.

72 Software

1 Operating system: Powerful enough to efficiently coordinate the CPU with the above mentioned peripherals. It should be a multi-user, multi-tasking disk-based operating system, should support both menu and command (JCL) driven OS instructions for the novice and experienced user, should support I/O spooling, job accounting etc.

2 System utilities: Disk file management. Powerful Sort/merge, text editing and/or processor utilities. Fast file backup/restore routines. File recovery routines. Program debugging aids.

3 File management: Sequential, direct access and ISAM file structures. Capability to support general secondary keys. Versatile length field/record structures capable to support very large number of records.

4 Powerful DBMS with multiuser capability. Interactive query and report generating facility. Higher level language interfacing through DML Programming languages : Extensive string/text handling features. File handling capability.

8 SAMPLE COMPUTER CONFIGURATION FOR SMALL LIBRARIES

A sample computer configuration for LA/IR is given below. This can be used as a model while formulating the hardware/software specifications for a particular library.

81 Hardware

1 CPU: 16 bit word length.

2 Memory: 512 KB, with provision for expansion to 1 MB. Minimum of 256 KB should be program addressable.

3 I/O: High speed I/O channels for handling devices like disks and tapes.

4 Disk storage: hard disk: minimum 10 MB on-line disk. One DSDD floppy drive.

5 VDU Terminal: Should have interface with dot matrix/LOP printers for local printing.

6 The terminals should support screen (forms) design and cursor control and function keys for forward/backward (scroll) etc, should be capable of printing screen images using a function key.

7 Printer: 600 DPM heavy duty line printer, 132 columns and 96 ASCII character set.

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INDIAN LANGUAGES IN INFLIBNET : ROLE OF NATIONAL LIBRARY

G KUMARAPPA*
N BALAKUMARI**

0 INTRODUCTION

INFLIBNET is the first "major national effort to improve capability in information transfer and access that provide support to scholarship, learning, research and academic pursuit."[1] It is aimed at achieving a bibliographical control in India, through networking system. It is not an easy task to achieve, as it sounds. Documents handled by such bibliographic control system, "exhibit a bewildering variety of different features, most of which have to be subjected to regulating routines so that control can be achieved. Thus cataloguing rules are explicitly aimed at creating order out of the chaos of author's various and changing names, pseudonyms, anonymous writings, different titles for the same work, same title for the different works."[2] The task becomes still more complicated, when the system attempts to have a bibliographical control in a country like India. As a polyglot country, India produces documents in different languages written in different scripts.

1 INDIAN LANGUAGES AND SCRIPTS

Though Census of India registers more than one thousand five hundred languages as the mother tongues of the Indian people, about 98% of them speak only twenty four languages. So, these languages may be considered as the major languages. They are: Assamese, Bengali, Bhili, Bhojpuri, Central Pahari, Gondi, Gujarati, Hindi, Kannada, Kashmiri, Konkani, Maithili, Malayala, Marathi, Nepali, Oroan, Oriya, Punjabi, Rajasthani, Santhali, Sindhi, Tamil, Telugu and Urdu. In addition to these Sanskrit

*Assistant Librarian, National Library, Calcutta.
**Junior Technical Assistant, National Library, Calcutta.

may also be mentioned, though it is not used as mother tongue but for its literary heritage. Among these, except tribal languages, many of the languages have either their own scripts or some other scripts for writing. Bhojpuri, Central Pahari, Hindi, Marathi, Sanskrit are written in Devanagari script, Gurmukhi script is employed to write Punjabi language, whereas Persian is used to write Kashmiri and Urdu. Sindhi is also written in Persian alphabet with several additional letters for the sounds peculiar to that language. Remaining sixteen languages have their own scripts, but much of the north Indian seripts are the by-forms of the Nagari (i e Devanagari) script. The languages which do not have their own scripts are written either in their neighbouring language scripts or in Devanagari script.

To have a proper bibliographic control in these languages, it is necessary to have a common language, through which either any or all the languages can be written. At present Roman alphabet is used for such purposes.

2 TRANSLITERATION OF INDIAN LANGUAGES : STATE-OF-THE-ART

The history of Romanization of Indian scripts is a long one. Sir Williams Jones (1788), Compte de Volney (1795), John Gilchrist (1796), Sir Charles Trevelyn, Sir Monier Williams (1859) Lepsius, Max Muller (1861), C R Lanman, William W. Hunter and others attempted to develop a common language for Indian and Oriental scripts.

Sir William Jones's transliteration system was widely accepted in those days. It was first published in the first issue of the *Asiatic Researches* in 1788.

In recent years Library of Congress, British Museum have developed transliterated Roman scripts for Indian scripts. British Museum, even has the additional schemes for the minor languges like Badaga, Coorgi (Kurgi) and Saurastra.

In 1958 the Ministry of Education, Government of India promulgamated an official transliteration scheme.

National Library, and Central Reference Library, Calcutta are transliterating the authors and titles of the Indian documents in catalogues and *Indian National Bibliography* respectively.

There is a considerable uniformity in all these schemes as they use the common Roman alphabet to denote a particular letter of Indian script. But use of diacritical marks varies slightly. These schemes have certain limitations for computerising Indian languages. So, National Library in consultation with library professionals and linguists both at home and abroad, developed a version of transliteration scheme, which can be used in computerizing the Indian languages (specimen at Appendix-I).

Problems of computerization and adopting Indian languages for networking will not end with the standardization of transliteration and diacritical marks. But it is the first and basic step towards computerization. There are other few more problems to be tackled before venturing to record the bibliographical data of the Indian language documents with computers. They may be listed as follows.

21 Problem of Indic Names

Indic names pose a big problem to the cataloguers as well as to those who Romanize them. The different practices of naming a person in different cultural groups, different elements, with no proper order, like given name, surname, pseudonym, title, words denoting caste, tribe, place, occupation etc baffle the cataloguers in selecting the right entry element. The problems of spelling variations and splitting the names, while writing in English (i e in Roman script), compound names with separable or inseparable elements, make the situation chaotic. The problem of selecting the entry element may be overcome by following different cataloguing codes, but the standardization of Romanization vis-a-vis transliteration still remains.

National Library, and Central Reference Library, who are dealing with much of the published Indian documents have already developed a standardized system for their routine work. But these two systems have slight variations. So, these two institutions may take up the problem to standardize the transliteration forms for Indic names.

IASLIC had organised a seminar on the 'Rendering of Indic Names' as far back as 1961. In the proceedings of the seminar a list of "Variant Romanised spelling of entry words (last names) of Hindu personal names (with suggested standardized forms as passed in the special committee meeting on 16.4.1961)" is given (pp. 122-150). This may be consulted while standardizing the transliteration of Indic names.

22 Problem of Corporate Bodies

The corporate bodies as the author, pose two types of problems. First of all the names of the bodies, i e institutions, departments, boards, committees, sub-committees, divisions, sub-divisions, commissions etc are to be translated into Indian languages, as much of the bodies names are found only in English or in Hindi. The names of the foreign corporate bodies are found only in English. So, the languages should be enriched with the standardized equivalent to such corporate body names. Then comes the second problem, i e the transliteration. While transliterating, special care is to be taken, as the names of such bodies are generally, too long and cumbersome to transliterate. A minor mistake in translite-

ration either by the cataloguer or by the computer operator may misplace the document record in the system. So it is always advisable to refer to Indian names of the corporate bodies by their English names in the system.

23 Problem of Explanatory Words

The terms or the explanatory words denoting the relationship between the person and the document—like, edited by, illustrated by, translated, by, compiled by etc—are different in different Indian languages. These terms are to be standardized either at the individual language level or at all Indian languages level. Then suitable transliteration format is also to be standardized.

24 Problem of Place Names

Place names in the title may not be a problem as it is to be transliterated as it is. But, while cataloguing topographical materials or while recording the place of the publisher, cataloguer may find some problems as some places may be recorded differently in different documents. For instance, Tiruchirapally (Trichy), Bombay (Mumbai), Benaras (Banaras, Varanasi, Kashi). Many times anglicized names are quite different from that of the local names. In such cases gazetteers may be considered for the standardized format.

25 Problem of Subject Headings

Very less work has been done in translating the subject headings into Indian languages. No serious thought has been given to translate such subject headings. However, Central Reference Library, Calcutta, uses subject headings in Indian languages for its language fascicules of INB. But no attempt has been made to standardize such subject headings on all Indian languages level. It is suggested that Central Reference Libray may collect all the subject headings ascertained in Indian language fascicules and update it and publish it. It will be a valuable publication towards the standardization of cataloguing activities in Indian languages.

These are the few problems pertaining to the cataloguing of simple monographs. The problems relating to the serials, cartographic materials, manuscripts, sound recordings, music scores, etc in Indian languages are to be discussed in detail before attempting to computerize the Indian language documents.

3 TRANSLITERATION TABLES IN INDIAN LANGUAGES

The attempts of transliteration have so far been carried out in only one direction i e from Indian scripts to Roman alphabets. There is an enormous scope and need for transliteration schemes from Roman and non-Roman scripts into Indian scripts as no attempt has been made to prepare such transliteration tables.

Even in Indian languages "apart from the Tamil script and the Urdu script differing considerably in the phonetic make up from the other Indian scripts, even among the other Indian scripts, there are substantial differences in respect of phonetic values of a few letters of the alphabet. Thus there is scope for considerable work to be done in internal transliteration."[8] So, Dr S R Ranganathan suggested that Documentation Committee of ISI should prepare such a transliteration table. We are unaware of any such attempts by BIS (Bureau of Indian Standards). Now the time is ripe to take up this project. National Library, with the assistance of Central Reference Library may take up this project. Suggestions and standards for transliteration, prepared by International Standards Organization (ISO) may be consulted while developing such transliteration tables.

4 INDIAN LANGUAGES AND COMPUTERS

The developments in the computer technology, and the computer controlled phototype setting devices, have made possible to reproduce practically any script at a speed and convenience. Even the entries, in these scripts can also be alphabetized automatically by a suitable programme. Considerable work is being done in India to perform input/output in several Indian languages.

A sub-committee of the Electronic Commission of Government of India has published an interim report in 1980, regarding the "*Standardization of Indian Script Code for Information Exchange*". Indian Institute of Science, Bangalore is on its way to achieve automatic translations from one Indian language to another.

Indian Institute of Technology, Kanpur, has developed a system, based on the transliteration scheme developed by the National Library "which has the possibilities of interchanging one Indian script with the other as well as the possibilities of tranliterated Romanised script for all Indian languages". Even CDM, Pune, Tamil University, Thanjavur and other institutions are also developing such systems. The user will be better, served, if he is supplied with the information regarding the documents in the language which he can read. Therefore, with the help of advanced technology it is suggested to think in terms of performing the input/out-

put and other data manipulation directly through Indian languages.

5 ROLE OF THE NATIONAL LIBRARY

By the virtue of being the largest library in the country having the substantial collection in Indian languages, as well as the professionals with rich experience, representing all these languages, the National Library can play an important role in bringing the Indian languages into the fold of INFLIBNET. We feel that the National Library should take up, with the help of other professional bodies, the following projects on the priority basis to assist the networking system.

51 Standardization of Indic Names

The standardization of rendering system of Indic names, as well as the corporate bodies names, with the proper transliteration is the need of the hour. The slightest variations like spellings, transliteration, diacritical marks or separation of name elements, may misplace the document records in the system. National Library with the help of Central Reference Library and other professional bodies may take up the transliteration scheme.

52 Translation of Subject Headings and Other Details

No work has been done in translating and standardizing the transliteration scheme, for the subject headings as well as for the explanatory words used in the catalogues. Unless these are standardized, information transfer in Indian languages through networks will be hampered. Central Reference Library, Calcutta is already using the translated explanatory terms in its Indian languages fascicules. It will be easier for this institution to attempt to standardize such terms, or it can assist the National Library in such attempt.

53 Transliteration Tables in Indian Languages

Developing transliteration in Indian languages for foreign scripts is not an easy task, but such tables need to be developed. The National Library, Calcutta may approach and assist Bureau of Indian Standards to prepare and develop such tables for the major foreign languages like Russian, French and German.

It is further suggested that a national level body, comprising the library professionals and linguists of different languages, may be formed to take up these projects. National Library may coordinate such activities.

6 CONCLUSION

Day by day, Indian languages are becoming richer and richer, in their vocabulary, to cope up with the development of science and technology and other spheres of knowledge. INFLIBNET, though now it is in its initial stages, may become an inseparable tool for the research activities. These two potential elements are to be developed together for the better service of the intellectual world.

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APPENDIX I

A SPECIMEN OF STANDARDIZATION OF DIACRITIC AND TRANSLITERATION PATTERN, DEVELOPED BY NATIONAL LIBRARY, CALCUTTA FOR INDIAN LANGUAGES

अ	—	*a*	ड़	—	$\hat{d}$
आ	—	*ā*	ढ	—	*ḍh*
इ	—	*i*	ढ़	—	$\hat{dh}$
ई	—	*ī*	ण	—	*ṇ*
उ	—	*u*	त	—	*t*
ऊ	—	*ū*	थ	—	*th*
ऋ	—	*r̥*	द	—	*d*
ॠ	—	*r̥̄*	ध	—	*dh*
ऌ	—	*l̥*	न	—	*n*
ऐ	—	*e*	ऩ	—	*n̤* (Mal & Tam)
ए	—	*ē* = *e* N. I	प	—	*p*
ऐ	—	*ai*	फ	—	*ph*
ऍ	—	$\hat{e}$	फ़	—	*f*
ओ	—	*o*	ब	—	*b*
ऑ	—	*ō* = o—N.1	भ	—	*bh*
औ	—	*au*	म	—	*m*
ऑ	—	$\hat{o}$	य	—	*y*
क	—	*k*	य़	—	*ẏ*
क़	—	*q*	र	—	*r*
ख	—	*kh*	ऱ	—	*r̤* (Mal & Tam)
ख़	—	*k̲h̲*	ल	—	*l*
ग	—	*g*	ल़	—	*l̤*
ग़	—	*g̲h̲*	व	—	*v*
घ	—	*gh*	श	—	*ś*
ङ	—	*ṅ*	ष	—	*ṣ*
च	—	*c* = *ç* (Tel)	स	—	*s*
छ	—	*ch*	ह	—	*h*
ज	—	*j* = *j̇* (Tel)	ं	—	*ṁ*
ज़	—	Z			*ṅ, ñ, ṉ, ṇ, m*
झ	—	*jh*			च ट त प
ञ	—	$\hat{n}$	ॅ	—	*ḥ*
ट	—	*ṭ*	ः	—	*ḥ*
ठ	—	*ṭh*	ः	—	*ḥ*
ड	—	*ḍ*			

SOURCE : *The National Library News Letter.* 5 (2) ; April-June, 1988; 9-11.

LIBRARY AUTOMATION AND NETWORKING IN THE NORTH-EAST REGION : SOME PROPOSALS, SOME ACTIVITIES : A MANIPUR-PROFILE

RAMANSU LAHIRI*
TH KHOMDON SINGH**

1 INTRODUCTION

Three factors are dominant in counselling the automation in libraries : (i) enviroment, (ii) user, and (iii) library professionals. Environment usually has been moulded by widespread adoption of new information storage devices and access methods, networking and the expanding marketing by the information industry, increased competition and changing consumer's needs and demands. The users are no longer in the position to spend hours at the library looking for documents that may or may not contain the required data or information. All they expect now is "access to content and information tailored to individual need." Professionals, on the other hand, have been tempted to the life of "active communicator and networker of data and information"[1] from a 'passive introverted role,' and 'drudgery'. Moreover, as Gordan says "no human-being should do a task which can be performed by a machine."[2]

It is now clear that the future of any organisation, academic libraries in particular, will be guided by computers with greater power. Automation is, therefore, the prime necessity for a library. Gordan argues "the library which does not take advantage of modern technology will not bring the full benefits to the staff and users of the library which should be its most important aim."[3]

In this backdrop, the present paper makes an attempt to focus

*Department of Library & Information Science, Manipur University, Imphal-795003.
* Manipur University Central Library, Impal-795003.

on various proposals for networking in the North-East Region (NER) in general and the automation-experience of Manipur, a North-East State in particular.

2. THE NORTH-EASTERN REGION OF INDIA ; SOME BASIC FACTS

The North Eastern Region (hereafter NER) of the country comprising of seven states (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura) covers an area of 2,55.037 sq kms, which is about eight precent of the total geographical area of the country. According to 1981 census, 265 lakhs people constituting 4% of the total population of the country were living in this region. While 90% of the population lives in rural areas, 60% are cultivators. More than 45% of the population is literate as compared to all India average of 36.23%.

3. COMMUNICATION NETWORK AND THE NER

As approximately 70% of total area in the region is hilly terrain and cultural background of people is diverse, the communication in the region is very weak. Recently some development is, however, seen. Now, communication network is possible either through the Satellite Earth Stations or through the microwave stations. The satellite stations have been servicing the remote areas in the region. The conventional ITI Microwave system is available in almost all the states. It is known that the Government of India have undertaken a project to upgrade the existing conventional system into a Digital Microwave System (DMS) and that the work is in progress. The DMS is highly suitable for library networking in the region and it can be used for both voice as well as data channels. This will also ensure direct and immediate access to the computers as well as network telephones. The Microwave System is primarily a commercial one and lines can be hired/purchased from the Department of Telecommunication, Government of India.

4. A SURVEY FOR NETWORK

The North-Eastern Council, set up under the Ministry of Home Affairs, Government of India (with Headquarters in Shillong, the capital of Maghalaya) took a programme (Office Order No. NEPF 76/81-82/124 dated the 3rd October, 1981) for conducting a 'feasibility study by Regional Computer Centre, Calcutta (hereafter RCC) for installation of computer facilities. "The main purpose of the study was to analyse the in-house requirement of NEC as a

planning and development agency for the North-Eastern Region of the country and those of different government departments, educational and research institutions and other central agencies located in the seven states in the region."[5]

The RCC team visited all important places of the North-East Region during the period October 14-23, 1981 in order to "access the present computational requirements and their future plans," During the visit, the team recorded the computational facilities available in the region (Appendex-I) which were "not adequate to meet their current needs' and were 'having limited capacity." As a result, not much of data processing activity can be carried out. And "the growth in the areas of agriculture, power, mines and minerals, irrigation, transport, forestry, education and manpower development have been affected in the absence of modern data storage, processing and retrieval facilities."

After studying in detail, the proposals forwarded by the team are[6] :

(i) augmentation of the microprocessor based system at the state level;
(ii) augmentation of the central system at NEC, Shillong; and
(iii) the central system at Shillong should provide terminal support to all the states to meet their specialised requirements, (Appendix-III).

5 THE OTHER PROPOSAL

Another proposal[8] was placed before the 'Conference of Vice-Chancellors, Education Commissioners and Education Secretaries etc' organised by the NEC at Guahati on the 28th February, 1989. The proposal was for setting up of a computer network through on-line, connecting all the Documentation Centres of the universities in North Eastern Region using the services of the digital microwave system as stated above. The basic items of the proposal were :

—the NEC should financefor setting up documentation centres in the campus of all universities of the Region (attaching the university libraries) with the cooperation of the universities;
—all these centres will act as the sub-units/information service points of the 'Regional Documentation and Information Centre' of the NEC at Shillong;
—a large computer can be installed in NEC, Shillong which can be connected through on-line (using the digital microwave system as stated) with other subunits where relatively smaller computer can be installed;

—through these centres and with the help of communication medium purchased from the Telecommunication Department, the information input can be stored in the main computer which means the information resources available in all university libraries, are stored in one place only. Thus one Regional Data Base can be established; and
—this 'Regional Data Base' can be utilised by the researchers of any university in the region through on-line interaction.

The cxpendiiure for setting up of such Documentation Centre in every university library of the region (including the configuration of computer equipment) was also submitted with the proposal.

6 PROPOSAL FROM LIBRARY SCIENTISTS[4]

Distinguished LIS scientists and experts of the region as well as country are of the opinion that

—a North Eastern Regional Library and Information System be created at the regional level upgrading and strengthening the existing facilities in the 'Regional Documentation and Information Centre' of the NEC;
—financial and other support should be extended to library and information centres for automatic bibliographical operations and services by concerned agencies and departments; and
—a scheme should be evolved for greater cooperation and greater coordination among the universities and specialized libraries of the region.

How far the NEC can go with these proposals is yet to be seen. The whole region has been eagerly waiting for having some concrete network programme from this organisation.

7 MANIPUR-PROFILE

The tiny state Manipur (inhabited by 15 lakh persons of different origins in an area of 22,327 sq km, mostly comprising hilly terrain) has now been under the phase of computer-boom. A recent survey, conducted by the authors, has revealed (Appendix-II) that there are at least twenty organisations (government, government sponsored and public) who have been using the machines for different purposes. Besides, there are a number of various private bodies who have made this unique box a part of their commercial activities. The models of computers used in these organisations, as it is found, are: MINI (HORIZON) and PC

family-groups, manufactured by HCL and WIPRO, with memory capacity varying between 2MB and 360 KB. The operating system commonly used is DOS, though systems like UNIX etc are also in use. Various software packages like dBASE, CDoT, BASIC, COBOL, LOTUS, FORTRAN, PASCAL, LYRIX, a variety of wordprocessing packages, and many other user-friendly-packages are also in common use. The application-area of these automation-programmes usually covers ; (i) training and educating the students; (ii) report preparation, census and planning work; (iii) data processing in Manipuri script: (iv) analysis of natural resource-data; (v) office management (like pay roll, provident fund roll, service books, examination results preparation) etc.

It has also been noted that only National Informatics Centre is having the privilege of using the Satellite Earth Station and thus is able to operate on-line system with NIC, Delhi and other branches.

The survey, however, could not assess the degree of output of these centres. It has, also, hardly come across any situation in most of the cases which can confirm the proper and maximum utilization of the systems. Appendix-II, of course, can claim a great automation-leap from 1981 situation shown by RCC in Appendix-I.

71 Manipur University Library

Has this automation-boom in the state brought any remarkable change for libraries? Let us take up the case of a centre which has been trying its best to develop a 'library software package' since 1986.

The Computer Centre of the Manipur University during 1986-87, installed a library software system using UNESCO's CDS/ISIS and made it operational covering nearly 1500 monographical descriptions under various subjects. For some time the programme was available to the library and its users. The users could use the system to find out about the existence/availability of any book, data of which was fed in the system. In case of multiple titled books with different authors, the system used to respond with different authors along with their corresponding accession numbers.

But, unfortunately, that initial attempt failed when the computer was damaged due to an accident. Therefore, the programme had to be dropped.

In 1988-89, the Library again took up a fresh programme with the help of University Computer Centre. This time the library software is programmed using dBASE III. This shift from CDS/ISIS to dBASE III is due to certain technical difficulties in (i) handling voluminous data, (ii) preparting format for data entry and (iii) shifting data from hard disk to floppy, etc. Since the second version of ISIS is not available

here, it is not known as to how far it has been improved on these issues. On the other hand, it has been experienced that the dBASE III is very much flexible in nature and has the ability to overcome the difficulties faced in CDS/ISIS. The data entry, storage, processing and retrieval are much easier and are user-friendly. They can handle large volume of data depending upon the memory capacity of the computer.

In this new programme the data chosen for entry are: author, editor etc, title of the book, sub-title, series, text/reference book, class no, book no, number of copies, and accession number. Accordingly, data-feeding has started and now continued on. It is learnt that data of nearly 10,000 monographs have already been fed, and transferred from hard disc (HDD) to floppy (FDD) (one contains nearly 750 monograph descriptions). At present level, the interrogation|search is possible only through author's name, titles, sub-titles and keyword in case it exists in author's/title's name. Interrogations through other forms (like subject, class number etc) are also possible but not at this level. For that, separate programme should be made. Since library does not have its own Programmer (it deputes one person who has some computer training for feeding the data), it will take longer time for using all different approaches for search strategy. The library has now been looking forward for having some new computers so that the software can be utilised by the users.

8 CONCLUSION

The above discussion has confirmed three realities. The different organisations (government, government-sponsored, private) and acadmic institutions (schools, colleges, universities) have started using computers mainly for official and commercial purposes and for teaching/training programmes, All these are individual efforts. The trend shows that people are enthusiastic to learn and use. But at the same time, it has not been possible to find out how effective and economic the automation (system) is, particularly, in government and government sponsored organizations. Similar situation may be prevalent in other states of the region.

Secondly, no effort has so far been made in the region to build a network. The NEC activity also is not clear in this regard. It is the only organisation in the region which can take lead. There is no other forum which could take initiative for building NELINET (The North East Library & Information Network) like CALIBNET in Calcutta or DELNET in Delhi.

Thirdly, automation in libraries is still a far cry in the region though some individual efforts are there. To almost all libraries (with very few exceptions) computer and automation are still alien subjects. The libraries which have been trying honestly in this direction are also

suffering from the absence of proper qualified team for personnel (e g Manipur University Library), proper hardware and other inputs.

Under such circumstances, the proposition is, therefore, that the NEC, a prime body 'in the striving for co-ordinated development of the North Eastern Region', should come forward for developing a network system called NELINET (The North East Library & Information Network) after setting up (i) documentation centres in all university enclaves of the region with all automation facilities, as the local units of the 'Regional Documentation Centre' of NEC at Shillong; and (ii) a network among all these (university) documentation centres keeping Shillong centre as main database (as proposed earlier[3]),

The NEC Data Base (or NELINET), in case it is built, can become a 'Regional Centre' and a 'part' of proposed INFLIBNET programme of the UGC.

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APPENDIX-I

COMPUTATIONAL FACILITIES AVAILABLE IN NE REGION

(Assessed by RCC Team in 1981)

Organization/ Institution	*Eguipment*		*Memory*	*On-line Disc/ Flopyy*	*Other Units*
	Manufac-turer	*Model*			
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Assam					
Gauhati University	ECIL	TDC-316	28 KB	Nil	(i) Magnetic Tape Drives—9TR BPI; 37.5 IPS —2 (ii) Card Reader —1 (iii) Line Printer —1 (iv) IBM 029 —2 (v) IBM 056 —1 (vi) IBM 082 —1
Assam Engineering College	HCL	1800	56 KB	(i) Floppy disc drive (500 KB) (ii) 2 Mini-Floppy drive (160 KB)	(i) 1 Off-line Data Preparation Facility on Mini-Floppy. (ii) 1 X-Y Plotter.

Appendix—I (*conid. on page* 354)

Appendix—I (*contd. from page 353*)

(1)	(2)	(3)	(4)	(5)	(6)
Assam Agricultural University, Jorhat	HCL	1800	32 KB	2 Floppy drive 500 KB	(i) Line Printer —1 300 LPM
Regional Research Laboratory (RRL) Jorhat	HCL	2200 & 1800	32 KB (Addl. RAM-16 KB)	(i) 2 Floppy Drive 500 KB (i) 1 Mini Floppy 80 KB	(i) Off-line Data entry device Mini-Floppy —2 (ii) 132 Ch/line 180 Ch/sec Matrix Printer —1
NEF Railways Maligaon	IBM	1401	16 KB	Nil	(i) Tape Drives—7330, 7TR, 556 BPI, 28 IPS —4 (ii) 1492 Card Reader-cum-Punch —1 (iii) 1403 Line Printer —1
Manipur					
Regional Medical College	HCL	2200			
Meghalaya					
ICAR, North Eastern Hill Region	HCL	1800	64 Kb	(i) 2 Floppy drive 500 KB (ii) 2 Mini Floppy 160 KB	(i) Magnetic Card Reader —1 (ii) X-Y Plotter —1 (iii) Mag Tape Drive 9TR 800 BPI —1 (iv) Matrix Printer —1

Survey of India	DCM	SPECT-RUM/7	52 KB	(i)	2 Floppy drive 500 MB	(i) 12"VDU 24×80 —1 (ii) Serial Dot Matrix Printer 120 CPS 1—
NEC	HCL	2200				
Tripura						
Directorate of Statistics and Evaluation, Govt of Tripura	IBM	Unit Record System	Nil		Nil	056 (Verifier) —1 024 (Punch) —4 *602 (Calculating Punch) —1 082 (Sorter) —1 087 (Collector-Merg & Sort) —1 514 (Reproducing Punch) —1 402 Accounting Machine —1

COMPUTER FACILITIES AVAILABLE IN SOME (Excluding Private

Sl No	*Organisation Institu*	*Year of Installation*	*Model*	*Quantity*	*Manufacturer*	*Remarks*
(1)	(2)	*(3)*	*(4)*	*(5)*	*(6)*	(7)
1	Department of Computer Science, Manipur University Canchipur Imphal-3	1985	Mini Computer WIPRO Z 650 16 bit. 8086 CPU 8087 Co-processor 4 on-line terminals 1 line printer	1	WIPRO	512 KB
		1989	Mini Computer Horizon IIIe 32 bit MC 68020, 2MB RAM IOPU 2MB LOCAL RAM 32 bit HSMEM BUS MC68881; 16.67 MHZ 60M Cartridge Tape drive, 4 terminals, 1 DMP 132 col 300 cps.	1	HCL	2 MB
		1986	PC/XT	5	HCL	640 KB
			PC/AT	1	HCL	640 KB
			PC	1	HCL	256 KB
2	Department of Science, Technology and Environment of Manipur, Imphal.	1987	Mini (Horizon III)	1	HCL	2 MB
			PC/AT	4	HCL	640 KB
			PC/XT	2	HCL	640 KB

APPENDIX—II

OF THE ORGANISATIONS OF MANIPUR
Organisations)

Hard Disk (HDD)	*Floppy (FDD)*	*Softwares Operating System used*	*Area of application*	*Staff*		*Remarks*
				Name of Post	*No. of Post*	
(8)	(9)	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*
36×2 MB	2×356 KB	BASIC, FORTRAN, COBOL, PASCAL, SSP, other utilities	For Teaching Research/ Examination/Finance/ Library etc	Professor Assoc Professor Asst Professor Systems Manager Programmer Operator Tech Assistant Key-punch Operator Assistant	1 3 5 1 2 2 2 2 1	
209 MB	2×1.2 MB	HICIX V. 3E, UNIX V. 3. C, BASIC, COBOL, FORTRAN, PASCAL LISP, a number of packages	—do—	—do—	-do-	
20 MB 40 MB —	360 KB 1.2 MB 360 KB×2	PASCAL, dBASE III, LOTUS 1-2-3, WordStar, CAD, CAM, CDS/ISIS	—do—	—do—	-do-	
2×80 MB 40 MB 20 MB	Minifipy 1.2 MB 360 KB	UNIX V. 3	Plan documents, Report preparation, Office work, Data processing in Manipuri Script etc	Sr Scientfiic Officer Programmer Computer Operator	1 1 1	

Appendix—II (*contd. on page* 358)

Appendix—II (*contd. from page* 357)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
		1989	PC/AT	2	HCL	640 KB
			PC	2	HCL	640 KB
			PC/XT	8	HCL	640 KB
3	Covernment Polytechnic, Takyel, Imphal.	1988	Mini (Horizon II)	1	HCL	2 MB
			PC/XT (Busybee)	1	HCL	640 KB
			PC	3	HCL	256 KB
4	Industrial Training Institute Imphal	1988	MICRO-32 with four terminals	1	ECIL	1.6 MB
5	MANIDCO (Manipur Industrial Development Corption, Imphal.	1987	PC/AT	1	WIPRO	640 KB
			PC/XT	2	—do—	640 KB
6	Directorate of Economics & Statistie, Manipur, Imphal.	1987	PC/AT	1	EIKO	640 KB
7	D M College of Science, Imphal.	1988	PC/AT	1	UPTRON	640 KB
			PC/XT	6	—do—	—do—
			PC	4	WIPRO	256 KB

(8)	(9)	(10)	(11)	(12)	(13)	(14)
40 MB — 20 MB	1.2 MB 360 KB×2 360 KB	MSDOS, dBASE III WordStar, Aotocat etc	Analysis of natural resource data	Nil		These are for (NRDMS projects) For the distribution at the DCs Offices in Manipur
2×80 MB 20 MB —	Miniflpy 360 KB 360 KB×2	dBASE III BASIC, Word-processor, UNIX, etc	Training of students for post Diploma in Computer Application. The duraton is one and a half years	Nil		Utilised one staff
80 MB	1.2 MB	BASIC, COBOL	Training of students for data preparation and computer software Duration one year	Instructor	1	
40 MB 20 MB	1.2 MB 360 KB	dBASE III PLUS, LOTUS 1-2-3, Drafter, MS-DOS BASIC, etc.	Payroll, Provident fund, Service book management Information system etc.	Assist Manager Computer	1	All the machines were damaged by fire in 1990
40 MB	1,2 MB	dBASE III PLUS, BASIC etc	Census of Govt employees, Processing for Publication etc.	Nil		Utilised one staff
40 MB —do— —	1.2 MB 360 KB 360KB×2	dBASE III, COBOL, FORTRAN, BASIC, PASCAL	For TDC Course practicals.	Lecturers Part time Teachers	2 2	

Appendix—II (*contd. on page* 360)

APPENDIX—III

PROPOSED COMPUTER NETWORK FOR NORTH EASTERN COUNCIL, SHILLONG

(As proposed by RCC Calcutta in 1981)

