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Information Commons : Impact on and Implications for Libraries and Information Centres

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Indian Library Association

Chief Editor
Dr AL Moorthy

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FOREWORD

Intellectual property rights are a means to disseminate information besides protecting the rights owners from illegal infringements and rights violations. However, the path breaking developments in the information and communication technologies led to digital libraries. The characteristic vulnerabilities of digital information made the rights owners to use the same technologies to develop mechanisms to safe guard their interests. However, these measures resulted in the obstruction of free flow of information (in contravention to the UN declaration on human rights) stifling the academic research, hindering scholarly communication, creating problems in the development of firewalls and anti-virus softer, etc. In the software area, licensing regimes and monopolistic attitude of software companies led the copyleft (as against copyright) and Free Software Foundation launch Open Source Software Initiative and advocate development of free software (as against licensed software). The movement encouraged software enthusiasts all over the world to freely download the software with source and object codes, alter and develop new applications, use them freely, and redistribute the applications with source code freely. The user is obligated to credit the authorship of the source code to the original author and that of the subsequent additions to the user under General Public License.

On the other side, many scholars and intellectuals felt that the exorbitant cost of the professional journals makes their subscription and availability limited and so the published research is not accessible. This in turn deters researchers obtaining latest developments in their fields, thereby hindering further research. This coupled with the strict rights protection regimes in the digital world made many intellectuals to think of an alternative method to conventional publishing. The growth of web technology and the evolution of the Internet as a major publishing medium gave birth to the Open Access and Open Archives Initiatives (OAI). These initiatives strived to bring scientific literature and all research publications into the open access fold. An attraction of open archives is that they would raise the profile of research. At present, research originating in laboratories and published in expensive journals all too often goes unnoticed. Creating institutional archives of such work would help to integrate it into the global knowledge base, to reduce the isolation of scientists and to improve opportunities for funding and international collaboration. Major archives that took part in the OAI from the beginning are: arXiv.org, the pre-print server at the Los Alamos National Laboratory, which specialises in high energy physics and other related fields; CogPrints, which archives publications in psychology, linguistics,

and neuroscience; NCSTRL, a distributed system for servers within the computing sciences; NDLTD, the world's largest virtual archive of electronic dissertations and theses; and RePEc, a distributed archive of pre-prints in economics.

Libraries have a social and societal role to play. They have an obligation to provide free and fair means to access information equally to all users without any reservation. They are the meeting places where intellectuals meet, discuss and cross-fertilize ideas. Much before OAI came in to vogue libraries have been the places where any one can openly access the resources -- be manuscripts, printed, electronic or digital -- held by them. Much the same way as the OAI, Libraries encourage guaranteed access to information, disseminate information and promote sharing knowledge generation. Information commons too have similar objectives and goals characterized by certain values, laws and practices.

Towards redefining the role of libraries in the changing environs of open access, open archives, open source software and institution repositories, the Indian Library Association is organizing its 52nd All India Library Conference with the main objective of the country on one platform. The main theme of the conference is **Information Commons: Impact on the Implications for Libraries and Information Centres** with ten sub-themes. I take this opportunity to congratulate Dr S.K. Sharma, Organizing Secretary, 52nd ILA Conference, & Librarian and Head of Department of LIS, Hemawati Nandan Bahuguna Garhwal University, Srinagar and his teams for their dedication and commitment in organizing this Conference. I am very much thankful to the paper contributors of the conference and the editorial hoard members for bringing out the proceedings volume in a meticulous way and all office bearers of ILA for their valuable help. I wish the 52nd All Indian Library Conference a great success and hope that the discussions and deliberations will immensely benefit the libraries and library science professionals.

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PREFACE

We feel it a great pleasure in presenting before you the pre-conference papers volume of the 52nd All India Library Conference being held at Srinagar (Garhwal). Garhwal region is known as *devbhoomi*, blessed with the grandeur and serenity of the Himalayas. The region is home to the Ganga and the Yamuna, the source of life in the North Indian plains.

Revolution in information and communication technology in the past couple of decades has a drastic impact on the professionals of all walks of life. The World Wide Web has paved way for rapid proliferation of new information resources; in fact petabytes of information is stored in various manifestations like computer hard disks, digital video and audio tapes, flash memories, CD/DVD media, zip drives, online journals, e-books, e-zines, etc. This necessitated constant development of access and retrieval methods associated with the digital information. In the era of digital information explosion, librarians have a greater role in identifying the information resources and how best the resources can be exploited for optimal use of information and shared among the fellow professionals.

Also, the path breaking developments in the fields of mass storage, transmission and publishing gave way to electronic paper, e-journal and electronic (digital) library. The increasing number of publishers embracing e-publishing, the growing number of libraries around the world which acquire and the ready acceptance of users have catalysed the exponential growth in the number of e-publications. The increasing share of electronically/digitally available information in a variety of forms like machine-readable and online databases, bibliographic and full-text CD-ROM publications, multimedia products, online journals, computer-processed files and electronic mail, bulletin boards, teleconferencing, etc has made people to think of digital and virtual libraries.

Digital library technology emerged as a result of information storage, access and services using web technologies. The easy to use and seamless access to vast amount of information has given a boost to usage of online resources by the user community. In the beginning remote access to library catalogues were made available. The emergent of e-publishing technologies including multimedia authoring, web page designing and related hosting facilities and access tools in the web environment has facilitated for "open access publishing" which further gave impetus to institutional repositories and open archives. The movement encouraged software enthusiasts all over the world to freely

download the software with source and object codes, alter and develop new applications, use them freely, and redistribute the applications with source code freely. This has also led to the Creative Commons and Information Commons movements where the underlying principle is open access to information to the communities.

The overwhelming response received from the LIS professionals across India has been extremely satisfying and encouraging. The Editorial Committee reviewed them and short-listed 68 papers for publication. The papers are summarized under various sub-themes in the following paragraphs.

Sub-theme I: Digital Libraries and Knowledge Management

This sub-theme has 18 papers describing various issues viz. Issues and challenges of digital libraries, role of digital libraries in knowledge management, digital democracy, digital preservation, software issues and the role of librarians in digital environment. The papers also cover topics including use of open source web browser for annotation, usage of digital library software, total quality management in IT products, establishing hybrid libraries, comparison of open source software packages in creating digital libraries, collection development issues in the digital millennium, digitization issues and concerns as well as various facets of digital information management and knowledge management in a knowledge society.

Sub-theme II: Access to Knowledge and Culture

The six papers under this sub-theme address the access to knowledge and the various issues related with it. Two case studies cover information seeking patterns and use of multilingual script for web OPAC while one discusses about consortium to provide access to knowledge. The digital divide of IT haves and have nots as also the status of libraries from rural and R&D institutions in providing access to information in internet era.

Sub-theme III: Models for Collaborative Knowledge and Culture

Three papers have been dealt in this section on the diverse areas of the sub-theme viz. Authorship trends, Citation Studies and information sources in nanotechnology.

Sub-theme IV: Open Source Movement

This sub-theme has seven papers dealing with various topics of the sub-theme on open source initiatives, open source movement and open source software and their applications in libraries. A number of software packages available to create openly accessible repositories, the importance of the movement in advancing scholarly communication, problems and concerns to the library and information centres, community

information systems, content management systems, and institutional repositories as a means of scholarly communication.

Sub-theme V: Resource Sharing and Collaboration

Four papers have been covered under this sub-theme discussing topics on resource sharing among special libraries, resource sharing and collaboration and resource sharing using open archives and the protocol of metadata harvesting tools like OAIster.

Sub-theme VI: Digital Commons: Challenges and Opportunities

This sub-theme has five papers covering various aspects of information commons and communities in the academic library environment. The efforts of academic libraries as and in creating information commons, what college libraries expect, information literacy aspects, the implications of information commons in the changing digital environment and various issues associated with it like access, licensing and legislation, the need for human resource development and also vis-à-vis right to information.

Sub-theme VII: Computers, Creativity and Copyright

Under this theme five papers are presented. These discuss and describe the facets like application of WINISIS in managing library databases, WIKI technology, RFID technology and barcoding for library and information work, especially for library management and also the emerging wireless networking in providing seamless access to information in a library network.

Sub-theme VIII: Copyright and Licensing Issues

Six papers are presented under this sub-theme. Intellectual property, especially copyright has been a primary concern for libraries. These paper address the various issues related to copyright, the management of rights, role of national and international agencies, their implications, in the digital environment. Also, the concept of copyleft that has ushered in the open source software movement and open access initiatives are also covered. An overview of copyright under trade-related intellectual property rights vis-à-vis Indian law is included.

Sub-theme IX: Information Literacy and E-learning

Six papers in this section discuss aspects like using e-learning in knowledge organization management and the role of e-journals in it, the role of library in promoting e-literacy, issues involved in achieving information literacy and the role of e-learning in it. One paper deals with semantic approach to e-learning while another seminal paper deals with information literacy programs for reaching disabled and exceptional

children along with assistive technologies and a few Indian initiatives in this area.

Sub-theme X: Open Archive Initiatives

Five papers are included under this sub-theme. The open access initiatives are trying to liberate the authors and libraries from the clutches of rights owners (i.e., commercial publishers). These cover the aspects like universal resource locators for accessing referenced sources, the evaluation of an e-print archive in providing open access to the information, and issues related to internet and its role in libraries.

We feel that despite the best efforts of the Editorial Committee, we could not do full justice to the volume. This is mainly because paucity of time; as usual a large number of papers were received after the due date and we have to accommodate them due to professional brotherhood. But a few of them are poorly written and there is little time to revise the paper. Although there is a lot of scope for improvement, we regret for our failure despite devoting full time. We are extremely thankful to Shri Manoj Kumar and Shri K Sathiyamoorthy of DESIDOC for their help in editorial processing of the volume and in preparing the preliminary pages, respectively. The Editorial Advisory Board gratefully acknowledges the contributors and all those who have extended their cooperation in bringing out the volume in time. We are thankful to M/s Om Laser Printers, Delhi who have done tedious efforts in page designing and printing the volume in a presentable manner in a short span of time.

We hope that the thought content in this volume will be interesting not only to LIS professionals but also to those who are interested in promoting the cause of open access to information. We trust the deliberations during the conference will lead to cross fertilization of ideas and these proceedings will prove to be a useful collection and also will help in the advancement of LIS activities.

Dr AL MOORTHY
Chief Editor
Director, DESIDOC
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Application of Greenstone Digital Library Software in Dyal Singh College Library

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1. INTRODUCTION

In the evolutionary phenomena, the first phase comprises invariably of new things which forms the implementation of experimental stage. In next phase, it comes to be called as a trend and with passage of time this trend becomes a necessity for the society. On comparable basis, the same logic is followed in the areas of Library and Information Science. In 80's, application of information technology in India was in the experimentation phase. In 90's, this was deemed as a trend and in the next decade i.e. 21st century, it became a necessity for the Library and Information centers. Digitization of the library resources which by itself is in an experimental stage but in the context of Library automation, it is still in a developmental stage or next generation.

Digitization of information basically means the process of converting paper documents such as text, graphics etc. into digital images, which can be made accessible through electronic network. In other words, digitization is a process which is meant to eliminate paperwork and make a transition to a paperless environment with the help of software technology.

2. ABOUT DYAL SINGH COLLEGE

Dyal Singh College was established by the Dyal Singh College trust in Delhi in 1959 in the sacred memory of Sardar Dyal Singh Majithia, a great philanthropist and a pioneer in the field of education. It was taken over by the University of Delhi in 1978 and is now an institution wholly maintained and governed by it.

The College, with a campus spread over 11 acres at Lodi Road in New Delhi, is centrally located close to the sylvan Lodi Gardens. At

present, the college has an accomplished faculty of 165 members and a cosmopolitan student body of about 2800. It offers facilities and courses in Computer Education, Commerce, Humanities and Sciences. It is a co-educational college with a student-friendly, creative and competitive learning environment wherein students can acquire life skills for their personal and professional development, and become articulate and responsible citizens.

2.1 About Dyal Singh College Library (DSCL)

DSCL is housed in an exclusive but separate building on the campus. DSC Library is an automated library with the support of Libsys software. The total house keeping job of the library is maintained by the staff using Libsys software and provides OPAC service to the users within the library premises and departments of college. The Library is housed with more than 75000 books, CDs, National & International reports, cassettes etc., library also subscribes to a large number of current periodicals, journals, newspapers and magazines. Library renders its services not only to the faculties/research scholars/Students of the college, but also to other Colleges and Institute's of the University of Delhi. It also provides inter-library loan facilities and reprographic services on demand. Online searches are being carried out by the members and staff for providing instant access of Information Resources through Internet installed in the reading room of the Library. Additionally for the visually challenged students, audio-tapes and related software have been provided.

3. PROCESS OF DIGITIZATION

Process of digitization requires 4M's, man, machine, material and motivation. The whole process is indicated in the flow chart (Fig. 1):

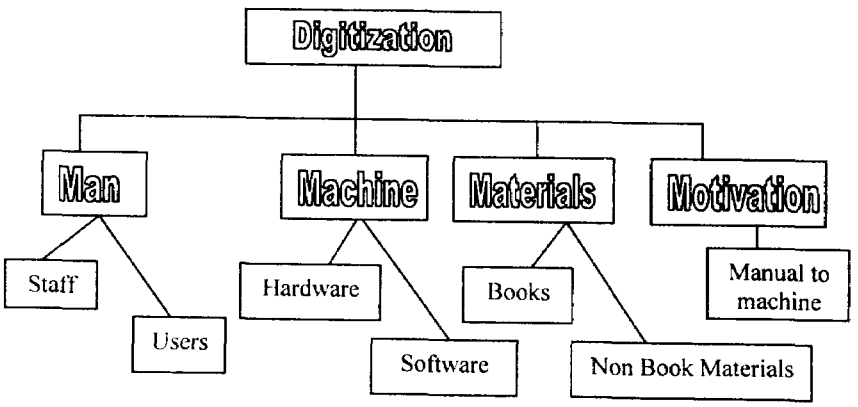


Fig.1 Digitization process

The staff with the help of devices via books and non book materials helps input the information with the support of the machine readable software to have the data on-line. This would enable the users to access the data through web and they can utilize the services to further enhance their knowledge for educational and research purposes. The process of digitization also helps in presenting the records of college in electronic form. Some of the areas are question papers and syllabus.

Digitization of question papers and syllabus forms an important step in the library service to disseminate information to the users of the Library. The library had started the process of digitization of question papers and syllabus in DSC Library in 2005 and right now it is in a developmental phase. Manual collection and providing access to question papers and syllabus is an old but time tasking tradition and currently is not in consonance with technological advances made in library automation. Demands from various quarters have increased manifold for providing consultation of previous years question papers and syllabus. However due to shortage of staff, it is very difficult to fulfill the needs of information to the users of the Library. To overcome this problem, library assiduously has undertaken the decision to convert the question papers and syllabus into electronic form and make it easily accessible for the users.

The various steps followed for this process are:

a) Collection: Question papers have been collected every year from examination branch of the college and library staff organized these question papers subject wise. These question papers kept in references section for consultation to the users.
b) Scanning: Collected question papers and syllabus are scanned with the help of HP Scanjet 2400 and saved in a particular folder in PDF format indicating the name of course, year and paper number. Portable Document Format (PDF) has become the most universally accepted format for documents. The main goal of PDF is to recapture the rich layout and presentation of information in a form that is equal to the presentation already out there in the vast realm of information residing in paper documents. Another main reason for choosing this format is that OCR of scanner cannot support the Hindi language which is given in question papers and syllabus.

Access and Retrieval: Due to large number of data files in folders, and to avoid these types of limitations and complex procedures which may be unwarranted to make searchable to the users, DSCL decided to go for Greenstone Digital Library Open Source Software (GDLS) for full text searching of question papers and syllabus.

Greenstone Software: GDLS was developed during the New Zealand digital library project, and provides a new way for the construction and presentation of information collections. It incorporates the interface in a way that makes it easy for people to create their own accessible collections. Locally, it is east to build new collections styled after existing ones from material on the web or from their local files, and collections can be updated/ uploaded as and when required. GDLS is available from the New Zealand digital library under the terms of the Gnu General Public license. It is easy to install on window and UNIX.

Witten and Bainbridge (2001) summarized the facilities of GDLS as below:

Widely accessible	:	Collections are accessed through a standard web browser.
Multi-platform	:	It can be served on Windows and UNIX.
Metadata-driven	:	Browsing indexes are built from metadata.
Extensible	:	Plug-ins can be written to accommodate new documents types. Classifiers can be written to create new kinds of browsing indexes based on metadata.
Multi-language	:	Unicode is used throughout.
Interface	:	Interface is available in multiple languages.
Large-scale	:	Collections containing millions of documents.
Z39.50 Compatible	:	The Z39.50 protocol is supported for accessing external servers and for presenting Greenstone collections to external clients.

GDLS provides:

Flexible Searching	:	Users can search the documents full text.
Flexible browsing	:	Users can browse lists of authors, list of titles, list of dates, hierarchical classification structures, and so on.
Phrases and key phrases	:	Standard classifiers create phrase and key phrase indexes of text- or indeed any metadata.
Sustained operation	:	New collections can be installed without bringing the system down.

GDLS enables:

Multimedia	:	Collections can contain pictures, music, audio and video clips.
CD-ROM option	:	Collections can be published on a self-installing CD-ROM.

Distributed collections : Collections served by different computers can be presented to users as though they were part of the same library, through a flexible process structure.

Installation of Software: For installing & running GDLS on system, it requires installing Java Runtime Environment (JRE 1.4.2) and Imagemagick (version-6.2.3-Q16) software on windows (from Internet or CD). GDLS can be downloaded from http://www.greenstone.org. This process of download is a self extracting and executable. To install, simply double click the downloaded file i.e. "gsdl-2.70-win32 1.exe" and follow the on screen instructions given below by pressing "next" as and when appeared on screen after following the instructions one by one till "finish" appears:

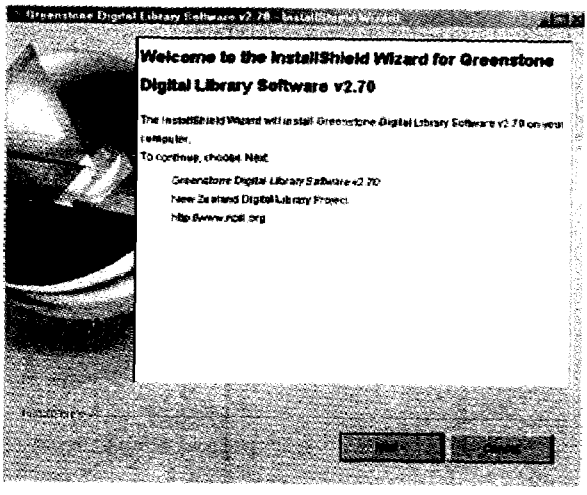


Fig.2

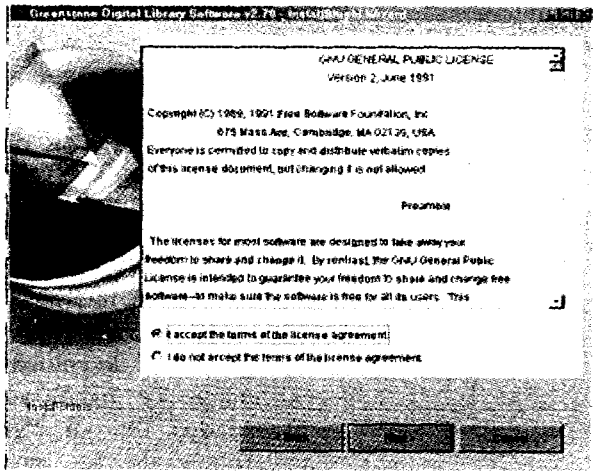


Fig.3

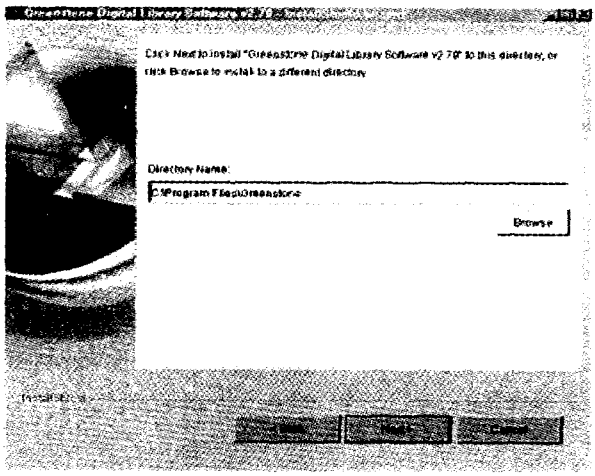


Fig.4

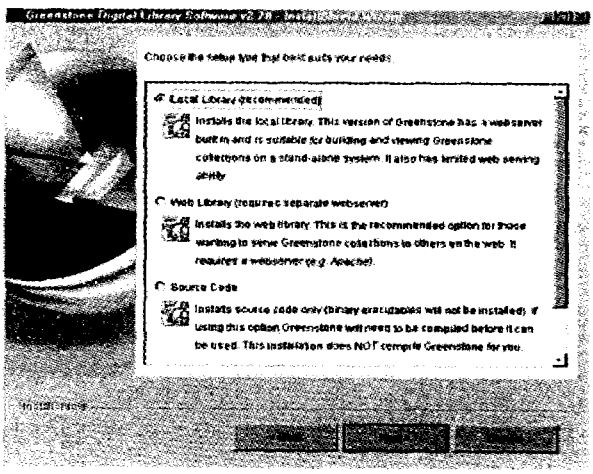


Fig.5

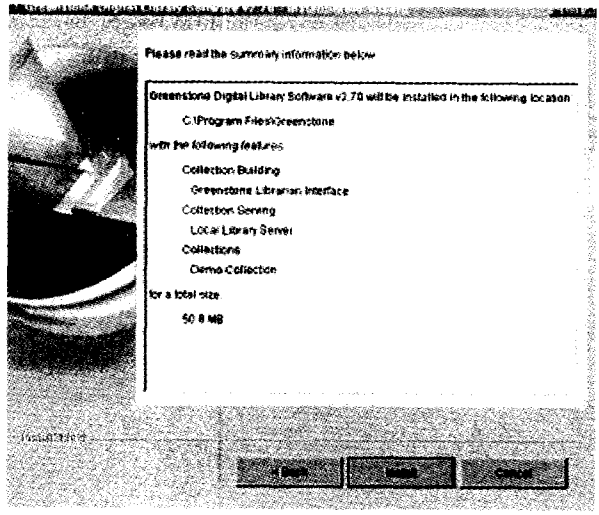


Fig.6

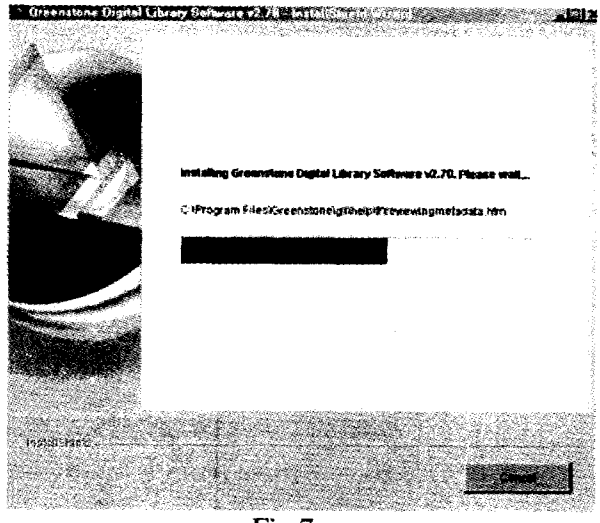


Fig.7

Collection buildings: We can create new digital collections using the Graphical Librarian Interface (GLI). This interface allows the users to build collections of different files types viz., doc, PDF, rtf, jpg, ping etc. The collection building process requires to follow some steps, which are summarized below:-

a) Creation of New Collection: To build a new collection open the 'file' menu and select "New" and need to fill out the information regarding new collection.

b) Gather: Gather panel to select what files to include in the collection building. It can be include by downloading, or from local files on computer. DSCL includes various files of question papers and syllabus, which are stored on the computer.

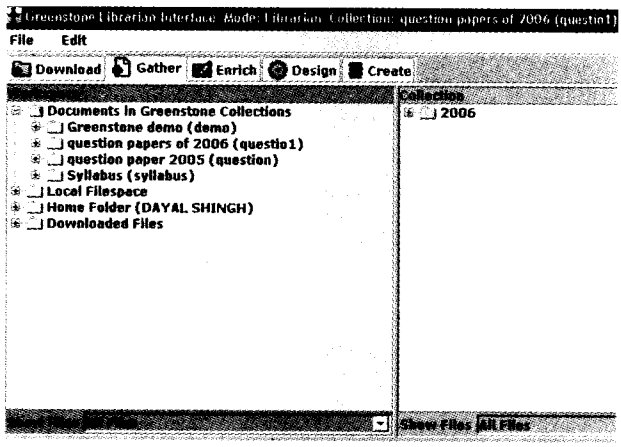


Fig.8

c) Enrichment process: Collections of various files are gathered and then one can enrich them with additional information. This panel explains how Meta data is created, edited, assigned and retrieves and how to use external metadata sources.

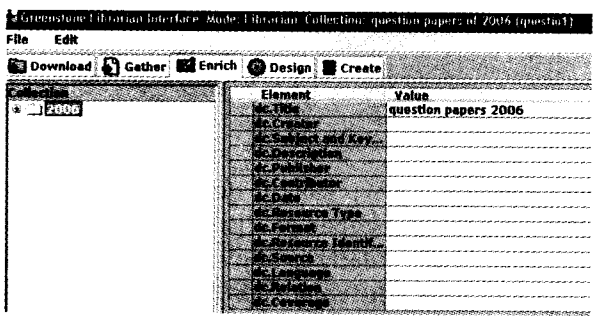


Fig.9

d) Design: Once files are marked up with Meta data. The next step is to create design panel, which is customizing Interface, which helps out the layout in required way. i.e. How the information can be searched? What are the ways a provided to browse through the document?

What languages are supported? In the case study, DSCL choose default index, title and file name.

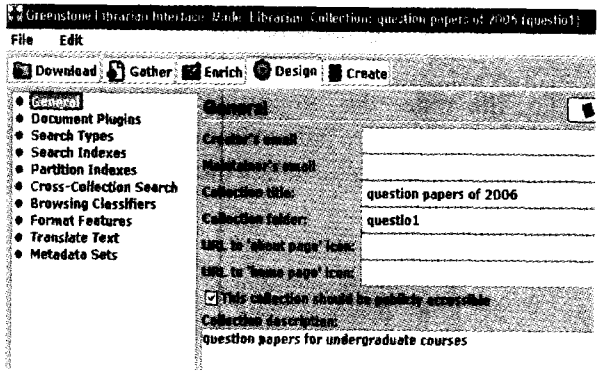


Fig.10

e) Create Panel: Once "design panel" is completed then only the "create panel" for building collection is developed. This panel creating collection and the end "Preview Collection" appear on the screen to see the "build collection".

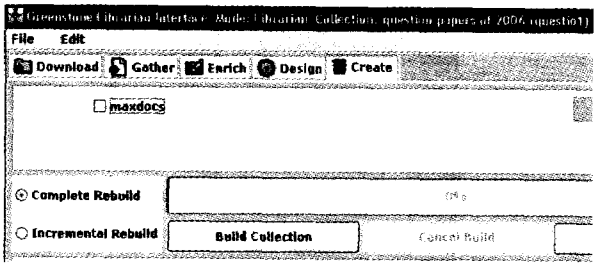


Fig.11

4. CONCLUSION

In the current scenario, the importance of providing of library information is as much pertinent as the availability of data in all other spheres of knowledge areas. In furtherance to providing of library services, the availability of question papers and syllabus through electronic form forms a very important part of broad basing the views of faculty and students. The DSC Library had created digital collections in three different categories indicating the Question papers 2005, Question Papers 2006 and Syllabus for the users. Presently, digital collections in DSCL are running on standalone computer only. These collections will provide comprehensive range of services on DSC Library Network. In the current system, the library is not able to provide all the metadata required for the same. This is important for future wherein extensive

usage is envisaged in the search of the information required; The Library now is able to meet the information needs with collections and services in machine readable form accessible from more than one location, which were maintained manually in yesteryears.

To illustrate the importance of the Greenstone software, for providing the required information in a suitable way, below are some of the enunciated screen visuals which are self explanatory:

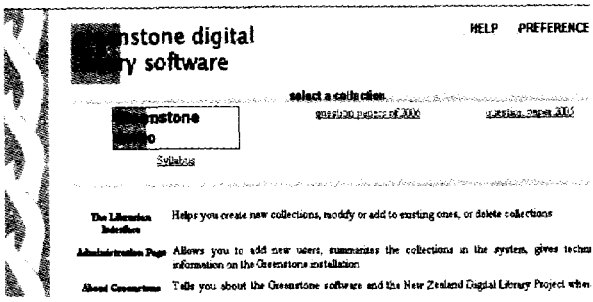


Fig.12

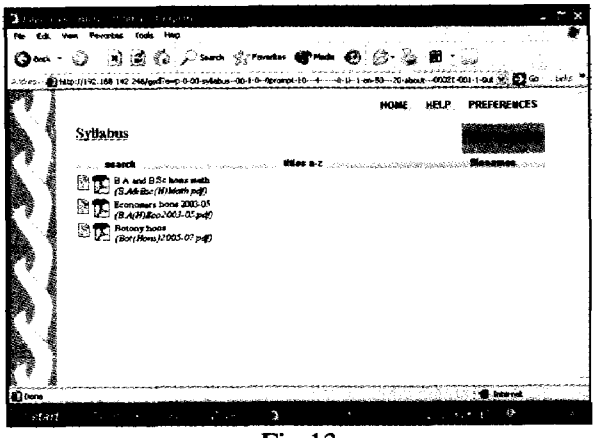


Fig.13

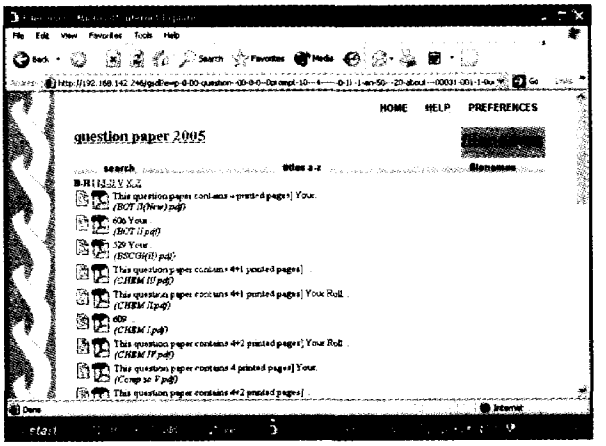


Fig.14

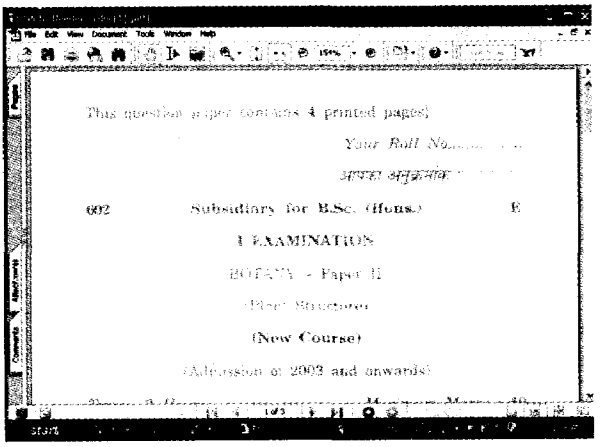


Fig.15

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Application of Total Quality Management in Information Technology Products: A Study

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ABSTRACT

Quality has become the buzzword in every walk of life. Modern Management Techniques are the major instruments for the improvement in information services in the present knowledge society for systematization and the infusion of Information Technology (IT).

The paper highlights the impact of Information Technology in Library Services and application of Total Quality Management (TQM) to enhance the clients satisfaction and also caring for cost-effectiveness. The components, features and merits of Total Quality Management, guiding principles for achieving the quality in library and information service products are enlisted.

Chance is witnessed in every facet of life. In the wake of information revolution, came in technological innovations and today it is the scene of information explosion. The world has shrunk in size to a global village.

'Quality' has become the buzzword for survival. How quality helps to solve the issues at the library platform by exploring different types of services. The basic characteristics of Quality in today's context is looked at and the drivers of quality are highlighted to assist information scientists/librarians for instigating the quality era in their respective institutions.

1. CHANGING SCENARIO OF QUALITY IN LIBRARIES

Quality in yesteryears	Quality in 21st century
Product quality was the key.	Customer/Clients requirement is the key.
Quality was a function.	Quality is a strategy.
Responsibility lied with library.	Quality responsibility lies with every employee.
Focused on product and service.	Focused on all service tasks.
Mainly the system was focused.	Mainly both the system and human components are focused.

2. BASIC DRIVERS OF QUALITY IN LIBRARIES

- Knowledge explosion
- Threat for survival
- Demand from Customers/Clients
- Promise of commitments
- Desire to do better
- Innovation of new technology
- Users demands

3. INFUSION OF IT ON LIBRARY INFORMATION SERVICES AND PRODUCTS

The application of various technology for the acquisition, processing, storage and dissemination of information. IT acts for a drastic change and to improve service conditions in the Library. Due to dynamics of information, a large amount of knowledge is generated and the libraries are experiencing virtual electronic information explosion. Thus the library managers cannot escape adopting IT and incorporating the advantages inherent in it, they plan the library products and services according to the every changing needs of the society with the coming of new technology like computers and communication, tele-conferencing, electronic spread sheets etc.

The application of IT on library products and services can be traced in various areas.

- Primarily of reading materials carrier, like print form of papers, and digital data.
- Secondly on Library operations: here for various processes computers will be integrated to enhance the operation efficiently.
- Thirdly IT will have bearing on management techniques by using Management Information System, Decision support System, Electronic Spread Sheet, Expert Systems, DTP etc.
- Finally, on library professionals and customer interactions will be enhanced for quick, effective and efficient library services.

In the present time the library managers need not sit as a spectator, but they must ensure the best use of IT by needs of their organization. So, future library has to move from the state of being merely a passive customer of knowledge to the level of becoming a platform for generation for providing information service currently available in the present technological world.

4. MODERN MANAGEMENT TECHNIQUES AND LIBRARIES

Information deluge, complexity in information resources, its procurement, organization and dissemination to the information seeker. The crunch in financial resources are the serious issues of today's libraries. With the innovation of modern management techniques and IT have drastically changed the environment in which the librarians need to work. Future libraries will be transformed by the realities of the electronic storage transmission and access of information and creating data base to handle information transfer systems. They are responsible to satisfied the customers, designing and maintaining needs, and create a modern management technique for the library.

The Librarian should know how the information is being generated. The managers of library are the experts in creating data base and make it possible, its access through sophisticated electronic network They must know how to cope intelligently, with the changing technique of management for delivering library products and services. Therefore, management perspective on IT is the most important factor in determining its effectiveness in any organization like libraries.

The library managers need to know structural balance between self sufficiency and networking. Modern management techniques also insist for good interpersonal relations, open communications, a comprehensive and supportive programme of training and it also encourages staff to feel involved in decision making and new developments within the library organization, encourage personal growth of employees, recognize the potential of individual employees, and operate in a participatory style. This will be more effective in accomplishing organization goals etc. Therefore, the successful operation of library products and services depends on the applications of sound and newer management principle's philosophy and that will help to accept the change and challenges of tomorrow.

5. WHY TOTAL QUALITY MANAGEMENT (TQM)?

TQM is basically a way of managing to improve the effectiveness, efficiency, flexibility and competitiveness of a business as a whole....and it involves whole organization getting organized and committed to quality in each department, each activity, and each person at each level. Therefore TQM aims to improve product quality and ultimately customer satisfaction as per their requirements and expectations. It emphasized to do right things at right time. So TQM is a management philosophy embracing all activities through which the needs of the customers and the community, and the objectives of the organization are satisfied in the most efficient and cost effective way.

The basic components of TQM are :

(i) The soft components are

1. TQM culture,
2. Communications, and
3. Total commitment.

(ii) Hard components of TQM are:

1. Documented quality management systems,
2. Quality management tools,
3. Techniques,
4. Team work, and
5. People.

The basic features of TQM are:

- Customer driven quality,
- Strong quality leadership,
- Continuous quality improvement,
- Decision making based on facts, and
- Employee participation.

Quality Gurus like Edwards Deming, Joseph Juran, Phillip Crosby, A Feigenbaum of UDSA and K. Ishikawa, G. Taguchi and S. Shingo of Japan are profoundly emphasizing for adaption of TQM. Edwards Deming devised "Deming Cycle" i.e. Plan Do-Check-Act. Similarly Joseph Juran advocates that, quality control must be an integral part of management, it is no accident but it must be planned and there are no short cuts to quality and problem should be taken as sources of improvement. Phillip Crosby expounded four absolutes of quality; viz. quality in conformance to requirements; quality is achieved through prevention, not appraisal; quality has a performance standards of zero defects; and quality is measured by the price of non-conformance.

Today's world national and international awards and prizes are instituted for outstanding TQM performance such as Malcolm Baldige National Quality Award of United States and Japanese Deming prize. Therefore, TQM practice will lead to many benefits.

- Creates quality awareness;
- Orients work and workers to customer needs and satisfaction;
- Generates team spirit;
- Improves performance, process and quality;
- Enhances productivity and job security.

6. APPLICATION OF TQM ON LIBRARY AND INFORMATION PRODUCTS AND SERVICES

TQM is such a quality concept that can include in every organization including service organization like library. The library can also be benefited through implementing Total Quality Management techniques in their service platforms. The library and information science literature reveals that quality management concept is still not taken into consideration in every sphere seriously, but TQM application can be seen on two main groups of libraries, those where parent organizations are for TQM and the other is library and information services.

The managers of library and information scientists of the future are supposed to design on-line catalogue and setting standards for library network to maintain potential in bibliographical access, exposure of Information technology potential , in acquisition, preservation , organization, dissemination of records, ILL control, budget control and collection development etc. The international information centres and archives will be in electronic format. They are interconnected with data bases at regional, national and international levels through communication network. The future library services products will be computer based.

In the changing scenario several challenges and problems are posed to the library managers and they must develop a new knowledge base, as well as new sets of policies, procedures, and reorganization strategies by adopting the novel techniques of TQM.

The successful accomplishing of TQM in library and information services needs certain guidelines to be followed. They are:

- Care to cost-benefit analysis;
- Prepare TQM documentation manuals, that should consist detailed guidelines, uniform procedures and systematic steps for efficient and careful working practice;
- Use communication technology to speed up;
- Breakdown all the processes involved in the libraries into a sequence of steps;
- Measure customer satisfaction by obtaining and analyzing feedbacks from customers and pinpoint their problems and expectations;
- Focus on preventive rather than curative maintenance;
- Set an example of practicing what you preach i.e. commitment to quality;
- Eliminate all non-value adding activities from every process;

- Educate library professionals continuously on library mission and further train and retain them on TQM and how to manage for quality.

7. CONCLUSION

The IT in the future will be evolutionary and not revolutionary. The libraries will become switching centres rather than resource centers. The worldwide market potential for IT in information exchange and the library customers too are more information conscious. Modern management techniques are important because IT has to be treated as a resource to be managed like any other. TQM is designed to help, not hinder and which continues to improve standards. It does not remain static in one place but evolves to meet changing scenario. Every success and good opportunities are possible to reap in today's competitive world.

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Building the Hybrid Library: Some Issues

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ABSTRACT

Explains the meaning of digital library. Discuss the issues central for building hybrid libraries such as infrastructural issues, electronic issues and management issues.

1. INTRODUCTION

A digital library is an automated or electronic library, where activities like accessing, retrieval, processing, automatic indexing and textual analysis, are carried with the help of a computer. It can be understood as an information centre with no sense of physical location for an end user. The user can access information from anywhere and information can be stored any where across the world. It is a system, which provides a community of users with coherent access to large, organized repository of information and knowledge. It is not just an entry, but multiple sources seamlessly integrated.

Digital libraries are the managed collections of digital objects, created or acquired according to the principles of collection development, in which information is stored and distributed in digital format with the associated value-added services necessary to allow users to retrieve and exploit the resources just like a traditional library. The e-documents in a digital library are accessible readily with a multitude of user-friendly attributes and proper methodologies ensure the persistence of such documents over time.

What are the real issues central for building hybrid libraries? One issue might be how to digitize objects and put them on-line. A second might be how to include new forms of information that do not have

temporal or tangible representation necessary for inclusion into physical libraries. Another could be how to locate materials in the new digital library. Yet another would be when to use and when to transcend the existing technologies and traditions of the physical library in its digital form. Still other issues stem from the problems of information overload created by new information technologies. This paper presents some of the infrastructural, electronic and management issues central for building hybrid libraries.

2. ISSUES

2.1 Infrastructural Issues

2.1.1 Staff Development

Traditional library training and staff development need to be supplemented with significant technological skills and capabilities. Of course, technical skills take the librarian only so far; they must also know the library's users and their demands, and they must be able to help shape those demands in reasonable proportion to what is possible in new and changing environments. It is a question first of identifying people with those skills, and second of creating the right leadership roles in the library for them to take up.

2.1.2 Equipment and Software

Libraries acquire information in electronic form; they must address the technological needs of staff and patrons. Each of them must have appropriate current equipment, software, and support, and there must be funding therefore for reasonable refreshment of that technology often enough to keep up with the wave of new electronic products coming down upon library. Keeping the equipment and software fresh and upgraded when an important "killer application" appears is a substantial and serious responsibility and keeping it working day to day is another expensive challenge.

2.1.3 Public service

Most important are the patrons for whom libraries exist. The varying electronic information sources with their diverse interfaces also need to be integrated with related print and electronic resources. Electronic information seekers need a new kind of library integration and "instruction" to ease navigation through incompatible and non-transparent interfaces and search strategies. Always, the user remains libraries largest focus and challenge and visitors to libraries remark on a rapid growth in formal and informal teaching and outreach to support these users as they learn new skills and information sources.

2.2 Electronic Issues

2.2.1 The Electronic Explosion –Existing Publishers

There looms an explosion, driven by electronic technologies, in the production and distribution of information begging for librarians attention. The risk here is one of de-stabilization. The same information now begins to present itself in multiple formats, each answering a particular kind of user need. How do librarians serve their patrons' needs if a long-established product starts appearing first in one form, then in another, then in another, then disappears for a while? There have already been cases of this happening. Each format decision entails a series of decisions not only to buy the information but also to equip the library to present the information in one or another electronic form and then to train and retrain its staff and users to adapt to each new form the particular information resource takes. The pattern multiplies itself by a large number of individual publishing projects undergoing such transformation, the library and its users find themselves victims of a particularly insidious form of cost increase that is very well unavoidable.

2.2.2 Long-Term Access/Preservation

Electronic materials bring their own worries as well, regarding long term access and preservation. Who will assure readers that material of high current value (and thus in a publisher's interest to prepare and sell) will be kept intact or migrated to a next generation of technology when the value falls below a publisher's criterion for marketability but remains significant for scholarly and scientific users? Some scientific disciplines require only literature of the last few months; others rely only on literature of decades back.

2.2.3 Licenses

It is so far characteristic of electronic information that it rarely comes to libraries, when they pay for it, as free of 'strings' as did print material. The concept of First Sale in the US. Copyright Act of 1976 has given libraries the ability to serve and lend all the objects they buy. Books are their purchasers' to keep and preserve. Electronic information, however, characteristically comes with license agreements that constrain rights in various ways.

(i) **Potential loss of knowledge.** Libraries generally do not own the electronic material that they are paying for (they lease or access it for a limited time). If at the end of that time, they cease paying the lease price, prior investment may become worthless as the information is taken away.

(ii) **License restrictions.** License restrictions on use probably mean that libraries cannot let all and sundry make reasonable use of materials but must employ passwords and user IDs to restrict use to formal members of specified academic or scientific communities.

(iii) **Limitations on users' rights.** In the world of license agreements the licensee generally begins with fewer rights to use information than in the world of print material, and then further limitations may be added.

(iv) **Licenses are labor-intensive.** Negotiation requires time, and time is a major cost here. How librarians can work together with publishers to encourage a more enlightened form of agreement, with a fairer balance of rights and responsibilities is an open question of the significant importance.

(v) **Cost.** In general, electronic licenses so far have cost on average 1/3 more than print equivalents. This has been the experience, in any case, for Indexing and Abstracting services, and American libraries have attempted to find funding source to absorb these increased costs for such valuable bibliographic tools. Now, full text is coming. For full text, many publishers also have the expectation that higher prices will be asked and should be paid. Publishers are setting surcharges of as much as 35% on electronic journals, and libraries simply do not have the capacity to pay such monies without canceling a corresponding number of the journals of that particular publisher or dipping into other publishers' journals. Many of these licenses are for trial projects. For these titles, we are partners in an important experiment with publishers. It is not readily within our power to pay higher-than-print prices for such titles as well.

(vi) **Copyright issues.** The costs of copyright clearances as librarians begin to offer electronically-enhanced forms of document delivery are a real economic factor. If indeed an adversarial atmosphere springs up between users and publishers and leads to litigation to define more precisely what rights users have, the results will be expensive in the short term and unlikely to lead to freer access in the future.

2.3 Management Issues

(i) **Technology adoption**. Most libraries today find themselves straddling the traditional and electronic library streams. Their main challenge is to plan their conversion from conventional to electronic formats. To some extent they are driven by the technology adoption of publishers and other suppliers as well as by technological developments

among library system vendors. Librarians need to be aware of technological development in order to present to their customers an image that is advance, efficient and effective as possible

(ii) **Future technological directions**. another management issue for the hybrid library is that of selection appropriate technology. Not only is it extremely difficult to keep up to date with technological and software developments in the field but the situation is complicated by rapid technological innovation, which lead to technological dead –ends.

(iii) **Stakeholder relationship management**. This gets back to the very necessary focus of the library on its uses. The principles of the New Economy are forcing business, including libraries, to become more sensitive to Stakeholder Relationship Management issues. This means that librarians are coming under increasing pressure to ensure that their institutions fit in with strategic direction determined by their employers or parent bodies. They need to give clear evidence to employers of the value of the library and the return on investment that the library provides. Similarly, to create the most positive impression of the library's competence and efficiency, librarians are creating strategic partnerships with "islands of excellence 'both within the institution and with associated bodies.

(iv) **Collaboration with consortial partners**. Among the stakeholders, of course, are consortial partners. Here the emphasis lies on collaboration, and electronic technologies lend themselves particularly to that activity. Not only do consortia provide opportunities for leveraging the negotiation power of numbers, but they also provide opportunities for co-operation in service delivery. Within any consortial arrangement, 'islands of excellence' should be exploited in order to enhance service and to convey a combined image that is greater than the sum of the component parts.

Apart from the above, there are other issues to be faced while building hybrid library. They may be:

* **Financial issues**– changes to funding allocation
* **Personnel issues**– staff commitment to new system and services
* **Organizational issues**– need for new organizational structures.
* **Subject discipline issues**– availability of content for different disciplines, appropriateness of delivery method.
* **Technophobia**– fear for upcoming technology hence still not ready for using it.

3. CONCLUSION

Changes and development in the field of information technology, the scenario of information science is changing at a very fast pace. Information today may become absolute tomorrow. The access to right time is very essential and in the new scenario also. The extent of maintenance of library collection is a manageable problem. The willingness among librarians, information scientist or documentation officers for adopting multimedia technology, is must for preservation of important and regularly used documents. In this context building hybrid library is need of the hour.

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Changing Roles of Librarians in Digital Era

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ABSTRACT

With the information technological changes library scenario is rapidly changing towards information centers. In this electronic age the librarian of the future must be equipped with a wide range of personal and transferable skills in order to manage the changing environment in which he works. Information professionals within libraries are playing an increasing role in dealing with information in electronic formats by creating Web pages to promote their services to external customers/readers and choosing automated library management systems.

Keywords: Digital Libraries, Librarianship

1. INTRODUCTION

The library in our country was originally conceived as Pustakalya or Granthalaya, i.e., a storehouse of books and literature meant for dissemination of knowledge to its users. The libraries were expected to store in a systematic manner the literature, records, books and encyclopedias so as to facilitate their users to have an access to the knowledge contained in these publications. A librarian was supposed to maintain the records of the library through well-defined accession and an issue and return system. He was also required to preserve the records, books etc. so that it could be utilized over a long period of time. The Librarian therefore, was considered as the custodian of the rich intellectual wealth kept in the library.

The libraries of 21st Century have to be conceived not merely as the storehouse of knowledge but an effective mechanism to facilitate dissemination of knowledge, promoting and sharing intellectual property.

In essence the libraries of electronic age have to be an effective support mechanism for dissemination of knowledge.

2. NEW ROLES OF LIBRARIAN

In addition to the professional skills, the librarian of the future must be equipped with a wide range of personal and transferable skills in order to manage the changing environment in which he or she works. Management and interpersonal skills will make librarians more effective managers of networked resources and services. As Hastings says "it is more important that digital librarians possess particular personal qualities rather than specific technical expertise."

It is needless to say that in modern times the library professionals are not to stick their heads in the sand. The information professionals must change and adapt to the new electronic information environment. He or she must learn about new technologies and be aware of the strengths and weaknesses of them. Librarians should not feel threatened by computers and technical developments but should move forward with the new technology and take a pivotal role within organisations.

Information professionals within libraries are playing an increasing role in dealing with information in electronic formats by creating Web pages to promote their services to external customers and choosing automated library management systems. Skills in information organisation are more necessary in this age of information explosion. Library and information professionals have a key role to play in this era. For example, librarians are well equipped to take intranet projects through the various stages of design and maintenance, as they understand their users and their organisations' information needs and have the range of skills to manage the knowledge effectively.

The role of the librarian in this context is to help users find the information they require then provide them with the tools to assess and use the resources for their individual needs. Creth suggests that librarians achieve this by "actively seeking out users in a variety of settings" and by making "full use of information and multimedia technology" by offering instruction in a variety of formats (including Web based instruction and online tutorials).

3. USER EDUCATION ON THE INTERNET

As the Web is increasingly becoming the first place that students will look for materials the role of information professional, as intermediary, will also grow in importance. As librarians working with this medium, it is up to us to introduce the strengths and weaknesses of the Internet as any other library resource during our user education programme. Just as

a traditional academic library offers a programme of "user education" to students and teachers to maximise the benefit they receive from the library, Indian libraries working in the Internet environment in conjunction with the developing networked user education help people get more from this very rich information service. It is our experience that many users do not realise how rich a source, the Internet, can be used to find many research and teaching materials. Traditional library user education in a university, college or school offers:

- library tours– to become familiar with the layout of sections of the library,
- library induction sessions–to learn about the services available and to learn how to use them,
- subject guides–to identify the key information resources for a particular discipline,
- support from subject librarians–to get specialised help, and
- information skill development–to learn transferable skills in information handling.

By applying a traditional library role such as user education and the knowledge of the best resources available for their subjects in the Internet environment an Internet librarian is well placed to provide a comprehensive Internet information seeking skills.

4. ROLE AS INTERMEDIARY

The librarian acting as an intermediary will have greater access to library and external files than before, with the ability to add to and manipulate them. These will include the order and receipt files as well as information databases. The technical support staff will oversee the data on the system to achieve overall efficiency and security as well as providing the information worker with accurate and up to date information on which to base decisions. The ability of the selector to obtain information rapidly within the electronic environment and make the relationship between the user and the information librarian and between the information librarian and library management will help the users largely in finding the information they require. In the present day the information librarian plays an intermediary role, not only between the user and information, but also between the library management structure and end user.

5. ROLE IN WEB PUBLISHING

Librarian can help bring scholarly information to the web in a number of different ways. Firstly, we can be very assertive in prompting web publishing. This can take the form of encouraging others to publish their material on the issue of web publishing to the forefront of the

campus administrative agenda. Secondly, we may be actually publishing full text articles on the web. These articles can be placed on home page or placed in prominence on the library web server as an advertising message. Thirdly, librarian may be indexing these web publications. Full-text indexing has often proved to be less than helpful in term of precision and recall issue. These published articles deserve at least the base intellectual access point of author, title, and subject. Fourthly, we may keep adding value to web publication through internal and external hyper links. These links make the web just another intellectual platform. The value added aspect of the web, especially its almost universal accessibility, its immediacy, and its hypertext nature make a powerful and compelling argument for the concept of scholarly web publishing.

6. ROLE IN INFORMATION MANAGEMENT

In the area of information management, the librarian

- is responsible for the overall design, graphics, functionalities, and technologies of the site,
- mounts, maintains, and updates significant portions of the site,
- maintains a master list of all subscription databases on the site, with appropriate links, "about" files, etc.,
- maintains aspects of the Citrix database project,
- in close coordination with the Head of library systems, oversees and coordinates the technical needs of the site with academic computing,
- oversees the expansion of the directory tree,
- coordinates the inclusion of all new web builders into the site,
- solves technical problems for web builders contributing to the site,
- link checks the site, mounts reports on the staff Intranet,
- maintains the staff Intranet, assists in planning for a "true" Intranet maps SAMBA to staff PCs as requested to create a user-friendly web building environment,
- maintains subject resource pages,
- maintains the Webmaster e-mail account, and
- works with library systems and others to plan for web technologies that might be maintained within the libraries.

7. TRAINS, INSTRUCTS, SUPPORTS STAFF AND USERS IN INTERNET-RELATED TOPICS AND TECHNOLOGIES

The librarian of today

- teaches HTML to library staff; serves as the primary HTML support for the university libraries,

- provides bibliographic instruction to staff and users on using the Internet for research, Internet-related software, non-web Internet technologies, etc.,
- solves Internet-related problems that occur on public and staff workstations, and that with remote users,
- creates/maintains informational handouts for the reference of Internet workstations,
- creates/maintains a large number of web-based Internet tutorials,
- coordinates the reference of Internet workstation area,
- contributes to choosing the layout, furniture, equipment, and workability of this area with the Head of reference and library systems, and
- maintains signage, posting of use policies, etc.

8. COORDINATES THE INTRODUCTION AND UPGRADING OF INTERNET-RELATED SOFTWARE

The librarian is

- responsible for testing, recommending, and training for each Web browser upgrade,
- responsible for the same with Web browser plug-ins and viewers,
- recommends other Internet-related software as needed, and
- meets regularly with other librarians, faculty and staff to ensure effective communication on issues and new developments; plans and revises services in response to needs.

9. CONCLUSION

The library professionals and those, working and managing modern information system are required to possess the knowledge and skill to handle challenge of 21st century. They are required to constantly update their knowledge and skill base so as to work in today's information and knowledge system. Librarian can show the users that they still have the human and oganisational skill to fulfill their true purpose in society.

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Collection Development of Digital Libraries: Recent Trend

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ABSTRACT

A digital library stores information in digital format such as digital books, audio and video clippings, films, etc. It contains different types of materials that include multimedia objects, representing different subject fields. Digital Library technologies are rapidly developing to cope up the current informational demands. More broadly, increase in the level of education through knowledge and technology transfer is an important benefit of digital libraries. Audio, video and print material, technology operations are major components of digital library. Developing digital library involves various steps like scanning, storage and retrieval. The paper will focus on the important factors that should be considered useful for the selection of digital information sources. Moreover in present scenario the status of digital collection development in India and role of UGC will also be discussed. In the collection development, digital information resources are selected carefully by the professionals keeping in view of the objectives of the institution and the requirement of the users. To search the relevant information resources like e-books, e-journals and e-reference books, the web is scanned by the professionals through various search engines and meta search engines.

1. INTRODUCTION

"The meaning of the phrase digital library varies tremendously, but one simple definition is the use of computers to store library material appearing in electronic (digital) format"[1] In brief a digital library is a collection of material, converted to machine readable format for preservation or instant access .The same can also be accessed

electronically. In digital library, information is stored in electronic and digital format such as audio video clippings, scanned images, digital books and graphics, etc.[2] and can be retrieved on networks. A network connects the computers to personal computers of the users. This is totally a paper less library with managed information. Different people can use different software as per requirements. The aim of digital collection development is to provide information within no times. The development of digital collection is essential to improve the quality of life by providing on the spot information. The basic theme of collection development of digital library is to utilize the facility of information technology up to maximum extent. With information explosion quality and the quantity of the collection of digital material changes. The mental attitude of the people also changes accordingly. To develop a digital library collection, interaction between the librarians and computer professionals is essential because library professionals are not fully trained in computers.

Hence there should be clear understanding between these two groups. Technological advancement has made electronic information available to every user. Readers have now direct access to the information without any medium. The technology of collection development of digital libraries is developing fast, moreover with the information explosion the attitude of the people are also changing.

2. DIGITAL LIBRARY COLLECTION

A digital library comprises the collection available in digital format. The following items comprise the digital library collection:

a) **E-Books**[3]: "This is a small, portable device on to which the contents of a book in electronic format can be down loaded and read; A book whose contents are in electronic format." With the technological advancement e-books have started replacing traditional books. In simple words e-books can be described as the books, whose contents are in digital format and can be downloaded. Electronic books are available on CD-ROMs and can be accessed online. These are easy to carry. Even one CD- ROM contains many books. Moreover they occupy less space.

b) **E-Journals**[4]: "Electronic journal is publication issued in regular intervals and available electronically". Publishers are providing online access to licensed users. Some of them is publishing their journals both in electronic and print version. Sometimes electronic journals allow accessing the full text of articles of the journal but not all the articles. Password is provided to the users to access an e-journal. In India INFLIBNET is providing online journals of various publishers to the member universities. Electronic journals are of two types:

* **Full text journals**: Full text remains available online. These can be in electronic version and print version
* **Partial text version**: These include abstracts, indexes and some part of the text.

c) **E-Reference books:** A number of e-reference book are available on CD- ROMS and internet. Many of them are accessible through payment and many are free.

d) **Audio and video material**: Audio and video material also form the major part of digital library collection.

e) **Print versions**: Some of the publishers publish their material in electronic and print format. These also form the major part in digital library collection development.

f) **Graphics:** Graphics can also be digitized to develop the digital library collection.

g) **Net Library:** The net library offers full text of large number of books. Access to some of the book is provided free of cost while payment is charged for others. The users can become the members of these libraries and thereafter they can search and read the books as per their requirement.

3. COLLECTION DEVELOPMENT OF DIGITAL INFORMATION RESOURCES

Selection of digital information resources is very important task for library professionals. Information resources can be selected keeping in view the objective of the institute and the thrust of the users. Search engines and meta search engines can be used for the selection of the relevant digital information resources. The following factors should be considered seriously while selecting the digital information resources:

- Hardware requirement
- Software requirement
- Internet requirement
- Matching of objectives
- Number of users to be allowed
- Digital rights agreement through password/IP address
- Easy to use
- Licensing policy
- Preservation of digital resources

It is very important to note that librarians must be given training for the collection development of digital libraries. The hardware and software used should be selected keeping in view the thrust of the library.

4. PROCEDURE OF COLLECTION DEVELOPMENT

Building a digital collection is not an easy process. It involves the following steps:

* **Identification and selection of material:** It involves the identification and selection of materials keeping in view the objectives of the library.
* **Scanning:** This process involves the conversion of material in digital format.
* **Storage:** This step involves the storage of scanned images on CDS and DVDs.
* **Retrieval:** It involves the fast and easy retrieval of information keeping in view the digital right management.

5. SOFTWARE ISSUES

This is a sensitive issue to be considered seriously while digitizing the library. Software should meet the objectives of the library. Greenstone is the software used for building a digital library collection. It organizes the information and publishes it on internet or CD-ROM. It was produced by the New Zealand Digital Library Project. This is open source software issued under the terms of General Public License. The aim of the software is to encourage the users to build up their own digital collection.

The NIC has developed software for digital libraries, known as Delsis. This software is used by the Developing Library Network (DELNET), which is also an effort to network libraries for resource sharing.

In India at present INFLIBNET is encouraging library automation, networking and database development. They have developed their own software 'SOUL' which is used for online public access for resources, cataloguing and archiving. Indian Institute of science, Bangalore is cooperating with INFLIBNET in the field of information management for digital libraries.

The 'Eprint'[5] is open source software, provides web based institutional repository. This software is easy to install and need minimum maintenance. This has been developed at the School of Electronics and Computer Science, University of Southampton, UK.

The DSpace software is a digital repository system which capture, stores, indexes, preserves and distributes digital research material. Research institutes are using it as an institutional repository, a learning object repository for records management. The DSpace is freely available.

5. COMPONENTS[6]

a) **Documents**
* Print
* Audio
* Video

b) **Hardware requirement**
* Latest workstations with latest configuration and enough memory
* Web server with enough space to store data
* CD and DVD writers
* Scanners with the capability to scan images at high resolution
* UPS
* Printers
* Network connection

c) **Software Requirement**
* Software to colour, scan and correct data in required format
* Web interface for the fast information retrieval
* Database for easy information search

d) **Standards**
* Standardization is must for the building digital library collection. A manual need to be maintained for the standardized vocabularies and formats/size of files

e) **Manpower**
* Skilled manpower to operate the computer/software
* System administrator

f) **Environment**
* Appropriate networking with nodes
* Safe environment
* Appropriate lighting and sitting arrangement

6. DIGITAL INFORMATION COLLECTION IN INDIA

The concept of digital library in India is in its early stage. In the academic sector UGC is encouraging the libraries to build up the digital library collection. The grants are provided to libraries to develop the same. Many of the publishers have started publishing the books and

journals in electronic format. A number of magazines are also issuing CD-ROM versions. There are some of the electronic databases which are very helpful for the users, i.e., Prowess and Economic intelligence service of Centre for monitoring Indian economy. The prowess contains the data of thousands of corporate firms. Both the databases are very useful for the students of management, economics and commerce. The CMIE is charging Rs 24000/- for Economic Intelligence Service and Rs 60000/- for PROWESS. Both the databases are also available in print format.

In India Delivery of Book Act covers only print on papers material. There is no legislative policy to make it mandatory fro publishers to deposit electronic publication with any national centre. This is why NISSAT has established a centre to collect information on CD-ROM and electronic publications in India and on topics with focus on Indian items published outside India.

National Centre for Digital Publication[7] was thus established at the Foundation Innovation and Technology Transfer at Indian Institute of Technology, Delhi. The product need to be covered is CD media, DVD and internet. Due to the scarcity of resources it is not possible for the centre to look all the fronts. The present concentration is on knowledge and information products:

a) Those published on CD media with following exclusions:
   * Software ported on CD
   * Games packages
   * Music
   * Other entertainment products

b) Reproduction of foreign CD publication for the Indian market

The centre interacts with the publisher of CD-ROMs directly. Earlier the centre was acquiring the products at the prevailing market price. Now the publishers are impressed that their CD-ROMs are part of national heritage and need to be preserved and they should cooperate in this national venture. Some of the publications have now been received free of cost, but a national consensus among the publishers still need to be made.

The financial position of the National Centre for Digital Publication is not so good for the acquisition of all the electronic material published in India. Presently electronic publications costing up to Rs 20000/- are procured after the content is reviewed by the committee. Other than that, various projects[8] have also been started in India in the field of digitization. They are:

Archives of Indian labour: It acts as a special repository of records. At present in total eight special collections comprising of 40000 printed pages, 100 hour of taped interview are stored in digital format. In addition several articles on labour history of India are also available. This library has been developed using Greenstone software at V.V. Giri National Labour Institute, Noida.

Digital Library of India: It is a digital library of books in Indian languages which are free to access on internet. This project is collaboration between different Indian institutes and universities and Carnegie Mellon University under digital library project.

Digital library of library and information science: This library has been developed by DRTC. It contains full text of papers related to Indian librarianship. Presently it contains full text papers submitted by library and information science professionals and students in DRTC.

ETD at Indian Institute of Science: This is the digital repository of thesis and dissertations of Indian institute of science, Bangalore. This has been developed to capture, disseminate and preserve research thesis of Indian institute of science.

Indira Gandhi National Centre for the Arts (IGNCA) digital library: It contains digital images, audio recordings and animations etc. related to Indian art and culture.

Nalanda digital library: This project aims at a full fledged digital library at NITC to meet out the increasing demand for information resources. Some resources are open to all while access to the rest of resources is restricted to NITC campus and their members only

Vidyanidhi: Digital library and E-scholarship portal[9]: Vidyanidhi understands the importance of archiving doctoral thesis and is an initiative to advocate, promote and facilitate the archiving of thesis. Vidyanidhi is an Indian initiative to archive and provide access to thesis submitted to Indian universities. It is a digital library accessible via networks. It is a national repository of e-thesis. It is a consortium of universities and academic institutions for archiving e-thesis. It started as a project in the year 2000 with support from NISSAT. The project is based at Dept. of Library and Information Science, Mysore, University, Mysore, Karnataka.

7. CONCLUSION

The digital library system is very important to cope up with the instant informational thrust of the users. Broadly speaking, increase in the level of education through knowledge and technology transfer is an important benefit of digital libraries collection. Most of the libraries have started building their digital collection. Government is providing financial assistance through the UGC sponsored INFLIBNET. But in environment like India, libraries are lacking resources, i.e., finance and skilled manpower. Libraries need to utilize their scarce resources effectively. Librarians are still not trained in computers .Initially they need to work in cooperation with the computer professionals. Moreover internet is also playing key role in motivating the libraries to develop their digital collection. In country like India speed of internet usually remains slow causing difficulty for the users to be habitual users of digital library. High speed internet connection should be provided. Libraries should come forward for resource sharing to enhance the digital collection and its quality. Government must do something in this field. Some agencies should be there to trained library professionals to build up digital collection. Moreover the important consideration is that Librarians and HOD's should also change their attitude to explore the benefits of digital collection.

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Digitization Trends among DRDO Libraries

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ABSTRACT

Advances in Information Technology have led to a new era of Digital Libraries. Today Digitization of Information in Libraries is most important activity for Creation, Storage, Retrieval and Dissemination of Information. The user can access information irrespective of format, time and location of information. All Libraries in DRDO are providing user based services by using Digital Resources for Internet, Procurement of E-Journals and E-books and DRONA. RCI Library has developed Digital Library of Key Missile Literature to meet information requirements of all Scientists and Staff in their core areas of work.

This paper discusses various aspects of Digital Libraries, its functions, Current trends worldwide and digitization trends in DRDO Libraries

1. INTRODUCTION

It is a well-known fact that a large number of libraries are providing access to Information by using of Digital Libraries in their day-to-day activities. The recent developments in the area of Computers & Networks namely Internet, Intranet & DVDs have brought radical changes in the process of generating, storage, retrieval & dissemination of information. The digital library has been one of the important outputs of rapid changes in web technology allowing user to access information from any where in the world.

2. DEFINITION OF DIGITAL LIBRARY

A digital library can be defined as collection of information stored in digital formats and accessible over a network. Digital libraries can also be defined as set of electronic resources and associated technical capabilities for creating, searching and using information. (1)

In other words, a digital library can be broadly defined as collection of documents in organized electronic form available on the Internet/DVDs.

3. NECESSITY OF DIGITAL LIBRARY

Libraries are providing a large number of information services to its users by automation of its services and In-house operations. But, there is a gap between user's demands and services provided by the library. The rapid growth of information due to increased activity in all areas of research & development, financial constraints and manpower problems could not help libraries to meet the needs of its users.

Some of the major reasons for creation of digital library are as follows:

a) Digital libraries have lot of storage capacity and thus save space required normally for physical documents
b) Provides easy and fast access to information irrespective of time and location
c) Provide access to rare books
d) Provide download and printing facilities
e) Helps in reduction of procurement of multiple copies of text books

4. FUNCTIONS OF DIGITAL LIBRARY

The basic functions of digital libraries are:

a) Capture, store, manipulate information and provide access to a large collection
b) Improve the cost effectiveness of library operations
c) Digitize documents for preservation and for space saving
d) Provide facilities for networking and resource saving
e) Access national and international Journals, which are being published only in machine-readable form
f) Introduce and provide user-friendly interface and new services
g) Provide need-based and retrospective search services to the user(2)

5. CURRENT TRENDS

It is a well known fact that Internet is the best example of the digital library. Today a large number of search engines are regularly used to access the information all over the world.

Some of the major initiatives for the digitization of documents internationally are:

a) The Google aims to provide access to millions of E-Books, Manuscripts, Patents, Newspapers and Sound Recordings available in digitized form
b) It has signed agreement with University of Stanford, Michigan, Harvard, Oxford and New York public library to let Google digitize their holdings and make them searchable
c) The US Library of Congress has also launched a new project of its own to create a World Digital Library to provide universal access

d) Besides, Yahoo and MSN are jointly trying to create open content Alliance representing the collaborative efforts of cultural, technology, non-profit and government organizations from around the world that will help to build a prominent archive of digitized text and multi media content

In the context of our country a number of universities have initiated steps to digitize and preserve the rich legacy of printed world. To name a few, digital library of India launched by IISC, Bangalore with the support of Carnegie Mellon University, and efforts of Jawaharlal Nehru University and Hyderabad Central University in this area are noteworthy.

The best example of digital library is Indian National Digital Library of Science and Technology funded by Ministry of Human Resource Development for subscription to Electronic Journals for IITs, IISC, NITs and IIMs on consortium basis. Similarly the CSIR Labs are also accessing E-Journals on consortium basis. The important thing is all types of libraries in our country have initiated steps for digitization of documents as per users needs.

Lastly, the biggest hurdle is the problem centered around books, which are out of print but not out of copyright. It is observed that documents, which are out of copyright, can really benefit from Internet based services (3).

6. DIGITIZATION TRENDS IN DRDO

A large number of libraries in DRDO are providing access to digital information by adopting following methods

a) By subscribing to databases (e-journals, online indexing and abstracting services, reference books, etc.)
b) Downloading key information from Internet (e-books, technical reports, newspaper clippings, etc.)
c) Scan and digitization of documents in key areas of work, rare books, etc., by using suitable retrieval software.
d) In RCI, keeping in view user's areas of work, projects in progress and future areas of work TIRC has initiated creation, and development of digital library in key missile literature. It has scanned missile information in pdf format and categorized them broadly into four areas namely. Lecture notes, conference papers, current topics and technical reports from 1960 onwards.

In spite of above initiatives the library users feel Digital libraries are yet to make major impact on library services. The main reasons for the wide gap between E-resources and user satisfaction are:

a) Consortium approach has not been established for procurement of e-resources
b) DRONA (DRDO Intranet) does not provide list of e-resources procured/downloaded by various libraries
c) Resource sharing of presently subscribed e-journals, e-books does not exist among DRDO libraries
d) The user feels digitization of documents should cover all key areas of DRDO activities

7. FUTURE PLANS

In order to provide easy and fast access to e-documents to all scientists and staff the following steps are needed:

a) DRDO should take policy decision regarding terms and conditions for procurement of e-resources
b) The consortium approach for procurement of e-journals covering all labs is urgently needed to avoid duplication and waste of resources
c) DRONA should serve as right platform for resource sharing of all e-documents

8. CONCLUSION

The digitization of documents has added a new dimension to various ways of sharing knowledge. Its impact is clearly felt and organizing digital information resources as per users field of interest and bring out the subject value of the E-resources, as sources of knowledge is need of the hour. (4)

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Digital Annotation through Amaya

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ABSTRACT

Annotations have been considered important right from printing age to digital age. There have been significant changes in the tools employed for annotating and in the ways they are presented in the document. In the 'print-on-paper' documents, they are shown as footnotes, bookmarks and highlighting the text etc. In the digital age these are represented using different media. The annotating tools available in the digital age are more sophisticated. This article discusses how the concept of annotation has changed in digital media, the tools and their application to web documents.

1. WHAT IS ANNOTATION?

It is common practice for users of scholarly documents to record, in the marginal space in the document, notes, comments, explanations, suggestions, etc about the document. These are generally referred to as '*annotations*'. Annotations are comments, notes, explanations, statements and ratings about a document that can be attached to a Web document or a selected part of it. An annotation, therefore, is a form of metadata providing additional information about an existing piece of data. Annotations are stored on servers (annotation servers), and when a digital document that is annotated is browsed by a user, the client (e.g. Annotea) queries the servers to retrieve and display the annotations related to that document. Annotations may be in the form of comments, suggestions, explanations or a combination of these. An annotation basically contains details about its creator or author, date and last modification date, type of annotation and context of the annotated resource.

1.1 Value of Annotations

In today's digital environment, annotation provides a great possibility to attach any type of multi-media document to another document and link them. One can annotate using plain text or complex HTML encoding, which can be used to dynamically upload local files and attach them to annotations. Annotations can also be used to link with

other objects of the system or link to an URL. Primarily annotations are seen as assisting the user in learning more easily by adding comments, links and bookmarks, thus personalizing web material to fit specific learning needs. They increase the usefulness and substantially enrich the digital material and have special significance and relevance in the context of E-Learning systems where they facilitate learning by individual users by highlighting or adding notes that will make understanding of the material easier. Users can also add textual comments, links or some other multimedia content as well as insert annotations in their course material that can be helpful to others.

1.2 Major Concerns

- It requires some authority, which is responsible for looking at each annotation made before releasing and making it accessible to all users of the concerned relevant document.
- A workflow has to be implemented to manage or organize the creation, reply, and posting of annotation to the annotation server.
- Annotations are not normally visible instantaneously; Delay in making available an annotation is another major problem; this lack of spontaneity in display of annotations discourages many potential users who really want to see their comments immediately because of the rapidly changing material.
- There are also limitations in terms of space provided for annotation within a web page or document
- There are questions that relate to the validity and authenticity of the annotation and its creator

In this paper, Annotea, sponsored by the w3c to enhance document-based collaboration through shared document metadata based on tags, bookmarks, and other annotations, some tools for digital annotation are mentioned and the features and application of one of them, viz., Amaya is described.

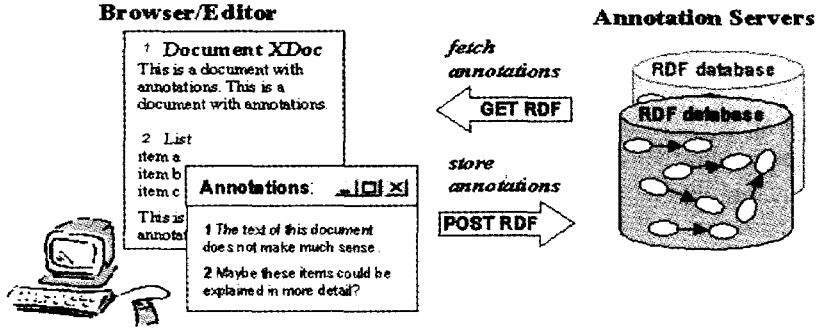
2. ANNOTEA

Annotea is a part of the Semantic Web efforts, based on RDF standard. Annotea uses an RDF schema for describing annotations as metadata while, Xpointer is used for locating the annotations in the annotated document. The principal aim of Annotea project is to associate text strings to a web document or selected parts of a web document without modifying the original document. This associated text with the document metadata is basically found in the form of Keywords, Comments, Notes, Explanations, Errors and Corrections. An essential requirement for creating, posting, and publishing annotations associated with a web document is an annotation server. The annotation server stores the annotations and is responsible for creating, replying, deleting,

linking and posting an annotation, when queried by a user. The foremost purpose of an annotation server is to make better use of the annotation in today's co-operative and shared digital environment. Annotation Server not only treats annotation as an authoring tool, but also to develop communication channels, e.g. between the teacher and the students of a course. Annotation server treats annotations as external statements made by an author about a Web document, and stores this annotation in central RDF databases in one or more annotation servers.

2.1 How Annotation Server works?

Annotation server stores the annotations in an RDF database. When users query a server, it gives the information and retrieves an existing annotation, post a new annotation, modify an annotation, or delete an annotation. All communication between a client and an annotation server use the GET and POST methods of HTTP standard protocol.



Annotations are posted to the annotation server in RDF format and are stored as metadata triples in the RDF database. Annotation server uses Algernon general query language syntax to query with RDF database, and uses POST and GET method of HTTP protocols for sending and retrieving the RDF description of the annotations from the server.

Work Process

RDF triples are basically a type of statements having a subject, given property and specified values. It is a simple and flexible framework for describing objects on the Web. Using this any object in the web is defined through literal strings or through the address of another Web resource.

2.3 Various Annotation Tools

There are many open source annotation tools that are available in today's web environment that are being used for creating annotations.

- SHOE Knowledge Annotator
- COHSE Mozilla Annotator

- Amaya: W3C web browser and authorizing editor
- Melita (Information extraction-based semantic annotation)
- OntoMat-Annotizer based on CREAM annotation framework
- MnM: semi-automated tool support web pages with semantic contents.
- ZOPE Annotation annozilla client

3. AMAYA

Amaya is an open source Web browser and editor that acts both as a browser and as an authoring tool, designed and supported by W3C and INRIA, with the primary purpose of demonstrating new web technologies and helping users in generating valid annotations with the web page or document. Amaya allows users to publish documents on the Web. It is equipped with a "WYSIWYG style" (what you see is what you get), which helps users to generate HTML and XHTML pages similar to the most popular commercial browsers. It supports today's modern formats like HTML, XHTML Basic, XHTML 1.0, XHTML 1.1, MathML 2.0, CSS 2.0 and SVG formats.

3.1 Salient features of Amaya

Amaya is a structured editor, through which one can publish and edit a document directly on remote servers. One can create a simple or target link through a very simple method. Documents can be edited through different synchronized views. Amaya supports WebDAV–the "Web-based Distributed Authoring and Versioning"–which is a set of extensions to the HTTP protocol, allowing users to collaboratively edit and manage files on remote web servers.

3.2 Various activities with Amaya

Many things can be done using Amaya:

- Browsing a document
- Editing a supported document
- Activating and editing a link
- Edit both local and remote documents
- Selecting an element and picture of document
- Changing the type of document through transform command
- Editing the attributes of an element
- Create simple, target, internal and external links
- Creating and editing rows and columns of a table
- Adding or replacing an image
- Loading and editing an XML document
- Save and Publish a document through Set-up and Print Command
- Annotate and Bookmark a document or web page
- Assemble large documents.

Apart from this it supports CSS, Spell Checker through dictionary and searching of text. In the following paragraphs the core activity of Amaya, viz., how to deal with annotations is explained.

3.3 Creating an Annotation

Annotations are of two types:

- Local Annotations: Local annotations are stored locally in a preferred directory, and can be seen only by their owner. They contain basically three types of files namely *annot.index*, index + random suffix and Annot + random suffix.html
- Remote Annotations: Amaya stores remote annotations remotely in an annotation server accessed through World Wide Web, these annotations can be accessed by anyone having the correct access rights. Remote annotations are further categorized in three ways as private, group and public annotations.

Amaya supports annotations that apply to a whole document as well as to specific part of a document. (Annotations > Annotate > whole document/selected part). Apart from this, Amaya saves local annotation in annotation directory, while remote annotations are saved into the annotation post server. We can also delete and reload annotations and navigate through annotations using annotation menu.

There are certain issues and problems with Annotation:

- Orphan Annotations: These are annotations no longer attached with any document. Amaya warns if it detects any orphan annotation. It shows through an icon with question mark superimposed on the annotation pencil.
- Misleading Annotations: These are annotation that point to a wrong piece of information. Amaya does not warn if an annotation is found misleading.

Amaya contains various menu preferences that help users to customize it according to their needs:

- General Preferences: Loads homepage (URL) and for font & zoom level setting.
- Browsing Preferences: Controls loading of pages in different tab & windows.
- Language Negotiation Preferences: Set language preferences, from the given options.
- Publishing Preferences: Set printing preferences and parameters.
- Cache Preferences: provides a cache through libwww.
- Check boxes: Checks whether cache box is active or not.
- Proxy Preferences: Set the domain where HTTP proxy should be.

- Colour Preferences: Controls colour options.
- Window Geometry Preferences: Sets window size and their values.
- Annotation Preferences:
  - Annotation user: By default author of annotation uses, the login name of the user.
  - Annotation post server: It defines the server to which the annotation is posted. Local annotations are always saved to the local directory.
  - Annotation servers: Amaya searches for these types of server when looking for annotations.

Amaya shortcuts list helps users to work easily with Amaya and is located in the Amaya/config directory.

4. CONCLUSION

Annotations are a very flexible and powerful tool for customizing almost all kinds of information. Unfortunately, their potential concerning digital media has not been realized to any extent, yet. We believe that a more general concept of annotation that separates content from material added later changes the situation dramatically to the better.

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Digital Democracy: Emerging Challenges for Librarianship

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ABSTRACT

Present article provides the information about the new revolution of digital era called "Digital Democracy" and the role of public libraries to spread out the huge benefits of this concept. Access, Governance a users are the major components of digital democracy, while public libraries and confluence of internet can play the vital role in this revolution. Digital democracy may change the role of public libraries in presents scenario, some countries carrying success use of this concept, therefore India should go ahead for this culture to public welfare, for that public libraries will have to equipped with modern devices and librarians also trained for this revolution.

1. INTRODUCTION

The information society comes with a strong tendency to distribute control over things to those who most bear its consequences. Modern centralized political systems and entities will have to break down into distributed ones for this tendency to develop into true grassroots democracy. Public libraries can play the vital role to distribute the information in digital mode.

Increased connectivity and access to information can greatly improve citizens' participation in governance–such is the common perception, at least. However, existing political systems were created out of the basic assumption that the majority of citizens will not, in fact, have access to the range of information that electronic networks promise, leave alone make good use of it. Better, digital, democracy will require a change in the nature of governance itself, perhaps even of the nation state.

However, they change with the spread of networks- radio, television, and especially on-line services. Access to information is then large, and while citizens may not yet, in practice, be better informed, they can make their opinions felt. And as Time magazine wrote in a recent criticism of what they incorrectly called 'digital democracy', this surfeit of loud opinion results in the confused politics of mob rule. When citizens go beyond choosing decision-makers to making decisions, neither centralized government nor large countries are workable, for most people (unlike the idealized leaders of early democracy) are qualified only to make decisions that affect themselves or the small community around them. People are most interested, and therefore best informed, in what affects them directly - but large nations and their representative democracies require a plethora of rule-making that often affects diverse constituencies in conflicting ways.

Real 'digital democracy' can be found on the Internet. Although its electronic sphere of activities is limited, power is extremely decentralized. While the Net does acknowledge that expertise is not equally distributed–there are many semi-formal groups that produce quasi- official rules and (mainly technical) standards–it also gives its citizens more decision-making power than any real-world government. The difference is that in cyberspace your decision-making power is limited to your surroundings–nobody affects you, unless you belong to a community where you also affect them. This truly participatory democracy works only because there are never any 'big decisions' to be made as there is no single social unit of 20 million people, but only a loose grouping of much smaller ones; because communities are tiny and consist of people largely in agreement, who belong by choice, not by birth or location; and because there is always room for any dissenters elsewhere.

2. COMPONENTS OF DIGITAL DEMOCRACY

2.1 Governance

Beyond hardware, the use of internet as a basis for processes and practice of democracy should be defined in terms of civil rights. Information collection via internet is a growth area for businesses and governments alike, and few users understand how much information about them is stored, the purpose for which that information is kept, and who has access to that information.

2.2 Access

Some developed countries have announced an initiative of making internet access available through all public libraries. In that context all the citizens should theoretically have access to the viewing and creation of internet content via their public library. This policy does not address

literacy in new media technology, but it assumes that access to the technology will enable literacy programs to develop. Some governments have tried to provide for every citizen the right of access. While literacy in the technology may take time, it is reasonable to suggest that enabling participation in the medium will sanction development of literacy.

2.3 Users

As an information resource, the internet is yet young. The World Wide Web–the most dominant organ of the internet–is less than a decade old. It is partly due to its age that the internet is yet difficult to control. Little is understood about the way in which the internet will affect users, and whether growth rates for use of the internet will continue to rise. While access to the internet is dependent upon multimedia strategies developed by state and federal governments, and while literacy in new media at large is dependent on self-education, there has yet been little research on the reasons why internet has enjoyed such unprecedented growth

3. THE RETROSPECTIVE DIGITISATION OF DOCUMENTS

The systematic conversion of conventional documents into digital documents is a central aspect of any library's activities. To meet this challenge followed certain principles:

- The documents must be of special significance for academic research.
- They must be rare.
- The online presentation should lead to a certain added value.
- All questions concerning copyright law must be verified.

4. PROBLEMS IN TERMS OF CONTENT

Today, we as librarians hold the opinion that our tasks in the contemporary digital age do not differ fundamentally from those in the "paper age". Our collecting activities comprise conventional as well as digital documents and both types of documents are indexed according to almost the same standards. And we attempt to integrate the digital documents into the existing structures of next generation of librarianship. The library collects brochures, press services and journals in digital format. The archive files complete Internet pages. This means that it is possible to browse through the library's digital journals as if they were conventional documents. This is not possible with the archive's Internet pages though.

5. AREAS OF DIGITAL DEMOCRACY

5.1 The database of electronic press releases of political parties and trade unions

The difficulties caused by copyright law made us consider which form and procedure we could choose to extensively save Internet-based

resources of political parties and trade unions, and re-publish them on the Internet as collections. Finally, we decided to archive press releases of political parties and trade unions.

5.2 Archiving of press releases – a sensible addition to conventional collecting activities

The decision to collect press releases of political parties and trade unions systematically should be based on different ideas:

- As press releases are explicitly intended to be openly and widely published there are no copyright problems in the redistribution on the Internet. These press releases usually do not contain any pictures that, differently to written information, often cause copyright problems.
- Press releases are naturally predestined to be offered on the Internet. Therefore many organisations choose to publish theirs this way.
- Several archives of press releases of single organisations relevant for the project can be found on the Internet, but there are no cumulative archives that contain press releases from different organisations. Now it is possible to compare directly different opinions and statements which offer many advantages to the user of this service.

5.3 Conceptional consideration on the indexing of the archived materials

The most obvious idea concerning the indexing of the archived documents is the use of a fulltext retrieval programme. The project does offer this, but only in addition to the search with meta data or–speaking in librarian terms–catalogue records.

In certain cases fulltext retrieval is not always sufficient, especially in those cases in which the search is restricted to the finding of documents of a certain period. Fulltext retrieval systems that stay within the library's financial limit do not offer this.

5.4 Fulltext retrieval as a supplementary option for searching

It makes sense to also offer this kind of search. At first it was planned to extract all meaningful words from the archived press releases in order to combine them with the generated records in our library database.

6. CONCLUSION

Access, Governance a users are the major components of digital democracy, while public libraries can play the vital role in this revolution. Digital democracy may change the role of public libraries in presents scenario, some countries carrying success use of this concept,

therefore India should go ahead for this culture to public welfare, for that public libraries will have to equipped with modern devices and librarians also trained for this revolution.

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Digital Democracy for Indian Farmers: A Case Study

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ABSTRACT

India being a democratic country, the information given is by the people to the people and for the people. Initially, the libraries were established by few only and were additionally used by those who were allowed to use them. However in India, later on this kind of system was changed and libraries were made open to public and thus become real democratic institutions. Many states have enacted library act. More than the 70 % of Indian population live in rural areas and in villages, therefore it is difficult to develop a conventional library system which can be accessible to every village. But the digital information, available online, can be accessed in remote areas without distinction of caste and creed. The paper deals with the process of establishing digit democracy alongwith its modes particularly to the Indian farmers. Central Government has developed *Kisan* Call Centers for use to the farmers and e-governance project also penetrated into villages to disseminate governmental digital information to the farmers. It suggests for an advance digital information center, which may be designed to transfer agricultural information in India to farmers so that the agriculture production and productivity in the country may be enhanced.

1. INTRODUCTION

The Telephony was stared in 1838 in Calcutta. In 1885 Indian Telegraph Act was formulated. But for long, even as late as the mid-eighties, a telephone was considered a luxury and beyond the reach of

the average Indian. In urban area, it would take seven years to acquire a home telephone connection after an application had been filled. The rural areas were almost blank. India has a little over 6,30,000 villages each with an average population of roughly 1200. A distinctive feature it rural India is rather high density compared to other parts of the world. Most states in the country have a population density of over 250 people per sq. km, and in some states it is as high as 700 people per sq. km or more. A significant population of the villages does not have a single reliable telephone connection today and less than one percent of these villages have an Internet connection. Rural areas in India are also characterized by very low incomes. Most households have incomes below Rs 3000 per month (Which amounts to Rs 600 per month). Providing telephony and Internet access to such populations on a commercial basis has always been a challenge. The introduction of the STD-PCO in the late eighties marked the first telecom revolution in India. STD-PCOs, run by entrepreneurs, began to appear on every street corner. They were kept open 16 hours a day, 365 days a year, and the advantages of telephony soon become available to ordinary urban Indian. By the mid–nineties there were a million such STD PCOs serving about 300 million people and contributing to 25% of total telecom revenues in the country.

The capital expenditure (CAPEX) for installing a telephone line was about Rs 40,000, and taking into account the 15% interest cost, 12% depreciation and yearly operational expenditure (OPEX) that amounted to about 12% of the CAPEX, one needed average revenue per user (ARPU) of over Rs 1200 per month to simply break even. Even if a household were to spend 3% of its income on telecom, this was affordable to less than 5% of Indian households,. With the cost of mobile handsets at approximately Rs 25000 and mobile tariffs at Rs 16 per minute there were very few mobile phone holders. The Cost of mobile handsets has dropped dramatically to less than Rs 1500. Owing to the increased competition and reduced cost structure, mobile tariffs in India stand at 0.15 paise per minute today, the lowest in the world. Telephony has become widely affordable. It is little wonder that India has become the fastest growing telecom market in the world, adding 5 million lines a month. By 2015, it is predicted that India will be the second largest telecom market in the world.[2]

1.1 **Rural Telephony**

Nearly 85 percent of Indian villages are situated within a 15-20 km radius of *taluka* towns and therefore a wireless system with a radius of coverage of about 20 kms deployed at these towns would be able to connect nearly all of these villages. Today, wireless systems are available that cost about Rs 10,000 per line, including the costs of towards and deployment, which can provide telecom and Internet connectivity within

a 20 km radius. Broadband corDECT, designed at IIT Madras is perhaps the best available today, providing a 256 kbps dedicated connection to each village, even with limited spectrum. Such systems are reliable, sturdy and are now widely deployed in rural India. Most of rural India can indeed be connected today with Broadband. Wireless technologies, that further reduce the cost and increases the bit-rates, are evolving every year and will improve rural connectivity even more in the years to come. The present coverage of mobile networks in rural areas both by area and by population is negligible. At present the USO fund does not support telephone connections on mobile wireless technologists. With the aim of providing rapid connectivity to all rural areas, inclusion of cellular mobile services in the roll-out of rural household lines is being seriously considered.[2]

1.2 Digital Divide

Traditionally a "Divide" has been talked of in terms of the Marxian divide between haves and have-nots. This has further been defined as divide between the North and the South, rich and the poor, educated and the uneducated. It has also been discussed in terms of gender, caste, religion, language, culture and creed. The divide essentially is in terms of unequal access, its causes and consequences. The divide exists between nations and within nations. It exists between rich and poor, young and old, urban and rural dwellers, etc. There is a financial divide, a knowledge divide and a divide of confidence.

The digital divide is a social/political issue referring to the socio-economic gap between communities that have access to computers and the Internet and those who do not. The term also refers to gaps that exist between groups regarding their ability to use ICTs (Information and Communications Technologies) effectively, due to differing levels of literacy and technical skills, as well as the gap between those groups that have access to quality, useful digital content and those that do not. The Digital divide perhaps encompasses all of these when it talks of information haves and information have-nots.

Access to Internet is crucial in future access to information". It is increasingly becoming an essential factor in any strategy of development to empower the masses. The Internet has been hailed as a "great equalizer", a revolutionary technological tool that enables efficient transfer of information on a global scale. This global information could be used for international trade, online digital libraries, online education, telemedicine, e-governance and many other applications that solve vital problems in the developing world. At the very core digital divide is lack of access to communication facilities, which is now extended to lack of access to Internet / broadband facilities. Developed nations with the

resources to invest in and develop ICT Infrastructure are reaping enormous benefits from the information age, while developing nations are trailing along at a much slower pace. This difference in rates of technological progress is widening the economic disparity between the most developed nations of the world (primarily Canada, the United States, Japan, and Western Europe) and the underdeveloped and developing ones (primarily Latin America, Africa, and Southeast Asia), thus creating a digital (that is, digitally fostered) divide.

In general, the digital divide is a phenomenon wherein the rich in technology Information and Communication (ICT) get richer with the rapid foray into the information age of the late twentieth century, while the technologically poor get poorer-if not absolutely poorer, at least relatively so, as the gap between the technological haves and have-nots widens.[3]

1.2.1 Telecom Divide

India has achieved an overall teledensity of 13.95 so far. At the end of June 2006, total fixed lines were 47.42 million and mobile were 105.95 million, taking total of telephony subscribers in country to 153.37 million. However our urban – rural telecommunication access gap has remained vast, in spite of telecom reforms India at present is stark example of telecom divide with urban teledensity being a high as 40.65% and rural teledensity being as low as 1.85%.Rural areas demand greater investment, but offer less return due to lower household income levels, greater geographical dispersion, and lower call traffic generation. Thus in India, in spite of the presence of a booming mobile telecom industry, which is growing at 90% per annum, one is confronted with the starting statistics that the penetration level of mobile telephones in rural areas is less than 1% and overall private operator share in rural telephony is 0.01%.[2]

1.3 Digital Democracy

A democrative government is of the people, to the people & by the people. Similarly public libraries are of the people, by the people & to the people. Now a days information has replaced the word libraries. Information is now of the people to the people & by the people. The digital information on computers must reach to all those who mead it, use it & think of it. This is digital democracy. There should be no barriers in getting information. There should not be any divide–be it nations to nation, languages, rich or poor, rural or urban, male or female, child or adult, literate or illiterate, or like. Since the most digital information flow on telecom network, any telecom divide leads to digital divide. In this chapter we have tried for the measures taken to reach remote farmers to achieve digital democracy in India.[5]

1.4 Universal Access Obligation

Universal Service is the long – term objective of making communications facilities available to every member of society on an individual or household basis to achieve digital democracy. It means providing access to telecommunication services of a defined minimum service quality to all users, everywhere, at an affordable price. Universal Access has been defined providing convenient and affordable access to communication on a community or local basis, through combinations of Public facilities (pay phones, telecenteres etc.) and individual private service. It generally means providing a telephone with in a reasonable distance for all citizens. The USO (Universal Service Obligation) is defined as the cost of serving those customers whose monthly bills do no cover the cost of providing the service. Mandatory service obligation and Cross-subsidization. Access deficit Charges (ADC) is some methods in an ADC regime, other operators pay subsidies (earlier on per minute of call basis in India) to finance the total cost of the deficit incurred by the incumbent (BSNL in India) in providing local services that are priced below cost. Telecom Regulatory Authority of India (TRAI) is working towards phasing out ADC after 2008.

Rural teledensity continues to leg at a level below 2% in spite of the overall telecom boom and above mentioned efforts. The Government has a grand plan of 50 crore phones by 2010. The current subscriber base is 15 crore. By 2010 the population is expected to reach 122.23 crore with 36.38 crores in urban areas and 85.85 crores in rural areas. Assuming a teledensity of 80 in urban areas, by 2010 the number of telephones in urban areas will be 29.10 crores and the balance 20.90 crores has to be rolled out in rural India, taking the rural teledensity to 24.35. The aim for rural areas is that by 2010 one in two rural household should have a phone. To achieve such an ambition target, augmentation of the existing USO policy by introducing fresh measures is warranted. [2]

1.5 Rural Information Kiosks

An innovative model is required to deliver Internet services to rural areas. Such are now emerging in form of wirelessly connected Internet kiosks in villages throughout India. Inspired by the STD-PCO example, the model involves creating local entrepreneurs who will own the kiosks and drive the business at the village- level. The KO sets up a kiosk at a cost of around Rs 55,000 which includes the costs of a multimedia PC, a UPS with battery, a digital camera, printer, and the wireless subscriber unit with related accessories as well as a marketing kit, local language software, training and an Internet connection for the first six months. The KO needs revenue of Rs 4500 per month for the business to be sustainable.

Once the kiosk is in operation, the KO accesses a host of services. These include computer education, adult literacy programs, agriculture-related services, health services and e-governance services. Many of these services make use of iSee, a low bandwidth videoconferencing software (Developed by a company) called OOPS. In association with the TeNet Group) that allows villagers to communicate with various experts remotely. Other online services include entertainment (games, music and movies) and astrology. In addition, the KO offers any number of other services that he or she develops independently, or with others partners.

The TeNeT group at IIT-Madras and Midas Communications have taken an initiative to develop a very low cost single channel micro-GSM Base station using software radio concepts, with an IP backhaul provided on the broadband connection to a village. This can provide mobile telephony at a differential tariff for rural areas. Installed in a village with Broadband Internet providing the back- haul, it enables a villager who is connected to such base stations to enjoy a lower tariff. As GSM handsets are now available at a cost off around Rs 1000, deployment of micro-GSM in villages would significantly boost rural connectivity further.[2]

Rural Information Society Initiative (RISI) launched by the Bharat Sanchar Nigam Limited (BSNL) that seeks to set up one lakh kiosks covering villages with a population of 2000 or more the 100,000 Common Service Centres being established by the Department of Information Technology on an entrepreneurial model; the Public Tele Information Centers (PTICs) form the Universal Service Obligation (USO) fund, among several others.

In agriculture, advice on farming methods and solutions to crop and animal diseases, via videoconferencing, can be provided. Farmers should also access various agricultural portals to find weather information, crop prices, and improved farming techniques at the kiosk, other agricultural services offered through the kiosks are the farm equipment manufacturing companies. In areas where livestock rearing is common, kiosks can provide online veterinary advice from experts. Potential future agricultural services include facilities for soil testing at the kiosk, online farming "School," an early warning system for diseases outbreaks, and long-term predictions on crop prices, crop demand, and rainfall. Given the size of the agricultural sector in the country, the level of outreach in these services has been extremely limited and much more remains to be done.

E-governance services which can be included at the kiosk include access to government portals that contain online forms and applications

for birth and death certificate etc. In the southern state of Karnataka, the kiosk network has partnered with the government's *Bhoomi* database, allowing access to land records. Videoconferencing sessions between village kiosks and local government officials are organized.

The Government of India has launched a massive rural infrastructure development programme, titles "*Bharat Nirman*", which is designed to provide a new deal to Rural India in the areas of irrigation, roads and communication, healthcare, education, markets etc. The Village Knowledge Centres (VKCs) will thus serve as the flagships of the new deal for rural India movement. Knowledge connectivity based on the principle of social inclusion and gender equity will help to end the prevailing gender gaps in our 6,00,000 village.

1.6 *Bharat Nirman* Plan

India has only 66,822 villages (Nearly 10-15%), which are uncovered by Village Public Telephone s (VPTs). Under *Bharat Nirman* Plan the Department of Telecommunications has the responsibility of providing telecom connectivity to these villages by November 2007. This rural connectivity programme is funded under the Universal Service Support Policy of the Government. VPTs and Rural Community Phones (RCPs) through USO funding have provided public access while private service providers are being assisted by USO fund to penetrate into the rural areas for several activities which include maintenance existing VPTs and replacement of VPTs installed on Multi Radio Relay (MARP). It is hoped that these measures will to increase in rural teledensity and provide rural users access to information of value and transact business.

The Mission 2007 works towards gifting India; her much deserved rural knowledge centers that will cater to each and every *panchyat*, village and hamlet. These knowledge centers would act as a link between Knowledge connectivity and physical connectivity, planned through the Bharat Nirman Programme. This will also bridge the divide between urban India and the rural Bharat.

The first steps towards what is universally recognized as Mission 2007 today were taken in 1998 with the launch of the Information Village Research Project (IVRP). Under this programme, Information Centers (later renamed as Village Knowledge Centres) were set up in three villages near Pondicherry initially. These VKCs were aimed at providing locally relevant knowledge to host communities and access to information mediums thus far denied to them. Since the VKCs were launched as an innovative project, they experimented with all forms of communication technologies including the Internet, VHF two way radio, spread spectrum, world space Radio, Satellite communication using C

and Ku bands and low cost wireless technology. The mandate of these Village Knowledge Centres (VKCs)thus, was to act as a one stop shop to provide host communication with locale specific and timely information , apart from other deliverables like skill building, micro-credit, education, health, governance and entitlement

Integral to the growth of Mission 2007 is the 'Cs' model. The 'Cs' stand for: Connectivity, content and services, Capacity building, Control and care, Coordination, Coalition of the Concerned, Conductive Policy and Convergence of resources. The National Alliance views this framework as the bare minimum that we need to provide for Mission 2007 accomplishment[4]:

- Rural areas may be opened for the Rural Service Provider (RSPs) to encourage rural connectivity at zero license fees for a period of ten years.
- A provision may be made for the use of telecom / internet / radio services at the VKCs by exploiting all / any of the technologies available.
- Spectrum charges for all technologies should be free for rural service or a levy of 2 percent of revenue share may be imposed.
- The towers in the *talukas* and small towns and villages should be shared by all service providers on a nominal lease for servicing the rural areas.
- The existing public connectivity available with Government Should be shared with the RSPs
- There is a need to build 2 Mbps plus rural backbone in every *taluka*. The TRAI has already reduced fibre-leasing charges for such networks by a factor of 4 enabling RSPs to build their networks in a more affordable way.
- All State Wide Area Networks (SWAN) should be laid out completely and be available by June 2006 to RSPs at fixed charges.

E-governance services should be made available through the Internet (web enabled) and be accessible to all the RSPs.[2]

1.7 Niche Operators

The Govt. of India also plans to appoint small telecom operator for rural areas. These are called Niche operator. These would be small-localized rural telecom service providers. They would be rural telecom service providers. They would be subject to nil entry charges. They would pay 6 % (Contribution to USO fund plus administrative costs) of their AGR as license fees and may be given support by USO fund. The possibility of zero spectrum charges for them is also being considered.

Niche operators should be allowed to offer a multiple communication services such as cable T.V. and Internet ATM etc.[3]

1.8 Kisan Call Centers

There are many projects under going to reach the farmers. Many of them are primarily e-governance projects with an aim to reach to the rural people. Basically these are Government to Citizen models. A few of them are Web Portal Kisan Helpline developed by NIC in collaboration with Directorate of Oilseeds Research, Hyderabad; Agri-business Information Hubs of Haryana state marketing Board is collaboration with State Agriculture Deptt. & IIM, Ahmedabad, Kisan Channel of IGNOU through T.V., Kisan Hatt of Agricultural Marketing Committee Delhi, Tata Kisan Kendraa by Tata Group. Tata Chemical Ltds. e-Chaupals of India Taleco company with a budget of 7 billion rupees for its extension. Besides Drishtee, Tara haat, RDES, Gyandoot, Ikisan, Greenstar, etc. are many other projects which are helping farmers but with limited resources. [9]

Recently Govt. of India has launched Kisan Call Centre using telephone. Now the digital information is just a call away that too free of charge, just reach a telephone in your vicinity, dial 1555 & get desired information is not so easy. The Department of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India haved launched Kisan Call Centers on 21st January, 2004. By dialing telephone No. 1551 across the country to respond to queries raised by the farmers instantly in the local languages, on a continuous basis. Subject Matter Specialists (SMSs) using telephone and computer, interact with farmers to understand the problems and answer the queries at a Kisan Call Centre. To begin with, Kisan Call Centers were initiated at 8 premier institutions of the Department of Agriculture and Cooperation on a pilot basis for meeting the requirements of different states. The eight centres are located in Mumbai, Kanpur, Bangalore, Chennai, Hyderabad, Chandigarh, Delhi and Kolkata. The KCC work at three levels as follows:

a. *Level I (Basic Call Center)*

The calls coming to the call center are picked up by an operator (level – I functionary) and details are fed into a computer. The first level operators are agricultural graduate with rural background and know local languages understand the local conditions and farmer's situation for the query he raises, diagnosing the problem by providing the details and answering the query at farmer's level. Infrastructure provided call centers includes a BSNL line with 8 hunting lines connected to LAN, two telephones with headphone & tale conferencing facilities, server internet connectivity, uninterrupted power supply, air-conditioning etc.

b. Level II (Subject Matter Specialists)

At level –II it consists of Subject Matter Specialists (SMSs) who are located at their respective places (Research Stations, ATICs KVKs, Agricultural Collages), of work. In case the first level operator is not able to answer the questions, then it is forwarded (in call sharing mode) to the level- II i.e. concerned S. M. S. In the cases, it is not possible to answer at level- II there is a system to revert back the quires to the caller or post/fax/e-mail by telephone in 72 hours. Which are then consulted at level III

c. Level III (Management Group)

The level–III consists of a dedicated cell located at the Nodal Office. This centre receives the questions that have not been answered at the first and the second levels. The replies are sent to the farmers promptly by post/ e-mail/fax/telephone etc. within 72 hours of receipt of the question. Nodal Officer is provided with the assistance of an ICT facilitator with good skills in computer software and data entry. The Infrastructure includes dedicated high bandwidth telephone line p2JVA with UPS system etc. The operational mechanism of the Kisan Call Centre is explained through a schematic diagram in Annexure I.

1.9 Monitoring and Review of Kisan Call Center

Nodal Institution monitors and reviews the various activities of the KCCs on regular basis. The Nodal Institutions are also responsible for documenting the daily activities of the KCCs. The Nodal Institutions also organize fortnightly meetings with the Heads of Departments to ensure the proper identification and placement and change, if necessary at Level–II functionaries and replies to the queries with Subject Matter Specialists and their documentation in response centers on rotation.

The Department of Agriculture & Cooperation (DAC), Ministry of Agriculture, Government of India reviews the functioning of all the Kisan Call Centers with the Heads of Nodal institutions on monthly basis.

1.10 Documentation and Reporting

The Nodal Institutions are responsible for documentation and reporting. There prepare consolidated statement of farmers queries and answers, crop/enterprise-wise, along with the solution given at Level-III and report to the Department of Agriculture & Cooperation (DAC), Ministry of Agriculture (MOA), Government of India through e-mail on fortnightly basis. All the proceeding of the KCCs are documented by each of the nodal institutions and shared with other KCCs for preparing a

database on crop/enterprise-wise and also to prepare Frequently Asked Questions (FAQs).[8]

2. CONCLUSION

The telecommunication facilities have yet to reach nearly to 10-15% villages. Only 4 states have 100% Village Public Telephone (VPT) coverage. The rural teledensity is still nearly 1.69, very low as computer to 25-90 urban teledensity by 2005. Private telecom operators have not reached rural areas in most cases. The subscriber base though, is increasing but PC penetration is very little. Literacy rate is increasing but information literacy is in infant stage. Many e- governance projects are on way but they yet to take shape. The state of Public literacy system in many states is very poor. It may take many years to achieve digital democracy. The seeds are just sown; its fruits may take years to be eaten. Much more serious efforts are yet to be taken both by state & center & local bodies. *Panchayats* can play vital role in this regard. By coordinating many agencies, Village Malls can be established among a cluster of few villages.

In the end following suggestions can be made:

- Telecom facilities in rural areas should be subsidized for next 10 years
- Private telecom operators should exploit potential of rural telecom market,
- PC penetration should be provided by cheaper & simpler technology
- Free, reliable & accurate software should be available,
- There should be at least one fully equipped PC in each cluster of 5 villages
- Information Literacy Mission should be given priority in five year plans
- Cooperative information infrastructure in the from of Village malls should be established with the help of joint industrial groups
- A percentage of government budgets should be allocated to Information Literacy Programme & telecom sector.
- Public Library system should be supported by state and center governments
- E-governance projects should be taken up in all areas.
- Niche operators should be allowed in remote areas.
- Non-conventional energy use should be promoted in remote areas to ensure electric power.
- International help through UNO, US, Gt Bt etc. should be sought for the purpose

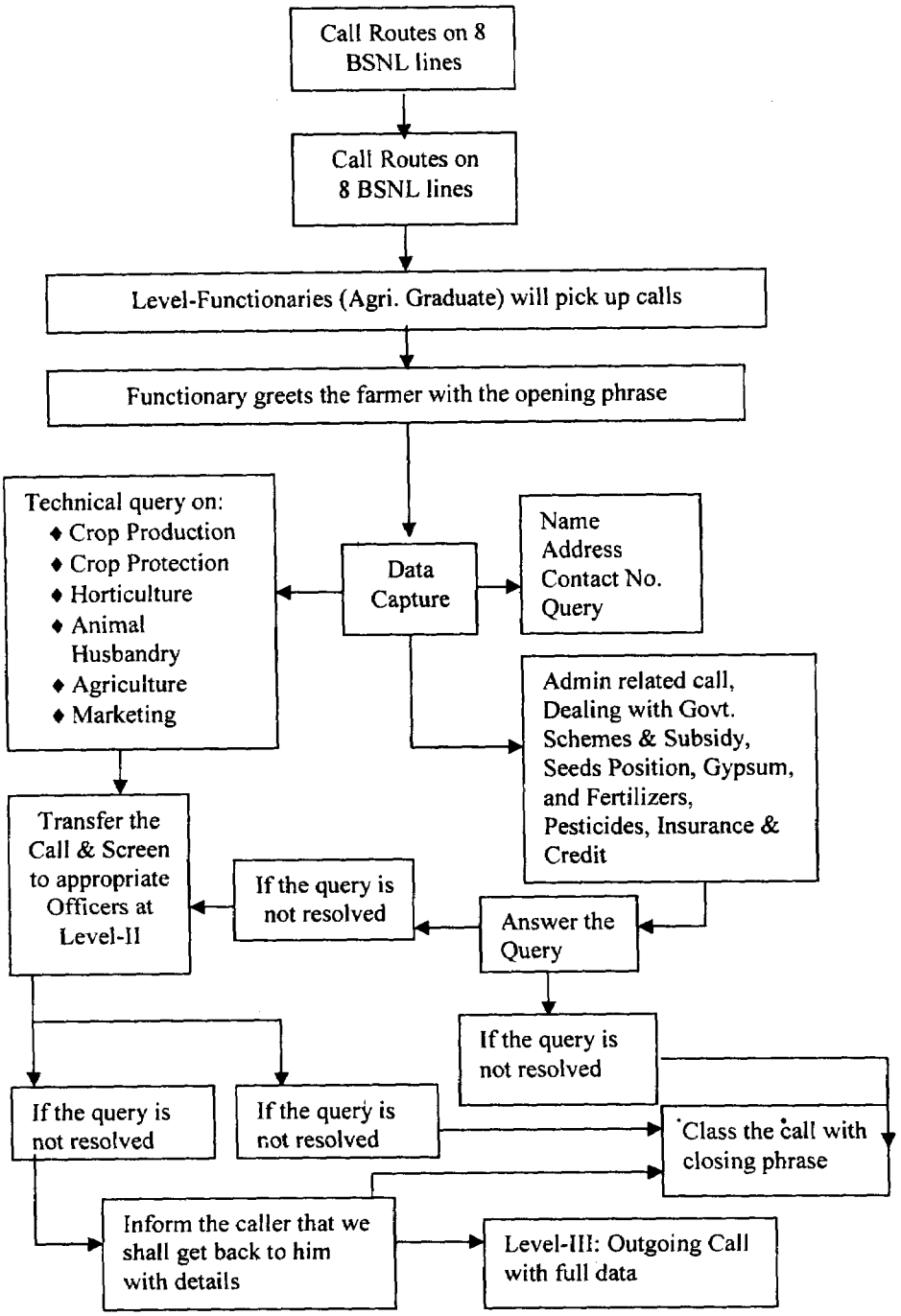
- Students of computer Science, IT & Library & Information Science be compulsorily trained in Rural Information Programme before the award of the degrees

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ANNEXURE-I

Farmer Dials Helpline No: 1551



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Digital Libraries: A Comparison of Two Key Open Source Software

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ABSTRACT

Gone are the days when libraries were storehouses of books. Information technology has changed the complexion of today's libraries in a big way with the current thrust on resource sharing. Indeed recent advances in the filed of information technology contribute significantly to improve the services of libraries. Further the impact of information technology has led to a paperless society, digital libraries and virtual libraries. It may not be wrong to say that everyone associated with the management of knowledge in the coming days would be talking about the digital processes and the digital library. Of the many open source systems for digital libraries, two of the most prominent are Greenstone and Dspace. Greenstone is older and more established internationally; whereas DSpace has a more impressive institutional pedigree. Both of these Greenstone and DSpace are widely used software systems for digital libraries, and prospective users sometimes wonder which one to adopt. In fact, the aims of the two are very different, although their domains of application do overlap. One aim of this article is to clarify the similarities and differences between them, and map out the natural areas of application of each one. This should help users to understand the differences and make an informed choice between the systems. It should also provide a basis for future developers to combine the features of both

Keywords: Digital Library, Open Source Software, Greenstone, Dspace

1. INTRODUCTION

1.1 What is a Digital Library?

Digital Libraries does not mean Libraries in the classical sense, but a network of multimedia systems. A typical digital library is a media

server (group of interlinked workstations) connected to high-speed networks. Unlike a conventional library where users are provided with physical materials from many sources a digital library is a group of distributed repositories that users see as a single repository in digital form. According to the Berkeley Digital Library project, University of California, "the digital library will be a collection of distributed information sources. Producers of information will make it available, and consumers will find it perhaps through the help of automated agents".

1.2 Need for Digital Libraries

With Libraries facing manpower and monetary constraints, it is impossible to acquire every publisher's document under one roof and thus evolved the concept of resource sharing and networking. Since information can be digitized, the participant libraries are coming together to convert their holdings to electronic form and then putting them on the network. The technology for electronic transfer of information is developing rapidly; electronic publishing, electronic storage, processing and delivery of information including text and images are all feasible and operational. Further, presently most of the information is reproduced on paper. The legibility of documents, which are reproduced, is poor, and the transmission of the same to other users is difficult. Moreover, it requires a large amount of storage space. Since there is a demand for information with a facility for searching tailor-made information at faster speed. Hence digital library is an appropriate solution.

1.3 Characteristics of Digital Libraries

The transformation effects that digital technology brings in to information system are as follows:

(i) Collections: Digital library collection contain fixed, permanent documents and facilitates quicker handling of information.

(ii) Work: There is work-oriented perspective focusing on a group of information analyst, work being done and the documents and technologies that support it.

(iii) Trans bordering of information: With the development of ICT data transfers are breaking the physical boundaries within and outside the countries.

(iv) Technologies: Digitization requires certain technologies. They are basically grouped as:

- Computer technologies with input devices that collect and convert information into digital form. Such devices include keyboards; touch screens, voice recognition systems, flatbed scanner, high-resolution digital camera, image navigator software etc.

- Storage technologies with variety of devices to store and retrieve information in digital form. These include magnetic tapes/ cassettes, floppy disks, hard disks, DAT Tape, CD-ROM smart cards, etc.
- Processing technology for creating the systems and applications software required for the performance of digital network.
- Communication technologies primarily to communicate information in digital form.

1.4 Issues in Building a Digital Library

The following are some of the major issues concerned with the establishment of a digital library:

Metadata

Digital collections require well-structured metadata schemes to describe digital objects and content at various levels of granularity. Structural and descriptive metadata are two general classes of metadata of particular relevance. One major challenge with regard to metadata is the diversity of digital information formats and the ways in which they should be described in different collections with different target audiences and uses.

Interoperability

Interoperability is one o the most heavily discussed issues in digital library research. The requirement for interoperability derives from the fact that various digital libraries with different architectures, metadata formats and underlying technologies wish to effectively interact, something they can do through applying a range of common protocols and standard.

Standards

Standards within the context of digital library research encompass all protocols and conventions that have been set for digital library architectures, collections, metadata formats, interoperability and so forth. This is a major challenge concerned with the development of a digital library. The following are some of the standards which have been the focus of research: (i) digital collection development standards, (ii) archiving and preservation standards; (iii) metadata formats (e.g. Dublin Core, MARC, IMS); (iv) cataloguing content and indexing standards; (v) electronic publishing standards for books, journals and other media, OAI and Z39.50.

Knowledge Organisation System

A range of tools are used for organization, classification and retrieval of knowledge in a general sense which is also used in a digital library. Digital library researchers, operating in different contexts have investigated the potential of these tools for different purpose. One of the challenges is the way in which these tools can interact with each other. To this end research is under way to investigate issues surrounding mappings and interoperability among various knowledge organization systems.

Users and Usability

In order to develop usable digital libraries and to improve system design, researchers have addressed user behaviour and user requirements in different contexts including academic environments, schools, government departments and business. One of the major challenges in user studies is associated with the methodology and data gathering techniques. Researchers have tried to use a combination of tools and techniques to collect useful data for user evaluation.

Legal, Organisational, Economic and Social Issues

Rights management is an important issue with regard to digital library because intellectual property in the complex global market is a major problem in these days. Legal issues associated with access, licensing, copying and dissemination of digital materials, economics, business and pricing models and strategies are all major issues come under legal aspects of digital libraries. There are economics issues such as commerce, shopping, marketing and business competition, all of which form part of the digital library research discussion. Social issues in relation to digital libraries include on the ways in which people view digital libraries and their usefulness; and the extant to which they are integrated into people's lives and social activities.

2. OPEN SOURCE SOFTWARE

In the phrase open source, source refers to source code, the human-readable computer code which is the origin, or source, of the computer application. Open refers to the terms of access to that computer source code. So open source software is software for which the source code is freely available. But this is a very general and incomplete definition. A detailed definition of open source software is maintained by the http://www.opensource.org/.

Open source software provide access to source code and possess the ability of making modifications, they also provide right to redistribute modifications to benefit wider community. They are free and excellently

supports networks community. Some of the disadvantages are limited or no accountability and informal and unaccountable support channels.

The open source digital library software (www.osslib.org) derives its strength form several enabling technology and metadata based interoperability protocols, which have become available recently. There are quite a few digital library software packages available in the market. One has to select the right kind of package depending on their specific need. There are a few library automation software packages, which have a separate digital library module. Of the many open source systems for digital libraries, two of the most prominent are Greenstone and DSpace Greenstone is older and more established internationally; DSpace has a more impressive institutional pedigree. I would like to first take Greenstone software.

2.1 Open Source Software: Greenstone

Greenstone (http://www.greenstone.org/) is a suite of software for building and distributing digital library collections that provides a way of organizing information and publishing it on the Internet or on removable media (e.g., CD-ROM/DVD). It is produced by the New Zealand Digital Library Project at the University of Waikato, (http://www.nzdl.org/) and is distributed as open source, multilingual software in cooperation with UNESCO and the Human Info NGO.

Greenstone's aim is to empower users, particularly in universities, libraries, and other public service institutions throughout the world, to build their own digital library collections in the fields of education, science and culture. UNESCO hopes this will encourage the effective deployment of digital libraries to share information and, where appropriate, place it in the public domain.

Greenstone is:

- *Widely accessible.* Collections are accessed through a standard web browser.
- *Multi-platform.* Collections can be served on Windows and Unix, with an external Web server or (for Windows) a built-in one.
- *Metadata-driven.* Browsing (and, if desired, searching) indexes are built from metadata. Metadata may be associated with each document or with individual sections within documents. It must be provided explicitly (often in an accompanying XML or spreadsheet file) or derivable automatically from the source documents.

- *Extensible.* Plugin can be written to accommodate new document types. Classifiers can be written to create new kinds of browsing indexes based on metadata.
- *Multi-language.* Unicode is used throughout and is converted on-the-fly to an encoding supported by the user's Web browser. Separate indexes can be built for different languages: A plugin allows automatic language identification for multilingual collections.
- *International.* The interface is available in multiple languages: new ones are easy to add.
- *Large-scale.* Collections containing millions of documents, and up to several gigabytes, have been built. Full-text searching is fast. Compression is used to reduce the size of the indexes and text .
- *Z39.50 compatible.* The Z39.50 protocol is supported for accessing external servers and (under development) for presenting Greenstone collections to external clients.
- *Flexible searching.* Users can search the documents' full text, choosing between indexes built from different parts. Queries can be ranked or Boolean terms can be stemmed or not stemmed, case-folded or not.
- *Flexible browsing.* Users can browse lists of authors, lists of titles, lists of dates, hierarchical classification structures, and so on. Different collections offer different browsing facilities, determined at build time.
- *Zero maintenance.* All structures are built directly from the documents themselves. New documents in the same format can be merged into the collection automatically. No links need be inserted by hand, but existing hypertext links in the original documents, leading both within and outside the collection, are preserved.
- *Phrases and key phrases.* Standard classifiers create phrase and key phrase indexes of text–or indeed any metadata.
- *Sustained operation.* New collections can be installed without bringing the system down. Even active users rarely notice when a collection is updated.
- *Multimedia.* Collections can contain pictures, music, audio and video clips. Currently, non-textual material is either linked in to documents or accompanied by written descriptions to allow access. However, the architecture allows plugins and classifiers to be written for generalized documents.

- *CD-ROM option.* Collections can be published on a self-installing CD-ROM. A multi-disk solution has been implemented for larger collections.
- *Distributed collections.* Collections served by different computers can be presented to users as though they were part of the same library, through a flexible process structure.

And last but not least, because Greenstone is open-source software, it is easily modified.

Greenstone is available from the New Zealand Digital Library (http://www.nzdl.org/) under the terms of the Gnu General Public License. It is easy to install on Windows and UNIX.

2.2 Open Source Software: Dspace

DSpace (http://www.dspace.org/) facilitates the building of institutional repositories that capture, distribute and preserve intellectual output at an institutional level. It is produced by HP Labs and designed in partnership with MIT, who note that much of the intellectual output of professors and researchers is in digital form and potentially ephemeral unless the institution has an aggressive policy for collecting and preserving it. The liaison with MIT has been a crucial factor in the development of DSpace. A co-development contract between Hewlett-Packard Labs and MIT Libraries was established in March 2000, and MIT publicly launched its institutional repository in November 2002.

From the outset, DSpace is designed to help capture and organize everything produced by faculty and staff–digitized versions of lecture notes, videos, papers, and data sets–into an "institutional repository" that will make it available to future generations in its original digital form. Of course, it has applications in government organizations and commercial enterprises too.

DSpace provides a set of tools for helping institutions keep track of their data, organize it in meaningful ways and migrate that data to new formats as old ones become obsolete. It helps establish a system for the curation of the data in a manner that is as automated as possible, in order to handle the increasing volume and complexity of the data being produced.

The key points that DSpace makes for core business to support include:

- Repositories at an institutional level
- Self-deposit of digital assets by faculty

- End-user interface for depositors
- Assets made available for searching and browsing
- Data retrievable many years in the future
- Institutional commitment to ensure the continued availability of certain named formats.

DSpace supports the Open Archive Initiative Protocol for Metadata Harvesting (OAI-PMH), and was designed to support interoperation with both other DSpace installations and other OAI-compliant archives. DSpace uses the qualified Dublin Core metadata standard for all collections. Only three fields are required: title, language, and submission date; all others are optional. There are additional fields for document abstracts, keywords, technical metadata and rights metadata. This metadata is indexed for browsing and searching the system, either within a collection or across collections.

The current version of DSpace is available online as an open source Unix program, licensed under the BSD Open Source License. Neither HP nor MIT offer formal support for DSpace. Users are assumed to be institutional, with all the necessary resources to use the system (or the means to outsource this), including hardware running Unix, and a systems administrator to install and configure the system – and, in most cases, a Java programmer who can localize and customize the system.

Plans are afoot to develop the next version, which will be a more modular, flexible version into which different modules of functionality can be plugged in to suit different needs, and with refactored storage to enable different approaches to the digital preservation problem to be tested.

System	URL	Platform	Technology	Supported Standards
Greenstone	www.greenstone.org	Unix, Windows, MaxOS X	GDBM, MG (indexing), PERL, (building), C++ (runtime)	Z39.50, Open Archives, MARC
Dspace	www.Dspace.org	Java/Unix	PostgreSQL, Lucene (indexing)	Open Archives

Following Indian libraries have been using Dspace:

- Indian National Science Academy (INSA)

- Indian Institute of Technology, Delhi
- National Chemical Laboratory
- Indian Institute of Science (IISc)

3. CONCLUSION

Many potential users apparently view these systems as competitive, and wonder which one to adopt. However, both of them are open source softwares but involve some effort in downloading and installing, and considerably more effort in learning how to use it. Even to simply investigate the capabilities of a system of this nature requires a lot of work. In the case of digital library software, the investment required to create new collections, or adapt existing ones to work with new software, can be very significant.

The digital library systems Greenstone and DSpace aspire to make it easy for others to build their own digital libraries that offer comprehensive services to users – readers, authors and librarians. It is certainly not my intention or purpose of this article to recommend one of these systems over the other – that would be counter productive and contrary to the spirit of this article. However, there are some clearly defined situations that quite obviously fall more naturally under the purview of one or the other.

Preservation. The act of creating any digital library collection based on open source software will contribute to the preservation of the material it contains. However, DSpace is explicitly oriented towards long-term preservation, while Greenstone is not. DSpace stores preservation metadata and includes a scheme where institutions commit to ensuring the continued availability of certain named formats.

Support infrastructure. DSpace is designed for institutional use, where there are centralized computing facilities and a competent infrastructure for software support. Greenstone is designed to be easy for anyone with basic computer-literacy skills to install. in a laptop, desktop, or institutional environment.

Multiplatform operation (related to the above). Greenstone runs on Windows computers (collections can be built on Windows 95 and up), Unix, and Mac OS/X. DSpace is currently restricted to Unix and OS/X. Note that this is unlikely to be a serious practical disadvantage in typical DSpace usage scenarios.

Author-oriented. DSpace incorporates an interface whereby users (typically authors, though some institutions choose to have librarians do

this on behalf of the faculty) can submit documents to the system, and define metadata for them. Greenstone does not.

Librarian-oriented. Greenstone supplies an end-user interface with which collections can be designed, customized, and built. DSpace provides a generic design that can be tailored – but not by typical end users.

Built-in metadata standard (related to the above). DSpace imposes a single metadata standard on all collections. Greenstone provides a widely used standard (Dublin Core) but also allows collection-builders to use their own metadata scheme either by extending an existing one in an ad hoc manner or by defining an entirely new one using a metadata set editor.

Distribution on removable media. Those who create Greenstone collections can write them to a self-installing CD-ROM that operates on all Windows systems (even obsolete ones right down to Windows 3.1/3.11, still in use in developing countries).

Dynamic collections (historically related to the above). In Greenstone adding documents to a collection normally involves rebuilding the full-text index and browsing structures (though rebuilding can be scheduled to take place automatically), whereas DSpace operates incrementally (though operations on recently-added documents like extracting text or producing image thumbnails are processed in batch mode).

International users. Greenstone provides interfaces for readers in 35 languages, including many minority ones, and has a scheme that helps language maintainers keep the interfaces up to date when new interface features are added.

Both systems are continually evolving, and these features can change rapidly. For example, Greenstone can indeed accommodate dynamic collections by using a different search engine from the default one. Although this is probably beyond the technical capabilities of the librarian-level users that Greenstone targets, a user interface enhancement could easily rectify this. Conversely, although the default DSpace configuration is currently restricted to UNIX, it would not be hard to modify it for other operating systems. And there are some DSpace installations in languages other than English.

The difference between the two systems is largely explained by the environments in which they are designed to operate. DSpace is designed for the institutional setting, where members of faculty submit their

documents to a common system that enforces common standards. Its model envisages "communities" (e.g., schools, departments, centers, labs, and programs) that contain one or more "collections" of digital "items" Greenstone is designed to allow non-specialist users to produce single, individualized, collections. Its model envisages a "librarian" who is creating collections from existing "resources" (comprising both "items" and metadata resources) and distributing them over the Web or on removable media, possibly in an international setting.

While there is certainly overlap in what Greenstone and DSpace can do, they have quite different goals and strengths. One aim of this article is to clarify the similarities and differences between them, and map out the natural areas of application of each one. This should help users to understand the differences and make an informed choice between the systems. It should also provide a basis for future developers to combine the features of both. Although creating each system has involved a prodigious amount of programming effort, combining them would not be such a monumental task. One advantage of open source software is that it allows new entrants to stand on the shoulders of established.

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Digital Libraries and Knowledge Management in the New Millennium

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ABSTRACT

The advent of the World Wide Web and the internet has provided a watershed moment for all libraries. Digital libraries have the potential to increase learning and knowledge. The challenge for libraries is to take that same content it usable and searchable in ways that can engender discovery, creativity and invention. Information and communication technology (ICT) albeit young in years, is moving at a pace that makes what took place during the past twenty years seem almost ancient. The technology with which we are concern during this programme is not limited to maxi, mini and micro computers and their peripheral devices, for emple, terminals and printers, but includes data transmission techniques, laser technology, optical and video in the educational process itself has progressed from a disc technology. Latterly the role of ICT mosai of individual experiments and projects to something more integrated and structural through the introduction of digital learning environment. It is clear that learning can already be effective in certain markets, training, professional development and distance education. In learning however, the long heralded fundamental changes have generally been slower to arrive than predicated.

1. INTRODUCTION

Technological progress has changed how libraries do their work, not why. But the most profound technological development, a connection of computer to computer in an unbroken chain around the world, may after the fundamental concept of the library in the 21st Century. Technology will not substantially after the business of librarians connecting people with information. If librarians and informational professionals are going to progress into the 21st Century then a clear and effective digital library model for library services and development will be increasingly important. An increasingly complex technological, social, legal and

economic environment defines many boundaries within which digital library services will evolve librarians may discover that libraries without-walls are actually only libraries with new walls, technologically bounded, legally restricted and administratively hamstrung. The digital library may be equally impenetrably and as profoundly limiting to their patrons as the physical library which techno-pundits would suggest digital collections are intended to replace. The process of world wide inters connection made possible thanks to network communication and information technologies, which constitute communication circuits, and spaces in which the exchange of merchandise, values, knowledge, power and culture, take place. Systemic perspective organizational reality is thought of complex unit of linked relationship.

1.1 Definition of Digital Library

The digital library has been defined in various ways. According to Chowdhury and Chowdhury, "A managed environment of multimedia materials in digital form, designed for the benefit of its user, population, structured to facilitate access to its contents and equipped with aids to navigate the global network..... with users and totally distributed, but managed as a coherent whole."

Andrews defined as "A digital library system that provides a means of integrating digitised text, image, audio and video resources. These resources can then be delivered across a network to authorized users wherever they are located, whenever they need them."

The Digital Library Federation (DLF) developed following definition. "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities." This definition emphasis that a digital library, like any library, is more than a mere aggregation of information resources: it is a service which is based on principles of selection, aquisition, access, management and preservation, related to a specific client community. Some definitions are very short but effective in this scope. According to Lesk, "a digital library is a collection of information that is both digitized and organized and which offers capabilities beyond those of the traditional library." Griffin defined a digital library as "an organized collection of multimedia data with information management methods that represent the data as useful information and knowledge to people in a variety of social and organization contexts."

1.2 Purposes of Digital Library System

According to proposal prepared by a group of academic and research libraries in Canada in 1995 the purposes of a digital library are:

- To develop the means to collect, store, and organize information and knowledge in digital form;
- To promote the economical and efficient delivery of information;
- To encourage cooperation among libraries;
- To strengthen communication and collaboration between and among the research, business, government, and educational communities; and
- To contribute to the lifelong learning opportunities.

1.3 Knowledge Management

In fact knowledge is the key factor in the natural growth of human society. The knowledge is an organization resides in various places such as database, knowledge bases, filing cabinets and peoples mind and is distributed right across the organization. Owing to its importance, researchers and academicians are depending on knowledge over centuries which may be in any form such as facts, skills, techniques theories etc. under these circumstances, libraries being the depository of public knowledge of all times have a prime role in the management of knowledge and provide the expert researchers and academicians to access it and act on it. Today, we are treading into the knowledge age and society is better known as knowledge society. Its paradigm shifts from industrial to knowledge economy the catalyst to a whole new knowledge driven economy new approach to the problems of competitiveness currently facing by the companies.

1.4 Definitions of Knowledge and Knowledge Management

As stated by Raman "Knowledge, not merely about new things but also about existing ways of doing things in order to gain new insights to conserve, economise and achieve ever higher efficiency and above all secure the future of mankind."

"Knowledge Management can be defined as accessing, evaluating managing, organizing, filtering, and distributing information in a manner that is useful to end users."

According to Bansal," Knowledge is the full utilization of information and data, coupled with the potential of people's skills, competencies, ideas, institutions, commitment and motivations, knowledge is stored in the individual brain or encoded in organizational processes, documents, products services, facilities and systems."

1.5 Role of LIS Professionals in Knowledge Management

It was suggested that the most important task for organizations developing KM is to change the mindset of their people. Information professionals have to think of themselves as part of core business not as a service to those who do the business Librarian Sherila Corral suggest that KM is "a management of philosophy, which combines good practice in purposeful information management with a culture of organizational learning in order to improve business performance."

2. CONCLUSION

The knowledge management system mainly includes knowledge architecture, system and technology and the people. The swift transformation of IT has changed the traditional library environment into a digital library environment where knowledge is the main concern. Therefore, in this changed environment library's new role has been shifted to generation, storage and delivery of knowledge and its proper use. Most of the attention regarding digital libraries has gone on the technical developments that do, and will make them feasible, whether permanent locators, verson, control, metadata or cross-platform searching.

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Digital Libraries: Issues and Challenges

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ABSTRACT

The paper discusses the description and use of digital libraries. It also discusses the functions, importance and challenges of library professionals in digital environment.

Libraries play an important role in the life of a modern social organization and life of the nation. A library is not only a place of storing books and magazines but also a center for knowledge and information. It plays a role of a catalyst in the life of the community in which it operates as it acts as a powerful medium of mass communication, or credit of information in the present era of information explosion.

In this context it is taken to be true that communication and information technology has made a dramatic impact in the process of information management. This impact is very intensive in the field of information system and services, which influenced the working conditions of the people belonging to library profession. The library professionals have tremendous responsibility in terms of fulfilling not only the requirements of their job related duties but also extending a sense of identification and contributing towards their growth and developments and provide ample new tools for improving access to need based information and sharing of knowledge.

In the electronic world, the scene is more complex, because the possibilities for direct contact are far lesser. Users need not have to go physically to the library to access resources. Due to information explosion libraries are facing new challenges, new demand, new expectations and variety of information services from users needs. Libraries are incorporating new technologies, upgrading information resources, training people, changing information objects, mode of

communications and information delivery in order to add value to their services and to satisfy the changing information needs of user community. Information seekers are no longer satisfied with old printed materials. They want to supplement the printed information with more dynamic electronic multi media documents. The user's demands for information delivery in digital form of their desktop are increasing in recent times, in the present environment, where there is a wealth of information resources being published and transmitted through electronic media, libraries must take protective measures to develop digital collections to cater for digital information needs of their users.

There are various definitions of digitization some of which are listed below.

Working Group of the U.S. Information Infrastructure Technology and Application (IITA) has defined: "Digital libraries are systems providing users with coherent access to a very large, organized repository of information and knowledge".

Lesk defines "A digital library is a collection of information that is both digitized and organized and which offers capabilities beyond those of the traditional library."

According to Larsen "A digital library as a global virtual library- the library of thousands of networked electronic libraries."

Griffin defines a digital library as "An organized collection of multimedia data with information management methods that represent the data as useful information and knowledge to people in a variety of social and organizational contexts."

The meaning of digital libraries continues to evolve as technology advances, and more importantly, people explore new possibilities offered by open, dynamic, and globally distributed information environments. The digital libraries may be defined as the new way of carrying out the functions of libraries encompassing new types of information resources, new approaches to acquisition (especially with move towards accessing to different library collections and their sharing); new methods of storage and preservation; new approaches to classification and cataloguing; intensive use of electronic systems and networks; and dramatic shifts in intellectual, organizational and electronic practices. It is also known as a distributed text-based computerized information systems and services. It may have several provisions to access documents; those are of high value, mostly from outside the organization. In simple language, we can even define digital libraries as libraries which have a number of

machine-readable publications and facilities for remote access to several databases.

The functions of digital libraries include content creation, storage, search and access, retrieval and preservation. Digital libraries are supposed to generate new type of information resources; new approaches to acquisition, classification and cataloguing; and intensive use of electronic systems and networks, and dramatic shifts in intellectual, organizational and electronic practices.

Digital libraries have ability to preserve and extend information. It enables change in the individual and group behaviour. It is a powerful instrument of change and involves into an active medium of communication which affects social and work practices.

The basic requirement in creating digital library will be the building of digital collections. The digital collection of information, include various resources such as electronic journals, books, full text, CD ROM databases etc. Both library professionals as well users have recognized the benefits of information collections in digital form for preservation, access, and managing large quantities of information. Digital library can also store large volume of information in digital form for archival management. It provides users with immediate access to the rapidly growing information stored in digital form. It provides users fast access to multimedia information quickly and interactively through the integration of technologies. It offers remote access to expensive and special collections of information from many locations by many simultaneous users. Digital libraries offer new dimensions of easy access to their resources when information materials are in digital form and stored electronically on digital media.

It helps to avoid duplication in generation and collection of data by different organizations. It enables librarians to choose the information and control with standardization. It helps link with other texts through hypertext linkage. There is also a close interaction between the user and the computer. Digital libraries are characterized by equitable access; reduce barriers of distance, timeliness, shared resources and content delivery. They can provide access to a large quantity of collection of documents. They can also support integration of new information. Digitized library can further help and organize printed works into a universal library and thus provide access to it from anywhere in the world.

ISSUE AND CHALLENGES IN DIGITAL ERA

For the effective functioning of Indian libraries, the following challenges must be met if digital libraries are to be created.

(i) Sufficient funds for the establishment of computer systems.

(ii) Manpower development to attend to information technology.

(iii) Motivation of manpower to adjust to the changing environments. Training and development opportunities for library professionals and end users for optimal utilization of digital innovations are to be encouraged and revitalized.

(iv) Develop improved technology for digitizing analog materials. Database management methods extended, relational or object oriented are needed not only to support direct use of data collection in digital library but also to handle all services.

(v) Integrated access to both digital and physical materials

(vi) Provide more efficient and more flexible cost for transforming digital content to suit the needs to end-users.

(vii) Net working facilities and co-operation with other libraries and database etc.

(viii) One of the largest issues in creating digital libraries will be the building of digital resources.

(ix) To store digital information, the digital storage media such as hard disk, compact disk, floppies have a very sort life span. These storage media have become so common everywhere from two to five years before they are replaced by better technologies.

CONCLUSION

- Successful development of the digital libraries is possible when we establish a coordination and cooperation between the government, non government, private and public organizations.
- Increase the communication among the organizations.
- Free flow of information between and among the people and the organizations and also among the digital library developers.
- Adoption of new technologies to capture the data and user needs. Making all these technologies more pervasive. Once the technologies become pervasive, digital library could become more popular and user friendly. The reality is that, the moment has been, for some time, to do more for less money, and libraries need to maintain collections, manage new technologies, and trained staff.

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Digital Preservation: Myriad Interrelated Issues

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ABSTRACT

Our society is fast emerging as an information society and this has brought in new challenges before the library, archives and information profession, particularly due to the emergence of digital information systems and services. *Digital preservation is increasingly recognised as a vital part of managing digital resources.* The scenario is changing very rapidly to keep pace with the changing environment. All are making good progress in this challenging new area. However, there is a strong need for cooperation, knowledge sharing and collaboration at international level for further development. The purpose of this paper is to provide guidance based on our practical experience to those who wish to manage their digital collections. Appropriate materials, identification, metadata, copying, preservation and access consideration are dealt with in practical terms to help you understand how to manage your digital resources. This paper does not claim that the suggestions being presented here are the only possible answers, but we do believe that our experiences may help many people to get a start on managing and preserving their digital collections.

1. INTRODUCTION

This glorious past of Indian culture lies in manuscripts. The importance of manuscripts is significant for sufficiently notable reasons. These are the basic historical evidence and they have great research value, which led to recognise its need and importance internationally. Our ancestors tried to preserve them with whatever possible means they were having. In the present context, recognizing the need to encompass and preserve such Indian culture, a pioneering attempt has been made by Indira Gandhi National Centre for the Arts (IGNCA) to serve as a major resource centre. The Centre is visualised as a centre encompassing the study and experience of all the arts–each form with its own integrity, yet within a dimension of mutual interdependence, interrelated with nature, social structure and cosmology. The arts are here understood to comprise the fields of creative and critical literature, written and oral; the visual arts, ranging from architecture, sculpture, painting and graphics to general material culture, photography and film; the performing arts of music, dance and theatre in their broadest connotation; and all else in fairs, festivals and lifestyle that has an artistic dimension.[1] The centre is

also playing a leading role in raising and discussing digital preservation issues with other national and international libraries and in looking for areas of collaboration. We have also been engaged in a quest to find effective solutions to an overwhelmingly complex problem, the preservation of digital resources. Experience suggests that it is a profitable to see digital preservation not as a monolithic problem but as a challenge with many layers.

2. DIGITAL PERCEPTION

Newspapers, books, manuscripts, and archives are for decades being filmed to protect them from the endogenous deterioration or from other causes of damage and to ensure the permanence of the information they contain. But the Information Age is creating a digital dilemma. The current generation of digital records has started getting unique historical significance. At this stage, digitization has become the issue that most fascinates and haunts preservation managers in archives and libraries at the moment.

The term 'Digitization' refers to the conversion of materials that were originally created in another format into an electronic form. Technically, the process of digitization involves converting an analog image into its corresponding numeric values. It is just a set of ones and zeros for the computer.[2] Digital conversion of library material has advanced rapidly in recent years, prompting some casual observers to believe that everything of importance can be found on the World Wide Web in digital form on a single click of mouse.

3. DIGITAL PRESERVATION STRATEGIES

Some organizations are blessed with high-quality information technology expertise as well as long-standing programs in preservation, collection development, and collection control for no digital materials. Other organizations have less expertise and experience. However, even the best-equipped organizations rarely have a clear road map for dealing with all the challenges of digital preservation. Most have had to learn on the way, investing heavily in work to build what they hope will be a set of well-established procedures. Many remain uncertain as to how they will maintain access across repeated and unpredictable technology changes.

No doubt, the digital preservation programs have developed more slowly than have our digital collection building. However, preservation action should not be delayed until a single 'digital preservation standard' appears.[3] Some concrete strategies are starting to emerge. Strategies for digital preservation such as storage media, refreshing, migration and emulation are at the core of management for long-term access. Storage

and metadata systems essentially aim to make emulation and migration possible. The basic concern is to protect and maintain the data stream carrying the archived information, and to maintain, and if necessary to recover, a means of accessing the archived information. Digital preservation will happen only if organisations and individuals accept responsibility for it. Digital preservation must address threats to all layers of the digital object: physical, logical, conceptual, and essential.[4]

4. SELECTING STORAGE MEDIA

How long a digital manuscript will survive depends on storage media, system requirements and the methods used to deal with. Before selecting any storage media for long term preservation, it is very important to know about various storage devices because they deteriorate differently and require different treatment. The longevity of the storage media is important, but the ability to access the file types with the necessary hardware and software is also a determining factor. The predicted failure of either of these factors can strongly influence the priority of action taken to preserve these materials. Media deterioration must be anticipated and addressed within an appropriate period or the first evidence of a problem may render the material unusable. Obviously, data should be stored in such a way that it will be accessible for as long as possible. Fixed storage media such as Hard Disk or Removable storage media such as Floppy disks, Optical Discs such as CD-ROM or CD-R and DVD-ROM or DVD-R may be used but need to be monitored to ensure transfer of the data to a newer media before it is affected by deterioration or obsolescence. Networked or online storage is another option provided that regular back ups are made and storage space is available. There should be an agreement with network administrators not to delete material on the basis that it has not been accessed, which is a common criterion for administration of some IT systems.[5] Networked material also needs to be migrated when systems are replaced.

5. SET PRIORITIES

Not all digital materials need to be kept, only those that are judged to have ongoing research value need to be preserved. It is essential to be able to identify such digital materials in your collection that require preservation by name/number and by type. Therefore it is essential to record a maximum amount of information about each publication in a database, which should provide searching capabilities for material by format and system requirements. This important information or metadata should include the details necessary to use the data.

Not all digital materials may warrant time consuming management for preservation.[6] A series of collecting principles based on the overall

manuscript collecting policy may be applied to determine what materials you wish to preserve.

6. ACCESS TO DIGITAL MSS

Digital materials cannot be said to be preserved if access is lost. The purpose of preservation is to maintain the ability to present the essential elements of authentic digital materials. When providing access to digital resources there are a number of points to keep in mind. The most important is to avoid direct access to the original files to prevent loss, changes or corruption. The machine provided for to view the files will need the appropriate software and hardware for access. Care should be taken with the copying facilities provided, allowing only appropriate amounts (possibly none) of printing, copying to disk or sending online or when a reader requests the files, a copy may be made available from the intranet.

The Internet is now undoubtedly a rich source of information and publications documenting our rich resources. Therefore it has become a strong focus for many digital preservation efforts around the world.

6.1 Usage and Arrangement of Files

An inhibiting factor for use of the files is the frequent lack of information about the file formats used and their software requirements. Digital manuscripts are frequently text documents or graphical images or may be database files and they may have been created using any number of software packages. It can be difficult to access the files again without their original software.[7] Therefore, it is very necessary to keep updated environment for proper usage of digital files.

The arrangement or order of paper manuscripts created by the author is often considered to be significant and may be preserved or recorded. This may also apply to digital manuscripts, including directory structure and naming conventions that have been used for the files.

6.2 Selecting File Format

In the process of migrating text files or image files to another format we need to carefully choose the target format. The format should not be proprietary because when change occurs or the format is no longer supported you may have no ability to convert to another format or could be locked into a limited selection of expensive options. It is best to choose a popular and widely adopted format. The greater the market share, the greater the market forces and likelihood for support of this format for as long as possible. A format with an open source is ideal for future access. This means that you can get the specification for how the file is encoded. The benefit is that in the future, if you keep a copy of the

specification you will be able to decode the contents of your digital files even without the original rendering software.[8]

6.3 Maintaining Layout

It is important to be sympathetic to the structure and layout of many documents. It is reasonably simple to recover the text of many old files but for some types of documents there is meaning in more than the words. The layout of words on a page can be as significant as the text itself. Another is the layout of text in a script which is especially important for readability and comprehension, e.g. character names generally appear on the left, an indent for speech and another type of emphasis such as italics for stage directions.[9]

6.4 Authenticity

Authenticity is best protected by measures that ensure the integrity of data is not compromised and by documentation that maintains the clear identity of the material. Digital files can be easily changed without any indication that the file you can see has been edited. This raises the issue of proving the records we are preserving are originals and exist as the creator intended them. Proof of authenticity in digital records can be assisted by the use of special tools, but this is a complicated topic, which requires further investigation of the complex issues involved.[10]

Our aim is to keep an original version of all files, preserving their original structure, organisation and file names, which may be significant. It would also be sensible to apply some kind of authenticity tool such as a check sum to these files in case there are doubt in the future over possible changes. A difficulty is that many files must be migrated to a different format for access purposes, which essentially changes the file and the check sum is no longer applicable. However, for preservation purposes we want to keep original versions of files in case alternative preservation paths are chosen in the future.

Original files will be copied and may be even migrated to another format, and then they may be restructured and even renamed to make them easier to use. All of these changes need to be documented and recorded in the equivalent of a conservation file for the item to retrace it's history and which parts of the item belong to the original document or may have been altered.

Due to the copyright restrictions we cannot copy these digital materials to a network drive, a logical option possibly from a technological point of view. We are effectively creating a copy for use and backup of these digital resources.

Therefore, preservation programs must clarify their legal right to collect, copy, name, modify, preserve, and provide access to the digital materials for which they take responsibility.[11]

6.5 Metadata for Long Term Access

Any good quality preservation strategy will insist on the necessity of recording item and treatment details. In managing digital collections and items the need for information or metadata that will support effective and efficient decision-making is even greater than with traditional collections–there is less opportunity to recognise and understand problems just by looking at the object. Often one can only recognise and manage the material itself through its associated information. There is also likely to be a much larger amount of material to be managed, with much shorter preservation cycles, so management processes need to be automated as much as possible, based on easily interpreted metadata. Metadata is an important and high profile tool for assisting long-term access to digital material.[12] Electronic records projects in particular see metadata as the answer to long term preservation.

7. CONSIDERING FUTURE CHALLENGES

The next most pressing issue is dealing with changes in technology, technological obsolescence, the evolving software and hardware environment. When you know what disks you have in your collection and which ones you want to preserve, you can take steps to avoid losing access to materials due to media deterioration and technological obsolescence. It would rather be better either to create back-ups on new media of the same type, i.e., refreshing or preferable to transfer the data to a media that will have a higher storage capacity and a greater life expectancy to reduce the frequency of back up. However, as technology progresses further and new media comes in to the market, further back-ups are definitely expected to be made on the newest stable media available.

To access digital resources, there are specific system requirements but we must be aware how they will be affected as technology changes. A program written for X may have difficulty running under Y for example. Software developers are not compelled to include backward compatibility. Use the knowledge gathered in recording the preservation metadata to determine what hardware and software are required by the whole collection. It is beneficial to establish whether you have the hardware and software required to provide access to your digital collection because this will affect your ability to preserve them. Regularly examine these requirements and be aware of impending changes in hardware and software and incorporate these needs when planning IT changes. This will help identify precise problems that can be

addressed, e.g. this process should be able to pick up when a piece of hardware or software is about to go out of use and allow action to be taken before it's disappeared completely.

When a change in technology has been identified, various methods may need to be examined. Changes in operating systems and software for example are far more complex. Methods such as migration and emulation currently appear to be the practical options that may be employed. However, there has been little practical experience whether these methods are being applied as common phenomena. The migration method generally relies on conversion software to change data from one format to another. This also depends on having the source code if you want to migrate a type of software and also having the appropriate conversion software. This is a very complex solution if there is no such software available. Emulation involves software that emulates or pretends to be another type of software or operating system, e.g., a Commodore 64 emulator to be used on a PC.[13] This may only be a short-term solution until the current operating system becomes out of date and we need an emulator for that as well. A series of emulators for emulators is likely to be unreliable. Our options to find migration, emulation or other solutions will rely on cooperation and research at international level. Communication with other libraries with similar situations and advice from the publishers could be a starting point for help. Computer societies and enthusiasts might be able to help transfer near obsolete materials. Commercial help and advice is also available.

8. PROVIDING SUITABLE STORAGE AND HANDLING

When you have material in a viable condition and a state of current system requirements there will be a period where the most basic preservation measures should be in place to assist the plans for long-term use. A basic need in any preservation plan is to provide appropriate storage and environmental conditions. A stable environment, such as air-conditioning or an insulated storage area, is ideal (i.e. storage free of large fluctuations in temperature and relative humidity). A cool dry environment slows down the processes of physical deterioration, which will extend the useful life of an item.[14]

Reduce exposure of magnetic media to magnetic fields, for example do not store on motorised equipments or expose to electronic equipment in close proximity. Limit light exposure by turning lights off or boxing material.

Security should also be considered. Procedures for access should limit chances material could be stolen or corrupted. Security boxing could be used to protect material in storage. Sticky labels should not be

placed directly on CDs due to increasing the chances of delamination and corrosion. Do not bend any types of disks and avoid the use hard tipped writing implements on them.

Storage should aim to be completely secure and tamper proof. As a security precaution files should also be set to read only to avoid accidental changes.

Some collections have particularly sensitive materials and may be restricted or closed for a set period, e.g., 20 years, or even culturally restricted by gender. These restrictions must be carefully managed to ensure that they are guaranteed. And it is important that this material is required indefinitely although usage is low, otherwise it is possible an over-keen administrator will apply standard IT logic and delete files not recently used.

9. CONCLUSION

Techniques for managing long-term access to these digital resources are still developing, and it cannot be accurately predicted yet exactly what the ideal processes will entail. For long term preservation, they will surely require the use of standards and appropriate infrastructure, such as the application of persistent identifiers and preservation metadata, in addition to the strategies that look promising and are receiving a lot of attention such as media selection, emergency back-ups, refreshing, migration and emulation.

It is very important that we not only further research on these topics, but we must also share information with like-minded projects throughout the country and internationally. It should also be understood that this is just the beginning of the process. Digital preservation will require an ongoing commitment to repeat many of these steps if we are to keep up with changes in technology.

The goal of maintaining accessibility is to find cost-effective ways of guaranteeing access whenever it is needed, in both the short- and long-term. Managing digital collections for ongoing access remains expensive. Inadequate funding is an obvious barrier. Many organizations that struggle to perform even basic functions find the cost of buying and refreshing dedicated computer equipment prohibitive. The IGNCA finds itself severely constrained in the scope of its collecting and in the research it can undertake to prepare for changes in technology; it is also constrained by the costs of recording adequate preservation metadata.

We hope, at least at a primary level, that the basic guidelines for digital heritage preservation strategy will help a wider range of

organizations take responsible action toward viable preservation programs.

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Digital Un-divide with Information Literacy in the Horizon of Information Technology: An Indian Perspective

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ABSTRACT

Digital divide is chiefly responsible for information illiteracy in digital environment. Digital divide is a social issue referring to the socio-economic gap between communities that have excess to computers and the Internet and those who do not. Whereas Information Literacy is the ability to recognize when information is needed and have the ability to use to locate, evaluate and use effectively the needed information. The paper correlates the digital divide and information literacy. Discuss the various issues related to Digital divide in India. Further it discuses the various initiatives taken into consideration to narrow the digital divide in Indian subcontinent. Finally, suggest that information literacy is the one of the tool or panacea to digital un-divide in this enhanced information technological era.

1. INTRODUCTION

The Information Communication Technology is taking a new dimension in almost everyday. The alarming rate of development of ICT the world is being changed into information oriented. The country which is rich in information is regarded is rich in every aspect. Information communication technologies (ICT) can eliminate many of the obstacles of time and space and help overcome gaps in regional development. However the arrangement of advantages brought by ICT is uneven, and this is what gives rise to the phenomenon of a "digital divide".

The concept of the digitai divide grows more complex as the phrase becomes shorthand for every conceivable disparity relating to online

access. The multi-dimensionality of the concept has been framed by Pippa Norris into three distinct aspects:

Global divide: divergence of Internet access between industrialized and developing countries;

Social divide: gap between information rich and information poor in each nation; and,

Democratic divide: difference between those who do and those who do not use the new technologies to further political participation [1].

The worry internationally is that a widening digital divide between countries could lead to a widening economic divide. In fact, the economic considerations driving the concerns about the digital divide underlie most of the concerns within a country as well as between countries. As economists have observed, however, we are in such early stages of the communications revolution that evidence on the question of the economic impact of differences in connectivity worldwide is very inconclusive.

2. DIGITAL DIVIDE

The digital divide is a socio-political issue referring to the socio-economic gap between communities that have access to computers and the Internet and those who do not. The term also refers to gaps that exist between groups regarding their ability to use ICTs (Information and Communications Technologies) effectively, due to differing levels of literacy and technical skills, as well as the gap between those groups that have access to quality, useful digital content and those that do not. The digital divide exists between those in cities and those in rural areas. For example, a 1999 study showed that 86% of Internet delivery was to the 20 largest cities. The digital divide also exists between the educated and the uneducated, between economic classes, and, globally, between the more and less industrially developed nations[2].

3. INFORMATION LITERACY

Information Literacy is the ability to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information [3]. Using information in a variety of information of formats requires literacy beyond basic literacy. To negotiate complex information formats one must also be skilled in other literacy such as Library literacy, Visual literacy, Media literacy, Computer literacy and Network literacy etc.

4. RELATION: LITERACY (INFORMATION) AND DIGITAL DIVIDE

Digital divide is chiefly responsible for information illiteracy in digital environment. Internet is growing faster than all the other technologies that have preceded it, e.g. radio existed for 38 years before and 50 m people were listening it. TV took only 13 years to reach this mark and Internet only 4 years.[4] Internet use is increasing dramatically. In India, some villages have never made a call. The language barrier is too much. Officially there are 18 languages in India. A small portion of it can read and understand English instructions on the computers. Very few websites are in other languages especially in typical Indian languages. Even today, in India, use of Internet is considered as unethical because of cultural background. It is because of might of having only unethical material on the net. Young boys and girls are especially not allowed to work on computers for sake of moral.

Comparing literacy and ICT access

	Literacy	ICT Access
Communication stage	Writing, print	Computer-mediated communication
Economic era	Industrial capitalism	Informational capitalism
Physical artifact	Books, magazines, newspapers, journals	Computer
Organization of content	Novels, short stories, essays, articles, reports, poems, forms	Web sites, e-mail, instant messages
Receptive skills	Reading	Reading + multimedia interpretation, searching, navigating
Productive skills	Writing	Writing + multimedia authoring and publishing
Divides	A great literacy divide?	A digital divide?

There are many similarities between literacy and ICT access. First, both literacy and ICT access are closely connected to advances in human

communication and the means of knowledge production. Second, just as ICT access is a prerequisite for full participation in the informational stage of capitalism, literacy was (and remains) a prerequisite for full participation in the earlier industrial stages of capitalism. Third, both literacy and ICT access necessitate a connection to a physical artifact (i.e., a book or a computer), to sources of information that get expressed as content within or via that physical artifact, and to a skill level sufficient to process and make use of that information. Fourth, both involve not only receiving information but also producing it. Finally, they are both tied to somewhat controversial notions of societal divides: the *great literacy divide* and the *digital divide[5].*

5. DIGITAL DIVIDE: INDIAN SCENARIO

5.1 Reasons for Digital divide in India

In a developing country like India, where poverty, illiteracy, unemployment, etc are the main problems of the government, providing access to the networked information is not on their priority list because of political considerations. In the South Asian countries, information is not shared because of political reasons. The SAARC Documentation Centre (SDC), New Delhi has not been able to serve as a clearinghouse on South Asia, because of the lack of cooperation among these countries. Political instability in these countries is another reason for such a situation in this region.

Vernacular languages pose another problem in ensuring access even to print-based publications, let alone the digital documents. It is possible to retrieve a lot of pertinent information in one's area of research from the developed countries, but it is very difficult to get a few pertinent references from this region. Even the National Library of India has not made any effort so far to digitize its resources, let alone the public, school and college libraries in this country. Political will and skill is really lacking as far as library and information infrastructure in India is concerned.

The library and information science courses are still focusing on technical services, i.e., the cataloguing and classification. It should be about networks and use networks in teaching and learning, particularly in distance / distributed learning, otherwise the existing 'digital divide' will grow further. All the benefits of the digital revolution will go to the 'elite' institutions, i.e. the science and technology libraries, and other research and development organizations.

The library and information services in India are by and large print-based and the network culture has not yet spread in the rural areas and the non-elite institutions. Here lies the biggest challenge for the Indian

democracy. Equality and equity of access can be ensured to one and all, only if the Government of India commits to it by adopting a suitable library and information policy.

5.2 Bridging Digital Divide Initiative in India

The digital divide has got ultimate impact in Indian subcontinent. However various measures and initiatives have been taken with the help of Government, NGOs, private organizations and international agencies to bridge the digital divide. Here some of the initiatives are discussed.

Computer literacy has started and reached a certain level. NIIT (National Institute of Information Technology) took initiative to launch computer literacy from 2001 onwards with Swift *Jyoti* a mean of creating computer awareness and a low cost training program with a slogan " Each one-reach one". With "*Akshya*" project in Kerala, Chamravttom village of Triparangode Panachayat of Malappuram district has distinction of being first e-literate village in India. One person each household gained skills to use computers and send email. It aims establish 9000 Community Information Centres across the state as part of campaigning to bridge digital divide. The project was inaugurated by Honorable President Dr. A.P.J. Abdul Kalam. People Learning Centres under National Literacy Mission *Jana Sikshan* Kendras have been established all the country in rural areas with objectives to disseminate information on development program and organize and reading room in the evening. In Madhya Pradesh, Dhar district has launched Information Messenger (*Gyandoot*) first of its kind in India an e-governance project. The project won Stock Holms Challenge Award. Under this project each village has a computer center and anybody can get information about agriculture, forests, crops, fields and water resources of villages/towns/tehsils etc., and answer of any complaints or request with in a prescribed period. The services provided by Public Information Kiosks make people aware of the ICT uses. In J&K and North Eastern States, CIC (Community Information Centres) has been inaugurated by the then Prime Minister Atal Bihari Vajpayee for basic needs of citizens such as information, education, entertainment and health services can be addressed through the establishment of Community Information Centres in the state. These centres would serve as a platform for e-governance, e-learning and other IT enabled services in the state. In Andhra Pradesh, all district headquarters have video-link facilities. Land records have been computerized in 1125 Mandals (village clusters). Hyderabad established public libraries in 2 districts as CIC's. Karnataka, has included Village local self-government Gram panchayat (village government) Information (GPI) kiosks. Municipal Industrial Trust (Karnataka) linked to district headquarters for transparency and accountability of governance. Maharastra in Kolhapur and Sangli district land records are available of

70 villages. Wired Village Warana is implemented at woman Cooperative complex at Kolhapur. Orissa is linking all the districts and blocks with the help of GRAMSAT. Pradeep Lokhande runs Rura Relations from the city of Pune. His business is rural marketing, in the course of which he has physically set foot in 4000 villages in five states, collects used computers from the Indians abroad who are willing to donate their used computers.[6]

In terms of access, in 1999 the IIT Chennai created a high speed, low cost Internet access system, which would do away with the need for modems and copper wires, thus enabling cheap access for developing countries. Academics at the Indian Institute of Science and engineers at the Bangalore-based Encore Software have designed a handheld Simputer, which will provide Internet and email access in local languages with touch-screen functions and micro-banking applications. Future versions even promise speech recognition and text-to-speech software for illiterate users. The intellectual property rights have been transferred for free to the non-profit Simputer.

Elections have just concluded in five states in India. For the first time voting was entirely electronic and carried out on India made machines. No yard long-ballots stuffed in boxes to be manually counted. People everywhere took to it with ease and are convinced 'poll riggers' would soon be extinct. Results were announced within three hours of beginning the software driven 'counting'.

6. LIBRARIES AND DIGITAL DIVIDE

Most public libraries in the United States, according to the 1998 National Survey of U.S. Public Library Outlet Internet Connectivity, offer public Internet access. Often, these public Internet access computers are people's only connection to the Internet. It is for this reason that libraries have come to be in the position to bridge the Digital Divide.

Libraries have a long-held value of people's universal access to information. This universal access to information mission, coupled with the library's focus on enhancing basic literacy as well as information literacy, makes bridging the digital divide an excellent mission for libraries. According to the American Library Association's Office for Information Technology Policy Brief, "Libraries and the Digital Divide," "The mission of libraries, as well as their associated services, programs, and technologies, is a key reason that libraries are indeed central to digital divide solutions and partnerships. Libraries, especially public, school and academic libraries, are the only institutions that are already structurally and programmatically prepared to fully address many of the

digital divide issues." Libraries are more than repositories for books and periodicals, libraries function as community and information centers and are using their position to bridge the digital divide.

The best example of using libraries to bridge the digital divide comes from the Bill and Melinda Gates Foundation. According to the foundation's fact sheet, the U.S. Library Program alone has made amazing strides: "More than 6,600 libraries have been reached, 28,000 PCs granted, and 8,100 librarians trained." Also, their International Library Initiatives are demonstrating how essential libraries to providing universal access to a population. Perhaps the most impressive example of this is the foundation's Chilean Library Program, where "368 Chilean public libraries will benefit from a US$9,284,339 million grant. The grant will provide training, computers and Internet access for all the libraries."[5] Such initiatives can only help to lessen the gap between the Internet "haves" and "have nots." There is a long way to go before the digital divide ceases to exist, but every home and library that is connected to the Internet brings society one step closer to conquering this problem.

7. DIGITAL UN-DIVIDE WITH INFORMATION LITERACY

Bridging the digital divide, nationally or internationally, entails more than supplying communities with computers. Information literacy must be integrated in the quest to bridge the digital divide. This means that a sustained and holistic training approach must be used to ensure that individuals can realize the technology's potential. When the digital divide is bridged, people are able to access the information and opportunities that the Internet offers. So enhancing information literacy one individual will be able to: Recognize a need for information, Determine the extent of information needed ,Access the needed information effectively and efficiently, Evaluate information and its sources critically, Incorporate selected information into their knowledge base, Use information effectively to accomplish a specific purpose, Understand the economic, legal, and social issues surrounding the use of information, Access and use information ethically and legally, Classify, store, manipulate and redraft information collected or generated, Recognize information literacy as a prerequisite for lifelong learning.[3]

So keeping view of the importance of information literacy towards digital un-divide, it should be propagated in India right from the grass-root level of education to the higher level of education. These groups of people in turns take the responsibility to make further literacy amongst mass section of people. The NGOs, government agencies, international agencies like UNESCO should work together to extend possible help with the help of information kiosks in villages, towns and cities.

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Digitization Management in Libraries: Procedure for Conversion of Print Text

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ABSTRACT

The paper explained the technological changes and need for digitization of the library materials from Print to Electronic format. It examined different technological aspects related to digitization, conversion and scanning of the different types of documents. The aspects that have to be taken into consideration, while digitization of the documents in the library is explained. They are Information needs of the users, Quality of the digital documents, organization of the information digitally, Preservation, Cost, equipments etc are discussed briefly.

Keywords: Digitization, Conversion, Scanning, Digital Preservation

1. INTRODUCTION

Over the past few decades, rapid changes in information technology have drastically changed the functions and activities of the libraries. The Information and Communication Technology created a new type of work culture, new forms of information storage, and new means of communication and dissemination of information. The advent of electronic resources and their increased use in libraries has brought about significant changes in Storage and Communication of Information.

As a Result, the Conventional libraries are transforming into digital libraries. Majority of the libraries have computerized already and digitizing their printed collection. In India, the process of digitization is slow compared

to other developed countries. This is so because, only 21% of the Indian population is computer literate and only 14% of the Indian Population is using Internet. Due to the development in digitization, many of the libraries are digitizing their collection by transforming their printed materials into digital form.

A fully developed digital library environment involves the following elements[1]:

- Initial Conversion of Content from Physical to Digital form
- The extraction or creation of metadata or indexing information describing the content to facilitate searching and discovery, as well as administrative and structural metadata to assist in object viewing, management and preservation
- Storage of digital content and metadata in appropriate multimedia repository. The repository will include rights management capabilities to enforce Intellectual Property Rights, if required. E-Commerce functionality may also be present if needed to handle accounting and billing
- Client Services for the browser, including repository querying and workflow
- Content delivery via file transfer or streaming media
- Patron access through a browser or dedicated client
- A private or public network

2. DIGITIZATION

Digitization refers to the conversion of an item–be it printed text, manuscript, image or sound, film and video recording–from one format (usually print or analogue) into digital. The process basically involves taking a physical object and essentially making an 'electronic photograph' of it. An image of the physical object is captured using a scanner or digital camera–and converted to digital format that can be stored electronically and accessed via a computer[2].

Digital equipment such as Flatbed Scanners, digital cameras and digital audio/video recorders—generate digital copies of physical objects. Flatbed scanners are in short, desktop photocopiers and they are mostly mechanical devices. A lamp moves slowly across the face of the original. The lamp shines onto the original and the reflected light is focused through a series of mirrors and lens onto the recording medium. In flatbed scanners, the medium is a compact light sensor, either a CCD (Charged Coupling Device) or CIS (Contact Image Sensor) each of which is composed of hundreds or thousands of elements. When light strikes each element the intensity of the light is assigned a number. The numeric reading of light intensity and element position are recorded in sequence into a file, which forms the digital version of the original[3].

Many of the Information and Communication Technology applications of digitization are developed and in market now. Digital formats may be derived by scanning printed paper or micro film searchable by keying or Optical Character Recognition (OCR) encoded the converted information by a standard or encoding scheme and communicated through networks.

Selecting materials for a digital project entails different factors than selecting print documents, such as legal issues and the high costs of digitization projects. In addition, the project team needs to determine if the materials to be digitized warrant the time and Expense of transferring the digital files to new formats every few years as technologies change[4]. Most of the library professionals do not know about digitization. Even though a few professionals know about digitization, they are facing certain problems such. as what kind of information has to be digitized, are there any restrictions for digitization, among the available technological applications what kind of technology is suited for digitization, extent of quality needed etc. For this purpose, proper planning of digitization is essential. The present paper attempted to describe different aspects related to digitization.

3. PLANNING OF DIGITIZATION IN A LIBRARY

Although many digitization projects are undertaken to increase access, the digital image as a preservation copy is a natural by-product. The digital information needed to be preserved in the library through computer networks, so as to enable its use continuously over the years to come. Following are the general recommendations, which were developed by the California Digital Library as part of their Digital Image Collection Standards[5]:

- Consider current and future user needs, as well as the unique requirements of specific types of materials and collections
- Scan at the highest resolution appropriate to the content of the original
- Scan at a resolution level to avoid rescanning in the future
- Create and store master image, allowing for production of derivative images for current and future use
- Use standards that are international, industry based and non-proprietary
- Current distribution technology limitations should not determine levels of scanning
- Use system components that are non-proprietary
- Create appropriate backup files and store media in an appropriate environment
- Develop a migration plan to assure successful transfer across technology generations
- Consider grayscale over bitonal; color over grayscale

- Use objective measurements to determine scanner settings. Do NOT attempt to make the image look good on a particular monitor or use image processing to correct color
- Do not compress digital masters, unless a lossless compression is used
- Capture metadata about the scanning process, as well as the descriptive metadata

Planning is an essential aspect in everyday life in all the activities. Especially to undertake the projects which need much time, energy and finance, the planning is emphasized. The planning of digitization should necessarily consider the following:

4. INFORMATION NEEDS OF THE USERS

It is noted that the information needs of the users of the library must be assessed. There is necessary to know whether the user needs only abstracts or full text articles and how the users search for information, i.e., through key words index, authors or other approaches. The different types of digital information sources are:

Page images	It is just a photocopy image of the printed page and not searchable through keywords
Full text	Fully Searchable. It is accurate transcription of text to standard web browsers for use on screen or in print, but forgoing conveying original layouts and illustrations through page images.
Page images with full text	Here page images are displayed to the user and indexed with certain keywords.
Page images with full text for search display	Enables the user to choose between two versions of a work- either page images of fully searchable transcriptions – delivered to standard web browsers for use on screen or in print
Page images with encoded text for searching and display	Similar to Page images with full text for display and search, but the text includes mark-up to express document structure, formatting and such other features.

According to Chapman and Kenney[6], Converting collections into digital images begins with project planning, and then ostensibly follows a linear progression of tasks: select/prepare, convert/catalog, store/process, distribute,

and maintain over time. It is risky, however, to proceed with any step before fully considering the relationship between conversion–where quality, throughput, and cost are primary considerations–and access, where processing ability, speed, and usability are desirable. Informed project management recognizes the interrelationships among each of the various processes, and appreciates that decisions made at the beginning affect all subsequent steps. An excessive concern with user needs, current technological capabilities, image quality, or project costs alone may compromise the ultimate utility of digital collections. Once the general objectives for quality and functionality have been set, the following factors will collectively determine whether or not these benchmarks will be met:

- The nature of the source documents themselves, particularly in terms of their individual and collective value
- The strengths and weaknesses of the current state of digital image technology
- The institution's technical capabilities and commitment, including staffing
- Current and future users' needs and expectations
- All relevant budgetary considerations

It is important during scanning to verify the quality of the captured image. This can be done on each object or on a sample. The operator should test the quality as the nature of the objects change during a scanning session. This is because the contrast and focus may have changed. Object that failed this test will need to be re-scanned. For microfilming, quality assurance must be delayed until the film is developed.

Frequently source documents, photographs, stereographs, maps, and artwork are in poor condition. Besides fragility, they may have lost contrast, color definition, and clarity. In addition to physical remedies such as conservator methods, electronic remedies are available. Tonal improvements are possible after initial scanning into digital format. Contrast can be increased to improve OCR accuracy.

The process of capturing objects into digital form has evolved from several methodologies. Several competing standards exist. Depending upon the purpose of the capture and the ultimate display objectives, the digitization process should consider compliance with the most supported and enduring standards[7].

Quan Liu[8] suggested the 'Standards and guidelines associated with library digitization practices vary from project to project. Over the years, university, public, school, and special libraries have adopted their own policies with

regard to digitization. Some older standards, as well as more recent ones, are widely accepted and practiced library digitization projects. Metadata standards and image quality standards and guidelines are commonly sought when planning digitization projects. Common metadata standards used to date are Dublin Core, RDF, EAD, TEI, and SGML and its descendents XML and HTML. The MARC standard has been used as the standard interchange format in representing catalog records electronically'.

It is noted that scanning is a photographic process that produces only digital images, comprising of pixels that are not searchable. Conversion of text is a transcription process in which keying or OCR produces machine readable and fully searchable alpha-numeric characters. Full text refers to all formats of fully searchable alpha-numeric data.

Based on the needs of the users, a library have to deliver page images that replicate the appearance of the original materials and use full text for searching, it is better if the digitization include both scanning and text conversion. The Page images are stored in Printed Document Format. Further, the converted text may be stored in JPEG, GIF, Text and HTML formats.

5. QUALITY OF THE DOCUMENTS

The quality includes fidelity (to the original), level of utility, type of access to be provided, security and portability. Quality in digitization may be determined on

- An understanding of actual and anticipated nature of use
- Size and format of the digital files
- Navigational facilities within and among digital collections
- Describing, delivering and retaining the digital document

Quality of the digitized text plays an important role in searching, display and printing. For this purpose, while digitizing the document certain factors such as lens positioning, lighting, sharp focus, exposure quality, magnification etc. should be planned properly. Good digital masters are not characterized by size, but by their capability to produce the appropriate range of deliverables to meet the current and future use requirements.

Sometimes digitization overlooks the importance of emphasis on basic photographic principles of good object to lens positioning, lighting, sharp focus and accurate exposure to produce good images. Good digital images are not characterized by the size, but by the way of representation to meet the present and future use.

Compared to images, full text has one quality attribute that is accuracy and searching capability. In case of full text conversion, there are several methods to control how the text is rendered on screen or paper, but all depend on text encoding. Text encoding should be considered in the broader context of digital file functionality as its main function is to embed document structure.

6. ORGANIZATION OF INFORMATION

To be useful in original and in digital form, multi-paged text needs to be organized. Structural metadata helps to organize individual page images to facilitate navigation and citation. The organization of information includes the types of display (such as thumbnail view, two page side by side, zooming, magnification), search capability (by key words), navigation and convenient to print.

7. COST AND DIGITIZATION TECHNOLOGY

The most important aspect of digitization is the technological equipments such as Camera, Scanners, Storage devices etc. and the digitization cost. Parekh and Sen[9] suggested scanners for various types of materials as under:

Single Leaf, Regular Sized, Flat Materials	**Single Leaf, Large Sized, Flat Materials**	**Bound Materials**	**Transparent Medium**
Flatbed scanner	Over size flatbed scanner	Digital camera with book cradle	Slide scanner
Sheetfed scanner, if non-brittle	Sheetfed scanner if non-brittle	Right angle prism or overhead flatbed scanner	Film scanner
Digital camera	Digital camera		Multi-format flatbed scanner Digital camera

It is also noted that along with the cost of digitization, there is also need to consider the cost of preservation and conservation of digitally converted documents.

8. ACCESS CONTROL OF DIGITAL INFORMATION

Before digitization, it is necessary to know about the accessibility of the digitized documents by different users. It includes the following:

- Location of the users: where the users of the library are located and where and how they are accessing the documents. Whether any bibliographic

catalogues, web portals, indexes are needed to enable the access through web

- Interoperability: Whether interoperability between the different systems is needed to access the documents through networks. For this purpose, certain Standards such as Open Document Management API (ODMA, Document Management Alliance (DMA) and Web DAV (World Wide Web Distributed Authoring and Versioning) are important
- Kinds of Platforms/Software: How users access the information and through which software (The different software are Adobe Acrobat Reader, PDF, HTML, XML, Images, etc.)
- Which additional systems and access points are needed to promote use of the documents to new users

For this purpose, different techniques such as Portals, records, tags, web search engines, catalogues, links to the different pages should be maintained.

9. RESTRICTIONS TO USE DIGITAL DOCUMENTS

Majority of the information systems provide both free literature and literature for some charges (Fee). There is necessary to identify and classify the documents for both kinds of users. Some kinds of restrictions such as User identification, authorization and authentication are needed for charges information sources. By describing the access restrictions in these general terms, technical specifications can be developed or choices can be narrowed for information systems, storage and metadata.

10. PRESERVATION AND LIFE OF THE DOCUMENTS

The life span of the digital documents helps to make the decisions about where the data is stored. The digital documents refer to all the digitized text components: descriptive structural and administrative meta data, page images and full text documents. Digital files of all formats are physical objects whose life span relates meaningfully to the storage and preservation environment. The information stored in controlled environments has a greater likelihood of remaining usable over time than collection stored in secure, although relatively uncontrolled environment. Controlled storage environments are characterized by having systems and oversight designed to respond to known or perceived risks such as biological, chemical or mechanical failures. The notable and additional risk for digital documents is technical obsolescence: incompatibility of data with associated devices needed to render information into human readable form.

Digital preservation means taking steps to ensure the longevity of the electronic document in terms of the following:

- Data (this might be for text, images, video or audio stored in variety of formats and standards)
- Index to the data
- Link to other data
- Metadata
- Software (relies upon hardware and operating system); and
- Storage medium etc[10]

Hence, in preservation of digital objects the following measures taken into account are as follows:

- Integrity of digital materials
- The physical presence
- The preservation format
- The digital material's functionality
- The location and reference of digital materials
- The authenticity of that materials
- The context of preserved material; and
- The provenance

By stating the minimum life span desired for digital resources, a library manager can assess whether infrastructure is or will be sufficient to meet expectations of ongoing usability. Some amount of data transformation will be necessary although how much and at what intervals, cannot be predicted-for resources expected to keep pace with technological changes, user expectations or both. Hence most strategies for on going management of digital documents require administrative meta data to document ownership, rights and technical attributes of the data.

11. CONCLUSION

It is noted that a few University and College libraries have already started digitization and a majority of the University and College libraries are yet to start the work of digitization and conversion work of their printed collection. The digitization process involves various kinds of standards and processes and adequate knowledge is necessary for digitization and Conversion of the documents. For this purpose, every library professional must have to know about digitization, conversion and scanning of the documents and the standards for their conversion and preservation and also conservation of the converted documents.

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Knowledge Management: An Urgent Need in Knowledge Society

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ABSTRACT

The paper discusses about the concept of Knowledge Management & its evolution, the clear distinction between knowledge & information, Knowledge management vis-à-vis information management and its necessity in the Knowledge Society. Global and national scenarios along with the future of Knowledge Management are included.

1. Historical Background

Knowledge management before the term was coined used to be simply the transfer of knowledge from one person to another, the result of which enabled the recipient to benefit from the collected wisdom of the more experienced members of organization or group.[1]

Knowledge management which is originated in management science & defined as a scientific management of the early part of last century, has been applied successfully in commercial organizations and is now taking the development establishment, particularly the large bilateral organizations, by storm. In its most simple sense, it refers to the effective use of an organization's knowledge none of which are concerned with the management of knowledge. This knowledge is largely to be found in people's heads, with printed documents and databases offering a limited access to the total knowledge resources of any organization.[2]

The pursuit of any significant human activity typically requires the know-how and expertise in the field of activity in hand so that it may be successfully conducted. & by using earlier experience one can obviate the need of costly rework or of learning by making the same repetitive mistakes.

In the village, from time immemorial, the elder, the traditional healer and the midwife have been the living repositories of distilled experience in the life of the community.

Even in highly sophisticated modern knowledge organizations, the most valuable knowledge–know-how in terms of what really gets results and what mistakes to avoid often resides mainly in people's minds.

Interactive knowledge-sharing mechanisms have always been used from town meetings, professional consultations, meetings, workshops, and conferences–all functioning to enable individuals to share what they know with others in the relevant area of knowledge.

Migrations of people have been a principal mode of knowledge transfer across continents. Today, a range of technologies from computers to video-conferencing for distance learning offers unprecedented opportunities to disseminate know-how and insights rapidly and cheaply to a worldwide audience.

Explicating knowledge: The reach of know-how and experience possessed by individuals can be greatly extended once it is captured and explicated so that others can easily find it and understand and use it.

In ancient Greece, the philosopher, Plato, in his dialogues, captured and elaborated the thinking of his mentor Socrates, and so succeeding generations have been able to discover and share that thinking, and in turn reinterpret those thoughts and to be stimulated to achieve fresh insights and creativity.

Now-a-days electronic transfer is proliferating. Electronic databases, audio and video recordings, interactive tools and multimedia presentations have become available to extend the techniques for capturing and disseminating content.

Digital divide or opportunity: Although these tools are not yet everywhere available in the developing world, they are spreading rapidly and present a unique opportunity for developing countries to benefit most from the technological revolution now unfolding: low-cost telecommunications systems could help countries to leapfrog ahead through distance education, distance health services, and much better access to markets and private sector partners abroad.

Nevertheless, even with modern tools, the process of knowledge transfer is inherently difficult, since those who have knowledge may not be conscious of what they know or how significant it is. Thus know-how is "sticky" and tends to stay in people's heads.[3]

Now we may more precisely define Knowledge management or KM as a technology, techniques, for organizing and collecting "knowledge"

so that it applied at an appropriate time or place to share this flow of information. Generally corporate KM emphasizes the technology of databases and software applications collecting information which may also referred to as systematic management of vital knowledge.

One can also define Knowledge Management as a collection of processes that govern the creation, dissemination, and utilization of knowledge. In one form or another, knowledge management has been around for a very long time.[4]

2. INFORMATION AND KNOWLEDGE

'Knowledge' is defined as what we know: knowledge involves the mental processes of comprehension, understanding and learning that go on in the mind and only in the mind, however much they involve interaction with the world outside the mind, and interaction with others. Whenever we wish to express what we know, we can only do so by uttering messages of one kind or another - oral, written, graphic, gestural or even through 'body language'. Such messages do not carry 'knowledge', they constitute 'information', which a knowing mind may assimilate, understand, comprehend and incorporate into its own knowledge structures. These structures are not identical for the person uttering the message and the receiver, because each person's knowledge structures are, as Schutz (1967) puts it, 'biographically determined'. Therefore, the knowledge built from the messages can never be exactly the same as the knowledge base from which the messages were uttered.

In common usage, these two terms are frequently used as synonyms, but the task of the academic researcher is to clarify the use of terms so that the field of investigation has a clearly defined vocabulary. The present confusion over 'knowledge management' illustrates this need perfectly to the recipient. Collections of messages, composed in various ways, may be considered as 'information resources' of various kinds - collections of papers in a journal, e-mail messages in an electronic 'folder', manuscript letters The consequence of this analysis is that everything outside the mind that can be manipulated in any way, can be defined as 'data', if it consists of simple facts, or as 'information', if the data are embedded in a context of relevance in an archive, or whatever. Generally, these are regarded as 'information resources'. Thus, data and information may be managed, and information resources may be managed, but knowledge (i.e., what we know) can never be managed, except by the individual knower and, even then, only imperfectly. The fact is that we often do not know what we know: that we know something may only emerge when we need to employ the knowledge to accomplish something. Much of what we have learnt is apparently forgotten, but can emerge unexpectedly when needed, or even when not

needed. In other words we seem to have very little control over 'what we know'.[5]

3. IS INFORMATION MANAGEMENT SAME AS KNOWLEDGE MANAGEMENT?

If you take a perspective of information as a resource, then you arrive at a different definition. The Aslib task group defined information management as:

> *"the applications of conventional management processes to information, with the aim of maximizing its contribution to the achievement of organizational objectives."*

Similarly, many definitions abound for knowledge management, but most people agree it is something to do with the systematic management of knowledge to achieve business benefits. Knowledge management requires new methods and skills, and is a relatively new discipline where the methods have not yet been fully developed Like information, it is a vital resource. Unlike information, there is a large body of 'tacit' knowledge, knowledge that is not codified, is in people's heads and is context dependent. For these reasons some argue that 'knowledge management' is an oxymoron. How can you manage something that is intangible and very personal?

For me, the challenge of knowledge management is as much about know-why, know-who and know-how as it is about the more tangible know-what. It is about experience and skills and making sure that an organization continues to develop its competencies - in individuals and in the organization as a whole. Our research showed that good information management skills and methods (of the IRM type) are an important foundation. Such methods include those of information specialists (of the librarian school), such as thesaurus definition and management, information classification, abstracting and text database management. But knowledge management goes somewhat further. It also needs:

- processes that engage people and helps them apply existing knowledge
- systems that facilitate the flow of knowledge from knower to user
- processes that encourage the development and application of new knowledge
- a culture that stimulates creativity and knowledge sharing
- an understanding of the fundamental economics of knowledge (an increasing not a depleting resource)
- ways of measuring and developing and organization's competencies[6]

4. WHY KNOWLEDGE MANAGEMENT?

In past eras, most employees had to fit into their organizational structures by means of their performance standards based strictly upon their defined job description. Employment was secure as long as they performed assigned tasks & minded their own business. At that time the knowledge hoarding was the order of the day.[7]

In this knowledge era, our success depends upon what we know & what we do with what we know. The changes that we are going through are overwhelming. Following are the primary reasons why knowledge organizations should implement knowledge management (KM) strategy and manage their collective intellectual capital to succeed in the challenging knowledge era:

- Managing the continuous changing of business needs and the way business is managed
- Addressing the challenges of 21st century organizations
- Accelerating learning, innovation and execution to maximize top line and bottom line
- Increasing productivity and profitability while organizations are going through margin pressure due to tuff competition
- Addressing the highest expectations of customers
- Meeting the market demands in this continuously changing business environment
- Increasing need for building and accessing common knowledge easily and quickly
- Managing the complexities of knowledge, knowledge exchange & knowledge development[8]
- Reduced cycle times and shortened product development times
- A need for organizational adaptation because of changing business rules and assumption
- A requirement to operate with a shrinking number of assets (people, inventory & facilities)
- A reduction in the amount of time employees are given to acquire new knowledge; and
- Changes in strategic directions & workforce mobility that lead to knowledge loss.[9]

Not only that! Even when these access gaps are met, there are these fundamental challenges:

- How to use technology to convert challenges into opportunities?
- How to convert information into knowledge?
- How to apply knowledge for solutions, value-addition and competitive advantage?
- How to build and sustain an enabling environment for a knowledge based organisation and community?

This means bringing about changes in attitudes and values, changes in our ways of working and communicating, and changes in the entire framework of relationships and processes–among people, within organisations, and in the interface with the socio-economic environment.

To be enabled and empowered to face the challenges of the 21st century, therefore, means not merely accessing technology but developing the capacity to manage knowledge.[10]

Knowledge management powers the knowledge workers and knowledge organizations & helps them manage these challenges.

5. KNOWLEDGE SOCIETY

Well, Knowledge Management as a strategic framework for managing change, is still alive and kicking! And this, despite the gloomy and myopic scenarios projected by many during the turbulent recessionary period of last three years. We are as relevant today as we were when we launched Total Knowledge Management four years ago - as facilitators, integration consultants, and solutions providers for the emerging knowledge society.[11]

The idea and the concept of knowledge-based societies primarily appear in the political discourse of the European Community and some Asian countries.

A "knowledge society" is a type of society where activities related to science and technology reach such a level that they induce deep economic, social, cultural, and political transformations. The whole social structure enters unpredictable mutations. A different course of evolution becomes possible. New attitudes and behaviors, new needs and desires emerge. This new opening plays a major role in the "globalization" process.

This is the reason why the Humanities, Human, and Social Sciences become as important and relevant as science and technology themselves in order to understand and manage this evolution of our societies.

This is what the Knowledge Society Center is about. It reaches further than the so-called "new economy," "information society," "economics of knowledge," "human capital," etc. This does not mean that a full "knowledge society" already exists. It is a "virtual society," a recent phenomenon, still in the making and emerging. Even in their present crisis, Silicon Valley and the Bay Area, in general, are the most advanced cases in the world. But they are not the only ones, and they need to be compared with other cases in the world.

A knowledge-based society is the next step in the evolution of modern societies. A key element is the following: the way we are able to understand this evolution, science and technology in all their contexts, is shaping this new type of society. This concerns criticisms of modern and post-modern ideologies, ethics, philosophy, democracy, social needs, and economic interests, etc.

The stakes and the obstacles are enormous. Three problems need to be mentioned:

(i) This mutation is always "glocal," i.e., "local" with a "global" impact (for instance Internet, the role of regional networks, etc). It develops beyond the Nation-State and beyond a world order based on Nation-States.

(ii) These mutations touch Humanity and the conception of the Human, individual subjects, women and men in our social, economic, cultural and spiritual lives: our beliefs and values, the way we work and learn, communicate, raise our children, etc.

(iii) Major forms of resistance, opposition, and rejection already exist, also in advanced industrial Nations. They will grow further.[12]

The Vice Chairman of India's National Knowledge Commission (NKC), Dr P M Bhargava while delivering a special lecture on "how do we make India a knowledge based society" organized at the 93rd Indian Science Congress (ISC) in Hyderabad, Andhra Pradesh on January 6, 2006, said that there is no country in the world today that has a truly knowledge based society. Dr Bhargava said a knowledge based society was easier to govern, provided the government intends to be honest, fair, transparent and people oriented. He said mechanisms of knowledge generation, dissemination and usage around the world was faulty to various degrees, creating a fertile ground for growth of exploitation. Dr Bhargava said there is a direct relationship between a knowledge based society.[13]

6. INDIAN SCENARIO

Most Indian IT organisations are yet to implement knowledge management as an employee empowerment tool that gives them immediate access to central repository of company specific information". Says Selvam George Director HR Birla 3M technologies, "Knowledge management systems in India are at a nascent stage. "IT companies are implementing knowledge management systems piecemeal and restricting it to segments that have a short-term influence on business. But knowledge management is a broader term, inclusive of processes such as value creation, leadership skills etc. The benefits of capturing this knowledge are intangible. Hence, most employers are disinterested. In the manufacturing industry, a great deal of knowledge of processes was

lost till ISO certification was introduced. With IT companies now chasing SEICMM standards, organisations will be forced to move towards capturing and disseminating existing knowledge within the company. The external pressure will speed knowledge management activities." Perhaps an optimistic sign is that IT training majors like Aptech, International, Deldot among many others have begun offering courses in knowledge/documentation management!

However, the problem in India, an HR manager admits on the condition of anonymity is the lack of knowledge sharing culture in Indian companies. "The IT industry is knowledge intensive and very competitive. Employees are obviously reluctant to share what they know as it is know-how that gives them an edge. Unless knowledge sharing is incentivised it will not succeed given the mindset of a software engineer" There are other stumbling blocks too. "Most companies have informal knowledge sharing channels in the forms of regular training sessions, discussion forum, e-mail groups, and regular team meetings. But organisations by and large are so geared towards meeting immediate goals and ensuring client satisfaction that they usually do not possess the time to channelise these knowledge efforts into a continuous, formal initiative" purports Priti Pandit, HR member at Alopa Networks.

Counters R Srinivas working in a leading telecom company Indian IT organisations are stingy about investing on employees, except in areas that have an immediate short-term benefit. "With the downturn, even training courses for employees have been cut, knowledge management is dispensable. Most companies have started candy floss intranets where discussion levels are restricted, banal and low. The same technology could be used for serious knowledge management efforts within the enterprise." While employee face a near- term disability on account of centralised repositories of company specific information, in the long-term the, the loser is the organisation. Over a period of time, employees gain company specific information and expertise through informal organisational channels and bring their own perspective to problem solving. The refusal to capture and disseminate this experience works against the very grain of information and technology that companies claim to produce.[14]

Moving on to other knowledge-centric industries, a confused pattern of adoption is revealed. IT-enabled services companies like call centres, business process outsourcing (BPO) companies offering back-office accounting or Web services works, or even IT training outfits, which should have been the ideal ground of KM practice, are mostly far from possessing any decent knowledge management solutions. Aniruddha Limaye, vice president, corporate HR and Training, Daksh eServices, a

BPO service provider, admits the fact that most companies, including his, are bogged down by their commitment to meet their regular business requirements and that knowledge management has taken a back seat for the last few years.

It is not the overall picture of India. To promote and publicise Knowledge management initiatives:

- Infosys has a company wide intranet called Sparsh which acts as a central information portal
- Wipro Infotech has a 'saint & thief' award concept under which both the saint (person who contributes the maximum knowledge) and the thief (the one who steals the most from knowledge repository and deploys them) are rewarded
- Infosys has created Knowledge Currency units which employee can earn for contribution towards knowledge sharing, accumulate and encash them for contribution to knowledge sharing[15]
- Patni uses KM and converted their organization into an organisation of the new economy, and almost every employee of Patni now uses KM tools actively. At the end of each quarter, the photographs of the top five contributors were prominently put up on the knowledge management repository. To encourage contributors, Patni even gives points to employee suggestions, which are then counted in the annual appraisal of the employee[16]
- Satyam has been maintaining a knowledge repository for many years now, but has embarked on a dedicated knowledge management initiative two years ago. Since then, the IT major has been gradually expanding it to include more services [17]
- TCS Knowledge Management practice has been providing Knowledge management solution to wide industry spectrum, organizations including various Govt. Department and agencies[18]

7. GLOBAL SCENARIO

Worldwide Knowledge management is one of the most interesting and powerful IT & Management concept in decades. These are the issues said to include worldwide for developing, implementing and maintaining appropriate organizational, cultural, technical infrastructures to enable knowledge creation, codification, transfer and realization process (Grover & Davenport, 2001).[19]

It is by utilizing these processes that organization find, select organize, disseminate, & transfer important information & expertise necessary for activities such as problem solving, dynamic learning, strategic planning & decision making. Worldwide spending on knowledge management is expected to reach $12 billion soon. Worldwide Knowledge management is the key to competitive advantage,

better customer care, increased returns, faster turn around & innovation. Knowledge managers deal with the intellectual capital side of information management issues & must be skilled in ever changing technology systems used by corporate, government, research and professional organizations. To achieve business objectives over the next 3-5 years worldwide, emphasis on customer needs & preferences will be the top priority in the near future.[20]

These are the areas where one can see the application of knowledge Management

- Software
- Pharma
- Biotech
- IT Services(ITES)
- Telecom
- Health & Care Service
- High level R&D[21]

We are hereby providing the special reference to WHO, applying Knowledge Management in Health areas

Health & Care Service

World Health Organization (WHO) has taken the initiatives in Health & Care service by using the knowledge Management through e-health, Department of Knowledge management & Sharing. Key Programme areas are:

- Knowledge mapping
  It is an evolving discipline in knowledge management which not only attempts to quantify & categorize knowledge assets, but identify gaps, flaws, constraints and understanding of knowledge dynamics within a system to help make better use of knowledge within an organization or community. This program helps countries adapt & apply methodology for knowledge mapping.

- Health Internet Governance
  Enable National Health Systems to participate in world summit on the Information Society Process and the UN-ICT Task Force.

- ICT for Human Resources for Health
  Provide education and training via distance learning and e-learning for health care workers, mainly in developing countries. [22]

8. WISDOM SOURCE TECHNOLOGIES

In almost all other areas including health & care service as given above Wisdom Source Technologies founded in the early nineties provide its solution in support of a larger world vision of a peaceful, productive interdependence of nations through an understanding of the primary world systems and the corporation's role in human development within the context and support of those systems. The necessity of the world view of the international corporation set the stage, and need, for the development of the ideal work environment where the human resources self-actualize as part of their organizational role fulfillment. Only this would allow continual innovation and success for the organization while it transforms and adapts continuously to ever-changing demands amidst the larger converging world marketplace experience.

After intensive training and experience in the most advanced management techniques, technical strategies, corporate visioning, and knowledge organization, both ontological and phenomenological, the Wisdom Source software platform was discovered and created to lead the way for organizations and their people to attain success through mutual cooperation in fulfillment of their needs. Wisdom Source Technologies was created to be the epitome of the self-actualized organization through an impeccable belief in the goodness and resourcefulness of humanity and the organizational opportunity which faces the earth at this time. Wisdom Source software is a bridge for the organization to use in order to realign its people according to its purpose, core values, mission, strategies and goals while allowing it to be aligned with the needs and goals of the people, which after all is exactly what was a successful company. Ten office locations worldwide through which the Wisdom Source Technologies provide knowledge management solutions are:

- Atlanta, Georgia, USA
- Bangalore, India
- Hilo, Hawaii, USA
- Hong Kong, China
- Honolulu, Hawaii, USA
- New York, New York, USA
- Philadelphia, Pennsylvania, USA
- Sacramento, California, USA
- Salt Lake City, Utah, USA
- Vancouver, BC, Canada

These are the following areas where Wisdom Source provides solutions specific to your industry that combine vertical knowledge bases, best practices, and taxonomies to give you the exact solution that you need to get your organization to its next level of evolution.[23]

Sector	Industry	Included Solutions	E-Sharing Edition K3M Level 1-5	Enterprise Edition K3M Level, 1-8
1	Community & Nonprofit	Community visions, cultures, Non Governmental Organizations, charities	2.1 E-Share	2.1 EE
2	Education	Schools, Universities, Learning Organizations, Knowledge providers	2.1 EE, 2.1 EE, Med	2.1 EE, 2.1 Med
3	Energy	Utilities, Oil, Alternative energy	2.1 E-Share	2.1 EE
4	Financial Services	Banks, Brokerages, Exchanges, Financial Regulatory and Compliance, Organization, Investment Banks	2.1 E-Share	2.1 EE
5	Government	Government agencies, housing authorities, Public Safety Departments, Civil Defences	2.1 E-Share, 2.1 E-Share, Gov	2.1 EE 2.1 Gov
6	Legal	Class Action Suits, Law Firms, District Attorneys	2.1 E-Share Legal	2.1 Law
7	Manufacturing	Industrial Products, Automotive Chemicals, Semiconductors	2.1 E-Share	2.1 EE
8	Medicine & Health	Pharmaceuticals, Hospitals, Research Organizations, Health Systems	2.1 E-Share Med	2.1 Med
9	Military & Homeland Security	Military organizations, Homeland Security & Joint Task Force operations	2.1 E-Share HSE	2.1 HSE
10	Real Estate	Hospitality, Construction, Property Management	2.1 E-Share	2.1 EE
11	Retail	Franchises, Chains, Online Stores	2.1 E-Share	2.1 EE
12	Technology & Media	Software, Communications, Entertainment	2.1 E-Share	2.1 EE

9. FUTURE OF KNOWLEDGE MANAGEMENT

The most dramatic improvements in knowledge management capability over the next 10 years will be human and managerial. In the next couple of years, knowledge management will take off as a management enthusiasm. It will be fueled by some studies or even examples that demonstrate a linkage between knowledge management and economics-reduced costs or increased revenues. Every major consulting firm will (darn near already does) have a knowledge management consulting service. The trickle of titles like 'Chief Knowledge Officer, Intellectual Capital Asset Manager and VP of Knowledge Transfer will turn into a flood.

The smart ones will eschew faddistry and lay the groundwork for knowledge management. They will address all of the key knowledge management resources-not only technology, but also people, content and economics. They will manage all stages of the knowledge management process from creation to use. In most of the process steps, there are already exemplary firms that have made dramatic progress on aspects of knowledge management. In 1995, they are bellwethers; in 2000 their approaches will be commonplace.

Since knowledge is information that is highly valued by people and has at some point resided in someone's brain, people are the most important resource in effective knowledge management. In the future as today, firms that excel at knowledge management will corner the market for people who are adept at creating and using knowledge. These people will be evaluated and rewarded for their knowledge activities. Managers will be evaluated not only on how "successful" their decisions were, but also on the knowledge used in making them. The most successful firms in the future will make knowledge management every employee's responsibility-not just that of a select few.

Knowledge management in the mid-90s is a matter of economic faith. In the mid-00s (is that what we will call it?), it will be a matter of economic certainty for those who succeed with it. These companies will calculate not only the costs of managing knowledge but also the benefits-in bad decisions averted, in products and services that better meet customer needs, and in wheels not reinvented. Today, the lack of a clear tie to corporate economics is holding back the concept of knowledge management. In the future, at least some firms will have made the connection between knowledge and money.

Several key processes govern how knowledge management works on a day-to-day basis. They include how knowledge is created by or

extracted from employees, how it is distributed and accessed, and how it is transferred or lodged in new brains and applied to business problems and decisions. Again, all of these processes are found today in some leading firms; they'll be commonplace tomorrow and highly refined in the firms that have them today.

Knowledge creation is probably best performed today by universities. Whether the field is business or biology, the best creators of knowledge are academics. Consequently, businesses seeking to master this process may form innovative partnerships with universities in which the creation of applied knowledge is outsourced or done collaboratively. Of course, this will require enormous changes in how academics do their work, and they will no doubt resist. But governments seem increasingly disinterested in funding academic research, and this will be a powerful incentive to change.

Extracting knowledge that already exists in the minds of employees is a different type of process for generating knowledge. With no mind-melding on the horizon, future knowledge extractors will focus on rewards for knowledge, hiring good knowledge creators and providing easy-to-use tools for capture. Inc. emphasizes hiring and promoting the right people.

In the rosy future I envision, categorization and organization of knowledge will be a core competence for every firm. This will require strategic thinking about what knowledge is important; development of a knowledge vocabulary (and a thesaurus to accommodate near misses); prolific creation of indices, search tools and navigation aids; and constant refinement and pruning of knowledge categories. Knowledge editors will have to combine sources and add context to transform information into knowledge. In the future, the scarce commodity in knowledge management will be attention. No one firm does all these things well today, but the skills to do them are most commonly found among librarians and print journalists. Teltech Corp. does a good job of organizing expert knowledge; Trilogy Development Group organizes product knowledge well.

How do we get the stuff from knowledge repository to knowledge user? Technology plays a big role in this distribution process, of course, and will continue to do so. Firms need to convert from an information push strategy, in which we ship information and knowledge to those who might be interested in them, to a pull strategy. Those who need knowledge must seek it, and someone should be trying to make it easy for them. Hewlett-Packard Co. has a head start on the future in this

area; the information design firm InForm Inc. also focuses on information pull.

But knowledge management in the future will involve more than distribution and access. Knowledge transfer means ensuring that someone receives and uses the knowledge in question. Successful knowledge transfer involves neither computers nor documents, but rather interactions between people. If you want me to absorb your knowledge, then spend time with me, work with me, do my job and let me do yours. The more time together the better. That means the airlines will not go out of business in the next 10 years. Who transfers knowledge well today? Two semiconductor firms come to mind: Sematech Inc., which generates knowledge for the entire industry and works relentlessly to transfer it, and National Semiconductor Corp., which transfers fabrication technology well.

Knowledge management success in the future, then, belongs not to the quick or the technically adept, but to the long-term investors and harvesters across multiple fronts.

10. CONCLUSION

In nutshell we can conclude that the knowledge management is the management of the organization towards the continuous renewal of the organizational knowledge base so that the same information can be shared by the others therefore the prime importance should be given to categorization & organization of knowledge by an organization. It should also be kept in mind that the key knowledge management resources-are not only technology, but also people, content and economics. Knowledge management is about enhancing the use of organizational knowledge through sound practices of Knowledge management & organizational learning.

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Knowledge Management: Challenges and Avenues in Libraries

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ABSTRACT

Knowledge has been emerged as the power. It is significant not only to business sector but society as a whole. Knowledge management enhances the organizations ability and capability. Information explosion poses problem before the libraries to cater to the needs of the patrons. Survival of the business firms and so as the libraries is much depends on proper organization and management of knowledge. The concept is interdisciplinary in nature and global in scope. Knowledge management makes it easy to access the information required by the individuals or workgroup. It may be a database, directory etc. Yet there are several benefits of knowledge management approach but the path is not so easy. The present paper describes the concept, benefits, and challenges of knowledge management.

1. INTRODUCTION

The primary goal of knowledge management is to provide the right knowledge at the right time to the right person. This would enable the individual to make appropriate and informed choice, based on the relevant information pieced together through intelligent systems. Knowledge is information combined with experience, context, interpretation, and reflection. It is a high value form of information that is ready to apply to decisions and actions. Given the importance of such an asset, it is not surprising that organizations everywhere are paying attention to knowledge-exploring what it is and how to create, transfer and use it more effectively. In the present information era the increasing demand of users for information in various forms by using new

technologies has forced the librarians to take the advantages of emerging advanced information communication technologies for providing library services in digital form. Librarians have been giving new shapes to library services by automating the libraries, making use of barcode, radio frequency identification, digital library, internet, databases, making consortia arrangement for subscribing electronic books and journals.

2. DATA, INFORMATION, KNOWLEDGE AND KNOWLEDGE MANAGEMENT

Generally, data is nothing but raw facts whereas the information is processed data that has some meaning. Davenport and Prusak described knowledge as "a combination of experience, values, contextual information and expert insight; and knowledge provides a framework for evaluating and incorporating new experiences and information".

Earlier view about these terms was that the data is a prerequisite for information; and information is a prerequisite for knowledge. Thus their relationships seems as

Data → Information → Knowledge

Another view is called a reversed knowledge hierarchy i.e. data emerge only after we have information, and that information emerges only after we already have knowledge. Thus their relationships seems as

Knowledge → Information → Data

A third view is also possible. Zhang described that "once we have the relevant knowledge about how to process data, how to visualize data, the boring data start making sense and generating meaning". Hence the relationship seems like

Data → Knowledge → Information

The development of traditional information systems basically follows the traditional view of data, information and Knowledge while scientific research follows the reverse hierarchy on data, information and Knowledge. The knowledge management follows the third view. The knowledge management is related about how data is stored, associated and retrieved so that meaningful information is generated for a task.

3. CONCEPT OF KNOWLEDGE MANAGEMENT

KM is increasingly found to be important because of a shift from a predictable business environment to one, governed by discontinuous

change. It is essential for organizational survival, given that knowledge creation is the core competence of any organization (Gogula).

Knowledge management is not about technology management, but rather about deciding what information and knowledge is critical to the success of the company and to ensure that knowledge management activists get prioritised within the organisation (Fatt).

According to Tiwana Knowledge management is the "process of managing organizational knowledge for creating business value and sustaining competitive advantage through the creation, communication and application of knowledge gained from customer interactions to maximize business growth and value".

Wickramashinghe & Mills defined knowledge management as "the process through which organizations generate value from their intellectual and knowledge-based assets. Most often, generating value from such assets involves sharing them among employees, departments and even with other companies in an effort to devise best practices. Knowledge management is a newly emerging interdisciplinary business approach that involves utilizing people, processes and technologies to create, store and transfer knowledge".

4. TRADITIONAL INFORMATION SYSTEMS VERSUS KNOWLEDGE MANAGEMENT SYSTEM

Traditional information systems were meant for acquiring data about daily business transactions and for accessing processing, and analyzing internal and external data to generate useful information to support management e.g. management information system (MIS) and decision support system (DSS). These systems emphasize quantitative data processing and analysis but now we can not rely only on quantitative analysis. The knowledge management system support non quantitative side e.g. knowledge creation and management, document sharing, human communications, mental models and information exchange.

5. BENEFITS OF KNOWLEDGE MANAGEMENT IN LIBRARIES

The followings benefits of KM in libraries may be observed:

- Best selection, collection, processing, storage, retrieval and dissemination of information in the area of interest of the parent organization.
- Promotion of scientific research in the field of parent organization.
- Improve the efficiency of the library in terms of saving of time and enhancing overall quality of library services.
- Enhance responsiveness and communicative capabilities.

- Strengthening knowledge flow among libraries in order to share and enhancing the resources.
- Improve status credibility of the library as well as of organization.
- Decrease employees' turnover.

6. TYPES OF KNOWLEDGE

The knowledge is of two types-explicit and implicit. Explicit knowledge is available in the documented form. It can be preserved systematically and can be retrieved, communicated and used as and when it is required. It is the traditional form of knowledge and is available in the formal, documented form. It can be easily shared amongst its user. Since very long the librarians and information professionals have been working with the task of collection, organization and disseminations of it.

Implicit knowledge, also known as tacit knowledge is unformulised, related to intuitions, feelings and emotions. It resides in human minds. It is very difficult to document tacit knowledge e.g. it is difficult to document that what a driver will do if suddenly a child come before his vehicle.

7. PRINCIPLES OF KNOWLEDGE MANAGEMENT

Davenport highlighted the following principles of knowledge management:

- KM is expensive.
- KM requires knowledge managers.
- KM benefits more from maps than models, more from markets than from hierarchies.
- Sharing and using knowledge are often unnatural acts.
- KM means improving knowledge work processes.
- Knowledge access is only the beginning.
- KM never ends.

8. INFORMATION TECHNOLOGY AND KNOWLEDGE MANAGEMENT

The new emerging communication and information technology has been playing a vital role the field of information storage and retrieval and now it has shown its impact on knowledge management. For the creation of knowledge from any new events or activity on a continual basis, new infrastructure is required. The new tools and techniques are the most important component of any organization and are essentials for creation of new knowledge. An effective infrastructure is a repository of

knowledge, and distribution systems to distribute the knowledge to the members of parent organization and is helpful in the creation of new knowledge. Information technology is very helpful in enhancing quality and standardization if automation is implemented in the organization. Likewise, the automation of library is giving birth to the new concept that is data ware housings, which is giving way to the digital projects. Data in the form of digitized warehouse will be put on networking and linking of electronics resources.

One individual does not create the content of a knowledge management system. The content collection and the access of the content is a collective behavior. Therefore, the technological infrastructure installed must be able to facilitate the collective behavior of knowledge management. Web technology has provided a common technological infrastructure to support the collective knowledge management (Zhang). Earlier also Zhang and Chen stated that

- Web-based technology uses standard transmission-control protocol/internet protocol (TCP/IP), which is mature and is supported by almost every vendor.

- Information can be collected, retrieved, and shared through popular browsers like Netscape Navigator and Internet Explorer.

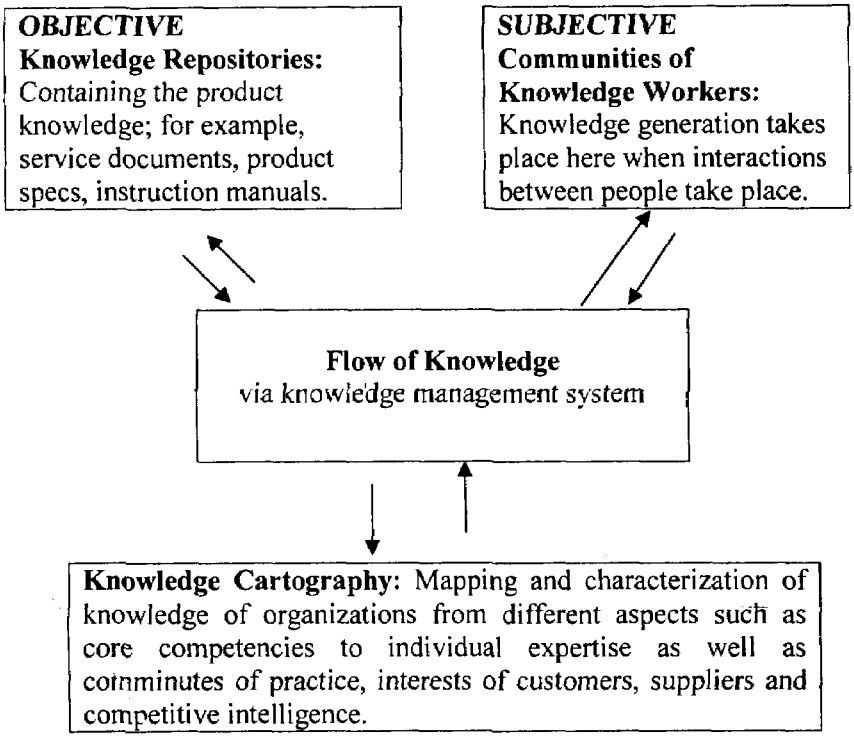
- A home page can be quickly developed, deployed, and shared.

- There are languages specially developed for web-based applications, such as Java or VB script. Java applets can be embedded in Web home pages. The applets are executed on client's PC and make it possible to develop interactive home pages with instant user responses and with multimedia features.

- With web technologies, an organization enjoys platform independence or cross-platform operation. Java applets do not have to be rewritten to work with PC browsers, Macintosh browsers, and UNIX browsers.

9. KNOWLEDGE ARCHITECHTURE

It is the blueprint of subjective and objective knowledge, its flows and cartography of knowledge within the organization. Architecture, specifically the information technology architecture, is an integrated set of technical choices used to guide an organization in satisfying its business needs (Weill & Broadbent).



The knowledge architecture (Wickramashinghe & Mills)

Underlying the knowledge architecture is the recognition of the binary nature of knowledge; namely its objective and subjective components. What we realize when we analyze the knowledge architecture closely is that knowledge is not a clearly defined, easily identifiable phenomenon; rather it has many forms, which makes managing it even more challenging (Wickramashinghe & Sharma).

10. HUMAN RESOURCE IN KNOWLEDGE MANAGEMENT

One cannot ignore the role of human resources in KM People from different professionals are involved in the processes of knowledge Acquisition, creation processing, distributing, information packages, publishing & editing.

For the sake of knowledge management, human resources have to generate internal records, available data or information they will not only generate it but also organize the data in database format. They may be database experts, digitization specialists, IT experts in networking & linking library professional have to extract, filter and disseminate vial external knowledge. It is expected them to work with users gathering

and synthesis the required. Professional will stand as consultants for knowledge.

11. KNOWLEDGE MANAGEMENT AND LIBRARY

Implications of knowledge management in libraries are manifold. This will be advantageous to library users mainly. Because of help in introducing quality services like –ATI (any time information), electronic data transfer, quick response, home/office information, ATS (all time service) quick compilation on search library. Information centers will also received benefits like Controlled on unnecessary information, better fund utilization, more accuracy in information dissemination, change in conventional processing of information transfer, increasing informational assets, better management of library system and with minimum effort maximum output.

The effectiveness of libraries is measured by providing required information to the users and also providing knowledge to the users about resources, training etc. in extracting the information. Knowledge management in libraries includes three aspects. a) Knowledge Innovation Management- the production, diffusion and transfer of knowledge as well as of the network systems constructed by related institutions and organizations. b) Knowledge Dissemination Management-the part that library play in dissemination of knowledge created by the authors. However the information may be available on Internet but the same may be false, uncivil, absurd and meaningless. Sheng stated that the library should strengthen Knowledge Dissemination Management - by creation and development of libraries own document and information resources - by raising the quality of library staff through continuous education- by giving full play to the special role of the expert system in knowledge dissemination- by utilization of all media to ensure security of operation of networks, prevent online criminal activities and online dissemination of inappropriate information. c) Knowledge Application Management-creation of high-speed information networks in order to acquire knowledge. Shanhong suggested that the libraries may achieve this target by setting up virtual libraries or information centres for government, public sector organizations, scientific research institutions and educational institutes. Libraries can do this work according to their respective information requirements by using information resources on the high-speed information networks by setting up digitized knowledge services, which is actually a development trend of libraries in the present time, creating step the users oriented information services systems such as information dissemination, information services systems such as information dissemination, information search, special supply of information: quickening the creation of digitized libraries; studying the methods, means and techniques of information distribution and search

with the internet as the base and WEB technique as the core- by digitizing libraries resources. The electronic libraries or digitized libraries are the technical modes and development trends of libraries in the knowledge economy era. The knowledge services of libraries in the future will start with creation of databases comprising electronic journals and e-books that can operate on high-speed information networks. Great efforts should be made to transform all existing large non-electronic information resources into electronic information and integrate them into electronic libraries.

12. CONCLUSION

Keeping in view of the benefits of knowledge management in business sector, information explosion, recent advances in information technology etc. libraries should come forward to implement the application of knowledge management. No doubt the libraries have been facing financial, administrative, infrastructural, technical challenges but it is true that its avenues can not be ignored.

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Major Challenges of Digital Preservation for Digital Information Management: A Solution to Digital Dark Age

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ABSTRACT

Preservation faces new challenges in the digital environment. Many issues flow from the need for specific computer hardware and software to see digital information. For example, the information on a computer disk cannot be understood unless there is also the right computer, disk drive, operating system, and software to use it. The storage media for digital materials can also be short-lived. Magnetic materials such a floppy disks and magnetic tape deteriorate in a very short time compared to the life of paper. However the greatest challenge is that technology changes quickly, which means that a CD-ROM lasts over a hundred years but there may no longer be a computer to read it. Computer hardware and software changes frequently and has limited backward compatibility. Present paper attempts to highlights the fundamental questions of new challenges for digital preservation and pointed out how to overcome this constrains.

Keywords: Digital preservation, Digital Materials, Digital Dark Age, Rights Management and Access Control, Knowledge Creation, Digital Triage

1. INTRODUCTION

Digital Preservation refers to the series of managed activities necessary to ensure continued access to digital materials for as long as necessary. Digital preservation is defined very broadly for the purposes of this study and refers to all of the actions required to maintain access to digital materials beyond the limits of media failure or technological change. Those materials may be records created during the day-to-day business of an organisation; "born-digital" materials created for a specific purpose or the products of digitization projects. This handbook specifically excludes the potential use of digital technology to preserve the original artifacts through digitization. The goal of digital preservation is to maintain the ability to display, retrieve, and use digital collections in the face of rapidly changing technological and organizational

infrastructures and elements. The question of preserving or archiving digital information is not a new one and has been explored at a variety of levels over the last three decades. Archivists responsible for governmental and corporate records have been acutely aware of the difficulties entailed in trying to ensure that digital information survives for future generations. Far more than their library colleagues, who have continued to collect and organize published materials primarily in paper form, archivists have observed the materials for which they are responsible shift rapidly from paper objects produced on typewriters and other analog devices to include files created in word processor, spreadsheet and many other digital forms.

2. DIGITAL PRESERVATION: MEANING

The phrase "digital preservation" creates confusion since readers, familiar with traditional approaches; assume that "preservation" involves the use of well-defined techniques to prevent the original artifact from deteriorating further and to perhaps even improve it to the point where it can be used again.

(a) Digital preservation involves quite different methods, skills, and outcomes and can complement traditional preservation services, while simultaneously providing unique and dynamic new uses of information
(b) Medium-term preservation–Continued access to digital materials beyond changes in technology for a defined period of time but not indefinitely
(c) Long-term preservation–Continued access to digital materials, or at least to the information contained in them, indefinitely
(d) Retaining the physical reliability of the image files, accompanying metadata, scripts, and programs
(e) Ensuring continued usability of the digital image collection (e.g., maintain an up-to-date user interface, enable users to retrieve and manipulate information to meet their information needs)
(f) Maintaining collection security (e.g., implement strategies to control unauthorized alteration to the collection, develop and maintain a rights management program for fee-based services)
(g) Definition of digital preservation as proposed by the Research Libraries Group as follows: For the long term maintenance of a byte stream (including metadata) sufficient to reproduce a suitable facsimile of the original document and For the continued accessibility of the document contents through time and changing technology
(h) Short-term preservation–Access to digital materials either for a defined period of time while use is predicted but which does not extend beyond the foreseeable future and/or until it becomes inaccessible because of changes in technology

3. DIGITAL INFORMATION IN THE LIBRARY

(a) Digital publications via voluntary deposit agreements, such as journals and interactive multimedia on CD-ROM
(b) Disks accompanying print publications
(c) Networked/online publications sent by email or file transfer protocol
(d) Special collections material such as manuscript collections containing email, disks, tapes of all types and even computers
(e) Digitization and in-house projects producing images and structured products
(f) Websites, audio, geographic information system data (GIS) from the ordnance survey

4. DARK AGE IN THE CHANGING CONTEXT OF DIGITAL ENVIRONMENT

Why are we living in the midst of digital dark age? The causes are:

(a) Storage media, due to physical deterioration, mishandling, improper storage, and obsolescence
(b) File formats and compression schemes, due to obsolescence or over-reliance on proprietary and unsupported file and compression formats
(c) Integrity of the files, including safeguarding the content, context, fixity, references, and provenance
(d) Storage and processing devices, programs, operating systems, access interfaces, and protocols that change as technology evolves (often with limited backward compatibility)
(e) Distributed retrieval and processing tools, such as embedded Java scripts and applets
(f) Insufficient institutional commitment to long-term preservation
(g) Lack of preservation policies and procedures
(h) Scarcity of human and financial resources
(i) Varying (and asynchronous) stakeholder interests in the creation, maintenance, and distribution of digital image collections
(j) Gaps in institutional memory due to staff turnover
(k) Inadequate record keeping and administrative metadata
(l) Evolving nature of copyright and fair-use regulations that apply to digital collections
(m) Enormous amounts of digital information are already lost forever. Individuals cannot recreate digital history and organizations cannot recreate a digital history because it was not archived or managed properly or it resides in formats that cannot be accessed because the information is on out-dated word-processor files, old database formats, or saved on readable media
(n) There will be a demographic bulge of electronic materials coming into libraries and archives as the Baby Boom generation of authors and academics begin to wind down their careers and begin off-

loading their materials to various libraries and archives. These materials will come to libraries on a wide-variety of storage devices, perhaps even in entire computer systems, and will probably have equally significant paper collections associated with them

(o) Information technologies are essentially obsolete every month. This dynamic creates an unstable and unpredictable environment for the continuance of hardware and software over a long period of time and represents a greater challenge than the deterioration of the physical medium. Many technologies and devices disappear as the companies that provide them move on to new product lines, often without backwards compatibility and ability to handle older technologies, or the companies themselves disappear

(p) There is a proliferation of document and media formats, each one potentially carrying their own hardware and software dependencies. Copying these formats from one storage device to another is simple. However, merely copying bits is not sufficient for preservation purposes: if the software for making sense of the bits (that is for retrieving, displaying, or printing) is not available, then the information will be, for all practical purposes, lost. Libraries will have to contend with this wide variety of digital formats. Many digital library collections will not have originated in digital form but come from materials that were digitized for particular purposes. Those digital resources, which come to libraries from creators or other content providers, will be wildly heterogeneous in their storage media, retrieval technologies and data formats

(q) Financial resources available for libraries and archives continue to decrease and will likely do so for the near future. The argument for preserving digital information has not effectively made it into public policy. There is little enthusiasm for spending resources on preservation at the best of times and without a concerted effort to bring the issues into the public eye, the preservation of digital information will remain a cloistered issue

(r) Increasingly restrictive intellectual property and licensing regimes will ensure that many materials never make it into library collections for preservation. These will be corporate assets and will not be deposited into public collections without substantive financial and licensing arrangements that few libraries will be able to afford. From a positive perspective, this fact will allow libraries to essential Ignore the preservation question for many kinds of key information resources (examples will include newspapers, electronic serials, directories) as their corporate owners may preserve these. The flip-side of this argument is whether corporate owners will develop a public-spirited interest in providing this archival role for future generations and whether the resources will be accessible to the public

(s) The archiving and preservation functions within a digital environment will become increasingly privatized as information continues to be commodified. Companies will be the place where the most valuable information is retained and preserved, and this will be done only insofar as there is a corporate recognition of the information as an asset

(t) The Commission on Preservation and Access suggests that the first line of defense against the loss of valuable digital information rests with the creators, providers and owners of digital information. This fact is a critical one for preservation purposes as it strongly suggests that the role that librarians and archivists must play will be an increasingly public one. Preservation is a desktop issue, not merely an institutional one

(u) Standards will not emerge to solve fundamental issues with respect to digital information. The challenge in preserving electronic information is not primarily a technological one, it is a sociological one. The dynamism of the market for information technologies and products ensures the fundamental instability of hardware and software primarily because product obsolescence is often key to corporate survival in a competitive capitalist democracy. Product differentiation manifests itself at the very level of the document standard. Proprietary systems provide commercial enterprises with profitable products whereas static (i.e. preservable) formats do not create a continuing need for upgrading which software and hardware companies depend upon. This situation conspires against standards that create a stable nexus of hardware, software, and administration

(v) Libraries and archives will be required to continue their existing archival and preservation practices as the current paper-publishing boom continues. Clearly, digital collections are not going to be a substitute for existing and future library collections and plans must be made to accommodate both. A significant concern of libraries and archives is that the financial resources necessary to address expensive IT upgrades, embark on data rescue operations, and undertake digital preservation will have detrimental impacts on other aspects of library and archival operations such as building collections and providing services for the public

5. ATTITUDES AND RESPONSIBILITIES OF DIGITAL RIGHTS OWNER AND ORIGINATOR

These are the attitude and responsibilities of digital right owner and originator of digital preservations:

(a) Examine costing models for long-term preservation of digital materials

(b) Examining the three main methods of digital preservation: technology preservation; technology emulation; information migration
(c) Investigating the digital preservation needs of universities and research funders
(d) Investigating progress towards permissive guidelines for digital preservation
(e) Report on sampling methods and techniques for collecting materials, on the nature and extent of institutional electronic archives, and or the relevance of current archival practice to digital preservation
(f) An investigation of post hoc rescue, or data archaeology, of high value digital material, which cannot be accessed because the required IT environment is no longer available. The archiving of digital information is not a conservation problem

6. HOW TO OVERCOME THE CHALLENGES

What must libraries do to address the challenges of digital preservation? There are a number of key areas in which concerned institutions and professionals can contribute for overcome the major challenges. These are as follows:

Knowledge Creation

There is an urgent need to augment research in the area of digital preservation. Projects, which further our knowledge in the challenges of preserving various types of materials, maps, archival materials, color documents, bound volumes, data sets, music, and electronic formats like SGML, PDF, ASCII, HTML must be undertaken. The research needs to include a careful accounting of the actual costs of preserving these materials. If projects do not provide cost effective preservation solutions or have only marginal benefits, we need to be informed of this. If some techniques or strategies work better than others, we need this information clearly stated.

Digital Triage

There should be informed skepticism about the claims of organizations that say they will archive the Internet. The library and archival communities already know that not everything can and should be saved. What is key is selecting which digital resources to preserve and which ones not to preserve. Librarians and archivists must develop digital collection development and evaluation guidelines to assist in deciding what can be saved and what should be saved, and what can't be, on a case-by-case basis.

Rescue Operations

Digitally produced images of documents are not a substitute for microfilm preservation. Digital copying will not necessarily ensure the preservation of a digital document. The fact is that digital information may be outputted to microfilm for preservation purposes and it may even be appropriate to print an electronic document on acid-free paper and handle it according to established archival practices. These hybrid methods may be an effective transition step until stable guidelines and technologies evolve for long-term digital preservation. Librarians and archivists need to work with industry to develop simple and cost effective print-to-microfilm systems; this will enable archives to preserve documentary collections that are provided in proprietary formats such as word-processors in a cost-effective fashion to be effectively preserved. By transferring electronic information into non-electronic form there will be a loss of functionality for some kinds of information. Paper or microfilm documents may no longer have active hypertext links or be searchable by keyword and there will be some cases where it is not reasonable to migrate the information to non-electronic forms as it would render the information useless, e.g., software or large data-sets. Re-coding information of this type will be sharply constrained by the resources and in many cases will not be feasible.

Document Formats

Mixed media and multiple document formats will continue to remain the fly-in-the ointment of digital collections. Multiple formats may require maintaining multiple hardware/software platforms and will confound simple migration to new storage media. Whether possible or even preferred, requiring that data be stored in a common format is unlikely for the foreseeable future. Similarly, existing translation software available for the migration and translation of document formats illustrates that the problems are significant and the results are often less than satisfactory. The simple case of conversion between the most popular document formats, MS-Word and WordPerfect, provides ample illustration of the challenges that are faced and argues for skepticism about claims for future systems which will make this task easier. There will probably be no effective solution to this problem. If a library will be receiving electronic objects from content providers such as authors or publishers, they may want to specify a limited range of acceptable document formats. Working with creators to bring these problems to their attention and providing guidance on how to organize files and which formats to use for purposes of archiving will help. Once again, more research and effective communications with content and technology providers are required to address the issue of multiple formats.

Digital Rights Management and Access Control

The management of rights and access controls for electronic objects is an increasingly complex area of concern for libraries and archives. A library may have the rights to access and use electronic materials, but the right to preserve the materials may not be the same thing. Restrictions on access placed by rights-holders or by licensing arrangements for particular resources needs to be addressed when questioning whether the information can be preserved.

Promoting the Importance of Preservation

Librarians and archivists must engage in a concerted effort to raise the profile of preservation. The Commission on Preservation and Access and Research Libraries Group (RLG) in the United States, the Joint Information Systems Committee (JISC) in the UK and PADI Working Group and National Library in Australia, among others, have all been active in framing the problems of digital preservation within their constituencies. This work needs to be supported, expanded and brought to greater public attention. As a profession, librarians and archivists need to encourage critical thinking and be highly pragmatic about the nature of the new medium and the challenges of digital preservation.

Consultation with Others Fellows

Archiving decisions for materials, which are common to many libraries, will be made in consultation with other libraries to determine the appropriate forms and sharing mechanisms. Few libraries will be positioned to effectively archive large quantities of electronic information. Any given library will necessarily be required to select resources that they can archive and preserve according to their particular mandates and user requirements. In many cases, it will not make sense to duplicate efforts. Digital preservation efforts will need to be coordinated.

Digital Preservation as a Public Good

Librarians and archivists protect the public interest by making information available to the community and by asserting the importance of maintaining a record of our collective intellectual heritage. This task will be a continuing challenge because libraries and archives are too often considered to be competitors to publishers, document delivery services, and other private sector content providers. It is unlikely, unless a substantive ground swell of public support is generated, that libraries will win in the battle against commodification of information resources or be able to generate the public support necessary to meet the challenges. Despite the present lack of public interest in digital preservation, it is necessary to believe, perhaps as an article of faith, that the efforts of librarians and archivists will be appreciated in the future. The traces of information that we are able to save from our digital vellum

will be valuable sources of information to the future. Even if the task of digital preservation remains thankless, it is a vital one and must still be undertaken. The objective is a noble and necessary one even as the problems many appear insurmountable.

7. CONCLUSIONS

Digital places greater emphasis on the here-and-now rather than the long-term, just-in-time digital collections facilitate access, but do not facilitate preservation. Being digital means being ephemeral information rather than just-in-case. The research program for digital preservation has only recently been initiated to develop strategies, guidelines, and standards. Although tremendous work has been undertaken in defining the problems and challenges, much more remains to be done, and the tough task of actually doing digital preservation (and digital rescue) remains ahead. A critical appraisal of where we are vis-à-vis our digital culture and what we want for the future-something which may not be defined in technical terms at all is required both inside and outside of the library and archival professions. If history and cultural heritage are to be important, then it will likely fall to librarians and archivists, the monastic orders of the future, to ensure that something of the heady days of our "digital revolution" remains for future generations. The challenges to digital preservation are considerable and will require a concerted effort on the part of librarians and archivists to rise up to these challenges and assert in public forums the importance of protecting a fragile digital heritage. In broader aspect, we believe that both the dialogue and subsequent actions will help ensure that the creation of digital repositories–libraries and archives–on an information superhighway remains a credible item on the national agenda. Digital libraries are a sensible investment only if we also create the archival means for the knowledge they contain to endure.

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Role of Digital Libraries in the Present Era

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ABSTRACT

Information Technology plays a vital role in the development of libraries and also helps to improve the quality of services in the present era. The paper emphasises on the electronic media of information and the impact of digitization on the present day world. Digitization involves the conversion of print media into digital form, as digital libraries are organized collection of knowledge. We tend to focus on the impact of digital technology on libraries, general systems, trends and changing user behaviours and patterns of research and learning.

1. INTRODUCTION

The concept of four walls library is fading off today at least to some extent even in developing countries due to the introduction of information technology. The development of computer and communication technology has led to the development of electronic devices and has changed the traditional libraries to digital format.

In the age of science and technology the world surely stands on the threshold of a global information and digital networking. People around the world, including those in developing nations are increasingly demanding access to the emerging worldwide information network.

2. WHAT IS A DIGITAL LIBRARY?

Digital library technology plays an important role in promoting the use of information. Digital libraries give solutions to the main challenges of traditional libraries such as shortage of space and management of materials.

A digital library is a library in which a significant proportion of the resources are available in machine readable format accessible by means of computers. The digital content may be locally held or accessed remotely via computer networks.

Digitization refers to the process of translating a piece of information such as a book, sound recording, picture or video into bits. Bits are the

fundamental units of information in computer systems. Turning information into these binary digits is called as Digitization.

The main purpose of the library is that information should be provided to the reader at the doorsteps of the library. So we can say that:

" Digital libraries put a world of information at your fingerprints "

Traditional Libraries	Digital Libraries
It emphasises on the storage and preservation of physical items particularly books and periodicals	It emphasises on access to digitized materials wherever they may be located
Cataloguing at higher level rather than one of details, i.e., author, subject indexes as opposed to full text	Cataloguing down to individual words (OPAC)
Browsing based on physical proximity of related materials, i.e., books on sociology are near one another on the shelves	Browsing based on hyperlinks, keywords or any defined measure of relatedness and are not supposed to be near one another.
Information is located at one place. Users are supposed to visit the library personally	There is no need to visit any particular place. Information can be accessed from any access point where ever you want to access.
The books are issued on loan, inter-library loan basis.	We just retrieve the information through information technology tools.
Main purpose is acquisition and collection development	In digital library data is captured on-line
Data and documents are found on stacks, inventory management and shelf list	Store the data in hard disk, floppy, CD-ROMs
Patron privileges and circulation rules consistent with public law policy	The concept of five laws of Ranganathan has changed in the present day world due to revolution of telecommunication.

3. NEED OF DIGITAL LIBRARY

A library is a treasure house of knowledge. Traditional services are insufficient to meet the needs of users in the present information society. Library should extract the benefits if IT in order to render qualitative, pin pointed, exhaustive and expeditious services to the readers. The availability of software, hardware and networking technology, the advent of WWW, its ever increasing usage and highly evolved browsers have paved the way of creation of digital library.

The development of computer and communication technology has led to the development of electronic devices and has changed the traditional libraries to digital libraries.

Digital libraries have obvious roles to play in formal learning settings by providing teachers and learners with knowledge in a variety of media. Digital libraries offer more information than most individuals or schools have been able to acquire and maintain. Digital libraries are accessible from any access point. The promise is one of better learning through broader, faster, and better information and communication services. The digital libraries offer greater opportunity for users to deposit information as well as use information. The most important change brought by digital library is advancing informal learning.

4. ROLE OF DIGITAL LIBRARY

- Digitization involves the conversion of print media into digital form. It includes documents data processing, storage, indexing and processing, retrieval and display and data capturing also.
- Conversion of print media to digital media and acquisition of digital media.
- It is to facilitate systematic and efficient access to and sharing of information, resources and money and overcome the barriers of time in accessing the information.
- It helps in storing of digital resources in appropriate repository in a networked environment for hosting in intranet, extranet, and internet.
- It also helps in managing searches that is not practical possible manually. We can also preserve unique collections through digitization.
- It also helps to manage contents from multiple locations.
- To create a single user interface and a gateway for digital resources.
- We can preserve the original copy of the document any number of times without any degradation in quality.
- Digital library has the potential to store much more information as compared to traditional library.
- Networking is very easy as a particular digital library can provide link to any other resources of other digital libraries very easily and helps in integrated sharing.
- Protecting rare books that are rapidly deteriorating due to over use and poor storage conditions.
- Saving space which is required for physical documents.

Digital libraries are playing a major role in the present day changing scenario. But it is sometimes said that digital Library cannot reproduce the environment of a traditional library, people are more interested to

read the information in print form instead of on the computer screen. Digital libraries are hampered by copyright law because works cannot be shared over different periods of time in the manner of a traditional library Stable information technology depends upon the infrastructure, i.e., power, computers communication links, etc.

Digital library services are really in transition from local traditional collection to global resources provided on demand through the most advanced networking technology. Thus we can say that digital libraries are growing in popularity. Information technology and networks are the major tools to shape our society in future. Information technology and computer based systems are going to dominate and revolutionize the traditional libraries in the coming era. Digital libraries provide better learning through broader, faster, and better information and communication services.

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The Roles and Responsibilities of Information Professionals of Corporate Libraries in the Era of Knowledge Management and Digital Library

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ABSTRACT

This paper describes reflection on the potential of information professionals of corporate libraries in this era of knowledge management and digital library to strengthen KM by virtue of their knowledge, training and skill .This article will serve as a starting point for thought, and discussion, action that will lead to an easier and clearer path for information professionals to follow.

1. INTRODUCTION

Knowledge management is a management philosophy comprising elements of a number of disciplines, including human resources management, organizational learning, information management, and information technology. The amalgamation of these elements into what many consider a "new" discipline has raised numerous issues, including those of ownership, resourcing, competencies, roles, and responsibilities. Many organizations have embraced KM with a clean sweep - new management, new funding and resourcing, and new objectives - often ignoring the relationships between what they believe they need and what they already have.

Many organizations that have embraced KM already have well-established information management processes, yet they have often

sidelined or overlooked those processes when new KM initiatives have been introduced. This situation has had a significant impact on the success of the initiatives. Where a KM process is established without being underpinned by good information management, the knowledge that is created or reused may be substandard or inaccurate, as may be based on irrelevant, inaccurate, outdated, or unauthoritative information.

Information professionals are trained to manage information and to provide the most relevant and up-to-date information to their client base. They are also trained to ensure that information products and services are aligned with the achievement of organizational objectives. These are critical processes in ensuring that information users have the "best" information available so that the knowledge generated is "good and valid" and meets organizational requirements. This tells us that our skills and knowledge are still relevant and valuable, yet KM initiatives and environments are being established and nurtured without a clearly defined role for information professionals.

2. SOME THOUGHTS ABOUT KM AND THE KM ENVIRONMENT

Knowledge management is seen as a means of achieving organizational goals. It consists of the systematic processes that are put into place to identify, create, capture, share, and leverage the knowledge that is needed for an organization to succeed. Putting it simply, KM aims to (1) determine what knowledge an organization needs to be successful; (2) capture and store explicit knowledge until required for reuse; and (3) manage and exploit the tacit knowledge that resides within people.

KM initiatives use four primary processes to achieve these aims:

- Identification/discovery;
- Creation/acquisition;
- Capture/storage/codification/retrieval;
- Sharing/transfer/flow.

The KM environment is holistic, with all processes and programs having an organizational focus rather than a section/department/business unit focus, and incorporating the external environment in which the organization operates. It is also open and visible–knowing what everyone does and why (where they fit in the organization and what they contribute). The KM environment is a sharing culture, value based and people focused, motivated and committed, proactive, resourced and supported, and technology enabled.

3. ROLES AND RESPONSIBILITIES OF INFORMATION PROFESSIONALS

The information professional has three primary roles and responsibilities in a knowledge environment:

i. To provide information products and services that continually and consistently match the requirements of the organization;
ii. To educate information users to ensure that they can access and use the information products and services effectively to maximize the quality and consistency of organizational knowledge; and
iii. To facilitate the sharing and transfer of knowledge.

Each of the four primary KM processes is supported by activities that require the skill and knowledge of information professional.

Knowledge identification/ discovery	*Defines what knowledge the organization needs for business success and identifies what it has and doesn't have (as well as what it has that it doesn't need)*	Needs assessment Information audit Knowledge audit
Knowledge creation/ acquisition	*Determines where valuable knowledge is being created within the organization (and by whom, which process, etc.), and defines what the organization needs to acquire from external sources*	Select, source, and acquire external resources Source and evaluate external information Identify and evaluate internal information Facilitate communities of practice Design and develop information products Package information Negotiate contracts and licenses
Knowledge capture/storage/ codification/ retrieval	*Supports the capture, storage, and codification of valuable knowledge for effective retrieval*	Develop thesauri/ taxonomies Index and abstract/Code Catalogue/classify/ metadata Ensure effective and efficient access Train in access and retrieval Communicate delivery options
Knowledge sharing/transfer /flow	*Develops a sharing culture so that knowledge is transferred efficiently to where it is needed*	Map information/ knowledge Facilitate communities of practice

We can successfully undertake many of these processes or activities using our existing skills and knowledge. Continuing education courses can help us in this regard.

4. RESPONSIBILITIES

- To ensure that KM is supported by good Information Management;
- To have a clear understanding of our role in the KM processes and the significance of our contribution to the KM achievements;
- To work in collaboration with other KM individuals and teams, not in competition with them;
- To have confidence in our ability and to apply skills and knowledge assertively.

5. FACILITATORS FOR KM PROCESS

Information Professionals are trained to manage explicit knowledge that is documented in reports, records, databases, and so forth, but explicit knowledge has no value to an organization until a person uses it. To create new knowledge and to effectively reuse captured and stored knowledge requires an explicit-tacit (or a tacit-tacit) interaction. Consequently, storing explicit knowledge is only a part of the KM process–it must be stored in such a way that it can be accessed and used by the right person, at the right time, in the right context before it has business value.

Information professionals can become facilitators of this process by:

- Facilitating the access and retrieval process by creating indexes, taxonomies, thesauri, and abstracts; applying metadata and otherwise cataloguing and classifying the documents;
- Educating information users in efficient and effective retrieval practices;
- Ensuring that any required external information is acquired;
- Maintaining a liaison with IT professionals to match access and delivery options with user preferences; and
- Maintaining a liaison with human resource/training professionals regarding information and computer literacy skills and training.

KM acknowledges that the knowledge that exists within an organization's employees is its key to success; therefore the first of two major changes in our roles as information professionals is a shift from a technical/process focus to a more people-orientated focus. The emphasis is not only on the processes that enable information to be provided and used effectively, but on the personal attributes necessary to take on the required facilitation and communication roles.

The second major change is a shift from the traditional concept of providing a service to being part of the organization's core business. We continue to become highly skilled at information access and delivery, but we lack the overall knowledge of the organization and its operations to participate actively in planning and decision-making. This is particularly evident where information professionals have taken on a diverse range of new responsibilities without dropping the activities that no longer add business value.

6. KNOWLEDGE MANAGEMENT COMPETENCIES

Competencies comprise skills, knowledge, and personal attributes. These components must be present in the right balance for a person to be competent at a specific task, so it is important to understand what the components of a competency are in order to evaluate whether we have them or need to acquire them. To select CE and personal development programs, we must also identify the components of the competencies that we wish to acquire or improve. We can then rate ourselves in order to prioritize our individual learning requirements.

Breaking down the competencies into their components gives us the lists of skills, knowledge, and personal attributes that comprise the competencies. One of the critical issues here is that often a skill can be learned but cannot be applied effectively without the requisite personal attributes. For example, communication is a skill, and the processes can be learned. To be effective communicators we must have the confidence, motivation, and self-assurance to apply the learning. Consequently, "communication" is listed as a skill, whereas "effective communication" can be listed as a personal attribute. A further example is the skill of negotiation. Once again, we can learn the processes, but without the necessary personal attributes such as effective communication, motivation, open-mindedness, flexibility we are unlikely to negotiate well.

Here are some examples of the skills, knowledge, and personal attributes that have applied to the KM competencies. These are not definitive lists, but examples of the how the lists of skills, knowledge, and personal attribute can be developed from the competencies.

Knowledge Identification/Discovery *Defines what knowledge the organization needs for business success and identifies what it has and doesn't have (as well as what it has that it doesn't need)*			
Information Professional Contributions	Skills	Knowledge	Personal Attributes
Needs assessment	Audit/Survey	Of the organization	Confident

	Analysis	-Political -Cultural -Social	Effective communicator
Information audit	Evaluation Planning	-Economic /Financial	Self-starter
Knowledge audit	Decision-making Prioritization Negotiation	-Technical -Structure	Collaborative Flexible
	Project management Communication	External Environment	Open-minded
	Team development and management Facilitation	Industry Social networks	Able to learn Inquisitive

Knowledge Creation/Acquisition

Determines where valuable knowledge is being created within the organization (and by whom, which process, etc.), and define what needs to be acquired from external sources

Information Professional Contributions	**Skills**	**Knowledge**	**Personal Attributes**
Select, source, and acquire external resources	Selection Acquisitions	Of the organization -Political -Cultural -Social	Effective communicator Self-starter
Evaluate resources Identify and rate internal information	Evaluation (content, vendor, format, delivery, etc.)	Economic/Financial -Technical -Structure	Collaborative Flexible
Facilitate communities of practice	Communication	External Environment	Open-minded
Design and develop information products	User profiling	Information seeking behavior	Able to learn
Package information Negotiate contracts and licenses	Negotiation (with users, vendors, management) Financial management	User behaviors and preferences Legislation	Inquisitive Proactive

Information/ knowledge maps	Mapping Training/ instruction	Content Industry Learning styles	Risk-taker Confident
Knowledge Capture/Storage/Codification/Retrieval *Supports the capture, storage, and codification of valuable knowledge for effective retrieval.*			
Information Professional Contributions	Skills	Knowledge	Personal Attributes
Develop thesauri/ taxonomies	Thesauri/ taxonomy development	Information organization	Effective communication
Index and abstract	Indexing Abstracting	User behaviors and preferences	Confident
Code	Coding	Technical infrastructure	Collaborative
Catalogue/classify/ metadata	Cataloguing and classification	Learning styles	Open-minded
Ensure effective and efficient access and delivery	Metadata application		
Train in access and retrieval	Training/instruction		
Communicate delivery options	Communication Negotiation Facilitation Search and retrieval		
Knowledge Sharing/Transfer/Flows *Develops a sharing culture so that knowledge is transferred efficiently to where it is needed*			
Information Professional Contributions	Skills	Knowledge	Personal Attributes
Map information/ knowledge flows	Mapping Analysis	Of the organization -Political -Cultural -Social	Effective communicator

Facilitate communities of practice Facilitate information/knowledge sharing	Communication Training/ instructional Team development and management Facilitation	Economic/Financial -Technical -Structure External Environment Industry Social networks User behaviors and preferences	Self-starter Collaborative Flexible Open-minded Inquisitive Proactive Risk-taker Confident

7. CONCLUSION

We need to examine our new responsibilities and evaluate where our competencies place us. We then need to determine what actions are necessary to enable us to move forward. It is likely that those actions will include a mixture of skill/knowledge-based and personal development programs, as selecting CE programs that are purely skill or knowledge focused alone will not enable us to become key players if we do not have the requisite personal attributes of motivation, confidence, and assertiveness.

Professional associations and educators must develop comprehensive and cohesive CE programs enable information professionals to meet the needs of the KM environments in which they work. Information professionals must evaluate their individual levels of competence and develop structured plans for their own professional and personal development.

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Access to Information through Library Consortia

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ABSTRACT

Increasing pressures of diminishing library budgets, ever-growing number of journals and rising cost of journals have made it difficult for users to gain access to all relevant publications. The libraries all over the world are forming consortia of all types with an aim to take advantage of current electronic network to promote better, faster and cost effective ways of providing electronic resources to the information seekers. This article describes the concept of library consortia. Explains the need and objectives of library consortia Enumerates some of the major issues and discusses the consortia initiatives in India.

1. INTRODUCTION

The Library and information centers are increasingly being called upon to provide more relevant, up-to-date and timely information to a wide range of users. To satisfy the varied needs, they require availability and accessibility to a variety of information resources and formats (such as digital full-text, sound, graphics, images, multimedia and hypertext, as well as print documents) The libraries, like those in most developing countries, suffer from inadequate funding or stringent budget cuts. This has affected the level of services offered to users both in terms of quality of collections and the degree of staff support provided. In the present circumstances only a few libraries can afford to have a wide range of information resources with in their budget. The financial constraints of the states as well as the country as a whole restricts to extend a substantial support to individual libraries attached to different academic and research institutions. Mainly this situation gave birth to the idea of forming consortia to provide better facilities in library to access information resources.[1]

2. CONCEPT OF LIBRARY CONSORTIA

Consortium is a word that comes from the Latin *consortium* meaning *association* or *society*. The word refers to a temporary collaboration to perform a certain task or to provide a specific service or product more efficiently. A consortium is an association of two or more

individuals, companies, universities, or governments (or any combination of these entities) with the objective of participating in a common activity or pooling their resources for achieving a common goal.

Basically, Library ***consortia*** means group of libraries that come together with common interest to form consortium. The aim of **consortia** is to achieve what the members of the group cannot achieve individually.

Library consortium is a community (a cooperative) of two or more information agencies which have formally agreed to coordinate, cooperate or consolidate certain function to achieve mutual objectives[2]. It is an association of a group of library to achieve mutually the joint benefits.

Consortia may be formed on a local, regional, national, or international basis; on a functional or format basis; or on a subject basis.

The aim of the consortia is to achieve what the members of the group cannot achieve individually. Libraries are forming consortia in order to share resources and to bring their combined purchasing power to negotiate advantageous terms for the supply of journals and other research literature and to offer automated services.

3. NEED FOR CONSORTIA

- Libraries and information centers are finding it hard to maintain the subscription for core journals due to ever increasing cost of the journals subscription and also shrinking budget.
- Improving the quality standard of research in universities and research institutions in India and bringing it to a level of global recognition by improving the access–base of literature to them.
- Whole world is moving towards electronic publishing and the cost of the electronic publishing is much cheaper than that of the print version.
- Researchers can now access to learned journals in electronic form.

4. OBJECTIVES OF CONSORTIA

The objectives are as follows:

- Avoid duplication of subscription of electronic resources and promote rational use of funds.
- Better negotiation for purchase of e-journals with vendors that conventional libraries cannot do.
- Increase the cost benefit per subscription.
- Ensure the continuous subscription to the periodicals subscribed.
- Guarantee local storage of the information acquired for continuous use by present and future users.

- Develop technical capabilities of the staff in operating and using electronic publication databases.
- Strategic alliance with institutions that have common interest resulting
  - Reduced Information cost.
  - Improved Resource Sharing.

5. MAJOR ISSUES OF CONSORTIA APPROACH:

- Selecting a coordinating agency to deal on behalf of entire group of participants and executing and monitoring the work.
- Identification of libraries interested in participating and agreeing to common terms and conditions.
- Identification of potential publishers to provide access under consortia purchase.
- Negotiating with publisher to get a commonly acceptable and affordable price.
- Source of funding to meet the subscription cost.
- Legal issues involved in contracts and usage of material within the consortia.
- Informing the usefulness / importance of the consortia to the authorities to act upon the issues.
- Identifying the necessary infrastructure for electronic access to resources.
- Issues relating to backup of databases.
- Identification & selection of databases to be acquired and hosted by nodal agency & member libraries
- Documentation and training of staff.
- Access rights– whether to provide direct access from publisher site or mount databases at nodal agency[3].

6. CONSORTIA INITIATIVES IN INDIA

In this electronic age, library consortia has gained momentum even in the developing countries like India. Many library consortia around the country have been formed on different lines.

6.1 UGC-Infonet Consortium

ERNET India, a scientific society under the Ministry of Communication and Information Technology, in partnership with the UGC and Information and Library Network (INFLIBNET) Centre, an IUC of UGC has set up UGC-INFONET. Indian Universities constitute one of the largest higher education systems in the world. University Grant Commission has launched an ambitious program to bring about a qualitative change in the academic infrastructure, especially for higher education. Under this initiative UGC is modernizing the University Campuses with State-of-the-art campus wide networks and setting up its

own nationwide communication network named UGC-INFONET. Through its INFLIBNET Centre, the UGC-INFONET consortium benefits its members by providing electronic access to research journals, abstracts, review publications and databases. It covers all areas of learning: science and technology, as well as social sciences and humanities.[4]

The effort was announced by the Hon'ble Prime Minister of India, Shri Atal Bihari Vajpayee and the network was activated by the Hon'ble Minister for Human Resources Development, Dr. Murli Manohar Joshi, at the inauguration of the Golden Jubilee Celebrations of the UGC on December 28, 2002

6.1.1 Main Features of the UGC-Infonet Are:

- Scaleable Architecture to grow from Universities to affiliated Colleges
- Nation-wide Terrestrial Backbone using Fiber Optic links
- Integrated Satellite WAN supporting broadband and SCPC VSAT technology
- Comprehensive Network Management Systems for overall monitoring of the network, down to each and every device.
- Linkage with other Academic and Research Networks all over the world.
- Data security and virus protection using firewalls and Intrusion Detection Systems
- Dedicated Data Center for Web hosting, e-Journals and Mail Boxes.
- Mirror sites spread all over the country for content hosting.
- Broadband Multimedia and Video Channels for Distance Learning

6.1.2 UGC– Infonet Resources

- American Chemical Society (ACS) {37 Journals}
- American Institute of Physics (AIP) {13 Journals}
- American Physical Society (APS) {15 Journals}
- Annual Reviews {29}
- Biological Abstracts
- Science Direct (Elsevier Science Journals) {25 Journals}
- Cell Press Journals {9 Journals}
- Cambridge University Journals {200+ Journals}
- Emerald Journals {28 Journals}
- Encyclopaedia Britannica
- Institute of Physics (IoP) {38 Journals}
- ISI Web of Knowledge
- JSTOR- The Scholarly Journal Archive {464 Journals}

- Mathscinet
- Nature (NPG)
- Portland Press Journals {4 Journals}
- Project Muse Journals (John Hopkins University) {270+ Journals}
- Royal Society of Chemistry (RSC) {24 Journals + 6 databases}
- Scifinder Scholar (Chemical Abstracts)
- Science Magazine
- Springer Journals {1150 Journals}
- Taylor and Francis Journals {1050 Journals}

6.2 CSIR Consortium

The Council for Scientific and Industrial Research is an Indian government body that controls a number of research institutions across India. The CSIR, established in 1942 with corporate office at New Delhi, and a network of 40 national laboratories, 2 cooperative industrial research institutions and more than 100 extension and field centres and over 5000 R & D scientists spread over the country is a premier R & D Organization in India providing S & T inputs to a diverse spectrum of economic, industrial and societal sectors. The R & D activities covers fields from aerospace engineering to ocean sciences, molecular biology to metallurgy, chemicals to mining, food to petroleum & leather to environment.

Many of the laboratories have well equipped libraries, and some of them act as the main information centres in different subjects functioning as consultant libraries at the national level. Access to electronic journals through the use of state-of-the art technology is possible in many of the libraries belonging to these laboratories. Each of the laboratories have a well established library or documentation centre that is also backed up with strategic information support from the National Institute of Science Communication and Information Resource (NISCAIR), a constituent establishment of CSIR formed with the merger of INSDOC and (NISCOM). To augment CSIR research and development activities, NISCAIR implemented agency for the process of providing access to globally available Electronic Journals to entire S&T staff of CSIR and its constituent units through a consortia approach. As a first step, in recent past NISCAIR on behalf of CSIR has entered into an agreement with M/s. Elsevier Science to access its odd 1,500 e-journals and further intends to strengthen its information resource base by subscribing e-access of more and more journals published globally. Under this scheme the CSIR scientists shall be able to access these journals and download the material for the use.[5]

CSIR consortium extended its access by creating appropriate

agreements on consortium basis with the other providers of E-journals. NISCAIR is a nodal agency for developing a "Consortium for CSIR laboratories for accessing E- Journals:.

The objective of E- Journals consortium is

- To strengthen the policy, sharing and electronically accessing the CSIR library resources.
- To provide access to world Science and Technology laboratories.
- To nucleate the culture of electronic access resulting into evolution of digital library.

6.3 Indian Digital Library in Engineering Science and Technology (INDEST) Consortium:

The Ministry of Human Resource Development (MHRD) has set-up a Consortia-based Subscription to Electronic Resources for Technical Education System in India" on the recommendations made by the Expert Group appointed by the ministry. The consortium is named as the Indian National Digital Library in Science and Technology (INDEST) Consortium.

The INDEST Consortium has commenced its operation since Dec. 2002 through its headquarters at the IIT Delhi. The Consortium subscribes to full-text electronic resources and bibliographic databases for 38 leading engineering and technological institutions in India including IITs (7), IISc (1), NITs/RECs (17), IIMs (6) and a few other institutions directly funded by the Ministry of Human Resource Development (MHRD).[6]

The e-resources available through INDEST are the following:

Full-text electronic resources:

- IEEE/IEE Electronic Library
- Elsevier: Science Direct
- Springer Verlag's link
- ProQuest: Applied Science and Technology Plus
- ProQuest: ABI/Inform Complete
- ACM Digital Library

Online Databases:

- Ei Compendex Plus and INSPEC
- Cylinder Scholar (Access through a Z39.50 Windows-based interface)
- MathSciNet
- ISI Web of Science
- J-Gate Custom Content for Consortia.

INDEST is a common gateway to access 4500+ e-journals from 1028 publishers subscribed by IITs, IISc, IIMs.

The benefit of consortia-based subscription to electronic resources is not confined to 38 major technological institutions in the country but is also extended to all AICTE-accredited and UGC-affiliated institutions. 84 engineering colleges and institutions have already joined the consortium on their own.

J-Gate Custom Content for Consortia, is a customized solution for accessing and sharing journal literature subscribed by all the IITs, IISc and IIMs, individually and collectively through INDEST Consortium. Joining this community of resource sharing consortium are 17 National Institutes of Technology to whom the benefits of is extended as secondary members. JCCC@INDEST is a common gateway to access 4514 e-Journals from 1092 publishers, subscribed by IITs, IISc. IIMs (14 Libraries). The journals of following INDEST Consortium registered publishers are included in JCCC@INDEST

ACM Digital Libraries
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- IEEE Electronic Library
- Nature
- Science Direct (Elsevier)
- Springer-Link

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- Common TOCs and Database search facilities for both print as well as online journals with scholarly content subscribed by all consortium members.
- Links to fulltext of articles, where available.
- Facility to search a bibliographic database of articles and links to full text from JCCC interface.

- List of journals subscribed by each consortium member.
- E-mail request for the photocopies could be sent from one consortium member to the other.

6.4 HELINET consortium – Health Science Library and Information Network

The Rajiv Gandhi University of Health Sciences launched HELINET (Health Sciences Library & Information Network) Consortium, on the 15th of March 2003. HELINET is the first medical library consortium launched in the country.

Under the HELINET scheme, the member colleges can get access to around 600 scholarly, international biomedical journals, from 24 leading publishers, at about one-third the price of their print subscription. Moreover, the member colleges can get all time access to the current journals as well as archives i.e. the back-volumes of journals for a period of 7-10 years.

While there are over 1,000 essential good medical journals that the colleges need, what is subscribed by each library was around 150. Together, all colleges subscribed to nearly 1,000 journals. The University has already established the Digital Library infrastructure.

6.4.1 HELINET Mission

To network all the libraries under RGUHS for minimizing the cost of acquisition and maintenance of learning resources and maximizing their utilization among the faculty, students and researchers in the colleges and institutions affiliated to the

6.4.2 Future plans

To expand the access for more number of e-journals, e-books and other e-resources and develop the digital library infrastructure as a platform for e-learning.

6.5 FORSA Consortium

The Indian Astrophysics Consortium called Forum for Resource Sharing in Astronomy (FORSA) is a typical example of homogeneous group of members wherein the libraries have common area of interest and establishing the consortium is slightly easier than in heterogeneous type of members. The FORSA consortium consists of five members who joined the consortium for negotiating licensing for astronomy journals and identified a subscription agent as a supplier of journals. Subscriptions for both print and electronic format are paid through their supplier. The agreement made meant for only astronomy journals published by a particular publisher. Under the consortium Nature journal was also subscribed by six libraries those committed to share the license fee to access the Nature electronically.

6.5.1 Salient features of FORSA Consortium

- The journal titles for which the consortium license is negotiated are subject focused.
- The publishers find it convenient to negotiate with the members through the agent since the individual invoicing is handled by the agent for the individual members.
- The model is worked out for cross { e-access to the print journals subscribed to by the members of the consortium and hence gives equal access for all the members.
- No additional requirement of budget for the members in terms of subscription to new print journals is required since the currently subscribed titles will be maintained (subject to the normal increase in subscription).
- The most important feature is that the members are not burdened with subscribing to peripheral and less important journals, which is a standard feature of 'bundling-together' by publishers.

7. DRAWBACKS IN INDIAN SITUATION

- Lack of awareness about consortia benefits.
- Slow acceptance of e-information by the users.
- Difficulties in changing the mind setup of librarians.
- Maintenance and balancing both physical and digital library.
- Inadequacy of funds.
- Single point payment.
- Rigid administrative, financial and auditing rules.
- Uncertainty about the persistence of digital resources.
- Lack of infrastructure for accessing electronic sources.
- Lack of appropriate bibliographic tools.
- Lack of trained personnel for handling new technologies.
- Absence of strong professional associations.
- Big brother attitude of libraries.

These drawbacks need to be overcome to ensure the effective utilization of electronic resources.

8. CONCLUSION

The success and survival of libraries will depend on how much and to what extent the libraries cooperate with each other in future. So cooperation is an essential facet of modern library management in most developed countries of the world, but in our country is still in the normative stage. Tremendous explosion of information, financial constraints, information in different forms etc., the resource sharing networking has emerged as important alternatives. Establishment of better consortium, integrating intellectual access are all the distinct steps moving towards the 21st century libraries. Indian librarians should

seriously rethink and reinitiate consortium movement like western countries for maximum utilization of resources at a reduced cost, time and space.

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Access to Knowledge in Research and Development Institutions: A Status Quo

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ABSTRACT

A self respecting country in the world needs scientific and technological activity as an end in itself, for which information occupies prime importance to carryout research and development activities in the country. As Library professionals being part of R&D Institutions entrusted with a responsibility to support the research and development activities in the country has to provide right information to the right user at the right place in a minimal time. Establishment of Knowledge Commission and passing of Right to Information Bill, 2002 in the parliament has been a great challenge to the Library profession to provide access to knowledge (A2K). Attempts were made to explore the role of R&D Libraries in Karnataka in the light of A2K extending techno-based information services to the scientists in a research environment based on the survey made to research institutions in Karnataka.

Keywords: R&D Institutions, Knowledge Commission

1. INTRODUCTION

Research and Development (R&D) activities are life blood bank of the nation. Optimum utilization of natural and human resources of a country, innovation and investigation is imperative for the progressive national development. Recognizing the quality of education at all levels is the key to promote science and technology and as such steps needs to be taken for promoting high quality research in pure and applied sciences. For any research and development institution, information is the basic resource for carrying out extensive research leading to better standard of living and prosperous development of the country. The

Research and Development institutions of national and international repute carries out an extensive research in the areas of Science and technology and Social sciences for prosperous development of the country leading to a better standard of living. Jawaharlal Nehru rightly pointed out on scientific research as the first priority for investment in India for the development of the nation: "I am convinced that of all the big problems that face India today, nothing is more important than development of scientific research, both pure and applied and scientific method. This is indeed the basis and foundation of all other work... The extensive use of that method can only come through properly directed education and a large number of research institutions which deal with pure science as well as innumerable applications of it"[1].

Library and Information Centers attached to the parent institutions have to play significant role in meeting the nascent information needs of the scientists to their desktops, for which information and Communication technology has to be effectively utilized in library activities and services by building strong campus network. In the light of Information Bill 2002 and establishment of Knowledge Commission in India has further enhances the responsibility on the part of Library and Information Centers to make sincere efforts with their rich information resources using information technology to provide nascent information to the scientists of R&D institutions to support their research activities. This will enhance efficiency of libraries in extending technology based information services to the users and to satisfy the scientists of the research organization.

2. R&D INSTITUTIONS: A STATE-OF-THE-ART

The Library and Information Centres, the preservers of knowledge are the integral part of these R&D institutions by providing its valuable information resources to the users at the right time and right place in the light of Five Laws of library science laid down by father of library science Dr. S R. Ranganathan. In India, there are many R&D institutions carrying out research in different disciplines, in which libraries needs to extend techno-based information services to the users.

The Research and Development activities has been enlarged including the expenditure incurred on Research and Development in

- Higher Education
- Sector Small Scale Industry (SSI) Sector and
- Industries other than those recognized by the Department of Scientific and Industrial Research

The major highlights of the Research and Development activities in India[2] are mentioned below keeping in view of the potential of science and technology and the need for its wider dissemination to various sectors like Government, universities, firms, research organizations etc.

- The national investment on R&D activities attained a level of Rs. 12901.54 crores in 1998-99. The same is estimated to be Rs. 15090.22 crores in 1999-2000 and Rs. 17660.21 crores in 2000-01.
- 0.91 % of Gross National Product (GNP) was devoted to R&D during 1998-99.
- Sector-wise percentage share of national expenditure during 1998-99 was as follows: central government 62.5%, state governments 8.0%, higher education 2.9%, public sector industries 5.0% and private sector industries 21.6%.
- As on 1st April, 1998, nearly 3.08 lakh personnel were employed in the R&D establishments in the country including in-house R&D units of public and private sector industries, 31.0% were performing R&D activities, 32.6% were performing auxiliary activities and the rest 36.4% were providing administrative and non-technical support.
- R&D expenditure amounting to 83% was incurred by 12 major scientific agencies of the central government i.e. CSIR, DRDO, DAE, DBT, DST. DOS, DOD, ICAR, ICMR, MICT, MNEs, MOEn and the rest by other central ministries /departments' public sector industries. Among the major scientific agencies, Defense Research and Development Organization (DRDO) accounted for 31.8% of the expenditure.
- The extramural R&D support increased from Rs. 186.48 crores in 1996-97 to Rs. 349.84 crores in 1998-99. The Ministry of Information & Communication Technology {MICT) and Department of Science and Technology {DST) were the two agencies playing a major role in extramural R&D funding.
- India's per capita R&D expenditure was Rs.130.26 (US$3.1) during 1998-99.
- Industry spent 0.52% of their sales turnover on R&D in 1998-99.
- There were 9,701 women directly engaged in R&D activities. Doctorates in science form 68.4% of the total 5,608 S&T doctorates produced by the educational system in the country during 1998-99.
- There were 220 universities/deemed universities, 11 institution of national importance and 11,397 colleges during 1998-99 imparting higher education in the country.

Table 1 shows R&D spending in India[3] during 1990's and 2000's.

Table 1. R&D Spending in India (Rs Million)

Sectors	1990-91	%	2000-2001	%
Central Sector	30,583	77	118,358	67
State Sector	3,659	9	13,506	7
Private Sector	5,500	14	40,588	23
Higher Education Sector	-	-	4151	3
Total	39,742	100	176,602	100

Source: DST (2002)

The only significant change has been a decline in public sector industrial R&D (included in central sector spending) as a percent of the national total from 10.5% in 1990 to 5% in 1998-9. Total industrial R&D has also risen somewhat from about 25% in 1991 to just over 30% (estimate) by 2002. As we saw above, the Central Government dominates R&D spending, with its 67% share in 2000-01. This spending takes place mainly in the autonomous R&D laboratories that come under different agencies. The central government currently operates well over 200 major R&D labs in Defense, Space, Atomic Energy, Industrial Research, Agriculture and Medicine (each agency, such as Defense Research and Development Organization or Council of Scientific and Industrial Research consists of several independent laboratories focusing on different subjects). Table 2 shows, Defense, Space, and Atomic Energy accounts for over half of central government R&D spending. The next biggest are the Indian Council of Agricultural Research and CSIR.

Table 2. Research Institutions in India

Sl. No	Discipline	No. of R&D Institutes
1	General	39
2	Agriculture, Fisheries and Veterinary Science	13
3	Bibliography, Library Science and Musicology	10
4	Fine and Performing Arts	2
5	History, geography and Archeology	8
6	Language and Literature	17
7	Medicine	18
8	National Science - General	5
9	Biological Science	6
10	Mathematical Science	2
11	Physical Sciences	20
12	Philosophy and Psychology	2
13	Religion, Sociology and Anthropology	13
14	Technology	20
	Total	175

Source: World of Learning (2004)

The Research and Development institutes available in India[4] in various disciplines have been categorized as given in Table 2.

3. RESEARCH AND DEVELOPMENT LABS IN KARNATAKA: ACCESS TO KNOWLEDGE

The Research and Development institutions occupy national and international importance with is strong research out put striving towards the prospects and developments of the country in terms of political economical, cultural and social setup.

The Supreme Court of India[5] has recognized the right to information as a constitutionally protected fundamental right, established under Article 19 (right to freedom of speech and expression) and Article 21 (right to life) of the Constitution of India, 1950. Further, the Right to Information Bill[6] enacted in 2004 purports to set out to provide a 'practical regime of right to information for people to secure access to information... in order to promote transparency and accountability. National Knowledge Commission[7] was constituted in 2005 for devising and guiding reforms that will transform India into a strong and vibrant knowledge economy in coming years, as knowledge is an indispensable asset that has the potential to accelerate social and economic progress. The National Knowledge Commission focuses on certain key areas that can help India achieve this goal. These include education, science and technology, agriculture, industry, and e-governance. Broadly speaking, India needs to become a globally recognized player in the creation, application and dissemination of knowledge.

In the light of the above emphasizing access to knowledge as a mandatory, but does it apply to Research and Development Institutions because basically these Labs are of confidential in nature and is confined to in-house staff. To elucidate the role played by Libraries being integral part attached to R&D Labs, efforts were made to collect the data from R&D institutions in Karnataka. For this purpose, sixty five questionnaires were distributed to R&D institutions in Karnataka out of which 45 questionnaires were duly obtained.

3.1 Institution profile of R&D Institutions in Karnataka

The study compares the various research and development institutions established over a period in different areas of research. Further the establishment of R&D institutions in Karnataka differs from one to another in the interest of the national output and purpose.

The table 3 shows the profile of Research and Development (R&D) Institutions in Karnataka.

Table 3. Profile of Research and Development Institutions in Karnataka

N=45

R&D Institutions	Est. of Institution	Est. of Library	Area of Research	Library Staff Strength	No of users
NAL	1959	1959	Aerospace related subjects	29	2000
ISTRAC	1986	1986	Space applications	2	125
HAL	1941	1945	Aerospace	8	10000
ADA	1985	1985	Aerospace engineering	5	400
ISRO	1974	1974	Space Science and it applications	5	460
Atomic Minerals Directorate, DRDO	1986	1986	Atomic Energy	2	300
LRDE	1958	1958	Electronic and Radar Development	24	1000
DEBEL	1982	1982	Biomedical Engineering	6	100
CEMILAC	1984	1986	Certification of Military Aircrafts	1	147
IAM	1957	1957	Aviation and Aerospace	2	300
Regional Military	1965	1966	Aircraft Safety and certification	1	140
HAL-OH	1971	1971	Design Engineering	3	416
HAL-ARDC	1940	1963	Aero craft Design	6	150
KPTCL	1992	1992	Power Transmission	1	200
CPRI	1960	1998	Power Engineering	5	-
DFRL			Defense Food	3	200
CFTRI	1950	1950	Food science and technology	27	600
ADE	1959	1959	Aerospace Engineering	14	-
NIRM	1989	1989	Rock Mechanics	4	65
ITI	1948	1954	Telecom	10	1500
BHEL	1978	1978	Electrical, Electronics and Management Eng	6	1638
CMTI	1963	1963	Machine Tools and Production	12	370
BEML	1975	1987	Highway equipments	2	500
BHEL	1932	1932	Industrial ceramics	2	1400

C-DOT	1984	1984-85	Telecommunications	2	500+
CIPET	1990	1990	Plastics Technology	1	70+
CAIR	1989	1989	Telecommunications and artificial Intelligence	2	350
IPIRTI	-	-	Wood Science Composites, Bamboo Composites	3	130
NRCC	1986	1988	Plantation crops	1	25
SERICULTURE	1962	1962	Sericulture	4	350
IWST	1938	1938	Wood Science	4	100
RARS	1969	1969	Agriculture and allied	7	150
CCRI	1925	1962	Coffee	3	70
RALLIS	1971	1971	Agrochemicals	3	
CSWCRTI	1954	1954	Soil and water conservation measures	2	30
RRI	1948	1973	Astronomy/ astrophysics, optics, liquid crystals	12	150
CABS	1984	1984	Aerospace	3	150
GTRE	1959	1959	Design and Dev of Gas Turbine for military applications	12	1000
DRTC	1976	1976	Mathematics, Statistics, Library Science and Economics	8	150
ISEC	1972	1972	Social Sciences	12	150+
CMDR	1980	1991	Economics of Health, Environment, education, water	2	-
ORI	1890	1890	Manuscripts	5	100+
NTI	1960	1960	Tuberculosis	4	100
RRI (Ayurveda)	1973	1973	Ayurveda	2	115
C-DAC	2000	2000	Software and allied	2	250

It is observed from the table that, among the various R&D institutions in Karnataka, Oriental Research Institute, Mysore is the oldest institute established in the year 1890, which implies its prominence before the dawn of independence. This is followed by Center for Coffee Research Institute, Chikmangalore (1925), Bharat Heavy Electronics Limited, Bangalore (1932) and Hindustan Aeronautical Limited, Bangalore (1940). Further, it is noticed that,

except these four libraries, the remaining forty one Research and Development institutions in Karnataka amounting to 91.1% are established after the Independence in India. C-DAC (2000), Bangalore is the youngest R&D institutions being established in Karnataka when compared with the other R&D institutions. About 15% of the R&D Institutions are established in 1980's, 17.7% during 1970's and 13.6% in 1960's.

It can thus be inferred from the study that, the establishment of R&D institutions in Karnataka are considerably more in number which indicate that significant importance was given for the research and development activities in Karnataka.

In order to evaluate the importance of libraries as lifeblood of modern research in a research organization, the establishment of libraries on par with its parent institutions is elicited. From the table, it is found that the library of R&D institutions are established after its parent institutions are established accounting to (24.4%), which reveals that the libraries of these R&D institutions have not attached much importance for its simultaneous existence along with parent institutions. There has been considerable gap between the establishment of libraries and its parent body's especially CPRI, Bangalore.

As for as the availability of library professionals including its supporting staff are concerned, the National Aeronautical Limited NAL, Bangalore (29) has the largest staff available when compared to other R&D institutions, and this is followed by CFTRI Mysore (27), LRDE (24), Bangalore, CMTI, Bangalore, RRI, Bangalore and ISEC, Bangalore (12). The number of users of R&D libraries is quite numerous accounting to 10,000 users in HAL, Bangalore and is followed by BHEL, Bangalore (1638), NAL, Bangalore (1500), ITI Bangalore (1500) and LRDE, Bangalore (1000).

3.2 Information Services

Today the libraries have undergone dramatic changes especially with the impact of ICT in which the emphasis is on content of information rather than documents. The information services–reference service, referral services, bibliography service current awareness service, SDI service etc. can now be extended by using technology to improve the effectiveness of timely services to the uses. An attempt has been made to check the use of technology in offering various information services to the scientists of R&D intuitions in Karnataka.

Table 4. Information Services offered in R&D Libraries:
Manual vs Automated

N=45

Information Services	Use of Technology			
	Manual	Percentage	Automated	Percentage
Reference Service	36	80	30	66.6
Referral service	40	88.8	20	44.4
Reprographies service	33	73.3	20	44.4
Bibliographical Service	24	53.3	25	55.5
DDS	33	73.3	22	48.8
CD-ROM	-	-	34	75.5
Information consolidation service	13	28.8	15	33.3
Literature search service	19	42.2	29	64.4
Indexing & Abstracting service	17	37.3	25	55.5
SDI	23	51.1	33	73.3
CAS	28	62.2	30	66.6
Translation	13	28.8	-	-

It can be inferred that CD-ROM database service, Information consolidation service, Literature search service, Indexing and abstracting service, Current awareness service offered to the users by using information technology, but however the reference service, document delivery service and translation service are in manual node of extending service still exists.

3.3 Difficulties in rendering IT services

It should also be noted that, technology is not an ultimate and there is a chance of down or failure in the system administration. Trouble shooting and other technicalities are required in maintaining the networked systems of the library in the proper form.

Table 5. Difficulties in rendering Infotech based services

N=45

Problems of IT Services	No of Respondents	Percentage
Lack of Sound Information Technology infrastructure	20	44.4
Lack of Expertise in handling technology	11	24.4
Users are not competent	7	15.5
Lack of co-ordination from staff	5	11.1
Difficulty in maintenance of Technological gadgets in Library	6	13.3
Any Others (Lack of Staff)	7	15.5

It is found from the table 5 that, the routine difficulties in rendering IT based services are lack of sound information technology infrastructure (44.4%) and this is followed by lack of expertise in handling technology (24.4%) and others.

4. CONCLUSION

Libraries must re-evaluate their mode of information delivery to make it more effective and conform to current trends in order to continue having a place in the information economy. Libraries, which are able to exploit the services using technology, are benefited from inexpensive compact storage, faster provision of access to information they hold, and an ability to meet the user's needs, with access to a diverse range of resources available on the Internet. IT based information services is must for the library and information centers in order to provide timely access to the information/ knowledge required by the scientists in the research and development environment and really give a meaning to Knowledge Commission.

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Authorship Trends in ILA Conference Papers

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ABSTRACT

The main aim of this paper is to analyze the authorship trend of papers selected for presentation and included in the proceedings of 51st All India Library Associations national conference, at Kurukshetra in Harayana State. In all 204 authors contributed 110 articles. These authors are further analyzed according to sex, educational qualifications, their designations, working institutions, their geographical area, etc. This study has reflected very interesting results.

On 16-18 December, 2005 Indian Library Association organised its 51st National Conference at Kurukshetra in Harayana State. The main attraction of the ILA conference is always of its theme. For this time the theme was 'Libraries, information literacy and life long learning'? The selected theme was of much relevant to the present state-of-art of Indian libraries and information science field. As usual ILA made an open announcement to all its members for call of papers on the theme. It has brought out a conference proceeding of the papers received. This time the conference volume is presented in a new shape and style. The volume consists of 48 papers in full text form where as 62 papers are in abstract form.

Indian Library Association is the only biggest national library Association in India. Its members are scattered all over the country. ILA calls papers from national and overseas members. The main object of the present paper is to analyze the authorship pattern and to see the changing

trends of authorship in LIS by analyzing ILA proceedings. Analysis is made on following criteria:

1. Authors as per sex
2. Collaborative authorship as per the sex
3. Multi authorship pattern.
4. Joint authors working Institute
5. Designation Wise analysis of authors
6. Type of Institutions of authors
7. Geographical distribution of Authors

Authors as per Sex

The 110 articles included in the proceedings are written by 204 authors. Out of which, 152 were of male and 52 are of female. Contribution of Male authors is 75% and female is 25%. It means female library professionals are slowly coming out to express their feelings about professional work. It shows that their scope was not only confined to LIS work only, but is widening.

Collaborative authorship as per the Sex

Out of 110 articles 73 articles are collaborative. Efforts were made to find out involvement of female authors with male and vis-à-vis. Out of 73 collaborative articles, it was found that 21 articles were written by male and female authors (28%). Further details are as under

Table1. Distribution of authors as per sex

Sr.	Type of collaborative authorship	No. of articles	Percentage
1.	Female only	22	20%
2	Male only	67	61
3	Male and female jointly	21	19

Collaborative Authorship

While analyzing the authorship pattern from ILA proceedings, it was found that group writing tendency is increasing in LIS field. Collaborative authorship tendency is generally found more in science and technology discipline. But as LIS is professional work and library work is a team work, therefore, experiences which are depicted in the article may be of a team comprising of two or more professionals. Table no. 2 shows the collaborative authorship trend.

Appendix

IT Initiatives by States and Union Territories (Singh, ShashiPrabha, 2005)

Andhra Pradesh

- APSWAN the network, connecting the state secretariat with 25 centres.
- CARD project, a computerized registration of immovable property transactions.
- Multipurpose household survey project keeps data of all residents and land records.
- Automated services of transport provide issuance of driving licenses, vehicle registration.
- Secretariat knowledge information management system, caters to manage the work flow the secretariat.
- E-seva, with its 28 centres and 270 service counters has brought 30 different services to a single window to pay electricity bill, water bill, house tax, take driving license, apply for passport, etc.

Chandigarh

- Project telemedicine interconnecting three premier medical institutes, i.e. PG1-Chandigarh, AIIMS-Delhi and SGPG, Lucknow using ISDN for tele-diagnosis, tele-consultation and tele-education.
- Implemented e-governance to provide online facilities in the departments of police, excise and taxation, licensing and registering authority, registration of births and deaths, etc.

Chhattisgarh

- It is one of the best states in the country in telephone infrastructure facilities connecting all its districts with optical fiber cable.
- It has initiated e-governance project called CHOICE (Chhattisgarh online information for citizen empowerment) to provide various government services under one umbrella.
- CHIPS (Chattisgarh infotech and biotech promotion society) was set up as a prime mover for IT and biotechnology.

Gujarat

- Smartcard project: road transport offices of Gujarat have been equipped with state-of-the-art driving license enrolment and issuance centeRs
- State-wide WAN to connect various office complexes of the government.

Haryana

- The IT revolution in Haryana was started in 2000 when the state government announced its IT policy. The main objectives of the policy are – superior and cost effective e-governance; IT education and literacy; private investment in IT industry, infrastructure and services; and employment generation.
- The IT policy of the state provides large number of incentives for the IT industry.
- In Gurgaon, it is developing a Software Technology Park of India (STPI).

Himachal Pradesh

- Lokmitra, an ambitious programme broadly based on the model of Gyandoot (Madhya Pradesh) – to bring e-governance to be extended later to all state districts through intranet.
- Developed IT vision 2010 in collaboration with NASSCOM to convert the state in an IT destination.

Karnataka

- Digitization of the common entrance test (CET) seats allotment in professional courses.
- Computerization of the SSLC and PUC exam process and making results available online.
- Establishment of LAN in the Revenue Secretariat.
- Computerization of payments and receipts in 20/31 districts and 184 sub-treasuries.
- Network center to handle central database at Bangalore and disaster recovery center at Dharwad.
- Computerization of payment of taxes, filing of returns, dealers registration, vigilance and intelligence activities.
- Computerization of the Public Works Finance Cell and the zilla panchayat units for monitoring monthly grants and releases.
- Computerization RTO (on pilot basis) and all police stations. Yuva.com, an IT scheme for rural youth employment.
- Bhoomi, a computerized project launched to maintain land records. It has made land registration simple and easy for the citizens.
- Computerization of insurance department and municipal corporation is in progress.

Kerala

- Kerala RD Net networks 152 office blocks and provides regular updates of various state activities.
- CARD: automatic registration system.

- FRIENDS (fast, reliable, instant, efficient, network for disbursement of services), a convenient one-stop gateway to pay variety of taxes and bills, etc.
- Treasury computerization: the project involves the computerization of all district treasury offices and a few key sub-treasury offices.
- Water authority project involves the computerization of all operations of its 13 offices, including billing and collection.
- ISDN-based messaging system for administration.
- Computerization of the department of civil supplies, responsible for issue of ration cards.
- Computerization of the public service commission to conduct examinations like the state eligibility test, medical and engineering entrance and SSC examinations.

Madhya Pradesh

- Launched on 1 January 2000, the Gyandoot project covering 20 village information kiosks that offer services like current rates of agricultural produce, copies of land records, online registration of application and public grievance redresses, village auctions, etc. These services are offered at nominal rates ranging from Rs 5 to 25.

Maharashtra

- Maharashtra VSAT network connects Mantralaya with all the districts in the state which supports video-conferencing and e-mail.
- Sarita, a computerization project of the stamps and registration department. Computerization of the employment exchanges to network all the exchanges.
- Warna wired village project, a web-based information system on the agriculture produce market, agriculture schemes and crop technology, employment and self-employment schemes, educational and vocational guidance, availability of land records and milk procurement, etc.

North Eastern States

- Community information centers – (CICs) have been set up in 2002 in all the 487 blocks of the eight N-E states viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. Basic CIC services include internet access, e-mail, printing, data entry and word processing and training for locals.

Rajasthan

- Raj-swift, a statewide intranet to facilitate data, text and e-mail between the district offices.
- Rajnidhi information kiosk project proposed to function as a modern service delivery system.

- Networking of secretariat to monitor various key activities of the state.
- Vikas darpan, a GIS-based planning and decision support system.

Uttar Pradesh

- E-governance, computerized the election processes, and placed tender documents online.
- Computerization of treasury.
- Digitization of laws, rules, regulations and ordinances issued by the government and make them available online.

West Bengal

- A pilot web and kiosk-based education information system to standardize operations and processes.
- Vernacular interface project to provide information about tax payments, public utility bills, etc.

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Looking at the Rural Libraries of Karnataka State in the Internet Era

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ABSTRACT

This paper attempts to explore the status of rural libraries in the state of Karnataka State. Identifies the content available on Internet for use by rural community and discusses the implications there upon on the rural libraries. The paper concludes that it is an opportunity for the rural libraries to redesign their services to benefit the rural community.

1. INTRODUCTION

India lives in villages. With the advent of the Information, Communication and Technology (ICT) revolution India and its villages are slowly but steadily getting connected to the cities of the nation and the world beyond. ICT plays a pivotal role in combating the rural and urban divide, be it in education, administration or economic development. Of the various ICT tools the Internet is seen as a tool that can break down the information isolation that has been a barrier to the development of rural libraries. It can be used in a myriad of ways. The Internet has emerged as one of the most powerful tools for global communication. With the development of digital collection, electronic journals and global networks, Internet has become the most powerful tool in library and information centers for providing information services to users.

In fact today the Internet is recognized, as is peoples' network. There are so many activities one can do on the Internet. The power of Internet will help move quickly into effective transfer of information.

The Internet has the potential to link libraries for electronic sharing of full text, graphic, and multimedia library resources; to link library personnel electronically for new kinds of reference service; to link

libraries to non-library sources of information; and to provide access to the local library from any location with a computer and modem.

2. RURAL LIBRARIES IN KARNATAKA: A STATUS

In the context of rural development Gram Panchayat libraries have a major role. Library services should not be confined only to scholars and the learned, but these should be a universal in itself. In order to render effective and meaningful grass root services by providing relevant information on several disciplines related to rural area such as agriculture, education, health, employment, cottage industries, social welfare etc., so, as to create awareness among the rural folk.

Though the enactment of Karnataka Public Libraries Act 1965 has brought about tremendous changes in the establishment and maintenance of Public Libraries and the organization of the comprehensive rural and urban library service in the state, the rural areas continue to suffer needing an amendment to improve the rural libraries/CICs by providing sound financial and technical support under the mandate of law. Thus the thrust for rural library development towards 21st Century should be to reach out to the rural areas, so that the imbalance of library services between urban and rural communities can be reduced and that there will be equal access to information for all.

There are 5300 Gram Panchayats at present in the State. So for 3251 Gram Panchayats libraries have been established and are extending library services to the rural folk. The department is planning to establish Gram Panchayat libraries in the remaining Gram Panchayats from first of November this year. In spite of these developments the overall situation is not encouraging. Studies reported by Khan [1] Sadashiv Murthy [2] Biradar [3] Vijaykumar and Kumar [4] have identified the poor picture of rural libraries in terms of clear-cut policy, paucity of funds, low priority etc, poor collection. The Rural libraries [5] survey reveal that the villages do not enjoy the advantage of having good libraries, computers or other ICT facilities. Rural libraries offer significant advantages in serving public access role, but also face certain barriers. A review of rural library roles, users, services, and support indicates the potential of the institution as an access point and information provider on computer networks.

3. INTERNET IN CATERING INFORMATION NEEDS OF RURAL MASSES

Rural people are not only in need of information regarding agriculture and animal husbandry but they are interested in all kind of information, which may help them for their development. Rural development programs generally have objectives such as local

participation, training, education, research, technical backstopping and strengthening of institutions and delivery mechanisms. The Internet is not a panacea for development, but it can and does bring new information resources and can open up new communication opportunities and challenges between people and their organizations, institutions and government.

For rural people, the Internet shall be a valuable communication tool to add to the current suite of communication tools which typically includes the telephone, mail, and the mobile. They now have an extremely powerful and adaptable communication tool that can reduce isolation and provide access to a vast range of services and information. It can be a very convenient method for quickly accessing a large volume of information without being impeded by geographic barriers.

Despite the value of the Internet for rural use, people in rural areas do not generally have the access to the Internet. Internet can be useful in the form of new ideas, discussion groups, access to expert advice, continuing education resources, increased global understanding and cultural awareness, and information that helps make them better and more informed citizens, social benefits including new opportunities to overcome geographic isolation, increased social interaction, opportunities to organize and advocate for social change, equalization of urban/rural disparities and new links between urban and rural communities. It may not reduce existing barriers, but it can open access to alternative services and tools for people in rural areas.

Internet the world's largest virtual library contains wealth of information containing millions of scholarly publications, books, images, maps etc on public domains most often referred as information commons. Some of the reference sources available on the Internet include encyclopedias, dictionaries, yearbooks etc. All those who are accessing Internet today in India and elsewhere agree that the Indian content on the Internet is expanding and improving day by day. Efforts are being made to create the databases, web pages, portals to hook up over the net. Various State Governments including the Central Government are making efforts to implement e-governance programs and develop content of utility for rural mass.

The State of Karnataka is also not lagging behind. It has been at the forefront of the IT revolution in India since its start half a decade ago. The government of Karnataka believes that effective implementation of e-governance will take IT to the common man. As part of its ambitious plans under the leadership of the then honorable Chief Minister, Shri S.M. Krishna many projects were initiated to provide e-information to its

citizens. The government information now is accessible by anyone including rural community at http://www.kar.nic.in. Some of the ministries of Government of Karnataka have developed the content in Kannada language. All the Universities in the State do release the examination results on the web particularly Karnataka State Open University, Mysore which is providing distance education. In addition to this Karnataka State Public Service Commission, Secondary School Education Board, Pre University Education Board also makes announcements of their programs and results on the web.

A good number of media resources in Karnataka: Deccan Herald, Times of India, The Hindu & Business Line, New Indian Express (English dailies); Kannada Prabha, Prajavani–Sanjevani, Udayavani, Vijay Karnataka (Kannada dailies), Sahilonline (Urdu daily), Roopatara, Tarangaonline (magazines in Kannada), BPOIndia.org, BangaloreBest.com, careerindia.com, ciol.com, Click.in, explocity.com, Oneindia.in, thatscricket.com, PublicNotice.in, SEraja virtualbangalore.com (Portals in English), ThatsKannada.com, Hello Karnataka, Vishva Kannada (Portals in Kannada) etc are available on public domain.

Hence, for rural libraries it is an opportunity to offer Internet access to exploit the benefits of information commons as cheaply as possible. Even in small rural libraries some Internet services will prove to be popular and improve the library's image. The Internet can compensate for the present pathetical conditions. The rural libraries can take on the role of community access points to information, including government information. Rural public libraries can serve as gateways to the information highway providing large numbers of individuals with an access point for the Internet and other online information databases.

The Internet is the new librarianship and the rural libraries are competing for a societal role that no longer exists. The future role of the rural librarian will be to act as a communicator and to engage in a good deal of cooperation to provide equality of information access. There are many implications associated with this.

4. IMPLICATIONS

4.1 Equitable Access and Network Information Resource Provider

Role of rural libraries should expand into "electronic navigator and intermediary," it should be "provider of electronic information to remote user," "coordinator of local community electronic information resources," and "switching station for electronic information resources and services."

The first major barrier to rural libraries as public access points on the Internet is that no single rural library in Karnataka is connected currently. The expense of becoming a full node on the Internet is still a formidable barrier for many libraries. Rural libraries offer several advantages, the most important of which is equitable access to their services. In the case of the Internet, libraries shall offer freely available sites for equitable access to the network, and to the information resources available through it. The Library as a public place within a community is important for those potential network users who do not have personal or institutional computers or cannot gain access to the network. The social context of the library provides these citizens an information mediation specialist to help interpret network resources.

Rural libraries also offer the advantage of being network information resource providers themselves. Users expect to find everything in libraries. The library as the local access point for electronic government information is a natural extension of this partnership.

4.2 Administrative Issues

As rural libraries move through different stages of gaining access to the Internet, to staff familiarity and use, to providing direct public access to the Internet, a host of administrative and policy issues must be addressed. In general, these are not unique to rural libraries, privacy and security issues intellectual property/fair use of copyrighted materials pricing of commercial information services interoperability and standards whether and how to impose limits on public use when demand outstrips resources (time, equipment, capacity, or budget) scalability of Internet address system censorship, access by minors.

4.3 Infrastructure Requirement

This includes hardware (Pentium PC, Floppy drive, printer, modem and a telephone line), software (operating system and a web browser) and also manpower having good knowledge in various disciplines with good training in use of computers.

4.4 Identification of Websites

Utmost care must be incorporated while identifying the websites that are to be selected for inclusion in the Internet based rural library services. Since Internet is made up of millions of networks that are freely available, it is the librarian's responsibility to pickup the best and most suited to the information needs of the public.

4.5 Finance

Access to information commons is free but getting connected to Internet costs. Providing Internet based services to the public may be

expensive but it would be only one time investment and can be maintained at less cost.

4.6 Intellectual Property Rights

IPR is a collective term used for independent rights such as patents, copyrights, trademark, registered design, and protection of integrated circuits layout design, geographical indications and protection of undisclosed information. As per copyright law, once a material is published anywhere in member country of the Berne Convention, it becomes copyrighted. But library professionals feel that copyright law in electronic environment may encounter many difficulties.

4.7 Internet Management

This is a challenging and emerging concept, for satisfying the next generation needs mainly providing support for diverse technologies and adequate bandwidth. This requires a strategic and tactical view of entire Internet landscape. Predicting the future size of Internet, there is much to be done.

4.8 Place Libraries on the Web

The transition to the electronic era must be focused and directed at projecting libraries on the web. This is considered to be the best strategy for fighting out the challenge to their existence. What contents should they put up on the web? Individually not all libraries common big library resources, but collectively they do. They need to form consortia and emerge as subject gateways on the web, and start offering web access to their resources. Eventually these should strive to emerge as national facilities in their respective areas of interest. It is this vision that should guide their further course of growth and development.

4.9 New Roles for Professionals

In the emerging scenario, the involvement of library professionals in organizing user services will increase manifold. They will have to take up new roles. They will function as knowledge navigators, navigating users to use the information sites and resources. In the online websites, updating them on ongoing basis, and answering customers' queries by email, etc. They will also be involved in digitization on publications in print, and putting such digitized products on the web.

4.10 Develop New Skills

In order to cope with the changing roles, functions, and responsibilities as envisaged in the electronic information era, library professionals will have to learn new Internet skills and techniques. Manpower development and training is, therefore, going to assume greater importance. To what extent should library professionals try to

acquire the knowledge of Internet skills and techniques? The manpower development and training activity needs to be directed at two levels. At the first level, it is to equip professionals with necessary skills so that they should be able to use information technology tools effectively for giving service to users. This should include fundamental knowledge and awareness about computer hardware and software, and using systems software and packages for performing library functions and services. Elementary level training on these lines is required to be mandatory for all professionals. At the second level, the professionals will have to acquire advanced training in IT software applications.

4.11 Information Literacy

We are entering the 21st century, but one of the major problems, India is facing, is the information illiteracy. Information literacy is the ability of a person to locate, process and use information effectively regardless of delivery mechanisms and the type of format in which the information appears in the global information society. The efforts should be made to overcome the information illiteracy problem in the country. This will be a major challenge and an important issue to be addressed at the national level as it has serious and long-range implications in the Internet based information environment.

4.12 Computer Literacy

The computer literacy is the development of basic tasks that individuals can complete on a computer such as word processing, creating and manipulating data on a spreadsheet, or using the other types of software. Therefore, the challenge before the libraries in India is to make the professionals, computer literate and in educating the users of libraries in using computers.

4.13 Network Literacy

Every one talk about Internet in India and elsewhere, but no one ever mentions about how hard it can be to find what one is looking for. The use of Internet for library purposes requires network literacy on the part of LIS professionals and users as well. Network literacy is the ability to identify, access, and use electronic information from the network like Internet, will be a critical skill that is very much required in the networked environment. Only in recent years, the concept of networked information is picking up gradually in India. Hence, there is a need for educating and training LIS professionals for making them network literate so that they will have all the knowledge and skills required exploiting the networked information in providing services to the rural community.

4.14 Training and Education of Library personnel and Users

The knowledge of how to use Internet, its resources and tools by library personnel and users is central, in maximizing its effectiveness. The challenge before the rural libraries, if the networked information is to be exploited, is to educate them first and then educate and train the users in the Internet skills.

The rural library has to provide training for the public in the use of networks and networked information resources as well as point-of-use consultation, guidance, and technical assistance, as well as to develop online training and interpretative aids.

There is a need for raising awareness among rural librarians of the importance and use of information commons. Librarians should be taught how to know what's available, how to find it, what the technological problems may be and how to solve them, before using the Internet on behalf of users or providing direct access by the public.

4.15 Attitude and psychological readiness

The professionals and users of rural libraries need to take it as a challenge to develop readiness both emotionally, professionally and financially to accept and make the best use of Internet facility for information access worldwide. Whether one likes it or not the Internet is going to become one of the most powerful information dissemination and access tool in the new electronic World. Therefore, there is a need for developing positive attitude among rural librarians and users of information towards making best use of Internet for global access to information.

We know that libraries are interdependent and cannot be operated in isolation. Therefore, the libraries have to exploit the benefits offered by Internet and while doing, it must be selectively and imaginatively applied to libraries. To take best advantage of new technology, requires on the part of rural librarians a through understanding of the nature of change and psychological willingness to look upon it as an opportunity.

5. CONCLUSION

The rural librarians have a vital role to play in supplying the relevant information to the users at the right time. This means that libraries in every corner of our country should be glued together with the Internet. The rural library system should get further boost with the input of information technology into national mainstream. The networked rural library system at the national level is the need of the hour. The privately–sponsored Internet kiosks stationed in every rural community and publicly sponsored networked rural library system shall be the ideal

combination for transforming the current scene. The rural library shall enter the mainstream because it shall henceforward perform socially–related functions. Truly the village library has the potential of turning into a cultural center for the community.

These are over 140 million Internet users in the world hooked to over a 12 million host computer connected to the net, and this number is growing everyday. Internet is a boon for information professionals whose main aim is to provide information to their clientele. It has greatly influenced the practice of librarianship. It is the most useful tool to obtain latest information that may take may more months to get printed. Access-to Internet has changed the total scenario of librarianship. Internet has been found to be very effective for all the following library activities.

The rural libraries must undertake such steps get connected to Internet and using the information commons available should start providing services like a cyber café in the beginning. Rural libraries and users have suffered because of limited access to information. With the rapid development of networked resources and access tools available over the Internet, which are more easily accessible in metropolitan areas, disparities in access to information are growing even larger. Instead of widening the rift between urban and rural library users, the information commons could bridge the distance, providing more equalized access to the wealth of human knowledge to rural library communities. The library is often not recognized as an important part of the rural infrastructure, but rural communities that can tap into the information infrastructure through Internet have a greater possibility of making the transition to stronger communities.

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Multi-Lingual Script Web OPAC for Users: A Case Study of JNU Library

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ABSTRACT

The advent of the Internet and development of Unicode has provided many opportunities to advance user services. Unicode is an international character set developed for the scripts of all the languages of the world. It is becoming a fundamental tool for communicating and exchanging data between computer systems. This paper deals with bibliographic databases of JNU Library based on Multi-Script. JNU Library has very rich collections in different languages and it provide access to the library services to all community in their own languages.

1. INTRODUCTION

JNU library has been established LAN and VAN to become a virtual library by the help of School of Information Technology (Jawaharlal Nehru University) and interlinked its database and services first within JNU campus, then institutions within Delhi and finally worldwide. It has also been established exchange relation with many Indian and international/foreign institutions.

JNU library, established in 1969, has a rich and valuable collection of 5 lacs documents i.e. books, periodicals, non-book materials etc. and it is housed subject wise under three major discipline viz. Social Science, Science and Humanities. All language collection has come under Humanities division.

Total retrospective records of Multi-script are 58982 out of 120125 records. The Arabic records are still continued and will be completed till

December 31, 2006. The retrospective conversion of Chinese, Japanese and Korean collection will be started very soon.

Retrospective Conversion of Multi-Script Records (upto31-10-2006)					
Languages	**Total Collection**	**Converted records**	**Languages**	**Total Collection**	**Converted records**
French	7800	7613	Hindi	10500	10138
German	11000	10700	Urdu	10500	10367
Spanish	5200	5013	Sanskrit	1600	1533
Portuguese	1500	1411	Persian	2850	2800
Nepali	125	119	Bengali	200	196
Russian	50000	1213	Gujarati	100	71
Chinese	2500	-	Konkari	150	121
Japanese	2600	-	Maithely	150	111
Korean	1000	-	Marathi	200	179
Other	2000	1500	Panjbi	500	348
			Tamil	150	138
			Arabic	8000	4000
			Postu	1500	1411
Total	**83725**	**27569**		**36400**	**31413**

2. SOFTWARE & TRAINING

The software for the Multi-script system is VIRTUA, an integrated library management system developed by VTLS Software Pvt. Ltd. It provides support for the Unicode system, z39.50 capability and MARC 21 standard. The VIRTUA system allows searching the catalogue, input and updating catalogue records, loading data from other bibliographic utilities, and downloading records in all script to JNU Database.

JNU library staff had been provided department wise training in relation to acquisition, circulation, cataloguing, serial control, OPAC and system administration module of the software. During the retrospective conversion, involved professionals also trained in MARC 21 format, latest DDD 22 classification scheme, Library of Congress Subject Heading and Standard AACR II revise cataloguing rules.

3. UNICODE TRANSFORMATION FORMATS (UTF-8)

UTF-8 is a compromise character encoding that can be as compact as ASCII (if the file is just plain English text) but can also contain any Unicode characters (with some increase in file size).

UTF stands for Unicode Transformation Format. The '8' means it uses 8-bit blocks to represent a character. The number of blocks needed to represent a character varies from 1 to 4. *Unicode provides a unique number for every character.* The MARC 21 specification specifies the use of Unicode for the exchange of records.

4. PROCEDURE OF RETROSPECTIVE CONVERSION OF MULTI-SCRIPT DOCUMENT

Retrospective conversion is the process of turning a library's existing bibliographical records into machine-readable form. In JNU the total procedure has been done directly through books for maintaining the standard. The following standard has been adopted for retrospective conversion process:

4.1 Constitute a Retrospective conversion committee

It was decided that retrospective conversion has been done by outside vendor with the supervision of retrospective conversion committee. The committee consists: A consultant (retired AL), AL of the relevant department, Relevant Language Expert and other library professionals (as per requirement).

4.2 Cataloguing Standards

4.2.1 Duplicate Check

Before catalogue a bibliographic item, first check the database. If a bibliographic item already exists in JNU database, modify the record if necessary and add JNU library's holdings.

4.2.2 Copy Cataloguing

If there is no record for your bibliographic item on the JNU database, search for the record through the remote databases on OCLC/LOC through the z39.50 protocol. This is a very good facility in VIRTUA software.

Capturing records using a Z39.50 client: Z39.50 is a national and international (ISO 23950) standard defining a protocol for computer-to-computer information retrieval. Z39.50 makes it possible for a user in one system to search and retrieve information from other computer systems (that have also implemented Z39.50) without knowing the search syntax that is used by those other systems. The National Information Standards Organization (NISO) originally approved Z39.50 in 1988.

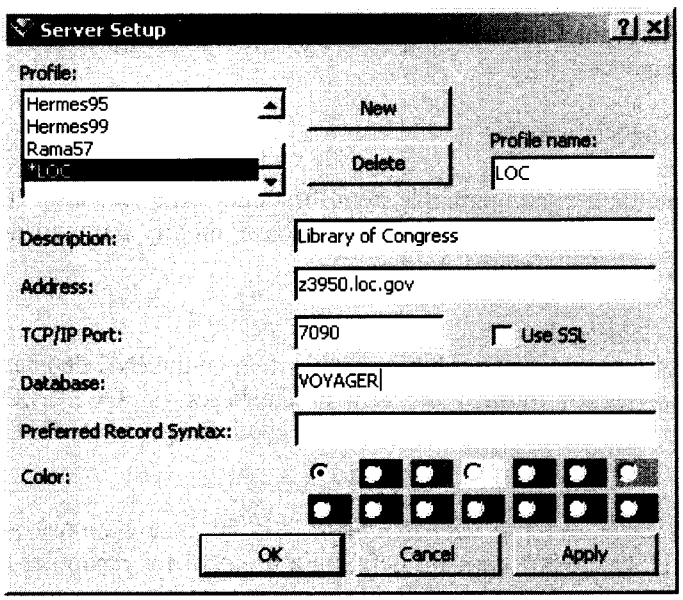
The VIRTUA Z39.50 server allows authorized users of Z39.50 client programs to access the OCLC/LOC database. If you would like to

capture records by using Z39.50 search and retrieval protocol, fill the following server setup requirement.

Server set up for OCLC Database		Server set up for LOC Database	
Profile name	OCLC	Profile name	LOC
Address	132.174.11.57	Address	140.147.249.38
TCP/IP Port	210	TCP/IP Port	7090
Database	OLUC World CAT	Database	Voyager

Step 1: Configure a Connection

1. To close the existing connection, select **File → Close Connection** from the Virtua main menu.
2. Click on **File → New Connection.**
3. To add databases to the connection list, click on the **Setup** button to display the **Server Setup** dialog box.
4. Click the **New** button to create a new connection



5. Type in the Profile name, Description (name appears in the Connection List box), Host name or IP address of the database, and enter the port number of the database.
6. Click **Save** and then **OK** to return to the **Connect to Server** window.

Step 2: Obtain Record from Z39.50 Database

1. Select **File → New Connection** on the Virtua menu bar to connect to your local database.
2. Select **File → New Connection** on the Virtua menu bar to connect to a Z39.50 database.

3. Set as the default, the Z39.50 database you wish to obtain records from by selecting **File → Connection List** from the main menu. The **Connection List** window will appear. Highlight the database to set as the default and click the **Set Default** button. This should be the database from which you wish to obtain records.
4. Click **Close** to exit out of the **List of Connections** window.
5. Search the OPAC for the desired record.

4.2.3 Original Cataloguing

If the records are not found in both databases, then a standard printed sheet has been prepared for creating a new bibliographic record.

4.3 Preparation of Sheet in MARC 21 Standard format

- *Bibliographic format:* MARC 21 formats should be used for MARC records.
- *Bibliographic description:* The standards for descriptive cataloguing are the Anglo American Cataloguing Rules (latest edition and revisions) and the Library of Congress Rule Interpretations.
- *Name Authorities:* Name Heading has been considered in the Library of Congress Name Authorities (LCNA). However, for the Indic name the local database has been considered.
- *Subject cataloguing standards:* The Library of Congress Subject Cataloging Manual: Library of Congress Subject Headings is the standard for application of subject headings. Although LCSH is the preferred subject thesaurus, subject headings from other sources are also accepted.
- *Classification:* The latest edition of DDC 22 classification schedule has been used. For easy and fast approach for call number and cutter table, the ON LINE DDC has also been used.
- *Data entry:* After completing and checking the sheet, expert data entry operator feed the record in MARC 21 data entry format.
- *Quality control:* Checking, editing and rectification have been done by another professional on mutual coordination basis. It is a tedious, time consuming difficult job.
- *Validation of records:* Validation means re-checking and editing the record by library staff.

4.4 Bar-Coding and Preparation of the Books

JNU library is using smart bar-coding system. In this system barcode have the shelving location, Call No. (DDC class no + Cutter No + First two letter of titles + Vol./Copy no.) and accession no. A barcode printer is used for printing barcode labels. After editing the books the two bar code labels are printed. One label is affixed to the surface of cover page, and other pasted at the back of title page. Besides pasting the bar code, date slip and book cards are also prepared. Smart barcode is very useful

to sorting and tracing the book because it also containing the shelving location, collection and item type information. It is also very easy for user to access the book quickly.

4.5 Multi-Lingual Script-related Fields

Alternate Graphic Representation: Field 880 and the associated Romanized field both contain a sub field |6 (Linkage). The first and second indicator positions in field 880 have the same definition and values as the indicators in the associated field. The sub field codes in field 880 are the same as those defined in the associated field except for sub field |6.

Linkage: Data that links fields that are alternate graphic representations of each other: the linking tag number of the associated field; a two-character occurrence number (right justified with a zero in the unused position

Example of a bibliographic record with 880 fields

082	04	\a891.4335 \b P916 \c Go
100	00	\6880-01 \a प्रेमचंद.
245	10	\6 880-02 \a गोदान / \cमुंशी प्रेमचंद.
260	##	\aनई दिल्ली\b :भारतीय ग्रंथ निकेतन, \c1990.
300	##	\a 323 p. ; \c 19 cm.
650	00	\a Hindi fiction \y 20th century.)
650	00	\a \a Authors, Hindi \z India.
880	01	\6 100-01/(N \a Premacanda, \d 1881-1936
880	10	\6 245-02/(N \a Godan / \c Premchand

5. OBSERVATIONS

JNU library faced various problems during the RECON like- lack of expert professional staff in different languages, lack of software knowledge, lack of MARC 21 concept and reclassification in latest DDC 22 from existing colon classification etc.

But with the help of retired library professionals and by providing proper training of the software and MARC 21, the entire project of Multi-Script has been successfully completed within a schedule time. The documents have been arranged physically on shelves according to new number. The new DDC Classification number is very easy to accessible for Users and very helpful to attendant for shelf management.

6. MULTILINGUAL SEARCHES

Library provides easy-to-follow menus to guide users through the searching process.

- User can use either Romanized or Original language script to input the search statement. However, library recommends for Romanized script to search. This system supports Unicode (UTF-8 encoding). Therefore, it is possible to display and search in all scripts.
- Windows XP client terminals have been use for script search.

6.1 How to Search for Language Display?

Patrons can change the language of the interface used for searching. Once a language is selected from the language list pull-down menu, all buttons, prompts and search windows are changed to the selected language. There are currently eighteen language translations. Changing the language selection displays all text--including headers, footers, button labels, field labels, and search fields in the pull-down list on all screens—in that language.



Explanation of search screens: There are four kinds of search screens. They are "Browse Search", "Heading", "Keyword" and "Control number Search" screen.

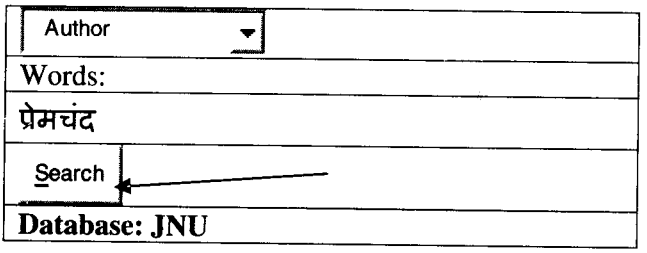
6.2 Browse Search

Browse Search takes advantage of a library's controlled vocabulary and cross-reference structure. The browse search feature is useful for searching the OPAC when the user wants to narrow a search from a broad topic to a specific topic or doesn't know an exact term.

Step 1: Enter Search Terms

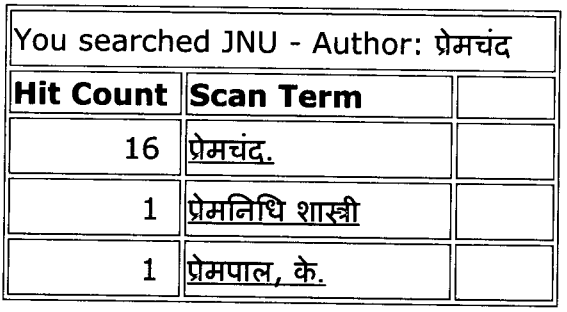
1. Select Browse to perform a browse search of the database. The Browse Search screen will open. The Browse search lets you search for authoritative headings or call numbers.
2. Enter search terms in the 'Search Terms' text box.
3. Select a Search type from the pull-down box that lists all the browse indexes available for your search.
4. Select a database to search by clicking the down arrow in the pull-down list box labeled
5. Click the **Search** button or press the **Enter** key

JNU Library Catalogue



Step 2: View Records

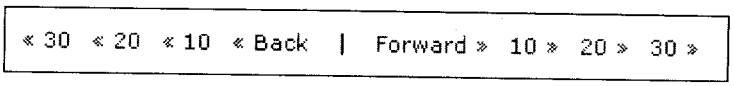
After you enter a Browse search, the Scan Search Results screen will appear.



1. In the Scan Results Search screen,:
   - A list of headings for the browse index you searched. Each heading is hyperlinked to a list of titles associated with the heading.
   - A hit count indicating the number of titles associated with the heading

   In the case of Cross Reference Screen displays:
   - A minus (-) sign instead of a number in the Hit Count column that indicates a *See* cross-reference associated with the term.
   - A plus (+) sign instead of a number in the Hit Count column that indicates a *See Also* reference associated with the term.

2. Click back or forward and then select the number group you wish to navigate through.



6.3 List of Titles Screen

1. From the Scan Results screen click on a term. The List of Titles screen will appear. This screen displays records in the database that are associated with the Browse term you selected on the Browse results screen or from the Bibliographic Keyword, Broadcast, or Expert search.

From this screen you can access the Full, Holdings, Items, and MARC screens.

first record | previous record | next record | last record

full | items(1)

Record 1 of 1

You searched JNU - Title: गोदान

Author प्रेमचंद.

Author Premacanda, 1881-1936.

Title गोदान / मुंशी प्रेमचंद.

Title Godan / Premchand.

Imprint नई दिल्ली : भारतीय ग्रंथ निकेतन, 1990.

Description 323 p. ; 19 cm.

Items 1 - 1 / 1

Acc.No.	Location	Call No.	Units	Item Class	Status
1 187028	Hindi	891.4335 P916 Go		Book	Shelving

Select for cart

Save to Cart

Other languages can also be searched by same process like Arabic as in below example:

first record | previous record | next record | last record

full | items(1)

Record 1 of 1
You searched JNU - Call Number: 892.71108

Author ايادي، لقيط بن يعمر.
Author Ayadi, Laqeet Bin Yamar.
Title ديوان لقيط بن يعمر الايادى / لقيط بن يعمر ايادى؛ مرتبه از خليل ابراهيم العطية.
Title Diwan laqeet Bin yamar al-ayadi/Laqeet Bin Yamar Ayadi; edited by Khalil Ibrahim Al-Atiyya.
Imprint قاهره: وزارة الاسلام, 1970.
Description 81 p. ; 24 cm.
Items 1 - 1 / 1

Acc.No.	Location	Call No.	Units	Item Class	Status
1 G35135	Arabic	892.71108 Ay13 Di			Book In Transit

Select for cart

Save to Cart

2. Sort controls are on the List of Titles screen. Select from the sort type from the sort pull-down list box and then choose the Ascending or Descending radio button to determine the direction of the sort.

Sort by: None Sort

Ascending Descending

3. The Chameleon iPortal can (optionally) display an icon on the List of Titles screen to indicate the type, bib level, or format of each record. You can define one or more icons by setting values for the following parameters in the chameleon.conf file.

6.4 Record Screen

To display the record, click the *full* hyperlink associated with the item. The Full Record screen will appear. Full record information is defined in the *i*Portal: Full Card Bibliographic Screen view.

first record | previous record | next record | last record

full | items(1)

Record 3 of 16

You searched JNU - Author: प्रेमचंद.

Author	प्रेमचंद.
Author	Premacanda, 1881-1936.
Title	गोदान / मुंशी प्रेमचंद.
Title	Godan / Premchand.
Imprint	नई दिल्ली :भारतीय ग्रंथ निकेतन, 1990.
Description	323 p. ; 19 cm.

Items 1 - 1 / 1 Top of Form

Acc.No.	Location	Call No.	Units	Item Class	Status
1 187028	Hindi	891.4335 P916 Go		Book	Shelving

Select for cart

Save to Cart

6.5 Items List Screen

Click on items to retrieve information about the copies and volumes that are associated with the bibliographic record of the material. Result will be displayed in format shown on the previous page.

Click on items to retrieve information about the copies and volumes that are associated with the bibliographic record of the material. Result will be displayed in below format

1. Click the **Request** button to open the online request wizard for the associated item.
2. Click the **Save to Cart** button to save the checked item(s) to the Cart.

7. CONCLUSION

This paper has discussed the issue pertaining to Multi-Script bibliographic database creation. Unicode-based software is the only solution for creating multi-script bibliographic databases. The vision of JNU library is to use the latest application of the new technology to develop its existing system. In the next phase of the library automation are digitization of paper clipping, theses and dissertation. JNU library database is also available through intranet to JNU community and user/guest can be access the JNU Library database through Internet very soon.

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National Information Policy: Digital Divide, Reasons, Schemes, Policy Programmes of India

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ABSTRACT

Digital Divide may also be called as "Information and Technology gap". In general terms, it is the gap between those who can effectively use new information and communication tools, such as the internet, and those who cannot. The digital divide becomes challenge for the development of digital libraries in India. Because the different factors such as Illiteracy, Poverty, Computer illiteracy, lack of widespread telecommunication facilities, shortage of power supply etc. created the digital divide in India. The Government of India and different state governments have already took developmental measures to control the digital divide. The present paper explained different government schemes, measures and programmes, which are aimed to overcome the digital divide and thereby enabling development of the digital libraries in India.

Keywords: Information and Technology Gap, Digital Divide.

1. INTRODUCTION

Information and Communication Technology (ICT) has revolutionized the information management activities in the academic libraries during the past few years developing the Information Society. The Information society demands that all the relevant technologies; that are involved in Access to Information, Information collection, information processing, consolidation, repackaging and retrieval be

merged so as to evolve an integrated system; capable of providing diversified services.

Advances in Computer Storage and telecommunication methods, online access to databases, electronic journals, electronic knowledge banks, direct document delivery, teletext, teleconferences, bulletin boards, Radio Frequency Identification Systems, Compact discs, Digital Versatile Disks, Networks including Internet, Smart Cards etc. are revolutionary developments in the last two to three decades that have brought a great change in the collection, communication, storage and management of information. As a result, the organization structure and functions of the libraries are changed. The libraries are termed as Conventional Libraries, Digital Libraries and Hybrid Libraries.

Now it is necessary to know about nature of these three kinds of libraries. Conventional libraries will operate through printed collection whereas the Digital Libraries are working to collect, store and communicate the information digitally. The combination of both conventional and digital library are hybrid libraries, where information is stored and communicated both in print and digital format. But majority of the Indian population is not prepared for the developments like digital libraries.

1.1 Digital Divide

This "information and technology gap" or "digital divide", to refer to the gap between those who can effectively use new information and communication tools, such as the internet, and those who cannot. This definition, however, is disappointing, as it is rather too simplistic. It is true that the most dramatic kind of digital divide is the global divide: some countries can use the internet, and others cannot, because of the simple fact that the indispensable technological infrastructure is missing[1].

As the digital divide focuses on the higher end of ICTs involving the electronic transfer of information using digital formats which may themselves be replaced by new technologies within the next decade. It assumes that the benefits of these technologies and access to the world of information that is contained within them is a benefit that no citizen in the twenty-first century should be without, certainly not at least in the developed world.

The digital divide is usually referred to as the "inequality of access to the Internet." The digital divide is the gap between those people and communities who can access and make effective use of information technology and those who cannot. Simply, a common euphemism that describes the have and havenotes of the information age is usually urban

versus rural communities. The digital divide is the socio-economic/technological difference between communities in their access to computers and the Internet. The term also refers to gaps between groups in their ability to use ICTs (Information and Communications Technologies) effectively, due to differing literacy and technical skills, and the gap in availability of quality, useful digital content. The divide is seen as a national/social/political problem. It became an issue among concerned parties, such as governments, scholars, policy makers, and advocacy groups, in the late1990s[2].

Cullen[3] stated that 'A number of research and policy papers addressing the issue of the digital divide identify specific groups of people as being especially disadvantaged in their uptake of ICTs. These include people on low incomes, people with few educational qualifications or with low literacy levels, the unemployed, elderly people, people in isolated or rural areas, people with disabilities, sole parents, elderly people, women and girls. Because they are often already disadvantaged in terms of education, income and wealth status, and also because of their profound cultural different from the dominant Western culture of the developed world, many indigenous people, and some migrant and ethnic minority groups are identified as having a very low uptake of ICTs. In the USA therefore Afro-Americans, Latinos, as well as North American, Indian Nations are identified as needing targeted programmes to increase their participation in the digital economy'. The digital divide is always described in terms of the difference in the number of telephones, internet users or computers per head between rich and poor countries[4].

As such in India, Digital Divide is caused with various kinds of problems such as Growing Population, Illiteracy, Lower Standard of Living, Less use of computers and internet etc. The problems are discussed as under:

1. Growing Population and Illiteracy

India is the second largest country in growing population. Approximately 1/3rd of the population is illiterate and uneducated. The following table shows the population and literacy rate of different Countries in the world.

It is noted that the digital divide can be overtaken only if the complete population of the respective country is literate. In this case, it is observed from the above table that literacy rate is higher in Russia, Japan, Germany, UK, USA AND China. But in India, the literacy rate is still 65.38% and it is a problem for controlling digital divide and development of the digital libraries.

Table 1. Geographical area, population and Literacy of the different countries

Sl. No	Country	Geographical Area (Sq.kms)	Population (In Millions)	Literacy Rate (In %age)/ Year
1	China	95,96,960	1295.0	86 (2002)
2	India	32,87,590	1049.0	65.38 (2001)
3	Germany	3,56,910	82.4	99 (2002)
4	Japan	3,77,835	127.5	99 (2002)
5	Russia	1,70,75,200	144.1	100 (2002)
6	United Kingdom	2,44,820	59.1	99 (2002)
7	United States of America	96,29,091	291.0	97.9 (1991)

Source: Competition Success Review Year book 2005.

2. STANDARD OF LIVING AND TELECOMMUNICATION FACILITIES

Growing population has caused unemployment and poverty in India. Consequently there is a lower standard of living and lower GDP per capita. Due to these factors, there is slow development in telecommunication facilities. The following table showed the GDP Per capita, number of fixed telephone links and Mobile Cellular available for people in different countries.

Table 2. GDP per capita ($), telephone facilities and cellular phones in different countries

Sl. No.	Country	GDP Per capita $	No. of Telephone Connections (In Thousands)	No. of Cellular Phones (In Thousands)
1	China	4700	135000	65000
2	India	2540	27700	2930
3	Germany	24051	53720	60043
4	Japan	31407	60381	56000
5	Russia	8900	35500	17608.8
6	United Kingdom	26150	34878	43500
7	United States of America	36300	194000	127000

Source: (i) Competition Success Review Year book 2005.
(ii) Career and Competition Monthly Chronicle: India 2005: A Handy Compendium of Statistics

It is noted that India is having lowest GDP per capita and there are lower number of Telephone and Cellular Phone useRs To overcome the

demerits of the digital divide, there is need to develop the standard of living and improve telecommunication facilities for the people.

3. DEMAND AND SUPPLY OF POWER

It is noted that the electricity is the basic and main source of power for working of any electrical and electronic equipment. Adequate Production and supply of Electricity helps the population to enable the use of telecommunication facilities and computeRs As per the Census of India 2001, of the total 191963935 households in India, only 107209054 (55.84%) households are having electricity and the remaining 84754881 (44.16%) households are powered with alternative energy sources such as Kerosene, solar power and otheRs Further, the Energy and Power Supply in India in the years 2002-03, 2001-02 and 2000-01 are as under:

Table 3. Demand and supply of power and energy in India in selected years

Energy (MU)	2002-03	2001-02	2000-01
Requirement	458777	522537	507216
Availability	417090	483350	467400
Shortage (%)	9.1	7.5	7.8
Power (MW)			
Peak Demand	81492	78441	78037
Peak Demand met	71520	69189	67880
Shortage (%)	12.2	11.8	13.0

Source: The Penguin India Yearbook 2005.

From the above data, it is clear that there is shortage in power supply and about half of the households in India are not using Electric power till now. Hence there is need to develop power sector in India, to overcome the digital divide.

4. COMPUTER AND INTERNET USERS

The awareness about the Information Technology, Computers and Internet is essential for the development of digital library. Hence to overcome the digital divide in India, the majority of the population must be able to use the computers and internet. The following Table shows the statistics about the Computer users in different countries in 2002 and 2005.

The Internet is popularly used media for communication in twenty-first century. Hence, to overcome digital divide and also to access digital libraries, the internet usage is also a most important factor. Table 5 shows the Statistics about the Internet users in different countries in 2002 and 2005.

Table 4. Number of computer users in different countries in 2002 and 2005

Sl.No.	Country	2002 (%)	2005 (%)
1	China	35	35
2	India	6	21
3	Germany	63	67
4	Russia	19	35
5	Canada	75	79
6	United Kingdom	59	76
7	United States of America	74	76

Source: http://yaleglobal.yale.edu/display.article?id=7031

Table 5. Number of Internet Users in different countries in 2002 and 2005.

Sl.No.	Country	2002 (%)	2005 (%)
1	China	24	33
2	India	3	14
3	Germany	47	60
4	Russia	7	15
5	Canada	68	71
6	United Kingdom	47	71
7	United States of America	64	70

Source: http://yaleglobal.yale.edu/display.article?id=7031

It is noted from the above table that only 21% of the population know about the Computers and only 14 % of the population use Internet in India. This is very important factor for causing digital divide in India. There is a need that majority of the population must be able to use computers and able to search Internet. When compared to other countries, the majority of Indian population is unaware of these technologies. Hence it is a major obstacle for causing digital divide in India.

5. STATUS OF LIBRARY AND ITS PROFESSIONALS

Libraries are regarded as medium of life long learning resources for all the kinds of people. For this purpose, the library and library professionals must be able to use and apply ICT applications to their libraries, so as to enhance the digital services to the people. It is noted that when compared to developed countries, the development of the Libraries is slow in India. Even after 59 years of Independence, many of the State Governments have not enacted Public Library Legislations so as to provide public library facilities to common public. Majority of the

public libraries are not having basic ICT infrastructure such as Computers and Internet. In many colleges, the Library professionals are still considered non-teaching and supporting staff. A few academic libraries are managed by non-library professionals. Even though Dr. Ranganathan, emphasized Open Access system for the libraries, many academic libraries are working with closed access system for their collection till now.

6. NATIONAL INFORMATION POLICY OF INDIA

The Government of India, Union Territories and State Governments already, formulated and executed various plans and policies to curb the growth rate of population, enabling Literacy programmes, formulating National Information Policy, so as to increase standard of living, to achieve full employment, developing Agriculture and industrial sector, Improvement in Power Production and Supply, to increase the exports, etc. and due to such efforts, India is developing in all respects.

Even though many of the problems proved to be obstacles for the electronic resources development and use and major reasons for the digital divide, the Government of India and different state governments initiated Information Technology projects to develop the application of Information Technology in administration and planned to educate the people. Of course, it is not possible to discuss all the measures and policies undertaken by the Government of India for encouraging use of ICT and web in India. Following are a few policies of the Government of India and developmental trends in promoting use and development of the Information and Communication Technology, electronic media and Information Sector. The policies and trends undertaken by the various state governments and Union Territories are discussed in an Appendix as provided by Shashi Prabha Singh[12].

The Prime Minister of India constituted a National Task Force on Information Technology and Software Development in May 1998 with the purpose of formulating a long term National IT Policy to convert India into an IT software superpower. As it is not possible to mention all the developments, the developments stated in the following paragraphs are the only a few achievements made in different departments and sections of the Central Government:

- A Land Information System has already started using Geographic Information System (GIS) and remote sensing to help the farmers to plan their activities and facilitate decision making and planning at the local level. Government is also planned for a System known as "Agriculture Online" for the exchange of Ideas and Information between farmers, Agricultural Scientists, traders and exporteRs

- The higher education institutions consisting of 310 Universities and academic institutions 16,000 affiliated colleges were networked with the help of INFLIBNET, an Inter-University Centre of UGC. In 28th December 2003, UGC-INFONET Electronic Journal Consortia was started by INFLIBNET and at present it is providing 4000+ Research Journals to 100+ Universities in India Online. The INFLIBNET is conducting regular training programmes in different applications of ICT to the information professionals. Now a day, every Indian University is using internet for its activities such as Admissions, Exams, Results etc.

- Postal Department got computerized and several new services based on Internet were introduced. E-Post is a new service available at 204 Post Offices at present in a few states – Andhra Pradesh, Gujarat, Goa, Kerala, and Maharastra to cater the postal service to the persons who do not have a PC or internet facilities. E-Bill post is a multipurpose web based facility for paying telephone bills, mobile phone bills, Electricity bills etc, online. Speed Net is another internet based tracking and tracing service for the customer at Speed Post CounteRs The computerization and VSAT connectivity for the postal service is under progress.

- India has the fifth largest telecom network in the world comprising of 61.09 million telephone connections (basic and mobile) and over 1.48 million public call offices. There are over 16 million cellular subscribers in the country, growing at the rate of about 1 million per month. The number of digital electronic exchanges was around 300 increased to 36,772 in July 2003.

- The software and IT industry has grown significantly during 2003-04 by emerging as one of the fastest growing sectors with a growth rate of over 30.5% and an export value of US$12.5 billion. According to the National Association of Software and Services Companies (NASSCOM) estimate in 2002-03, the total revenue from the India IT market was Rs 317 billion against Rs 291 billion in 2001-02. The Indian IT and electronics industry recorded a production of Rs 80,884 Crore during 2001-02 as compared to Rs 68,450 Crore during 2000-01 showing a growth of 18 percent. Software export alone has jumped by approximately 10 percent to Rs 36,500 crores during 2001-02 from Rs 3,700 Crore during 1996-97 with a compound annual growth of about 60 percent.

- The Government of India computerized different departments under E-Governance programme. The departments are Customs and Excise department, Banks, Railways, Air Transport, Income Tax, Telecommunications, etc. so as to facilitate Online Transactions.

Similarly the Electronic Voting Machines were introduced in Elections.

- Government also taken up development programmes in Mass Media, such as Television, Radio, Newspapers and Magazines. Electronic Media developed in such a way that the actual situations at various polling booths in Loksabha Elections 2004 were telecasted live through Video-Conferencing.

- The Collections of many of the Academic Libraries and Special Libraries were digitized already and can be accessible through the networks. Several Information Systems and Networks are developed connecting libraries. NISSAT developed several Metropolitan Area Networks such as ADINET, BONET, CALIBNET, DELNET, etc. The Other networks are INFLIBNET, ERNET, SIRNET, etc. Through networking of the Libraries, many libraries are sharing their resources online.

- On September 20, 2004 Geo-Synchronous Satellite Launch Vehicle (GSLV) is launched from Sriharikota and put EDUSAT, the educational Satellite. The EDUSAT is set to bring about revolutionary changes in distance education, converting homes into virtual classrooms. Through EDUSAT, a teacher from a television studio can simultaneously address hundreds of students in different schools and colleges in the various parts of the country if the educational institutions have a terminal to receive the programme. The EDUSAT has 12 transponders, which are capable of generating regional beams covering different parts of India. It is estimated that programmes from EDUSAT can reach 1,000 class rooms and 50,000 students.

- According to Essential Science Indicators (ESI) during 1997-2001, India produced 76,970 papers as against 1, 14,894 by China. The Number of Scientific papers is just one measure of state of research in the country.

- India has joined a select club of six advanced countries with the Pune-based Centre for Development of Advanced Computing (C-DAC) developing the country's Super computer. C-DAC developed 'Param Padam' a super computer which promises the creation of a seamless computing platform for supercomputing at an affordable price in the international market.

- Digital Mobile Library Project: The Govt. of India with the collaboration of C-DAC aimed at bringing about one million books of digital library at the doorsteps of common citizens. Internet enabled mobile Digital Library is brought for the use of common citizen for promoting literacy. It makes use of mobile van with

satellite connection for connectivity of internet. The van is fitted with printer, scanner and cutter and binding machine for providing bound books to the end user.

- NGO's Initiatives: According to estimates, around one million NGOs are functioning in India, majority of which are working for the poor and the downtrodden. Some of the NGOs have taken initiative in setting up information disseminating centers in rural areas. A few such schemes include Drishtee Project, Gyandoot Scheme, The Sustainable Access in Rural India (SARI) Network, General Resources and Information Dissemination (GRID) Center, etc.

- Corporate Initiatives: The motive of increasing market base has prompted several corporate houses to take up projects aimed at setting up information kiosks in rural areas in different parts of the country. In most cases such kiosks provide various information required by the rural people, besides information relating to the products and service offered by the respective corporate houses. Such developments include Amul's Disk Net, Hindustan Lever's i-Shakti, Ogilvy and Mather's Param Project, Parry's India Agriline, ITC group's e-chaupal project etc.

- India also ahead in production and export of the electronic products, as disclosed in the following table:

Table 6. Electronic exports from India

Sl.No	Items	1999-00	2000-01	2001-02	2002-03
1	Electronic Hardware	1,400	4,788	5,800	5,600
2	Computer Software	17,150	28,350	36,500	47,500
	Total	18,550	33,138	42,300	53,100

Source: Chronicle Year book 2005.

7. CONCLUSION

From the above discussion it is clear that India is developing in all respects so as to overcome digital divide between poor and rich, rural and urban population, illiterate and literates. But it is noted that growth of Indian economy is slower compared to other countries. For the all round development, the digital library must be able to serve the masses rather than only a few. On the other hand the mass people of India must be able to know and use the digital technologies for their development. Computer education to the masses and application of information and communication technology in all the areas is emphasized in this respect

for India. The efforts of the governments are also appreciable in this regard. To overcome the digital divide still few more efforts such as compulsory computer education, developing awareness of the ICT applications, etc are required to achieve a 'developed country' status.

In this respect about the development, it is worth to quote the statement of Dr. A.P.J. Abdul Kalam, the President of India, as "it does not make sense to achieve a 'developed' status without a major and continuing uplift of all Indians who exist today and of the many more millions who would be added in the years to come".

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Studying Library Catalogue Use for Identifying Information Seeking Habits of Library Users: A Case Study

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ABSTRACT

This paper examines library catalogue use for identifying information seeking habits of users by using observation, interview and questionnaire techniques. Based on a survey of library catalogue users in the National Physical Laboratory, the study identifies how scientists utilize library catalogue for meeting their information needs.

1. INTRODUCTION

The National Physical Laboratory, New Delhi has a specialized library collection catering to the needs of scientists and technologists having interest in physics and related areas in physical sciences. It is one of the largest collections in physics within the country, comprising over 43,000 books, 70,000 bound volumes of periodicals, and 4000+ electronics journals. Books in its collection, catalogued according to AACR-2 and classified by UDC scheme, are organized in classified sequence, whereas bound volumes of periodicals are organized alphabetically. The differential pattern in the sequencing of the collections has been followed in line with the information seeking habits of the scientific community in the Laboratory, and in line with the management approach to according highest priority to convenience of access to collections. Bulk of the library members are the scientists, technical, administrative staff, research scholars, project assistants working in the Laboratory. The house-keeping functions of the library are fully computerized. Its card catalog is partially computerized (over 60%) and work regarding remaining portions of the card catalog is still underway. The partial catalog (OPAC) is put on the NPL intranet for access. The Library has plans to put the entire cataloging database on the Internet once the remaining portion of the catalog is computerized. For seeking total information scientists and other users to the library are using card catalogues more frequently than OPAC. The Library is

offering online access to 4000+ e-journals (available under the CSIR journals consortium) within the campus via NPL intranet. Nearly 90% of the internal members are computer literate, well versed in handling computers and packages such as DTP, MS Office, and also in Web access to Internet resources. NPL intranet has over 350 node offering Internet access on a bandwidth of 2 mbps. The library has membership strength of 617 users comprising both internal and external users. The library remains open from 9.00 am to 6.30 pm, five days a week from Monday to Friday.

2. METHODOLOGY

The user study was carried out by observation, interview and questionnaire techniques. Questionnaires were distributed in person to the users who visited the library during Jan-Oct 2006. Of the 500 questionnaires distributed to library catalogue user, as many as 370 (both internal and external users)' duly filled by users were replied with answers and comments. Every user who consulted the card catalogue, during the survey period, was interviewed immediately after his/her search session was over, to ascertain the purpose of his of visit and of using and consulting card catalogue. During the survey period of 10 months, users visited the library 2789 times, though for several different purposes.

Reply of questionnaires:

Scientific	220	59.45
Technical	118	31.89
Others	32	8.64
Total questionnaires	370	99.98%

3. DATA ANALYSIS AND FINDINGS

Of 617 total members on the library membership strength, an average of 22.12% users visited the library each month. Internal members made the maximum use of the library. Of the 2789 total visits during the 10 months, 2506 were by internal members and 283 by external users (Table 1).

Out of total 2789 visits, 2061 (73.88%) were made first for consulting card catalogue, in addition to certain other purposes. The remaining 26.12% (mostly by long time regular library users) visited the library mainly for consulting and using books and current journals (Table 2). Most visits (1130) to author/title card catalogue were made for finding just the call numbers to locate known items on the shelves, 452 were for searching more (exact) bibliographic information about books, and 330 were for searching books by author. Because of open access system followed in the Library, some regular and long time users of the library informed that they knew where exactly their books are stacked on

Table 1: Frequency of User Visit to NPL Library

Months 2006	Frequency of Visit						Total visits (Internal + External)	% of Total Visits
	Internal Members			External Members				
	SCI	RS	OTH	TN/LEC/RS	ST	OTH		
Jan	55	85	115	24	20	05	304	10.90
Feb	58	82	108	18	10	08	284	10.18
Mar	62	98	99	10	05	15	289	10.36
Apr	53	80	122	09	18	10	292	10.47
May	50	78	130	02	10	05	275	09.89
Jun	45	93	132	12	22	00	304	10.90
Jul	40	80	125	05	07	04	261	09.36
Aug	65	75	118	04	12	07	281	10.08
Sep	75	60	110	16	04	05	270	09.68
Oct	50	73	90	05	09	02	229	08.21
Ten Months	553	804	1149	105	117	61	2789	100.00%

(SCI=Scientist; RS=Research scholars; OTH=Others, LEC=Lectures, ST=Students; TN=Technologists)

the shelves. They do not find card catalog of any utility to them (Table 2). Of the 110 visits to Kardex Reference system, 44 were made for knowing information receipt of a particular issue of journal (Table 3).

Table 2: Reasons for use of card catalogue and kardex

SN	Purpose	No of consultations		Total	%tage out of 2061
		Internal	Externals		
1	To locate document through call no	720	410	1130	54.83
2	Books by particular Author	119	211	330	16.01
3	More Details of documents	172	280	452	21.93
4	Searching particular issues of Journal	44	54	98	4.56
5	General purpose to know which it is	09	42	51	2.47
	Total	1064	997	2061	99.80

Following are some of the important findings on card catalogue usage:

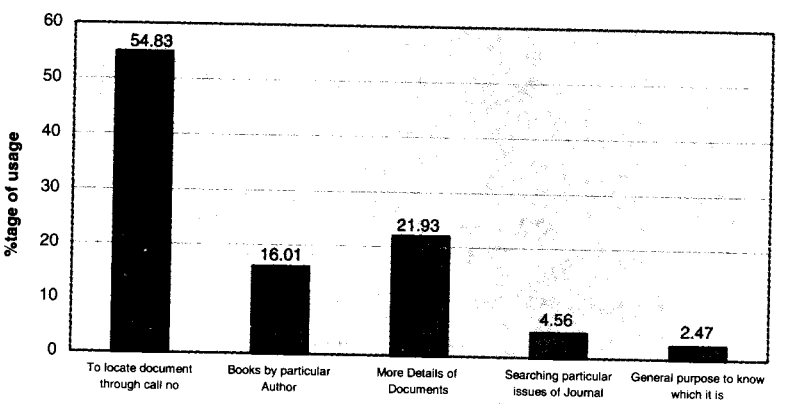
1. Searching by author/title is the main approach of the scientists when looking for information on books.
2. When looking for a suitable book on a topic, scientists prefer browsing books on the shelves than searching subject catalogue for the purpose.
3. Subject catalogue is comparatively far less used.

4. Scientists are still not aware of the finer lines of distinction between author/title catalogue and classified catalogue as maintained by the Library.

Table 3: Usage of catalogue during Jan-Oct 2006

Months 2006	Frequency of Visit		Types of card catalogue Used			% of 2061	% of 2789
	Internal	External	Author	Title	Subject		
Jan	168	58	109	100	17	10.97	8.10
Feb	142	32	90	74	10	08.44	6.24
Mar	172	22	56	130	08	09.41	6.96
Apr	155	38	62	122	09	09.36	6.92
May	198	40	74	04	160	11.55	8.53
Jun	148	30	74	84	20	08.64	6.38
Jul	135	60	51	140	04	09.46	6.99
Aug	180	36	77	135	04	10.48	7.74
Sep	194	44	112	106	20	11.55	8.53
Oct	175	34	86	13	110	10.14	7.49
Ten Months (304days)	1637	394	791	908	362	100%	73.88%

Use of Card Catalogue and Kardex

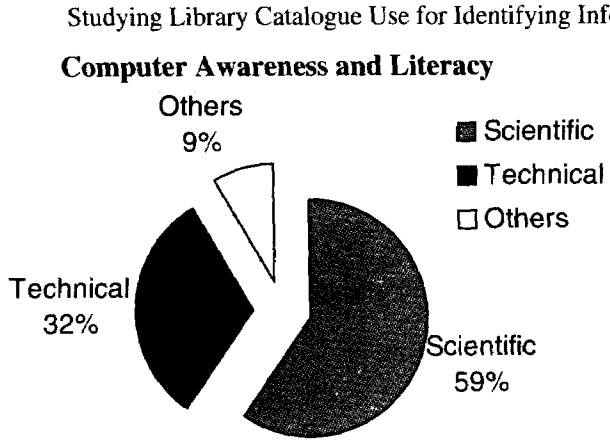


Of the 2789 visits, 29.76% were made for consulting both card catalogue and journal kardex reference system, 8.96% for reference query, 1.04% for browsing journal stacks, and 7.75% for browsing and using book collection. Card catalogue accounted for the highest number of visits. But the users had spent maximum of their time during each visit in searching contents, information using journal stacks, CD and online databases, and making some general queries (Table 4).

Table 4: Purpose of Library Visit by Users

Average time spent per visit (in Hrs) in the last 10 months	Library Services used	Average No of visitors per day	Total Visits During 10 Months	% of 2789 visits
<5	Standards & Lab publications, Ann rep	0.05	12	0.43
5-10	Back Volume of Periodicals	0.78	170	6.10
10-20	New arrivals	0.38	84	3.01
20-30	Card Catalogue	3.82	830	29.76
30-40	Book Stacks	0.96	210	7.53
40-50	Circulation Counter	0.42	93	3.30
50-60	Kardex Refer.	0.07	17	0.60
60-70	Reference enquiry	2.11	460	16.49
70-80	Abstracts, CD Database	1.15	250	8.96
80-90	General enquiry	0.45	98	3.51
90-100	Journal Stacks	1.29	280	10.04
>100(more)	Using online databases such as Web of Science, Physics Abstracts, Science Direct etc	1.31	285	10.22
		12.34	2789	99.99%

Out of 617 total members of the library an average of 12.34 % members visited per day. Saturday, Sunday and gazetted holidays are excluded while considering the average visit per day (Table 4). Approx 60 % scientific community is well familiar with computer technology and 31.89 % users are technical and are familiar with computer.



Ranking list of top ten major topics for which Library is used:

1. Materials Science and engineering
2. Temperature and Humidity standards
3. Optics
4. Thin films
5. Electrical and electronic devices
6. Radio Science
7. Nanotechnology and nanotubes
8. Physical Biotechnology
9. Superconductors science and technology
10. Computer Science and technology

4. SUGGESTIONS

Following are some of the suggestions and opinions expressed by the users in their reply to the questionnaire:

1. An alphabetical subject index is more considered more relevant for searching information by topics.
2. Publicize library services though library brochure describing its collections, their physical arrangement on the shelves, services offered, types of card catalogue maintained for access to collections, databases available for access to information, etc.
3. Orientation program may be conducted for the new staff joining the Laboratory.
4. Facilitate assistance/guidance to users in using card catalogue for searching desired information.
5. Make OPAC (Computerized catalogue) and online circulation services operational as soon as possible.

6. More terminals should be made available in the Library building, along with skilled library staff, for literature searching using online and CD databases.
7. All CSIR libraries be networked for sharing of local resources.
8. Library automation system be made operational in network mode.
9. Databases like Materials Science Citation Index, Physics abstract, Current Content on Disk (CCOD), Chemical Abstract, Electronic databases like Scopus, Web of Science, Science Direct (Electronic journals browsing medium) are highly useful and are in great demand for the current awareness and for application in new and advanced areas of research.
10. Users feel the need for more assistance from the Library for locating books/journals on the shelves.

5. CONCLUSION

Real time interactions with users provide sufficient insight into the strengths and weaknesses of the library catalogs, understanding information seeking habits of users, the relevance and utility of various library services, and identifying new avenues for library growth and development. Librarians need to put in more efforts for making libraries user friendly, educating users on the services they offer, and advertising their facilities and services.

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Citation Studies in the Journal of Intellectual Property Rights Data Base Information Products: A Tool for Organisational Development

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ABSTRACT

The present study is related to the analysis of 444 citations in view of Industrial *information/ literature use* and information *seeking pattern* approaches/access in JIPR Database information Products by the industrial research information user community in relation to the citation pattern approaches as by subject-wise pattern, document type–wise pattern, authorship–wise pattern, institution wise pattern and geographical–wise pattern appeared/ cited in JIPR on industrial research and allied fields pertaining to volume 5-10 and the year 2000-2005. The data were collected and classified according to the paper theme study "*Citation Studies in the Journal of Intellectual Property Rights (JIPR) Data base Information Products: A tool for Organisational Development" and* analysed and conclusions are drawn based on the study to reveal the research trends/ results in industrial related science and technology innovation and scholarly communication to support the R&D community in CSIR system for industrial research growth and development.

Keywords: Industrial information/ literature use, information seeking pattern, Citation Studies, Journal of Intellectual Property Rights (JIPR), Database Information Products, Organisational Development and Council of Scientific and Industrial Research (CSIR).

1. INTRODUCTION

The information and documentation management is playing vital and viable role in knowledge dissemination in the primary source of information product called **Journal Intellectual Property Rights (JIPR)** publication service activities in the National Institute of Science Communication and Information Resources (NISCAIR). Access to NISCAIR database facilitates the information user community to identify the innovations on industrial research related fields. The information scientists/Documentation officers are having vital role in content analysis and content management for Citation Study Approach (CSA) in JIPR database for Industrial application related knowledge dissemination on industrial growth and development.

2. OBJECTIVES

The study has been conducted with the following objectives

- To examine the growth of *industrial research contributions* published in JIPR during 2000- 2005.
- To identify the *subject-wise distribution of contributions/citations* in JIPR.
- To *rank* the *list* of contributing sources cited in JIPR publication
- To identify the different types of *document sources* cited in JIPR publication
- To analyse the *authorship patterns* in JIPR
- To identify the Institutions-wise distribution of contributions from JIPR
- To identify the *geographical-wise distribution of contributions/ citations* in JIPR

3. SCOPE AND LIMITATIONS OF THE STUDY

The present study is based on 444 Citation Study Analysis (CSA) to know the research trends on industrial related fields in the Journal of Intellectual Property Rights (JIPR) database source. The study is limited to the year from 2000-2005.

4. METHODOLOGY

Journal of Intellectual Property Rights (JIPR) NISCAIR periodical publication database-2000-2005 tool was selected as a source of this study.

5. A BRIEF NOTE ON JIPR

The Journal of Intellectual Property Rights (JIPR) started in 1996 keeping in a view the importance of IPR and their protection, the journal publishes contributed/ invited articles including the case studies on IPR related concepts. It also publishes technical reports, conferences, book reviews, IPR news etc. The JIPR, published Bimonthly, by National

Institute of Science Communication and Information Resources (NISCAIR), serves an information link between generators and users of technologies addresses a wide spectrum of target groups, viz, entrepreneurs, technologists, engineers, technocrats and administrators and managers for the advancement of industry.

6. ANALYSIS AND INTERPRETATION OF DATA

The collected data with regards to the stated objectives in this study were analysed and presented in the following tables to know the ***research trends*** in industrial related fields.

6.1 Subject–wise distribution of citations in JIPR

Table–1 provides the subject-wise distribution of citations/ contributions under study.

Table 1

Subject–wise distribution of citations in JIPR

S. No	Subject coverage in JIPR	Coverage for Total No. of records n = 444 (Year – 2000-2005)							Rank	%
		2000	2001	2002	2003	2004	2005	2006		
1	Agricultural sciences	2	3	4	4	5	6	24	III	5.40
2	Information Sciences	4	3	3	3	4	6	23	VIII	5.18
3	Management sciences	3	2	3	4	6	6	24	IX	5.40
4	Economics	3	3	4	5	6	15	36	I	8.10
5	Computer Sciences	3	4	4	5	6	6	28	III	6.30
6	Bio technology	3	3	6	4	6	6	27	IV	6.08
7	Biological sciences	2	3	4	4	5	6	25	VI	5.63
8	Legal education	3	4	4	5	6	7	29	II	6.53
9	Geography	3	4	5	5	6		23	VIII	5.18
10	Microbiology	2	3	3	4	6	6	24	VII	5.40
11	Fisheries	1	2	2	2	4	5	16	XI	3.60
12	Chemical Engineering	2	3	4	5	6	7	27	IV	6.08
13	Commerce	2	3	4	5	6	6	26	V	5.85
14	Botany	2	2	3	5	5	6	23	VIII	5.18
15	Education	2	4	4	4	5	7	26	V	5.85
16	Medical sciences	2	3	4	5	5	6	25	VI	5.63
17	Physical sciences	2	2	3	4	5	6	22	IX	4.95
18	Polymer sciences	1	2	2	3	5	6	19	X	4.27

It is observed from Table 1 with regard to the subject-wise citation analysis of records in JIPR indicate that out of 444 research contributions in JIPR, (8.10%) are from Economics, 29 citations (6.53 %) are from legal education, 28 citations (6.30 %) are from computer sciences, and followed by other subjects stated in the above table. The contributions are more in Economics, legal education and computer sciences under the industrial research related category. The subject economics stand at number one in ranking.

6.2 Authorship pattern citations in JIPR

Table 2 provides the authorship pattern citations in JIPR under study.

Table – 2
Authorship pattern citations in JIPR

S. No	Authorship Pattern	Citations coverage for (n=) 444 records							Percentage
		2000	2001	2002	2003	2004	2005	Total	
1	One	21	24	25	26	27	31	154	34.68
2	Two	5	7	9	12	14	17	64	14.41
3	Three	2	6	8	9	12	14	51	11.48
4	More than three	1	3	6	8	11	12	41	9.23
5	Citations from sources	17	19	21	23	25	27	134	30.18
	Total							**444**	**100.00**

It is observed from the Table-2 with regard to the author-wise citation analysis of records in JIPR indicate that out of 444 citations in JIPR, 154 citations (34.68%) are from single authored research contributions, and the remaining (65%) are multi–authored contributions including the other sources like review papers, conference reports, science and technology news. It is evident from the above table that the majority of the contributions cited in JIPR primary periodical publications are from single- authored contributions under study.

6.3 Distribution of documents/citations from articles and other sources

Table 3 provides the distribution of citations in JIPR under survey.

Table – 3
Distribution of documents / citations from articles and other sources

S. No	Types of sources	Coverage for Total No. of records n=444							%
		2000	2001	2002	2003	2004	2005	Total	
1	Article	29	40	48	55	64	74	310	69.81
2	Review papers	2	4	5	6	7	9	33	7.33
3	Conference reports	2	2	4	5	5	7	25	5.63
4	IPR News	2	3	3	4	5	7	24	5.40
5	Technical notes	2	3	4	5	6	7	27	6.08
6	Annual reports	2	4	4	4	5	6	25	100.00
								444 (5.63)	

It is clear from the table 3 that nearly 70 % of the contributions in JIPR are from research articles and followed by other sources as indicated in the above table. The research contributions are more research articles and stand at number one in ranking.

6.4 Institutions–wise distribution of contributions from JIPR

Table 4 provides the institutions–wise distribution of contributions under study.

Table – 4
Institutions–wise distribution of contributions from JIPR.

S. No	Types of institutions	Coverage for n = 444 records							Rank	%
		2000	2001	2002	2003	2004	2005	Total		
1	Universities	7	7	9	7	9	12	51	V	11.48
2	IPR related Colleges	5	6	7	9	12	15	54	IV	12.16
3	Research Institutions	9	11	14	15	21	23	93	II	20.94
4	CSIR Laboratories	12	14	17	21	24	27	116	I	26.12
5	IPR related associations	5	6	7	8	9	12	47	VI	10.58
6	Others	9	12	14	15	16	18	84	III	18.91
							Total	444		100.00

It is observed from the table 4 with regard to the institutions–wise citation analysis of contributions in JIPR primary periodical publication indicate that out 444 citations in JIPR, 116 records (26.12 %) are from CSIR contributions, 93 citations (20.94 %) are from other research institution's contributions, and followed by others stated in the above Table. The research contributions are more from CSIR laboratories as indicated in Table 8 & stand at number one in ranking.

6.5 Geographical–wise distribution of contributions from JIPR

Table-5 provides the institutions–wise distribution of contributions under study.

Table–5 Geographical-wise distribution of contributions from JIPR.

S. No	Name the countries	coverage for n = 444 records							Rank	%
		2000	2001	2002	2003	2004	2005	Total		
1	America (USA)	6	6	7	9	11	12	51	II	11.48
2	Argentina	2	3	4	5	4	5	23	IV	5.18
3	China	2	2	2	3	4	4	17	VI	3.82
4	England (U.K)	5	6	6	9	10	11	47	III	10.58
5	Geneva	2	2	3	3	3	3	16	VII	3.60
6	Germany	3	2	3	3	4	4	19	V	4.27
7	Greece	2	3	2	3	3	4	17	VI	3.82
8	India	15	18	21	25	27	31	137	I	30.85
9	Italy	2	3	2	2	3	3	15	VIII	3.37
10	Korea	2	2	1	2	2	3	12	IX	2.70
11	Netherlands	2	1	2	2	2	3	12	IX	2.70
12	Portugal	2	3	2	1	2	2	12	IX	2.70
13	Singapore	2	1	2	2	2	3	12	IX	2.70
14	Spain	1	2	2	1	2	3	11	X	2.47
15	Srilanka	2	1	2	3	1	2	11	X	2.47
16	Sweden	2	1	1	2	2	2	10	XI	2.25
17	Switzerland	2	1	2	2	2	3	12	IX	2.70
18	Taiwan	2	1	2	1	2	3	11	X	2.47

It is evident from the Table 5 indicate that the contributions were identified more from India and followed by other countries as indicated in the above table and the country India stand at number one in ranking.

7. CONCLUSION

From the study the following were observed as major findings leading to concluding remarks:

- The JIPR primary periodical publication services are having vital role in NISCAIR for information access and knowledge dissemination for industrial research development.
- The Citation Study Approach is an imperative measure to identify the emerging trends in Industrial Science and Technology innovations in industrial related fields with access to JIPR.
- The primary periodical publication services of this type will enable other academic and R&D institutions to provide similar services to their respective disciplines.
- The quantitative study of such type of this services would throw light on the nature of research being carried out in the area of industrial related fields.

- The Citation Study will also facilitate for the identification of core journals, core authors and core countries that produce research output in the field of interest.

In view of the changing scenario in the information and communication technology, it is suggested that the library and information officers shall strive for digital information management services in LICs.

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Nanotechnology | A Way Towards Modern Technology

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ABSTRACT

The paper discusses about the concept of Nanotechnology, historical background & it's application in different areas of Nanotechnology. Recent Advances in Nanotechnology on global and national level along with future development has also been highlighted in this paper.

1. HISTORICAL BACKGROUND

Feynman was the first physicist who described the advantages of matter and the possibilities of matter at levels as small as nanometers in a 1959 paper, "There's Plenty of Room at the Bottom."

The idea of manipulating anything at the nanometer level seemed impossible back then. Not only did he believe physics would allow us to manipulate matter atom by atom, he also predicted that in the future we would be able to have small machines build even smaller machines.

Norio Taniguchi, a professor at Tokyo Science University, in 1974 described nanotechnology as a technology which "mainly consists of the processing of separation, consolidation, and deformation of molecules by one atom or one molecule." If Feynman is the grandfather of nanotechnology, then Taniguchi is the father.[1]

2. NANOTECHNOLOGY

Nanotechnology comprises technological developments on the nanometer scale, usually 0.1 to 100 nm (1/1,000 μm, or 1/1,000,000 mm). It is defined as creation & utilization of materials, devices & system through the manipulation of matter at scales of less than 100 nanometers. It is also defined as understanding & control of matter at dimensions of roughly 1 to 100 nanometers.

A nanometer is one billionth of a meter, and possible way to interpret this size is to take the width of hair & imagine something 10,000 times smaller or a sheet of paper which is 100,000 nanometers thick.

It is also defined as a technology for building electronic circuits and devices from single atom or molecule. Nanotechnology is based on the fact that the properties of materials become marked different when their size approaches that of ten or one hundred atoms. Nanoparticles (nanometer sized cluster of atoms) have proved useful in catalysis. A material that is catalytically inactive on the macro scale can behave as a very efficient catalysts when in the form of nanoparticles.[2] Its versatility can be seen through the hard drives capable of holding 1,000 times as much data as used in computers today. The advances in nanotechnology may one day shrink modern day desktop PC's into the size of wrist watches. It is not only the size that is going to matter, the nano revolution is going to give a big boost to power sources, chip technology and semi-conductors.[3]. Nanotechnology devices are one hundred to ten thousand times smaller than human cells. Nanometric devices can serve as targeted drug delivery vehicles to deliver a drug at specified spot to fix defective genes.[4]

3. MAJOR FIELDS OF NANOTECHNOLOGY

Nanotechnology can also benefit materials and manufacturing (large scale structures), nanoelectronics and computer technology (miniaturization, speed, power consumption reduction, mass storage), medicine and health (in-vivo devices, drug delivery, rejection-resistant artificial tissues and organs), aeronautics and space exploration (low-power, radiation-tolerant, high performance computers), environment and energy (nanoparticle-reinforced polymeric material that can replace structural metallic components in the auto industry that could lead to reduction of 1.5 billion liters of gasoline consumption over the life of one year's production of vehicles and reduce related carbon dioxide emissions annually by more than 5 billion kilograms), biotechnology and agriculture (molecular building blocks of life-proteins, nucleic acids, lipids, carbohydrates and their non-biological mimics, molecular-engineered biodegradable chemicals for nourishing the plants and protecting against insects; genetic improvement for animals and plants; delivery of genes and drugs to animals), national security (information dominance through advanced nanoelectronics, more sophisticated virtual reality systems, increased use of enhanced automation and robotics to offset reductions in military manpower, reduce risks to troops, improve vehicle performance resulting in longer missions, achievement of the higher performance (lighter weight, higher strength) needed in military platforms while simultaneously providing diminished failure rates and lower life-cycle costs, control of nuclear defense systems, printing and engraving of high quality, forgery-proof documents and currency).[2]

Types	Major fields of technology
Applied Science	Artificial intelligence | Ceramic engineering | Computing technology |Energy Engineering physics | Materials science | Materials engineering | Microtechnology | **Nanotechnology** | Nuclear technology | Optical engineering
Athletics and Recreation	Camping equipment | Playground | Sports | Sports equipment
The Arts and Language	Communication | Graphics | Music technology | Speech recognition | Visual technology
Business and Information	Construction | Financial engineering | Information technology | Management information systems | Manufacturing | Machinery | Mining | Telecommunication
Military	Bombs | Guns and Ammunition | Military technology and equipment | Naval engineering
Domestic / Residential	Domestic appliances | Domestic technology | Educational technology | Food products and production
Engineering	Agricultural engineering | Bioengineering | Biochemical engineering | Biomedical engineering | Chemical engineering | Civil engineering | Computer engineering | Electrical engineering | Environmental engineering | Industrial engineering | Mechanical engineering | Metallurgical engineering | Nuclear engineering | Petroleum engineering | Software engineering | Structural engineering
Health and Safety	Biomedical engineering | Bioinformatics | Biotechnology | Fire protection technology | Health technologies | Pharmaceuticals | Safety engineering
Travel and Trade	Aerospace | Aerospace engineering | Marine engineering | Motor vehicles | Space technology | Transport

3.1 Recent Advances in nanotechnology: Global Scenario

There has been a plethora of revolutionary inventions in the last century that virtually changed the face of the world. This includes trains, planes, automobiles, telegraph & Internet. All these applications saw real money, in huge volumes, being made by those who were adventurous to explore the new possibilities.

Nanoelectronics is one of the field in the area of nanotechnology which means working at smaller and smaller levels having more power, more speed, and more applications in almost all the electronics applications. Almost all the pioneers of infotech business are into serious work on nanoelectronics.

In semiconductors, Intel & Advanced Micro Devices are working on 69 nm chips & beyond. Intel promises commercially available products by 2005 and AMD by 2006.

Hewlett-Packard, Toshiba, Samsung, and Texas Instruments are all working on chip designs for sub-100 nm chips. IBM, with reportedly 700 nanotech-related patents, is working on millipede data storage, as well as, ultimately, the molecular computer.

Motorola and Silicon Storage Technology are developing what they call superflash memory chips working at the 65 nm level. This could be one day supplementing the advent of Magnetic RAM (MRAM). IBM is also trying to bring this breakthrough to market. MRAM promises the much-awaited ability to switch on your computer as in case of TV to receive immediate pictures. The next generation of light-emitting diodes (LEDs) is already entering the marketplace with organic light-emitting diodes (OLEDs) being featured in digital cameras being sold by Eastman Kodak.

Nanomaterials: Nanomaterials includes carbon nanotubes, fullerenes, nano-oxides, nanocrystals and nanopowders. The market for carbon nanotubes and fullerenes has an annual growth forecast of 173%. Nanomaterials are projected to grow at 30.6% per annum. Carbon Nanotechnologies, DuPont, Dow Chemical, Nanosys are some of the companies involved in serious research and development of nanomaterials.

Japanese industrial giants, Mitsui, Mitsubishi and Hyperion Catalysis are all Perfecting production processes to produce hundreds of tons of nanomaterials per annum.

Nanobiotechnology: Novavax has been working for nine years on its proprietary Micellar nanoparticle drug-delivery platform, a topical emulsion of oil, water, and lipids capable of being absorbed through the skin. Drugs developed on this platform are used for treatment of hot flashes in menopausal women.

American Pharmaceutical Partners has received fast-track status for its novel nanoparticle-based drug, Abraxane, on the back of favorable phase 3 results for use in treating metastatic breast cancer. Skyepharma estimates that 40% of drug is abandoned at an early stage due to the inability of patient's body to absorb the drug. The company's nanoparticulate drug-delivery technology promises to remove a lot of these barriers. Flamel Technologies, a Motley Fool Hidden Gems pick, has a nanoparticle delivery technology that improves the delivery of drugs without side effects.

In another area of drug discovery, Advanced Magnetics is working on receiving final FDA approval for Combidex, an MRI agent that will aid in diagnosing cancerous lymph nodes vs. nodes that are simply inflamed or enlarged.

The global nanosensor market will grow to $17.2 billion by 2012, according to research firm NanoMarkets, but it must overcome technical barriers to connect to other sensor networks. Market for biomedical nanosensors will reach approximately $800 million in 2008 and $1.2 billion in 2012. Nanosensors will be used to detect the presence of biotoxins, such as anthrax and smallpox, as well as radioactive materials and to make a market of $827 million in 2008 and $3.9 billion in 2012. Semiconductors provide the enabling technology for virtually all computation and communications systems. The Nanoelectronics Research Initiative over the next 15 years will create devices with features less than 10 nanometers–or billionths of a meter–in size, roughly 10 times smaller than in current state-of-the-art chips. NanoMarkets expects that the aerospace segment of the nanosensors market will reach $214 million in 2008 and $2.1 billion in 2012 and that the automotive segment will grow from $133 million to $1.5 billion over the same period.[3]

3.2 Recent Advances in Nanotechnology: National Scenario

On global front India's position is not very appreciable in the field of nanotechnology. India should strive to capture at least 5% of the market share in the nanotechnology sector within a decade from now, using core competence with international partnership. The country needs to launch vertical missions in nanotechnology under organisations such as CII & NASSCOM, and with the public-private investment in at least 10

nanotechnology products in fields like water, energy, agriculture, healthcare, space, defence and ICT.

While inaugurating two day's Indo–US conclave on nanotechnology here, President A P J Abdul Kalam on Feb 22, 2006 in Delhi urged the Ministries of Human Resource Development of Science and Technology to launch a major drive to build up human resources in emerging field such as nanotechnology, Biotechnology & Information Technology. He has also given the stress that India could follow Singapore's Biopolis Model. Under the model, a global search for talent would be made and talent spotted would be provided with all the amenities to qualify from a university of his or her choice. The candidates' entire study programme would be funded and they were mandated to return and work in Singapore in the field of life Sciences for a minimum of 6 years. He also emphasized on nurturing young talent for all scientific research work, particularly in nanoscience and nanotechnology.

He rued that despite doing exceedingly well in the field of research in advanced topics right from the late 1950's, India lagged behind in implementing the research finding on a commercial level.[5] A nano science initiative of the Department of Science and Technology (DST) that began in 2003 has now identified & equipped research units in the country to carry India's hopes forward. Research funding of another Rs 20 to 50 crores is expected.

Units on the shortlist for research funding are reportedly the Indian Institute of Science (IISc), The Jawaharlal Nehru Centre for Advanced Scientific Research, The IIT's, Madras, Pune & Banaras Universities.

Eminent Scientist Prof. C NR Rao who heads DST's nanotechnology steering committee has also said that we have missed out on major revolution in Science. We must do something in nanotechnology which is just a beginning to develop, for us to be equal partners in the future of the technology.[6] The following companies/institutes of India have taken the initiatives in the field of nanotechnology:

Amity Institute of Nanotechnology (AINT) [Category: Academic] Considering the importance & wide applications of nanotechnology, a unique seat of learning this subject has been established–Amity Institute of Nanotechnology (AINT) under the aegis of Ritnand Balved Education Foundation (RBEF). The institute has started M.Tech Course in Nanotechnology w.e.f. November, 2003. [Detailed Profile]- City: New Delhi

Centre for Cellular and Molecular Biology (CCMB) [Category: Laboratories] The Centre for Cellular and Molecular Biology (CCMB) is one of the constituent national laboratories of the Council of Scientific and Industrial Research CSIR, the premier multidisciplinary Research & Development organisation of the Government of India. [Detailed Profile]- Country: India- State/Region: Andhra Pradesh- City: Hyderabad

Cranes Software International Limited (NSE: Cranessoft) [Category: Mems] On of the fastest growing technology companies in India, Cranes has maintained a clear focus on helping the scientific community. Cranes has extensive research setup for MEMS and Nanotechnology at India's leading institutions like the IISc, Bangalore. [Detailed Profile]- Country: India- State/Region: Karnataka- City: Bangalore

Forevision Instruments Pvt. Ltd. [Category: Imaging and Microscopy] The product portfolio of this company includes: Scanning Electron Microscopes, Transmission Electron Microscopes, Scanning Probe Microscopes - Scanning Tunneling Microscopes, Atomic Force Microscopes, Spectrometers, X-Ray Analyzers, Microware Digestion Systems and other scientific instruments and accessories. [Detailed Profile]- Country: India- City: Hyderabad

Indiaco Innovation Center [Category: Capital and funding] IndiaCo is a private equity investment holding company that invests in hi-tech companies that can access global markets. IndiaCo launched the Nanotechnology initiative in India. [Detailed Profile]- Country: India- State/Region: Maharastra- City: Pune

Indian Institute of Technology Delhi [Category: Research] Indian Institute of Technology Delhi is one of the seven Institutes of Technology created as centres of excellence for higher training, research and development in science, engineering and technology in India. [Detailed Profile]- Country: India- State/Region: Hauz Khas- City: New Delhi

IndiaNano [Category: Organizations] IndiaNano is a non-profit organisation supported by academic and industry experts aimed at developing a platform for real-time strategic collaboration between diverse groups in order to harness the benefits of progress in advanced technologies, including nanotechnology. [Detailed Profile]- Country: India- City: Pune

Qtech Nanosystems [Category: Consulting, Nanomaterials, Research, Tools and instruments] Qtech Nanosystems is a collaborative NEW PRODUCT DEVELOPMENT AND LAUNCH organization conducting

research and collaborative product and technology development activities in diverse areas to propel innovation in Nanotechnology. [Detailed Profile]- Country: India- State/Region: Karnataka- City: Bangalore

Velbionanotech [Category: Nanobiotechnology] VBN is dedicated to furthering the art, science and practice of nanotechnology, where Biology, Chemistry, Physics and mechanical design converge Molecular scale. The advantages are that you will be able to make lots of adventures without taking up too much space or using a lot of materials. [Detailed Profile]- Country: India- City: Bangalore

Yashnanotech (BSE) [Category: Consulting] YASHNANOTECH is a business information & consulting arm of Yash management & satellite Ltd. specialised in Nanotechnology. It aims to provide global nanotechnology business intelligence and consulting services to industries and investors worldwide. [Detailed Profile]- Country: India- City: Mumbai

Icon Analytical Equipment Pvt. Ltd. [Category: Imaging and Microscopy] Icon Analytical Equipment Private Limited is a distributor specialized in the field of analytical instruments, with a focus on Microscopy, Elemental Analysis and Characterisation. [Detailed Profile]- Country: India - State/Region: Shakarpur - City: New Delhi

Indian Institute of Technology Roorkee [Category: Research] Since its establishment, the Indian Institute of Technology Roorkee has played a vital role in providing the technical manpower and know-how to the country and in pursuit of research. Roorkee has defined nanotechnology and biotechnology among the key areas for the years ahead. [Detailed Profile]- Country: India- State/Region: Uttaranchal

Innovations Unified Technologies [Category: Nanomaterials] Innovations Unified is conceptualized by a group of IIT Bombay alumnus, having specialization in nanotechnology, process design and simulation with an aim to provide advance technology solutions at affordable price. [Detailed Profile]- Country: India- State/Region: Maharashtra- City: Mumbai

Nano Science and Technology Consortium (NSTC) [Category: Consulting, Organizations] The Nano Science and Technology Consortium works to create a platform conducive for the growth, promotion and partnering in the field of Nano Science and Technology taking together industries, academics and government through consultative, advisory and educative processes which will provide

growth platform for organizations, academics and governments for harnessing the Nano potential at Global level. [Detailed Profile]- Country: India- City: Noida

Nanoxtals [Category: Chemistry, Electronics] The first Indian company to develop, synthesize and market superior quality semiconductor nanocrystals at the cheapest rates in the world. [Detailed Profile]- Country: India- City: Delhi

The Naga Nanotech India [Category: Nanomaterials] We have developed an unique process of COPPER ALLOY in solid state for NANO PARTICLES through breaking to the nano level powder and more. [Detailed Profile]- Country: India- City: Bangalore

United Nanotechnologies Pvt. Ltd. [Category: Products and applications] United Nanotechnologies Pvt. Ltd was established with an aim to cater products based on Nanotechnology for the Indian market. [Detailed Profile]- Country: India- City: Kolkata[7]

The Indo-US cooperation in Nanotechnology had added a new dimensions to research in frontier areas like genomics, design and system engineering, photonics, optics, electronics, agricultural biotech, medical & bio-engineering, nano-science, weather forecasting and climate studies.[8]

3.3 Future of Nanotechnology

Nanotechnology is expected to have an impact on nearly every industry. The U.S. National Science Foundation has predicted that the global market for nanotechnologies will reach $1 trillion or more within 20 years. The research community is actively pursuing hundreds of applications in nanomaterials, nanoelectronics, and bionanotechnology. Most near term (1-5 years) applications of nanotechnology are in the form of nanomaterials. These include materials such as lighter and stronger nanocomposites, antibacterial nanoparticles, and nanostructured catalysts. Nanodevices and nanoelectronics are farther off, perhaps 5-15 years, and will have applications in medical treatments and diagnostics, faster computers, and in sensors.[9]

With its seemingly endless possibilities for health care, manufacturing, and electronics, nanotechnology is inspiring major research efforts around the globe but Current biomolecular computing technology is still far from overtaking the silicon chip. However, DNA computing seems to be the first example of true nanotechnology, forging a link between computational science and life science. Solutions take

multidisciplinary teams employing molecular biologists, mathematicians, computer scientists, biochemists, and material engineers" (Ellison).

Moreover, if researchers are able to control the molecular devices, including DNA, inside every cell, they will be able to engineer devices more complicated and more efficient than current microelectromechanical systems. For example, DNA computers could be used to "time-release medications, bolster organ function, or provide medical feedback" (Srivastava).[10]

4. CONCLUSION

Nanotechnology is the technology for bringing out the improvements in Health care, Electronics & Manufacturing. It is also discussed in this article that though the India has already taken the initiatives in the field of nanotechnology but the India's position on global front is not appreciable. Our President Dr Abdul Kalam has also given the stress that India could follow Singapore's Biopolis Model in the field of nanosciences.

On global front, the research community is actively pursuing hundreds of applications in nanomaterials, nanoelectronics, and bionanotechnology, therefore there is a much scope of R&D in this field of activity & will be going to play an important role in the future.

In nutshell we can conclude here by saying that it is the technology of 21st century in true sense

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Table 2. Types of authorship

Sr. no.	Type	No of article	percentage
1.	Single author	37	33.63
2.	Two authors	54	49.09
3	More than two authors	19	17.27
	Total articles	110	

From the above table, it can be observed that, more than 67% articles are having joint authorship.

Working Institute of Joint Authors

As shown above 73 articles were written by joint authors. Authors who jointly contributed their papers for the ILA proceeding are 167. In some cases authors are working in one institute. Where as some of joint authors are working in different institutions. Efforts are made to see how many joint authors are colleagues.

Table 3. Working institute of authors

Sr.	Work area of joint authors	Articles	percentage
1	Same Institute	36	49.31
2	Different Institute	37	50.69

It can be observed from above data that there is almost equal distribution of this attribute.

Designation of authors

Papers of 204 authors were included in the proceedings. These authors are working in different capacities in library and information science field in different institutions. In order to see which designation represents more in contribution of papers, data is further analyzed by designation. Intention of the present authors was to see whether teaching LIS professionals contribute more or working LIS professionals contribute more. The details are shown in Table 4.

It can be observed from the above table that 26.47% authors who include professor, reader, and lecturer and MLIS students are from teaching departments and 73.53% authors are from working librarians' field.

Institution wise Analysis of authors

Efforts were also made to see the affiliated institutions of 204 authors, so as to know the nature of institutions from where the papers were received.

Table 4. Designation of the contributors

Sr. no.	Designation	No of authors	%
1	Librarian	57	27.94
2	Deputy Librarian	04	01.96
3	Assistant librarian	21	10.29
4	Library Assistant	11	05.39
5	Documentation officer	03	01.47
6	Section Head (library)	04	01.96
7	Trainee	04	01.96
8	Professor	20	09.86
9	Reader	10	04.90
10	Lecturer	18	08.82
11	Research Scholar	07	03.43
12	Scientist	09	04.41
13	MLIS Students	06	02.94
14	Other (Director, Dean etc)	06	02.94
15	Not mentioned	23	11.27

Table 5. Institution wise distribution of authors

Sr. no.	Type of organisations	No of authors	Percentage
1.	Universities	48	23.52
2	Department of LIS	62	30.39
3	Colleges	30	15.19
4	Technical Institutions	19	09.31
5	Institutions	17	08.33
6	Research Institutions	14	06.86
7	Special libraries	03	01.47
8	Non professional Institutions	04	01.96
9	Public libraries	02	00.98
10	Govt offices libraries	02	00.98
11	School libraries	02	00.98

ILA is an Association having all types of libraries. But if we observe the above table, authors are from academic institutions are more. Public library professionals should be attracted towards ILA activities. The reasons for less participation by public libraries may be:

1. Public libraries are not having qualified librarians
2. Work of public libraries is run mostly in regional languages but ILA performs is activities in English and Hindi only.
3. The staff working in public libraries is lacking research attitude

Geographical Distribution of Authorship

People criticizes that ILA is an organisation, dominated by academic library professionals and specially North Indians. This may be because maximum members of ILA are from North India. Papers from all over India were called for the conference. To fine out the truth, Geographical distribution of authors was analyzed and shown in table no. 5 below. It is observed that papers of authors from only nineteen States of India were in the proceedings.

Table 6. State wise distribution of authors

Sr	States	No of authors	percentage
	North India	**78 38.22%**	
1	Jammu and Kashmir	09	04.41
2	Punjab	13	06.37
3	Hariyana	08	03.92
4	Uttaranchal	04	01.96
5	Uttar Pradesh	09	04.41
6	Delhi	35	17.15
	West India	**20 10.30%**	
1	Orissa	04	01.96
2	Zarkhand	01	00.49
3	West Bengal	10	04.90
4	Manipur	05	02.45
	East India	**25 12.25%**	
1	Rajasthan	01	00.49
2	Gujrat	12	05.88
3	Madhya Pradesh	12	05.88
	South India	**67 33.81%**	
1	Maharashtra	25	12.25
2	Goa	01	00.49
3	Andhra Pradesh	13	06.37
4	Karnataka	24	11.76
5	Tamilnadu	04	01.96
6	Kerala	02	00.98

The result of the analysis shows that papers from North India are more in numbers followed by South Indians. However it is surprising that there is not a single article from the librarians working the states like Himachal Pradesh, Bihar, Arunachal Pradesh etc.

Suggestions

1. Theme of the ILA conference should be such that it should be applicable to all types of libraries so that professionals of other libraries could share their views.
2. Representation from all the States is encouraged.
3. Conference working should be in Hindi language. If possible by forming language wise sections, papers may be accepted and its presentation in the conference can be made by parallel language wise sessions.
4. ILA should undertake measures to motivate library professionals for research activities.
5. Contribution of teachers in LIS is observed less than the working LIS professionals. The reason may be that teachers are less in number as compared to the working professionals.

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Community Information Service Through Open Source CMS "Joomla"

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ABSTRACT

In this age of information explosion, the sources of information grow gradually. Simultaneously the need of information of general people is also increasing and it varies from one people to another and from one situation another. Public libraries as a local community information centre can play a major role in this situation. Open source Content Management Software can be used for this purpose i.e. to organize various community information, not only text but also image, audio, video etc. This paper deals with the concept of "CIS" and how open source CMS "Joomla" can be used for this purpose.

INTRODUCTION

After agricultural society and industrial society human civilization entered into a new era called knowledge society. Information is now playing a major role in all sphere of human life. In this scenario the term of "community information" or "community information service" emerged as a significant concept.

What is community information?

According to Michel Edwards "CI is considered to be that information required by members of the public to make effective use of the resources potentially available to them in the communities in which they live. Such information may be needed to help to solve problems in the fields of housing, disability, household finance, marriage, employment and so on".

Elaine Kempson defined CI as "Information for self-reliance & self-determination".

If we analyze the term "community information" we get combination of two term "community" and "information" where information refers to "Discrete piece of meaningful data which inform people about something" and community refers to "A group of people having common

interests" so we can say that community information carries some meaningful data for the people having some common interest thus belonging to the same community. CIS does not mean providing service to single community identified by race, caste, sex etc but it refers to a group of community and CIS services are offered by considering the need of everyone within the community.

CIS provide the "common information" to satisfy the "common need" of "common people" of a "community". It is like the big shopping mall consist of various shop so people don't have to go different places to purchase the different thing of there daily requirements in the same way "community information Centre" act as a nodal point providing access to the different information resources like information of health, education, human right, from a single window. Information need differ from one man to another and one situation to another and it is not possible for a single system to collect all these information. Various govt. & private organizations collect repackage and disseminate information to the public for there specific need, besides creating their own information resources, public library or community information centre can use these resources to satisfy the information need of the respective community.

Role of CIS

- Satisfy the information need of common mass.
- Reduce the cost of information rendering.
- Reduce the waste of time, energy for duplicate searching of same information.
- It helps in right decision making.
- Helps to react knowledgeably & rationally in all situations
- Helps to know one's own right.
- Development of a country mostly depends on sound information infrastructure, proper utilization of existing information and proper information dissemination which can be possible through community information service.

Basic Component of CIS

- Individual Citizen.
- His/Her information need.
- Existing information sources.
- Solution for meeting the information need.

Steps for CIS

- Identification of information need of the community.
- Identification of the information sources Govt., NGO, others
- Judgement of the authentic sources.
- Collection of information.
- Organization of the information.
- Continuous review after formation of the system.

What is CMS?

CMS is a system for the creation, modification, archiving and removal of information resources from an organised repository. It includes tools for publishing, format management, revision control, indexing, search and retrieval. Actually CMS is software tool for creating, organizing and managing web content in an effective way.

It facilitates

- Easy creation of content.
- Easy editing of content.
- Automated templating.
- Additional features through plugin and module to increase the site's functionality.
- Scalable features set.
- Web standard upgrades.
- Cost effectiveness.
- Efficient workflow throughout the system
- Community support.

Criteria of CMS used in CIS:

- It is better to use open source CMS
- Software must support multiple languages so content creation in local language can be easy.
- Operation of system should be easy.
- It must support various file formats such as image, audio, video so that information of local cultural heritage can be stored in various format.
- System must be interactive so that people can ask for any information without any time barrier and geographical barrier.
- Content should be simple, legible and relevant to local need.
- It should follow open standard in all respect.

Why Joomla?

Joomla is one of the most popular Content Management system.It is useful for building effective community information system, business site, individual website, commercial site, school & church website, small business website, website for magazine and newspaper. A large user

community from all over the world supports the development of joomla.There is 50,000 registered users in joomla forum makes it the most versatile platform for building scalable websites.

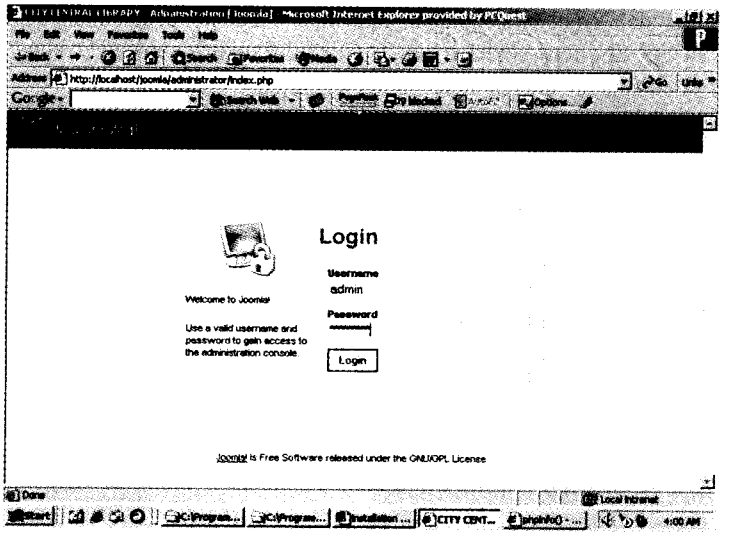
What does Joomla mean?
The name Joomla is a phonetic spelling for the Swahili word "Jumla", which means "all together" or "as a whole".

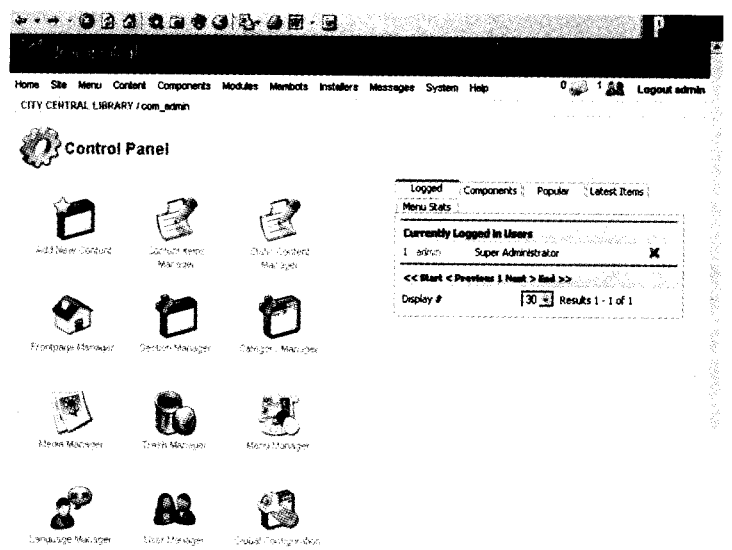
Features of Joomla CMS
- Effective document management.
- Images and multimedia galleries.
- Community builder system.
- Dynamic form builder.
- RSS feed.
- Business and organizational directories.
- E-commerce and shopping cart engines.
- Interactive features such as mass mail, private mail, chatting, forum etc.
- Calendar- general and event based (indicating the upcoming event).
- Bogging software.
- Directory service, Newsletter service.
- Statistics- user statistics, visitor statistics. Use of content statistics.
- Banner advertising, subscription service.

Installation of Joomla
You can download Joomla CMS from ...
http://developer.joomla.org/sf/frs/do/viewRelease/projects.joomla/frs.joomla_1_0.1_0_11;jsessionid=F5F7B3F6773C06136A6303FE025F6531

System requirements for Joomla installation on windows:
- Apache server -1.13.19 or above
- Mysql database- 3.23.x or above
- Php- 4.3.x or above

The basic steps of joomla installation:
- Get the Joomla package
- Unzip it and transfer the files to your site
- Run the install program from your browser
- Follow the four basic step of installation one by one and provide the required information where necessary.
- Delete the install directory
- After installation you will see the following screens.





Bangalore City central library and Joomla CMS

Public libraries act has come into force in Karnataka since 1965. Under this act a network of public libraries are functioning all over the state. Public library system in Karnataka includes State Central Library at the state level, Distric Central libraries at the district level and "City Central library" at all those cities having a population of more than one lakh. A prototype online community information system is build for the west zone "City central library" in Humpinagar, Vijaynagar II Stage, Bangalore. This library was established in 4th Feb. 2004.It consist of 18 branch libraries.

Sections of this library

West zone City Central library of Bangalore consist of following sections

- Book section, Reference section, Periodical section, Technical section, Children section. Audio-visual & internet section

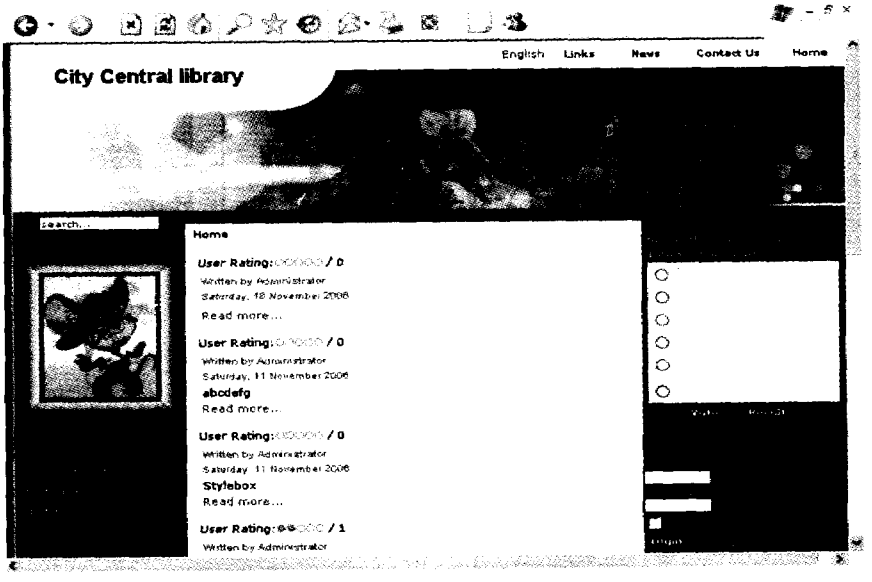
Library provides the following service:

- Lending of books, periodicals, educational CDs
- Internet browsing for public@ Rs 10/- per hr.

Library collection:

- Books-35,605; Journals-510; CD-455
- Newspaper- Kannada(10),English(11), Others(06)
- Journals- Kannada(27),English(58),

Community information system of "City Central Library"



Area of coverage:

The following areas are covered in this community information service.

- Health- Local health centre, nursing home, medical shop, emergency services like ambulance, blood bank etc
- Education- Schools, colleges, teachers, admission etc.
- Public Welfare- Bangalore Pin code,Govt. schemes,
- Important forms- birth form, death form, water supply from etc
- Transportation
- Tourism
- Consumer protection organization and services
- Employment
- Legal services

CONCLUSION

Such type of community information service will be fruitfull only when relevant and authentic information is collected in an organized manner. Proper user orientation program is also required so that user will come to know that such types of information are available for them. It is the best way to prove the potentiality of public library and its librarians, through this type of services librarians can play a major role within their community and can perform their social responsibility seriously.

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Open Source Initiatives in Libraries and Information Center

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ABSTRACT

Open Source Initiatives means the application of open source software. It becomes the world movement to overcome the economical, technical resistance of commercial software. With the limitations of libraries about commercial customized software in respect of cost, regular update, problem fixing, open source software are useful for libraries. Open source software is software for which the source code is freely available. Open source software is licensed to guarantee free access to the precompiled binaries, so called the source code. This allows the user to install the software on a new platform. CDS/ISIS FOR WINDOWS becomes very popular database management software worldwide. UNESCO and Free Software Foundation, which were founded in the mid-1980s by computer scientist Richard Stallman, promoted the open source initiatives. Digital Library software like D-Space, GSDL, Development tools like GENISIS, Apache web server, MYLIBRARY, are useful in Information Management.

1. INTRODUCTION

The use of open source software in Libraries is increasing and it becomes a world movement. Commercial or proprietor software has its own limitations of non-availability of source code, high cost. The use of open source software in libraries and information center is increasing because of the availability of need based open source software. The use of OSS in Indian libraries and information center particularly in the area of digital library is increasing. It is the need of the day to use open source software where there is problem of finance. Open source software plays an important role in knowledge management. The open source software is available in development tools, operating system and application software.

2. OPEN SOURCE SOFTWARE

Open source software is software for which the source code is freely available. Open source software is licensed to guarantee free access to

the precompiled binaries, so called the source code. This allows the user to install the software on a new platform.

Informal groups or "communities" of programmers who want to solve a technical problem and share the results with the rest of the world typically develop by very talented individuals or open source software. Some advocates claim that the open source model generates a higher level of innovation, and some supporters claim that the open source model produces software that is technically equal or even superior to competing commercial products.

The principal proponent of open source software is the Free Software Foundation, which was founded in the mid-1980s by computer scientist Richard Stallman and which proclaims its primary missions to be:

- Promoting computer users' right to use, study, copy, modify, and redistribute computer programs;
- Promoting the development and use of free software and free documentation;
- Spreading awareness of the ethical and political issues of freedom in the use of Software;
- Developing new free software;
- "Making that software into a coherent system which can eliminate the need to use proprietary software."

3. OPEN SOURCE SOFTWARE FOR LIBRARIES

Library and Information Center needs Software for their Housekeeping Works, Digitization Works and Developing WEBOPAC and Home Page of Libraries.

All these software comes under the category Application Software. In system software, LINUX open source software is used widely for the purpose. The following open source software is widely used in Libraries.

3.1 WINISIS

WINISIS is the window version of CDS/ISIS software distributed by UNESCO. It is the most useful and widely used open source software used in libraries by world community.

WINISIS can be used for various purposes in the Library including:

- OPAC of Library
- Newspaper clipping.
- Question bank
- E-Thesis/Dissertation

- Developing E-Library
- Circulation Works

3.2 WINIDMS/WINIDIS

UNESCO is providing statistical software WINIDMS/WINIDIS SOFTWARE used for statistical analysis of the work done in WINISIS. IDAMS is a software package for the validation, manipulation and statistical analysis of data. IDAMS, used in combination with CDS/ISIS (the UNESCO software for database management and information retrieval), will equip them with integrated software allowing for the processing in a unified way of both textual and numerical data gathered for scientific and administrative purposes by universities, research institutes, national administrations, etc.

3.3 WINIDIS

WinIDIS allows for a transfer of data between the CDS/ISIS (called hereafter ISIS) and IDAMS packages. This means a transfer:
Of a selected part of an ISIS data base into an IDAMS dataset, or
of a selected part of an IDAMS dataset into an ISIS database.
http://www.unesco.org/webworld/isis for news on CDS/ISIS and other technical support information.

3.4 GENISIS

Genisis is a web page interface generator for publishing CDS/ISIS databases on the web using BIREME's WWWISIS search engine and web server Apache. GENISIS is originally developed by the former ISISCUS Association (France) for UNESCO.I t is available on the following website:
http://www.ibiscus.fr
http://www.unesco.org/isis/files/winisis/genisis/web/genisisweb.exe

The root for GENISIS in CD is \cds-isis\internet\genisis\french.

Apache web server: Apache web server is needed to develop web interface of CDS/ISIS using GENISIS. Apache web server is open source software developed by the Apache software foundation can be downloaded the software from http://www.apache.org/dist/httpd/
The software is available for different operating system.
The Apache web Server is provided with CD distributed by NISSAT National Distributor in India or can be downloaded from UNESCO website. The root for apache web server in CD is: \cds-isis\internet\ genisis\websrv.

Developing Web Interface for CDS/ISIS: Developing Web Interface For CDS/ISIS needs GENISIS and web server Apache. Install GENISIS and Apache web server from available source.

Starting Apache Web Server: Before starting GENISIS, run Apache web server. To start Apache follow the following steps.
START>PROGRAMS>APACHE HTTPD
SERVER>CONFIGUREACHE SERVER>START APACHE IN CONSOLE.

When apache starts running, minimize the programme.
Copy the 'wwwisis' folder in GENISIS to 'htdocs' folder in Apache.
Copy all files in the 'bireme' folder in "GENISIS" to the "cgi-bin" folder in Apache.

3.5 Starting GENISIS

Start GENISIS from programs. Select the language "ANGLIS" then subfolder "wwwisis" in the document root. Then default browser (external) and document root as c:\program files\apache group\apache\ htdocs\

Then following message will get.
"web server "apache" is installed on your computer, do you want GENISIS to use it?
Click on "yes" then OK &OK.
Then the screen of GENISIS will open. Now here you can share your Library database through GENISIS.

RDB Utilities: The RDB Utilities is small software developed by Wanfang Data Cor. Of ISTIC, China for data exchange between RDB to ISO2709 files and to convert iso2709 to Dbase Tables. It is available on UNESCO website for free distribution with CDS/ISIS. With the RDB utilities, the data exchange between EXCEL, ACCESS, and FOXPRO to CDS/ISIS is possible.

4. OPEN SOURCE SOFTWARE FOR DIGITAL LIBRARY

Open source software provides opportunity to develop digital library. Some open source software, which mostly used for developing digital library are Green Stone Digital Library (GSDL), D-space, and E-prints.

4.1 Green Stone Digital Library

Greenstone is a suite of software, which has the ability to serve digital library collections and build new collections. It provides a new way of organizing information and publishing it on the Internet or on CD-ROM. Greenstone is produced by the New Zealand Digital Library

Project at the University of Waikato, and distributed in cooperation with UNESCO and the Human Info NGO. It is open-source software, available from http://greenstone.org under the terms of the GNU General Public License.

Greenstone runs on Windows, Unix and Mac OS X. The distribution includes ready-to-use binaries for all versions of Windows, and for Linux and Mac OS X. It also includes complete source code for the system, which can be compiled using Microsoft C++ or gcc. Greenstone works with associated software that is also freely available: the Apache Web server and PERL. The user interface uses a Web browser: typically Netscape Navigator or Internet Explorer.

4.2 DSpace

DSpace is a groundbreaking digital library system to capture, store, index, preserve, and redistribute the intellectual output of a university's research faculty in digital formats.

Developed jointly by MIT Libraries and Hewlett-Packard (HP), D-Space is now freely available to research institutions worldwide as an open source system that can be customized and extended. It is available on www.dspace.org.

4.3 E-Prints

E-Prints is generic archive software under development by the University of Southampton. It is intended to create a highly configurable web-based archive. E-Prints primary goal is to be set up as an open archive for research papers, but it could be easily used for other things such as images, research data, audio archives–anything that can be stored digitally by making changes in configuration. It works on Linux O/s and it needs MySQL, Perl modules and Apache web server.

4.4 UNESCO and Open Source Software

In 2001, as UNESCO begins to lend its support to the Free Software Movement, it is almost 18 years since UNESCO launched the movement and began developing the GNU operating system. Now UNESCO provides all type of software development program including operating system, application software, software development tools etc.

5. CONCLUSIONS

Open source software provides better opportunities to library and information center for Information Management, Developing WEBOPAC, and managing e-Library, developing e-collection, Institutional Repositories etc. The use of open source software depends on the potential and needs of the libraries.

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Open Source Software in Bioinformatics

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1. INTRODUCTION

Because of the power of many Open Source bioinformatics packages in the use by the Research Community today, it is not too presumptuous to say that the work of the Open Source Bioinformatics Community represents the cutting edge of Bioinformatics in general.

Several different organizations exist to promote software using the phrases "open source" and "free software". One might expect, based on common English understanding, that the phrase open source means "The source code for the software is available for download", and the phrase free software represents "software with zero cost". Both of these expectations are wrong. Unfortunately, the intricacies of software license agreements make our colloquial understanding of these phrases vastly inadequate to understand their real meanings.

The paper outlines recent activity in open source software development within the discipline of bioinformatics. The paper describes

a large number of projects and groups important to bioinformatics open source software development. The main purpose of the open source software of bioinformatics including:

- Accessing sequence data
- Indexing and transforming sequence data
- Annotating sequences
- Running BLAST (locally or remotely)
- Creating and manipulating sequence alignments

2. INFORMATICS AND BIOINFORMATICS

Informatics is an academic discipline closely related to computer science. At the most general level, informaticians study how people use information. Most often, people study informatics within the context of a particular domain, such as biology (bioinformatics), medicine (medical informatics), chemistry (cheminformatics), or social structure (organizational informatics).

Interest in bioinformatics has greatly increased in recent years. Several technological advances significantly accelerated the rate with which biological data are acquired. Primarily, these technologies are faster nucleic acid sequencing methods and highly parallel, micro-chip analysis technologies for both nucleic acids and proteins.

There are several driving forces pushing recent interest in biological information and the study of bioinformatics. Primarily, the technological changes in recent years have totally changed the manner in which biological research is performed. Biology has transformed into an information-based science that often requires computers and computational analysis for significant progress. Scientific and methodological advances in both medicine and pharmaceutical discovery use biological data, and hence bioinformatics. Better organization and use of biological data in both areas leads to better science and better products.

3. OPEN SOURCE AND FREE SOFTWARE

Several different organizations exist to promote software using the phrases "open source" and "free software". One might expect, based on common English understanding, that the phrase open source means "The source code for the software is available for download," and the phrase free software represents "software with zero cost." Both of these expectations are wrong. Unfortunately, the intricacies of software license agreements make our colloquial understanding of these phrases vastly inadequate to understand their real meanings. In the phrase free software, the word free does not mean zero cost, but rather free from restrictions. Specifically these freedoms include:

1. The freedom to run the program, for any purpose.
2. The freedom to study how the program works, and adapt it to your needs.
3. The freedom to redistribute copies so you can help your neighbor.
4. The freedom to improve the program, and release your improvements to the public, so that the whole community benefits.

A separate and arguably more influential movement within the software community is the open source movement. Instances of open source software can be thought of as a superset of free software as described above. The major distinction comes from point 3 above, when some open source licenses do not allow free redistribution of the available software.

4. NETWORKING AND BIOINFORMATICS

Bioinformatics projects and the development of the field depend on distributed networks and the Internet for a variety of reasons. There are several specific tasks that networks enable within the context of bioinformatics, which I describe here:

4.1 Data Access and Movement

Central to bioinformatics research and project development is access to data. These data can include biological sequences, structures, a variety of physical or clinical measurements, plus any other relevant data. Without access to data, the development of informatics applications, tools, and software is almost impossible.

To address this need, bioinformaticians maintain many centralized repositories of data that are of general interest. Appendix D describes some of the most important centralized, public bioinformatics databases. These databases serve bioinformatics research by ensuring that data are:

- available over a long period of time (longevity)
- maintained in a standardized and searchable format (curation)
- disseminated widely and reliably (access)
- collected from disparate sources and combined (integration)

Centralized databases depend on networks like the Internet for data submission and data dissemination. Without these networks, centralized databases would be effectively useless. One example of a set of development tools focused specifically on building reusable methods for remote data access and parsing is the BioPython project.

4.2 Collaboration

Most open source projects in bioinformatics are have researchers and contributors from various parts of the world. While much bioinformatics

software does not require remote collaboration, open source development tends to favor this approach. The limited number of contributors and the benefits of working with interested parties regardless of geographic constraints encourage remote collaboration via computer networks. Examples of collobratory environments within bioinformatics include projects like the San Diego Supercomputer Center's Molecular Interactive Collaborative Environment (MICE), and BioDAS for distributed sequence annotation.

4.3 Distributed Computing Applications

Many bioinformatics problems require significant computer power. Several different public and commercial initiatives use geographically distributed computing resources for bioinformatics projects. Examples include Stanford's Folding @Home project, Entropia and the Scripps Research Institute with Anti-HIV drug design, Oxford University and United Devices with Cancer Drug Screening, and Washington University with gene sequence analysis. Other examples include bioinformatics projects in the Metasystems Thrust by the National Partnership for Advanced Computational Infrastructure (NPACI). NPACI also has a distributed-computing project on protein folding.

4.4 Data Integration

A large part of bioinformatics is the integration of disparate types of data to discern new biological and medical knowledge. As mentioned above, such activities require access to data that is typically not stored locally. In addition, many software projects are under development specifically for data integration across distributed networks, such as BioCorba and the Piper project for peer-to-peer distributed work flow. These projects go further than facilitating data access. Instead, they strive to make effective integration possible.

5. MOTIVATIONS FOR OPEN SOURCE SOFTWARE

The majority of individuals involved in writing and releasing open source software in bioinformatics are more interested in scientific results within biology than in writing code. Individuals from both industry and academic institutions are well represented as open source contributors. Either for business reasons, or for publishing goals, these people are interested in the development of new knowledge in biology through the analysis of biological data.

However, the software tools to gain that new knowledge and push the bounds of biological understanding are not commonly available. Different researchers have to build these software tools to support their own research endeavors. This work is seen as a cost required answering the scientific questions of real interest. In most cases, sharing their

software development work (by sharing the code with others) helps both the researchers and recipients.

6. OPEN BIOINFORMATICS FOUNDATION AND OPEN SOURCE SOFTWARE

6.1 BioPerl

BioPerl2 is one of the oldest and most mature open source bioinformatics toolkits. BioPerl provides reusable objects to represent and manipulate a variety of different biological data types, primarily related to sequences. Many of the BioPerl developers are associated with Ensembl, a joint project between the European Bioinformatics Institute (EBI) and the Sanger Center to develop software which produce and maintain automatic annotations on eukaryotic genome sequences. The BioPerl server provides an online resource for modules, scripts, and web links for developers of Perl-based software for life science research. They can also provide web, FTP space and versioning tools like Concurrent Version System (CVS) for individuals and organizations wishing to distribute or otherwise make freely available stand-alone scripts & code.

6.2 BioPython

BioPython is an open source project with very similar goals and functionality to BioPerl–with the notable exception that the implementation language is Python and not Perl. Furthermore, the focus of the Python project is slightly different than their Perl counterparts. BioPython focuses on reliably accessing and parsing outside data sources and creating a development framework for machine learning algorithms for tasks such as classification, clustering and alignments. At a high level, both projects have similar aims in the creation of development tools & resources for bioinformatics software. BioPython5 has been around for about 2 years and the current release is BioPython 1.00a1, an alpha release.

6.3 BioJava

BioJava is another project with similar goals to BioPerl, with implementation in the Java language. The focus of the BioJava project includes objects for manipulating sequences, file parsers, CORBA interoperability, dynamic programming, and simple statistical routines such as support vector machines and probability distributions. Their current focus is to expand the package functionality toward areas such as ontology languages, expression data analysis tools and 3D data visualization. BioJava also focuses on access to ACeDB, a database engine with a non-standard data model designed specifically for handling scientific data exibly, and a graphical user interface with many display methods and tools for genomic data. ACeDB is used both for managing

data within genome projects and for making genomic data available to the wider scientific community.

6.4 BioDAS

The Biological Distributed Annotation System (BioDAS) 6 project is developing an open source system for peer-to-peer exchange of annotations on genomic sequence data. BioDAS is a client-server system in which a single client integrates information from multiple servers. It allows a single machine to gather genome annotation information from multiple web sites, collate the information, and display it to the user in a single view. Little coordination is needed among the various information providers once their data are organized to DAS specifications.
The official DAS specifications written by Lincoln Stein and Robin Dowell, is the basis for a number of clients and servers. DAS1 servers are currently running at WormBase, FlyBase, and Ensembl. In light of lessons learned during the DAS1 implementation, an improved version 2 specifications, spearheaded by Thomas Down, has been proposed.

6.5 BioXML

The BioXML.org website is intended to be a center of development for open source biological DTDs. The primary content available on this site is the Genome Annotation Markup Elements (GAME) - an extensible document type definition (DTD) for the annotation of biological sequences. The use of the GAME DTD allows different people to represent information about specific regions of sequences in a common format.

6.6 BioCorba

The BioCorba Project provides an object-oriented, language neutral, platform independent method for describing and solving bioinformatics problems. CORBA stands for Common Object Request Broker Architecture, and it represents a standardized method that allows software to share data over networks. The Object Management Group (OMG Section 3.4) manages the CORBA standards, and has their own subgroup (the Life Science Research, or LSR Group) for standards setting for biological data exchange.

Part of the BioCorba mission is to facilitate intercommunication between the bio projects in a simple fashion. For example, one might like to share objects from one source (say a 3D structure definition) as a software "object" over a network to a remote client. Internally, a CORBA server might allow users to write programs using BioPython and access BioPerl modules. This might be useful if one system implements functionality the developer would like to use.

7. ONLINE OPEN BIOINFORMATICS DATABASES

This Online Open Bioinformatics Databases is a reference to available online data sources in bioinformatics. Much of the text from these sections has been adapted or taken directly from the relevant websites. There are far too numerous different boutique data sources available online to list them all. This list attempts to describe the most commonly used and the most important data sources.

7.1 GenBank

http://www.ncbi.nlm.nih.gov/Genbank/index.html
http://www.ncbi.nlm.nih.gov/Genbank/GenbankOverview.html

GenBank is the NIH genetic sequence database, an annotated collection of all publicly available DNA sequences. There are approximately 12,974,000,000 bases in 12,244,000 sequence records as of June 2001. As an example, you may view the record for a Saccharomyces cerevisiae gene. The complete release notes for the current version of GenBank are available. A new release is made every two months. GenBank is part of the International Nucleotide Sequence Database Collaboration, which is comprised of the DNA DataBank of Japan (DDBJ), the European Molecular Biology Laboratory (EMBL), and GenBank at NCBI. These three organizations exchange data on a daily basis.

There are two common methods for searching Genbank. They are the Entrez Browser and Blast.

7.1.1 ENTREZ BROWSER

Entrez provides integrated access to biomedical literature, nucleotide and protein sequences, along with 3-D protein structures, complete genomes and population study data sets. Precomputed similarity searches are available for most database records producing a list of related sequences, structure neighbors, as well as related articles.

- PubMed - bibliographic
- Nucleotide - sequences from Genbank+ others
- Protein - sequences from Genbank+ others
- Genome - assemblies of complete genomes
- Structure - structures
- PopSet - population data

EntreZ HELP:
http://www.ncbi.nlm.nih.gov:80/entrez/query/static/help/helpdoc.html

7.1.2 BLAST

BLAST (Basic Local Alignment Search Tool) is a set of similarity search programs designed to explore all of the available sequence

databases regardless of whether the query is protein or DNA. The BLAST programs have been designed for speed, with a minimal sacrifice of sensitivity to distant sequence relationships. The scores assigned in a BLAST search have a well-defined statistical interpretation, making real matches easier to distinguish from random background hits. BLAST uses a heuristic algorithm which seeks local as opposed to global alignments and is therefore able to detect relationships among sequences which share only isolated regions of similarity. For a better understanding of BLAST you can refer to the online BLAST Course4 which explains the basics of the BLAST algorithm. There is also a simple online BLAST tutorial5.

7.2 dbSNP

http://www.ncbi.nlm.nih.gov/SNP/

A key aspect of research in genetics is associating sequence variations with heritable phenotypes. The most common variations are single nucleotide polymorphisms (SNPs), which occur approximately once every 100 to 300 bases. Because SNPs are expected to facilitate large-scale association genetics studies, there has recently been great interest in SNP discovery and detection.

7.3 Online Mendelian Inheritance in Man (OMIM)

http://www.ncbi.nlm.nih.gov/omim/

This database is a catalog of human genes and genetic disorders authored and edited by Dr. Victor A. McKusick and his colleagues at Johns Hopkins and elsewhere, and developed for the World Wide Web by NCBI, the National Center for Biotechnology Information. The database contains textual information, pictures, and reference information. It also contains copious links to NCBI's Entrez database of MEDLINE articles and sequence information. The OMIM Morbid Map, a catalog of genetic diseases and their cytogenetic map locations arranged alphabetically by disease, is now available.

7.4 LocusLink

http://www.ncbi.nlm.nih.gov/LocusLink/

LocusLink provides a single query interface to curated sequence and descriptive information about genetic loci. It presents information on official nomenclature, aliases, sequence accessions, phenotypes, EC numbers, MIM numbers, UniGene clusters, map information, and related web sites. Sequence accessions include a subset of GenBank accessions for a locus, as well as a new type, the NCBI Reference Sequences (RefSeq). RefSeq records are built according to the process detailed here. See the About and FAQ pages for more information. Data can be accessed by clicking one of the letters above to browse loci sorted by symbols, or by entering a query into the search form.

7.5 UniGene

http://www.ncbi.nlm.nih.gov/UniGene/index.html

UniGene is an experimental system for automatically partitioning GenBank sequences into a non-redundant set of gene-oriented clusters. Each UniGene cluster contains sequences that represent a unique gene, as well as related information such as the tissue types in which the gene has been expressed and map location.

7.6 SwissProt and TrEMBL

http://www.expasy.ch/sprot/sprot-top.html

SWISS-PROT is an annotated protein sequence database. It was established in 1986 and maintained collaboratively, since 1987. The SWISS-PROT protein sequence database consists of sequence entries. Sequence entries are composed of different line types, each with their own format. For standardization purposes the format of SWISS-PROT follows as closely as possible that of the EMBL Nucleotide Sequence Database.

7.7 Prosite

http://www.expasy.ch/prosite/

PROSITE is a database of protein families and domains. It is based on the observation that, while there is a huge number of different proteins, most of them can be grouped, on the basis of similarities in their sequences, into a limited number of families. Proteins or protein domains belonging to a particular family generally share functional attributes and are derived from a common ancestor.

It is apparent, when studying protein sequence families, that some regions have been better conserved than others during evolution. These regions are generally important for the function of a protein and/or for the maintenance of its three- dimensional structure. By analyzing the constant and variable properties of such groups of similar sequences, it is possible to derive a signature for a protein family or domain, which distinguishes its members from all other unrelated proteins. A pertinent analogy is the use of fingerprints by the police for identification purposes. A fingerprint is generally sufficient to identify a given individual. Similarly, a protein signature can be used to assign a newly sequenced protein to a specific family of proteins and thus to formulate hypotheses about its function.

PROSITE currently contains signatures specific for about a thousand protein families or domains. Each of these signatures comes with documentation providing background information on the structure and function of these proteins.

7.8 Genome Data Base (GDB)

Established at Johns Hopkins University in Baltimore, Maryland, USA in 1990, the Genome Database (GDB) is the official central repository for genomic mapping data resulting from the Human Genome Initiative. In the spring of 1999, the Bioinformatics Supercomputing Centre (BiSC) at The Hospital for Sick Children in Toronto, Ontario, Canada, assumed the management of GDB. The Human Genome Initiative is a worldwide research effort to analyze the structure of human DNA and determine the location and sequence of the estimated 100,000 human genes. In support of this project, GDB stores and curates data generated worldwide by those researchers engaged in the mapping effort of the Human Genome Project (HGP).

7.9 Protein Data Bank (PDB)

http://www.rcsb.org/pdb/

The PDB is the single international repository for the processing and distribution of 3-D macromolecular structure data primarily determined experimentally by X-ray crystallography and NMR.

7.10 Structural Classification of Proteins (SCOP)

http://scop.berkeley.edu/ (mirror)

SCOP archives manually classified structural folds and super families data for proteins. Nearly all proteins have structural similarities with other proteins and share a common evolutionary origin. Knowledge of these relationships is crucial to our understanding of the evolution of proteins and of development. It will also play an important role in the analysis of the sequence data that is being produced by worldwide genome projects.

The SCOP database aims to provide a detailed and comprehensive description of the structural and evolutionary relationships between all proteins whose structure is known, including all entries in Brookhaven National Laboratory's Protein Data Bank (PDB). It is available as a set of tightly linked hypertext documents which make the large database comprehensible and accessible. In addition, the hypertext pages offer a panoply of representations of proteins, including links to PDB entries, sequences, references, images and interactive display systems. World Wide Web URL http://scop.mrc-lmb.cam.ac.uk/scop/ is the entry point to the database (MRC site).

7.11 Nucleic Acid Database (NDB)

http://ndb-mirror-2.rutgers.edu/

The goal of the Nucleic Acid Database Project is to assemble and distribute structural information about nucleic acids.

7.12 Protein Domain (PRODOM) Database

http://protein.toulouse.inra.fr/prodom.html

The ProDom protein domain database consists of an automatic compilation of homologous domains. Current versions of ProDom are built using a novel procedure based on recursive PSI-BLAST searches. Large families are much better processed with this new procedure than with the former DOMAINER program.

7.13 Protein Information Resource (PIR)

http://www-nbrf.georgetown.edu/pir/

The Protein Information Resource supports research on molecular evolution, functional genomics, and computational biology by providing an integrated system of protein sequence databases, derived related databases, and access facilities that:

1. Enables rapid searching, comparison, and pattern matching of protein sequences,
2. Supports retrieval of descriptive, bibliographic, feature, and concurrent cross-reference information, and
3. Strives to be comprehensive, well-organized, accurate, and consistently annotated.

The Protein Information Resource was established in 1984 by the National Biomedical Research Foundation (NBRF) as a resource to assist researchers in the identification and interpretation of protein sequence information.

7.14 Protein Families (PFAM)

http://pfam.wustl.edu/

Version 6.4 of the Protein Families (Pfam) database as of May 2001 contains alignments and models for 2866 protein families, based on the Swissprot version 39 and SP-TrEMBL version 14 protein sequence databases.

The database contains multiple alignments of protein domains or conserved protein regions. The alignments represent some evolutionary conserved structure which has implications for the protein's function. Pfam is formed in two separate ways. Pfam-A are fairly accurate human crafted multiple alignments whereas Pfam-B is an automatic clustering of the rest of swissprot using the program Domainer. This FAQ is mostly about the Pfam-A section.

7.15 BLOCKS and PRINTS

The Blocks Database contains the most highly conserved regions in groups of proteins documented in the Prosite Database. The Prosite

pattern for a protein group is not used in any way to make the Blocks Database and the pattern may or may not be contained in one of the blocks representing a group. These blocks are then calibrated against the SWISSPROT database to obtain a measure of the chance distribution of matches. It is these calibrated blocks that make up the Blocks Database. The WWW versions of the Prosite and SWISS-PROT Databases that are used on this server are located at the ExPASy World Wide Web (WWW) Molecular Biology Server of the Geneva University Hospital and the University of Geneva.

7.16 Stanford Genome Databases (SGD)

http://genome-www.stanford.edu/

The Saccharomyces Genome Database (SGDTM) project is funded by the National Human Genome Research Institute at the US National Institutes of Health. The SGDTM is in the Department of Genetics at the School of Medicine, Stanford University. The trademark on SGDTM is held by Stanford University.

7.17 FlyBase

http://www.ybase.org/

The fruit y genome and associated data sequencing was complete in March 2000.

7.18 Miscellaneous

- **Metabolic Pathways**
  - ECOCYC - Encyclopedic reference db of metabolism pathways in E coli
  - Metabolic Database- Metabolic reactions and pathways in soybean (Yale)
  - KEGG - Information pathways of interacting genes or molecules (Kyoto University, Japan)
  - Links to Other Pathway Databases - KEGG
- **Enzymes**
  - ENZYME - Enzyme nomenclature database (ExPASy)
  - Enzyme Structures Database - Database of enzymes with structures deposited in the PDB
  - ReBase - Restriction Enzyme Database (NEB)
- **Transcription Factors**
  - TRRD - Transcription Regulatory Regions Database
  - TRANSFAC - The Transcription Factor Database
- **Organelles**
  - GOBASE - The Organelle Genome Database
  - MitoDat - Mitochondrion database
- **Signal Transduction Pathways**
  - G-protein Lins - Internet-resources related to GPCR research

- GCRDb - G-Protein Coupled Receptor Database (University of Texas)
- SPAD - Signaling Pathway Database (Japan)

8. CONCLUSION

Bioinformatics is an exciting and rapidly developing field. There has been an increased level of interest in the area in recent years paralleling the increased rates of biological data generation. All indications point to the continued expansion of bioinformatics both as a scientific discipline and as a commercial endeavor to meet the challenges of managing and analyzing biological data.

A large number of software projects exist to meet the needs of the bioinformatics development community, and many of these projects are open source. The development and burgeoning popularity in the open source bioinformatics software parallels an industry trend of slow but consistent growth of open source software. Most of the open source projects involve longer time scales compared to commercial products but typically enjoy wider distribution and application within the software development community.

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Open Source Software: The Most Prominent Face of Open Source Initiatives in the Digital Environment with Special Reference to Library and Information Center

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ABSTRACT

This paper provides an overview of open source software, a brief history, and its licensing provisions. Enumerates some related terminologies. Discusses its different applications in the library environment in general and digital library in particular. It also sites some of its benefits and costs.

Keywords: Open source software; Open source initiative; Open source intelligence; Open source information; Open source movement

1. INTRODUCTION

Open source initiative describes practices in production and development that ensures access to the end product's sources. According to some people it is a philosophy, and others consider it as a pragmatic methodology. Open source movement was very popular and effective with the rise of Internet. Open source software became the most prominent face of open source movement.

Open Source Software uses software code that is open, unrestricted and available by downloading it from the Internet. The code for open source software is available and viewable to all. Open source software is developed by identifiable communities who contribute to the development of particular piece of software. People in the software communities participate voluntarily or paid by employers such as government departments or companies like IBM, Hewlett Packard (HP) and Sun Microsystems.

2. BRIEF HISTORY

The history of open source software is one of the longest amongst other software developments. In fact, it could be said that in the beginning, there was only free software. Later on, proprietary software was born, and it quickly dominated the software arena. Only recently has the software industry considered free software as an option again. It will be effective to enumerate historical development chronologically under different points.

- In the 1960s, when IBM and others sold the first large-scale commercial computers, they came with some software, which was free, in the sense that it could be freely shared among users, it came with source code, and it could be improved and modified.
- In mid-1970s it was usual to find proprietary software, in the sense that users were not allowed to redistribute it, that source code was not available, and that users could not modify the programs.
- In late 1970s and early 1980s, two different groups were establishing the roots of the current open source software movement:
  a) On the US East coast, Richard Stallman, formerly a programmer at the MIT AI Lab, launched the GNU Project and the Free Software Foundation. The ultimate goal of the GNU Project was to build a free operating system, and Richard started by coding some programming tools.
  b) On the US West coast, the Computer Science Research Group (CSRG) of the University of California at Berkeley was improving the Unix system, and building lots of applications, which quickly become ``BSD Unix".
- During 1991-1992, the whole landscape of open source software, and of software development in general, was ready to change. Two very exciting events were taking place, although in different communities:
  a) In California, Bill Jolitz was implementing the missing portions to complete the Net/2 distribution, until it was ready to run on i386-class machines. Net/2 was the result of the effort of the CSRG to make an unencumbered version of BSD Unix (free of AT&T copyrighted code). Bill called his work 386BSD, and it

quickly became appreciated within the BSD and Unix communities. It included not only a kernel, but also many utilities, making a complete operating system.

b) In Finland, Linus Torvalds, a student of computer science, unhappy with Tanenbaum's Minix, was implementing the first versions of the Linux kernel. Soon, many people were collaborating to make that kernel more and more usable, and adding many utilities to complete GNU/Linux6, a real operating system. The Linux kernel, and the GNU applications used on top of it are covered by GPL.

- In 1990s, many open source projects have produced a good quantity of useful software. Some of them are Apache, Perl, XFree86, GNOME and KDE, Mozilla etc. Of all these projects, GNOME and KDE are especially important, because they address usability by non-technical people.
- The late 1990s are very exciting times with respect to open source software. Open source systems based on GNU/Linux or BSD family are gaining public acceptance, and have become a real alternative to proprietary systems, competing head to head with the market leaders.
- In 1993, both GNU/Linux and 386BSD were reasonably stable platforms. Since then, 386BSD has evolved into a family of BSD based operating systems (NetBSD, FreeBSD, and OpenBSD), while the Linux kernel is healthy evolving and being used in many GNU/Linux distributions (Slackware, Fedora, Debian, Red Hat, Suse, Mandrake, and many more).
- In 1998, the announcement of the liberation of Netscape Communicator was the starting point of a rush of many big companies to understand open source software. Apple, Corel and IBM, for instance, were trying different approaches to use, promotion or development of open source software. Many companies of all sizes (from the small startup composed of a couple of programmers to the recently public Red Hat) are exploring new economic models to succeed in the competitive software market. The media has also started to give attention to the formerly marginal open source software movement, which is now composed not only of individuals and non-profit organizations, but also of small and medium companies.

2. RELATED TERMINOLOGIES

Terminology around different sorts of software can be confusing. Here we attempt to distinguish different terminologies:

- **Software**: All computers and networks of computers require software to work. There are two main component of software:

a) the system software or operating systems, which controls the working the working of computer; and

b) the application software that allows computer users to undertake specific sorts of tasks such word processing, using spreadsheets or developing and manipulating graphics.

- **Freeware**: Freeware is usually used when a piece of software is given at no cost, even if the programs are released only as executables, with their source code not available. For example we can download the Adobe Acrobat Reader as freeware, but the software is still proprietary.
- **Shareware**: It is a software that is usually distributed free of charge for a limited time span or for a limited use, mainly to give the user the opportunity to test it before buying it. The term shareware also covers a sales concept.
- **Middleware**: This terminology is used to support distributed, networked computing environments. It refers to the set of services, the major components of which are identification, authentication, and authorization (IAA). Microsoft's Active Directory and Novell are examples of proprietary middleware software and standards.
- **Free software**: The software that requires permission for anyone to use, copy, and distribute, with or without modifications. It is of either gratis or for a fee. In particular, this means that source code must be available.
- **Proprietary software**: Proprietary software generally provides limited rights to use a product, sometimes on a specific machine, sometimes with a specific power or processor, sometimes with a limited member of signed or concurrent users or related to a limited amount of material.
- **Semi-free software:** The software that is not free of cost, but requires permission for individuals to use, copy, distribute, and modify for non-profit purposes. PGP is an example of a semi-free program.
- **Non-free software**: The software, which is not free. Actually this type of software includes semi-free software and proprietary software.
- **Public Domain software**: It is a software for which copyright do not exist. The phrase public domain software is often used for software any one can use for any purpose, without any restriction. In addition, the availability of the source code is not granted.
- **Copylefted software:** It is free software having no additional restrictions on copying and modification.

- **Non-copylefted free software**: The software developed by the author having permission to redistribute and modify, and also to add additional restrictions to it.
- **Commercial software**: This type of software is being developed by an organization that has prime aims to make profit from the use of the software.
- **Open source information**: Open source information is unclassified sources of information available to general public. They include print media like books, reports, newspapers, scientific and journals, conference proceedings; radio and television; Internet; and trade shows etc.
- **Open source intelligence (OSINT):** Open source intelligence (OSINT) refers to an intelligent operation that uses information acquired from public domain. It includes requirements analysis, information filtering, and the analysis and integration of information after it has been collected. Competitive intelligence refers to the corporate use of OSINT.
- **Open source software**: Open source software is software that has source code that is open, viewable, unrestricted and redistributed, and is available by downloading it from the Internet. It may be system software or application software. Examples of proprietary operating systems are Windows and Windows NT, and open source operating systems are LINUX and FreeBSD.

4. OPEN SOURCE SOFTWARE (OSS)

OSS is both a philosophy and a process. As a philosophy it describes the intended use of software and methods for its distribution. Depending on your perspective, the concept of OSS is a relatively new idea being only four or five years old. On the other hand, the GNU Software Project (a project advocating the distribution of "free" software) has been operational since the mid '80's. Consequently, the ideas behind OSS have been around longer than we may think. Here 'free' refers to freedom in some aspects: Free to-

- study the functions of the program
- run the software for any purpose
- access the software source code
- modify the source code in accordance with specific tasks
- modify the software to suit their needs
- redistribute of the software gratis or for a fee
- redistribute copies of the software to others
- distribute modified versions of the software
- run the software for any purpose by any users

Web applications also used software to provide access to the Internet. Much Internet is open rather than proprietary. Microsoft's Browser Internet Explorer uses proprietary software. Examples of open source software employed in the Internet include:

- **Linux**: Multi users operating systems
- **Apache**: web server
- **Send mail**: the program that routs over 90% of all email on the Internet.
- **Perl, python**: programming language
- **Bind**: Berkeley Internet Name Doemon, the software that runs the Domain Name server for the web
- **GNU software**: a variety of compilers, utilities, and notably, the EMACS Editor.
- **GNOME, KDE**: GNU interface for Linux.
- **Mozilla**: the open code software used in the Netscape Browser.
- **GIMP**: Image workshop
- **Jikes**: java compiler from IBM.
- **SAMBA**: Allows integration with Microsoft's SMB protocol.

Some of the Open Source Software commonly used instead of proprietary software, are given below (Fig-1)

TASK	COMMERCIAL SOFTWARE	OPENSOURCE SOFTWARE
Operating system	Windows 2000	Linux or Red Hat Linux
Word processing	Microsoft Word	Openoffice.org.writer
Spreadsheet	Excel	openoffice.org.Cale
Presentation	PowerPoint	Openoffice.org.Impress
Web Browser	Internet Explorer	Mozilla
Graphics	Photoshop	The GIMP

Fig-1: Some of open source software having similar type of functions to proprietary software

5. TERMS AND CONDITIONS OF DISTRIBUTION OF OPEN SOURCE SOFTWARE

Open source doesn't just mean access to the source code. The distribution terms of open-source software must comply with the following criteria:

i. **Free redistribution:** No license can restrict anyone from selling or giving away the software as a component of an aggregate software distribution having software parts from several different sources.

ii. **Inclusion of source code:** The distributed program must include source code. The software with source code must be the preferred

form in which there is a provision for a programmer to modify the program. Intermediate forms and deliberate obscure of source code are not allowed.

iii. **Modified and derived works:** The licensing of software must allow modifications and derived works, and must allow to be distributed under the same terms as the license of the original software.

iv. **Integrity of the author's source code:** The license may restrict source-code from being distributed in modified form only if the license allows the distribution of "patch files" with the source code for the purpose of modifying the program at build time.

v. **Irrespective of persons or groups:** The license should be given irrespective of individuals and groups.

vi. **Irrespective of fields of endeavor:** The license must not restrict anyone from making use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business, or from being used for genetic research.

vii. **Distribution of license:** The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.

viii. **Not product specific:** The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as those that are granted in conjunction with the original software distribution.

ix. **No restrictions to other software:** The license must not place restrictions on other software that is distributed along with the licensed software. For example, the license must not insist that all other programs distributed on the same medium must be open-source software.

x. **Not technology dependant:** No provision of the license may be predicated on any individual technology or style of interface.

6. MAJOR FACETS OF OPEN SOURCE SOFTWARE

Open source software are comprised of major two facets namely mutual development and license (Fig-2).

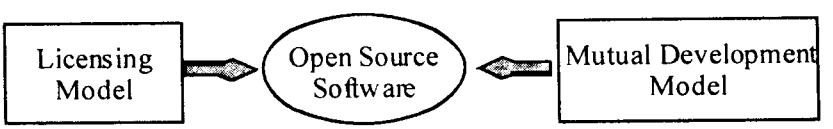


Fig-2: Two major facets of open source software

6.1 Mutual Development

The idea of mutual development of open source software is an act of collaborative works between programmers and technicians. They mutually can create, read, modify and redistribute the source code of that software. After creation/development of software people improved the software; adopt it and people fix it bugs in it. For example Fujitsu, Hitachi, IBM, and NEC have contributed to the development of better tools for analysis LINUX performance and troubleshooting LINUX kernels.

6.2 Licenses

Licenses of open source software provide an unconditional right to modify and redistribute any part of the software for free. In case of the software downloaded from Internet the users must need to license agreements. The copyright of open source software belongs to the author rather than vendor. There are verities of open source licenses (like the GNU General public license (GPL), the GNU library or "lesser" public license, the mozilla public license) but they are all premised on the author giving some fundamental freedoms to the user inside a license agreement.

7. BENEFIT AND COST OF OPEN SOURCE SOFTWARE

The Figure (3) provides an overview of some of the cost and benefit of open source software.

8. SELECTED PIECES OF OPEN SOURCE SOFTWARE

There are many open source software are in operation. Some of them are discussed below.

8.1 Apache

Apache is the most popular Web (HTTP) server on the Internet and standard open source software. Its name comes from the way it is built. It is "a patchy" server, meaning that it is made up of many patches or parts to create a coherent whole. The philosophy behind design has made the application very flexible and extensible in nature. Apache is currently at version 2.0, but for some reason many people are still using the 1.3 series.

8.2 Linux

Linux is an operating system just like Windows but open source in nature. It is software that handles the most basic operations of a computer like keyboard input, display via monitors, reading and writing to the hard drive, and getting input/output from network devices. Linux came about in 1991 when Linus Torvolds, a student of University of Helsinki of Finland developed a prototype OS in his project work. Later

he posted his work in the Internet with open source codes and asked to develop the OS by any one and people added new functionality. To date Linux is one of the most powerful operating systems ever created and definitely getting better all the time.

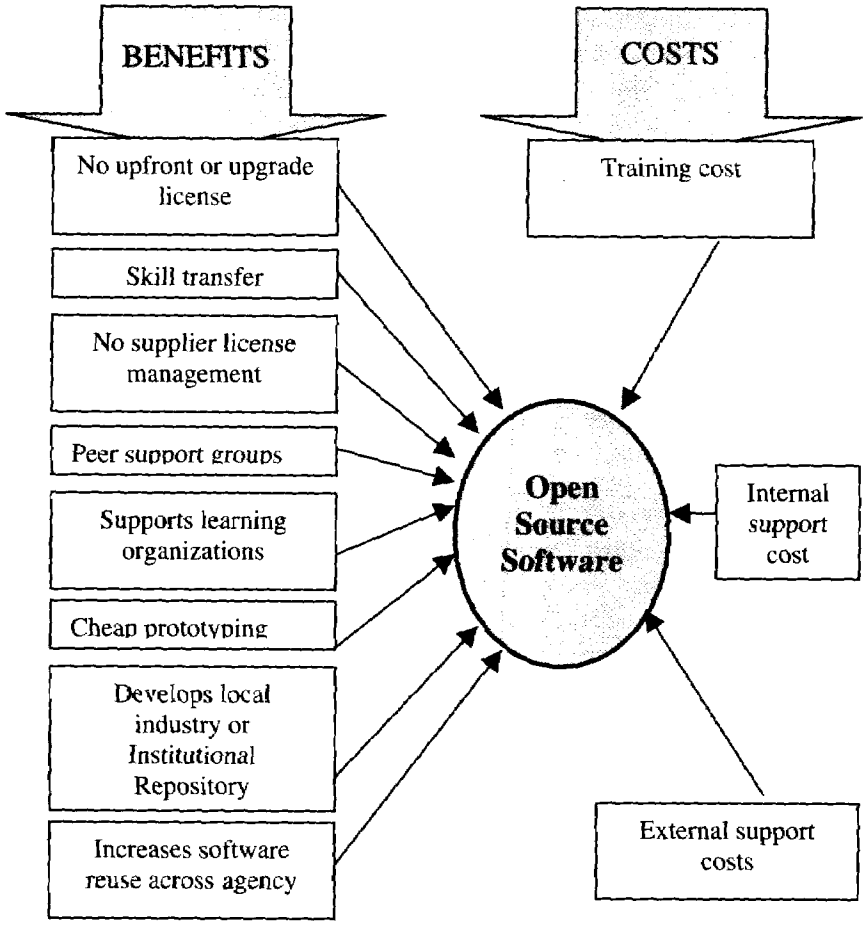


Figure 3: cost and benefits of open source software

8.3 MySQL

MySQL is relational database application software. It is very much popular in Internet community. MySQL is compatible in any types of computing platform. It has capability to manage huge amounts of records and data. Fast and robust, it supports the majority of people's relational database needs.

8.4 Perl

Perl is an open source programming language used for various systems administration tasks. Perl's strength lies in its ability to manipulate text. Though it matured through the era of Gopher but really

started becoming popular with the advent to CGI scripting. Perl has been ported to just about any computer operating system, has one of the largest numbers of support forums, and has been written about in more books than you can count. Perl is mature and very robust. Other very good programming languages exist and can do much of what Perl can do. Examples include other "P" languages such as PHP and Python. These languages are becoming increasingly popular, especially PHP.

8.5 Swish-e

Swish-e is a simple indexer/search engine. It indexes individual files on a file system, files retrieved by crawling a website, or a stream of content from another application such as a database. The indexing half of swish-e is able to index specifically marked up text in XML and HTML as fields for searching later. The same application that creates the indexes can be used to search the indexes. Swish-e supports:

- Relevance ranking
- Boolean operations
- Right-hand truncation
- Field searching
- Phrase searching
- Free text searching and
- Nested queries.

It's inherently open nature allows for the creation of some very smart search engines supporting things like spelling correction, thesaurus intervention, and "best bets" implementations.

8.6 Xsltproc and xmllint

Xsltproc and its companion program, xmllint, are very useful software for parsing and processing XML file. By feeding xsltproc an XSL style sheet and an XML data file we can transform the XML data file into any one of a number of text files whether they be SQL, (X)HTML, tab-delimited files, or even plain text files intended for printing. Xmllint is a syntax checker, which is used to check the validity of XML files.

8.7 602Pro PC Suite 2000

602Pro PC SUITE 2000 is compatible to Microsoft Office suite having three components:

- 602Text (word processor),
- 602Tab (spreadsheet) and
- 602Photo (graphic editor)

8.8 Animationstand

Animationstand is the leader in cross-platform tools for professional. It supports Mac, SGI, and Windows (95, 98, 2000, and NT) platforms. It

is very much cost effective and easy to use computer-assisted 2 1/2D character animation, composition and film quality special effects.

8.9 GIMP

GIMP is an acronym for GNU Image Manipulation Program. It is a freely distributed piece of software suitable for such tasks as photo retouching, image composition and image authoring. It supports Linux or Unix like platforms.

8.10 SOT Office 2002

SOT Office is a free Office program suite for Windows and Linux systems. It is an alternative to MS-Office and supports all its file formats.

9. OPEN SOURCE SOFTWARE IN THE FIELD OF LIBRARY AND INFORMATION SCIENCE

Different software, including library software, operating systems, programming languages like Java are available on the net for free. Some are available on a CD-ROM with nominal cost.

9.1 Library Software

A. Barcode Software

i. **Barcode Maker 1.0**: Works on Windows O/S. At a time one barcode can be printed.

ii. **GNU Barcode**: GNU Barcode is a tool to convert text strings to printed bars. It supports a variety of standard codes to represent the textual strings and creates postscript output. Can create tables of barcodes (to print labels on sticker pages). It works on Unix related O/s.

B. Digital/Electronic Library Software

i. **CdsWare**: It is acronym of CERN Document Server Software. It is developed by, maintained by, and used at, the CERN Document Server. It is compatible to electronic preprint server, online library catalogue or a document system on the web. It complies with the Open Archives Initiative metadata harvesting protocol (OAI-PMH) and uses MARC 21 as its underlying bibliographic standard. It is free software issued under GNU-GPL license.

ii. **Dienst**: Dienst is a system for configuring a set of individual services running on distributed servers to cooperate in providing the services of a digital library. It has been written in PERL. It works more comfortably on Unix/Linux run web servers.

iii. **Dspace**: DSpace is a digital library system to capture, store, index, preserve, and redistribute the intellectual output of a

university's research faculty in digital formats. MIT Libraries and Hewlett-Packard (HP) have developed Dspace jointly. It is now freely available to research institutions worldwide as an open source system. The DSpace software platform serves a variety of digital archiving needs. Research institutions worldwide use DSpace to meet a variety of digital archiving needs:

- Institutional Repositories (IRs)
- Learning Object Repositories (LORs)
- eTheses
- Electronic Records Management (ERM)
- Digital Preservation
- Publishing

iv. **EPrints**: EPrints is generic archive software under development by the University of Southampton. It is intended to create a highly configurable web-based archive. The primary goal of EPrints is to be set up as an open archive for research papers, but it could be easily used for other things such as images, research data, audio archives - anything that can be stored digitally by making changes in configuration. It works on Linux O/s and it needs MySQL, Perl modules and Apache web server.

v. **Fedora:** An Open-Source digital repository management system based on the Flexible Extensible Digital Object and Repository Architecture (Fedora). The Fedora repository system is open source software licensed under the Mozilla Public License. It requires Sun Java Software Development Kit, v1.4. Optionally one can use MySQL or Oracle 9i to create relational database. It works both on Windows and Unix versions of O/s.

vi. **Greenstone**: It is made for digital library management. Greenstone is a suite of software for building and distributing digital library collections. It provides a new way of organizing information and publishing it on the Internet or on CD-ROM. It is available for both Windows and Linux O/S. It requires Perl software to build collections.

vii. **Roads**: The ROADS software is a suite of programs intended to aid in the setting up and day to day running of World-Wide Web based catalogues of on-line resources. Although designed specifically to meet the requirements of the eLib subject gateways, ROADS software will be useful in a variety of other situations and for a variety of other

purposes. It works on a variant of the Unix operating system with HTTP Apache web server and Perl language.

viii. **SiteSearch:** The OCLC SiteSearch software provides a comprehensive solution for managing distributed library information resources in a World Wide Web environment. It offers tools that integrate electronic resources under one web interface, provide flexible access to resources, and build text and image databases locally. It works on both Digital Unix and Windows NT O/s.

9.2 Library Management Systems

a) **Athenaeum Light:** Athenaeum Light can handle large catalogues and manage borrower lists easily. As per its developer it is made for school libraries. As of now its limit of records is 50000. It is available for both Windows and Macintosh. It can even be used in the multiuser environment.

b) **Avanthi Circulation System**: The Avanti circulation system is a simple, scalable, networkable, client/server circulation system that can be deployed in small to medium scale libraries. The end product will be modular:

- Consisting of a system core
- Circulation module
- Minimal OPAC, and
- Network and user interfaces.

The entire system is written in Java. Avanti 0.3.1 was developed using the Blackdown JDK v1.1.7 on a Linux system with the servlet classes being developed using the Apache Jserv servlet engine.

c) **Emilda**: Emilda is a complete Integrated Library System that features amongst others an OPAC, circulation and administration functions, Z39.50 capabilities and 100% MARC compatibility. MARC compatibility is achieved using Zebra in conjunction with MySQL.

d) **FireFly**: FireFly is a Complete Public Library system. It is being written in Python, Perl, with all data being stored in XML. The driving force behind this project is to give public libraries a Free-Software set to run and maintain library systems.

e) **Glibms**: Glibms is Library management software developed using PHP and PostgreSQL to automate the different activities carried out in the library.

f) **Java Book Cataloguing System**: This software is primarily to create a Book Catalog using barcode data from the freely available cuecat(tm) bar code reader. It will use a RDBMS

backend database, and allow synchronization between different library branches.

g) **Koha Open Source Library System**: It was claimed as worlds first Free Open Source Library System. The Horowhenua Library Trust and Katipo Communications Ltd in New Zealand developed this software. The Koha system is used in cataloguing, circulation and acquisitions system of a library.

h) **ITIL Library Management System**: Library Management System is a workflow application which aims at automating various library functions encompassing Member Registration, Requisitions for New Items & their Approval, Accession & Cataloging of library items, Reservation/ Issue / Return of library items, Order Generation and maintenance of details pertaining to Inter-Library Loans, Bills, Orders and Vendors. It requires Lotus Notes Domino server.

i) **Mylibrarian**: This is an integrated suite of school library books management software targeted at secondary schools. The language used is totally Microsoft Visual BASIC 6.0 and Microsoft SQL 2000 server.

j) **Mylibrary**: MyLibrary is a user-driven, customizable interface to collections of Internet resources-a portal. Primarily designed for libraries, the system's purpose is to reduce information overload by allowing patrons to select as little or as much information as desired for their personal pages.

k) **OpenBiblio**: OpenBiblio is an Open source library software written in PHP containing OPAC, Circulation, Cataloguing and Staff administration. It is good for small school and public libraries. It requires MySQL, PHP and works on both Linux and Windows platforms.

l) **OpenBook Open Source Library System**: OpenBook is full feature open source library system developed for use of small school and public libraries. It has been developed based the original Koha open source library system of New Zealand. At present it consists of three modules viz. OPAC, Cataloguing and Circulation. All the modules are web-interface based. It works on Linux O/S with Apache, Perl and MySQL.

m) **Open-ILS**: It is website of an open source Integrated Library System (ILS), named Evergreen. This software is being developed and maintained by the Georgia Public Library Service for use by the Georgia Library PINES Program, a consortium of 249 public libraries. This software can be downloaded for free, and anyone can contribute to development efforts.

n) **PhpMyLibrary**: PhpMyLibrary is an open source web-based library software having cataloguing, circulation, webOPAC, file management modules, etc. It also supports import of data from ISIS databases. It requires PHP and MYSQL.

o) Python Simple Library Circulation System: The software useful for carrying out circulation activities of the library.

p) **Research Guide**: This software helps librarians to build web-based subject guides.

q) **Seansoft Library Loan Management System 1.17B**: It is very much suitable for school library. Each student can have a login, from which they loan books. Keeps track of weeks loaned and will alert a supervisor of overdue books. It has mail merge facilities to produce letters to individuals or a list for a notice board. Also features backup and basic repair facilities for the database.

r) **WebLis**: WEBLIS is a free-of-charge Web based Library Integrated System based on CDS/ISIS. Presently it has Cataloguing system, OPAC (search), LOAN module and Statistical modules.

s) **CUFTS**: CUFTS is an open source (GPL) OpenURL link resolver designed for use by library consortia. It supports multiple sites from one server, online management tools, usage statistics, and includes a knowledgebase.

9.3 Operating Systems

a) **Linux**: Lists FTP sites, which offer the Linux Kernel, assorted distributions, software applications, drivers, documentation, and more. Although Linux is "free", not all distributions are free for the taking. Some versions may be downloaded at no charge.

b) **Sun Solaris 8**: Now one can use Solaris[tm] 8 Operating Environment at home or at work without a license fee but by paying only the cost of media plus shipping.

9.4 Programming Languages

a) **Java 2 Platform Standard Edition Ver 1.3**: It provides cross-platform compatibility, safe network delivery, and smartcard to supercomputer scalability. It is available for Solaris, Linux and Windows platforms.

b) **Perl**: Perl is a high-level programming language with an eclectic heritage written by Larry Wall and a cast of thousands. It derives from the ubiquitous C programming language and to a lesser extent from sed, awk, the Unix shell, and at least a dozen other

tools and languages. Its binary distributions are available for Unix, Linux, Win32 and Macintosh

c) **PHP**: It is a widely used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML.

9.5 Relational Database Management Softwares [RDBMS]

a) **Abria SQL Lite**: Abria SQL Lite provides all the tools needed to develop web-database applications in a quick and easy installation. Abria SQL Lite includes MySQL, Apache Web Server, Perl, PHP, and phpMyAdmin.

b) **MySQL**: The SQL part of MySQL stands for "Structured Query Language" - the most common standardized language used to access databases. MySQL is a client/server system that consists of a multi-threaded SQL server that supports different backbends, several different client programs and libraries, administrative tools, and a programming interface.

c) **PostgreSQL**: PostgreSQL is a sophisticated Object-Relational DBMS, supporting almost all SQL constructs, including sub selects, transactions, and user-defined types and functions. It is the most advanced open-source database available anywhere. Commercial Support is also available.

10. CONCLUSIONS

This essay has described what OSS is and it compared OSS to the principles of librarianship. OSS provides the means for the profession to take greater control over the ways computers are used in libraries. OSS is free, but it is free in the same way freedom exists in a democracy. With freedom comes the ability to manifest change. At the same time, freedom comes at a price, and that price is responsibility. OSS puts its users in direct control of computer operations, and this control costs in terms of accountability. Be realistic, OSS is free, but not without costs.

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Open Source Softwares and Their Applications in Libraries

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ABSTRACT

The paper discusses historical background of open source software development with its concept, certification standard, salient features. This paper identifies the benefits of using the open source software, in general. It highlights on some open source software for libraries and their usage in Indian Library and Information Centers. The on-going use of open source software at Visva-Bharati Library is also discussed in this paper.

1. INTRODUCTION

Open source software has created an increasingly high profile in the field of library and information science management profession since 1999. It was due to an assemblage of 80 senior American academic library managers. In that meeting, three "keystone principles" were accepted to set a foundation for future developments of library services.

"The Keystone Principles invoke and express the urgency of three areas requiring explicit action based on a vivid set of user-centered principles". Out of these, principal two was regarding 'Open software', which stated the matter as: "libraries are responsible for creating innovative information systems for the dissemination and preservation of information and new knowledge regardless of format". It had an action item for libraries that to "create interoperability in the systems they develop and create open source software for the access, dissemination, and management of information"[1].

Members of the library and information science professionals continued this discussion to have a high level of interest in respect of open source software and for that over 200 articles and conference papers were published on describing specific library projects during four years after the first meeting held on September 1999.

2. OPEN SOURCE SOFTWARE: THE CONCEPT

Open source generally refers to a program where source code is available to the general public for their use and/or modification from its original design without paying any charge for that. Open source code is typically created as a collaborative effort in which programmers improve upon the code and share the changes within the community. Open source software helps programmers on the Internet read, redistribute and modify the source code, forcing an expedient evolution of the product. The process of eliminating bugs and improving the software happens at a much quicker rate than through the traditional development channels of commercial software as the information is shared throughout the open source community Thus uses of open source software in various applications have been increased at a very high rate. The application field of library and information science has no exception of it [2].

2. OPEN SOURCE SOFTWARE: DEFINITION

One website defines 'Open Source' as: "Open source promotes software reliability and quality by supporting independent peer review and rapid evaluation of source code. To be certified as open source, the license of a program must guarantee the right to read, redistribute, modify, and use it freely"[3].

According to International Encyclopedia of Information and Library Science "Open source software is available free of charge, and includes both the source code and the compiled version. Developers who accepts the open source concept believe that software is a common good that should be shared rather than sold or profit, and that it can best be adapted, improved and re-bugged by its users. To make this possible the users need access to the source code"[4].

Dictionary for Library and Information Science defines Open source as: "A computer program for which the source code is made available without charge by the owner or licenser, usually via the Internet, to encourage the rapid development of a more useful and bug-free product through open peer review. The practice also allows the product to be customized by its users to suit local needs (example: Linux operating system). To be certified "open source" under the Open Source Initiative (OSI), software must meet certain established criteria that include no restrictions on access"[5].

3. OPEN SOURCE SOFTWARE: CERTIFICATION

A certification standard issued by the Open Source Initiative (OSI) that indicates that the source code of a computer program is made available free of charge to the general public. The rationale for this movement is that a larger group of programmers not concerned with

proprietary ownership or financial gain will produce a more useful and bug -free product for everyone to use. OSI dictates that in order to be considered "OSI Certified" a product must meet the following criteria:

- The author or holder of the license of the source code cannot collect royalties on the distribution of the program
- The distributed program must make the source code accessible to the user
- The author must allow modifications and derivations of the work under the program's original name
- No person, group or field of endeavor can be denied access to the program
- The rights attached to the program must not depend on the program's being part of a particular software distribution
- The licensed software cannot place restrictions on other software that is distributed with it.

4. OPEN SOURCE SOFTWARE: SALIENT FEATURES

It has been realized from the above discussion that the Open Source Software has some special features. Dipen Deka [6] has also identified these special features as under:

- Open Source Software is normally created and maintained by developers crossing institutional and national boundaries, collaborating by using internet-based communications and development tools.
- Products are typically a kind of "free", often through a license that specifies that applications and source code are free to use, modify, and redistribute as long as all uses, modifications, and redistributions are similarly licensed.
- Successful applications are tend to be developed more quickly and with better responsiveness to the needs of users who can readily use and evaluate open source applications because they are free.
- Quality, not profit drives the open source developers who take personal pride in seeing their working solutions adopted.
- Intellectual property rights to open software belong to everyone who helps to built it or simply uses it, not just the vendor or institution that creator of the software.

5. OPEN SOURCE SOFTWARE: USERS RIGHTS

The 'Open Source Software' by definition is a 'bill of rights' for the computer user. Programs like the *Linux* operating system and Netscape's web browser have become extremely popular, displacing other software with more restrictive licenses. Several companies that use Open Source

software have the advantage of its very rapid development, often by several collaborating companies, and much of it contributed by individuals who simply need an improvement to serve their own needs. Programmers feel comfortable contributing to Open Source because they are assured of these rights:

- The right to make copies of the program, and distribute those copies.
- The right to have access to the software's source code, a necessary preliminary before you can change it.
- The right to make improvements to the program.

6. OPEN SOURCE SOFTWARE: LIBRARY USAGE

Libraries in India like other parts of the world having used Open Software for several purposes: for house keeping, content creation, managerial functioning, etc. Libraries are using these only for their great advantages. Some of the advantages are:

- Start-up cost is very low, which attracts librarians for introduction of IT applications to different libraries;
- Open Software licenses mean that software can be run on multiple machines (or at home or on laptops) with no extra licensing fees. So it is beneficial for the intranet library operations and uses;
- Open Software acts as quick problem solver mechanism by exploiting many libraries experience in comparison with commercial integrated library system software, which is very slower to develop and expensive to upgrade;
- Open Software includes more flexibility and thus has a better match to libraries' requirements
- Open Software has need-driven development process, where as commercial software has market driven process. [7]

Like different service organizations Open Source Software are available for libraries. Currently available Open Source Software library-related applications, which include not only integrated library management systems but also include a wide range of innovative functionalities, such as: data capturing, storing, indexing, preserving, distributing, etc. Some of the popular library Open Source Software has already been identified as: a) DSpace, b) Greenstone, c) Koha, d) MyLibrary, e) Avanti, f) Eprints, etc.

6.1 Indian Scenario

Open Source Software has increasingly been popularized in Indian libraries. Some of higher educational institute libraries and information centers have extensively using different Open Source Software for managing their libraries. Indian libraries have also used this Open Source

Software for building up their digital libraries. The DSpace software has been used by DRTC, ISI, Bangalore; IIT, Delhi; INFLIBNET, Ahmedabad; National Chemical Laboratory; NIT, Rourkela; IIT, Kharagpur, etc. The Greenstone software has been used in IIT, Bombay library. The IISC, Bangalore and National Informatics Centre have been used the Eprint software. The software is used by Vidyasagar University on trial basis.

6.2 Open Software and Visva-Bharati Library

Visva-Bharati Library is now using Open Source Software LINUX Red Hat as operating system and also using proprietary Software Libsys 4 (Unicode) for the management of its library system. Visva-Bharati Library is also using Avro open source software for transcription of Bengali interface this particular proprietary software Libsys 4 (Unicode). The Library is taking regular updating for using Avro open source software, which helps much in respect of library housekeeping and operation. The Visva-Bharati Library has now been using both the proprietary and open software in combined form very well and thus three modules i.e. Cataloguing, Circulation and OPAC (now in intranet) of the Libsys 4 (Unicode) software have been functioning successfully. The following figure will show this combined use of open source software and proprietary software at Visva-Bharati Library.

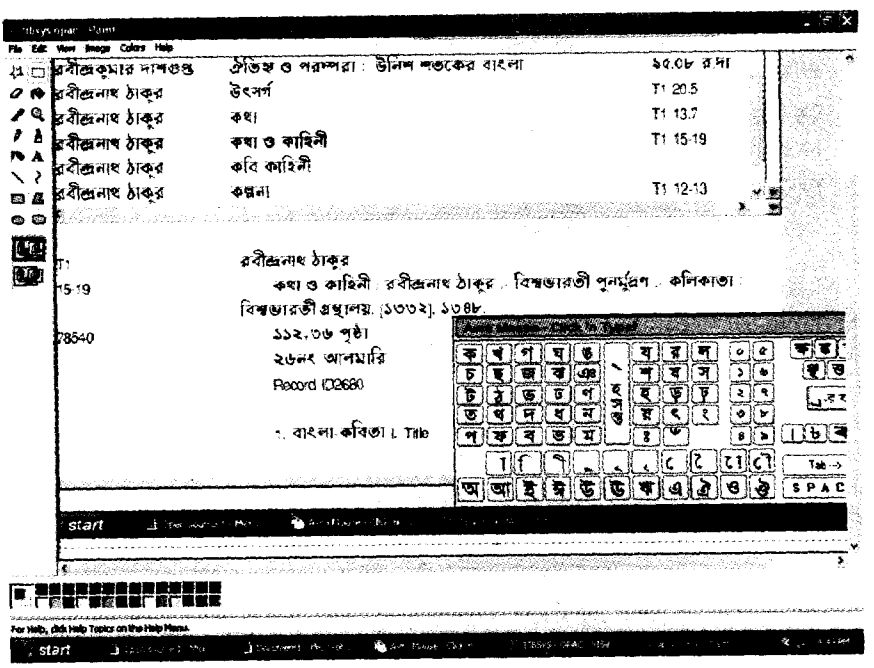


Figure 1: Use of Open Source Software and Proprietary Software (in combined form) at Visva-Bharati Library

7. CONCLUSION

Some debates exist for and against in respect of Open Source Software applications in different organizations. Some opine that there is a risk to use Open Source Software even though the initial cost is zero, supporting the software over its lifetime may involve considerable costs, and organisations may find it difficult to estimate these costs when the software is initially adopted. Again, in case where more control over the software's is necessary for the shake of organization's security, freely future development may perceive risks of using the Open Source Software.

But some believe that the most reliable indication of the future of Open Source is its tremendous growth. They argued that in just a few years, Open Source Software movement has gone from nothing to a robust body of software that solves many different problems and is reaching the million-user count. There's no reason for discarding it for implementation to different organizations including Library and Information Science organizations.

Bretthauer notes that this is not a risk for using open source software and he also comments that vendors of proprietary software can "withdraw the product, discontinue its support, go out of business, and/or can be acquired by another vendor who can do any of the above" [8]. Members of Open Software community often set up mutual support mechanisms, sometimes based on an email discussion list. It is possible for another organisation to take on the role of project "co-ordinator" if the project originator is unable to continue in the role. This has happened with the MyLibrary project, with support shifting from North Carolina State University to Notre Dame University when the project's main developer, Eric Lease Morgan, changed jobs.

In conclusion, it can be argued that adopting Open Source Software for management of libraries and information centers are increasing in India and the World. The success factors for adopting open source software in library organization require the same type of evaluation as purchasing commercial software. Libraries, in India, may think of adopting Open Source Software for their house keeping and other managerial applications.

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The Open Source Movement: Solution for Crisis in Scholarly Communication

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ABSTRACT

Communication of results of research is and has been an integral part of science. The single most important player in this process of scholarly communication has been the Scientific Journals. Unfortunately in recent decades a situation has arisen in which this vehicle, which was designed to help scholarly communication, has itself become a barrier. Open source movement has been thought of as a mechanism to overcome this crisis in scholarly communication system. This paper will try to explain the characteristics and the role of open source movement in the crisis in scholarly communication.

1. INTRODUCTION

The scholarly communication crisis has become a major concern in the academic and research community. To further the development of knowledge, scholars require access to relevant scholarly literature. Increasingly, this literature is interdisciplinary, global, expansive, digital, and hidden behind technical walls to comply with license restrictions. It is also burgeoning. Along with these, at the same time library budget is going to decreased. For this reason it is not possible for accessing the scholarly journals by these libraries. Thus the scholarly communication crisis has come into the scenario. To face this situation the open source movement has to be introduced.

Open Access, Open Source Software, and Open Standards are three concepts that played an active role in open source movement.

Open Access is seen by some as a possible solution to the increasing price of serials and as a way for governmental funding agencies to receive a better return on investment.

Open Source Software can benefit libraries by lowering initial and ongoing costs, eliminating vendor lock-in, and allowing for greater flexibility.

Open Standards allow for interoperability to exist between diverse library resources, eases data migration between systems and makes possible archiving and preservation of e-resources. [1] [13]

2. SCHOLARLY COMMUNICATION

For more than a decade the cost of print and electronic journals, particularly in the sciences, has increased rapidly. At the same time the amount of research that being reported via published articles has grown exponentially with academic libraries being less and less able to purchase the journals needed for their users.

Scholarly communication may be defined as the system through which research and other scholarly writings are:

- Created
- Evaluated for quality
- Edited
- Disseminated to the scholarly community
- Preserved for future use [2]

3. SCHOLARLY COMMUNICATION AS A SYSTEM

We can say that scholarly communication as a system, because we know that system composed of so many inter-related subsystems within a same environment. In this case also we see that scholarly communication consist of some correlated subsystem such as:

- Creation
- Quality control
- Production
- Distribution
- Consumption
- Support

  - Creation, the key component of the model, is the domain of scholars.
  - Quality control, the editorial process through rigorous peer review, is also the responsibility of scholars.
  - Production is the job of the publishers.
  - Distribution is handled by both libraries and publishers, with libraries disseminating the finished publication to most readers.
  - Consumption is also the domain of scholar along with students and nonscholars.
  - Underlying the system is the support provided by institutions, such as universities, government, granting institutions and taxpayers. [3]

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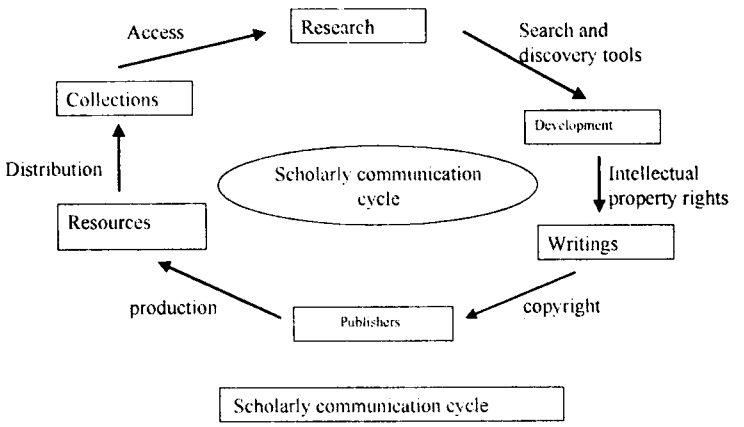
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4. FRAMING THE SCHOLARLY COMMUNICATION CYCLE

Scholarly communication follows a cycle. Between each steps in the cycle there are some issues that influence each segment of the cycle. Although any starting point in the cycle will work, for this discussion I will start with research.



4.1 Research

It is defined as work done by scholars for promotion, teaching, professional development or social goods. Most scholars are faculty members.

4.2 Development

As the research continues, the idea develops. It is presented at conferences; seminars, workshops etc and working papers are sent around the colleagues.

4.3 Writing

The next step is putting fingers to keyboard and writing the manuscript. This is done by scholars when they are ready to submit their works to a print or electronic publication. At this stage they have complete control over their intellectual properties.

All their sweet and hard work in the creation of their articles or books becomes a commodity called copyright, which has an economic value can be traded.

4.4 Publisher

A publisher takes or buys that copyright material and distributes it to the world.

Commercial and nonprofit publishers traditionally provide the services and production necessary to distribute books and journals in print or over the Internet. This production includes managing the peer-reviewed process and the resubmissions by the original authors, as well as editing the work and coordinating all the logistics of the operations.

4.5 Resources

Publishers produce Resources such as journals, books, websites, and other methods of documenting scholarly communication. This resource is the last product on which authors develop their reputations. It becomes a record in their fields of study, available for others to build upon. Publishers, and aggregators distribute these resources.

4.6 Collections

The resources are destined for collections. The most obvious examples of collections are libraries, but there are also commercial databases, institutional repositories, personal collections of scholars, and other places that hold knowledge. Libraries collect from distributors and act as points of access for scholars doing research. [4]

5. CRISIS IN SCHOLARLY COMMUNICATION: -

The scientific journals played a vital role in the process of scholarly communication. We can categorize the functions of scientific journals in two broad sections these are:

- It served to show the faith of the scholarly community in the need for sharing information and knowledge for enhancing knowledge and science by serving as a tool for dissemination of results of scientific research
- It also helped the scholar(s) to achieve recognition among members of the peer group. It helped to establish the researchs' claim to a piece of research and also enabled other researchers to built upon this and carry the research forward.

In the system of scholarly communication scientific journals is one of the main components.

In this system, the creators means the scholars or scientist they produce some nascent information in their own field and the cause behind it is to distribute those information globally and behind this total process they have only one expectation that to reach these information right hand at right time nothing more than that, not any monitory interests also.

Unfortunately in recent decades a situation has arisen in which this vehicle that was designed to help scholarly communication has itself

become a barrier and create problems in proper scholarly communication.

We can see these problems at a glance: -

- ❖ World production of published materials continues to increase
- ❖ Cost of research publications continue to inflate unprecedented rates.
- ❖ Acquisitions budgets have not kept pace with inflation, particularly for journals.
- ❖ More expensive commercial publishers taking over from academic/ society publishers.
- ❖ Electronic production, storage and distribution of research information of growing importance. [5]

Open source movement has been thought of as a mechanism to overcome this crisis in scholarly communication system.

To achieve open access to scholarly communication, we can acquire two complementary strategies:

5.1 Self-Archiving

When authors make their articles freely available in digital from on the Internet, they are said to be "Self-Archiving".

5.2 Open-access Journals

Open access journals are primarily electronic journals (print editions are sometimes offered as an optional fee-based add-on)[6]

6. OPEN SOURCE MOVEMENT

We can define open source movement, as "The open source movement is an offshoot of the free software movement that advocates open-source software as an alternative label for free software, primarily on pragmatic rather than philosophical grounds."

For knowing open access movement properly we have to know about open access, open standards and open source software. [7]

7. OPEN ACCESS

Open access is generally defined as online access to scientific and scholarly research free of charge.

The Budapest Open Access Initiative stated that "open access would permit users to read, download, copy, distribute, print, search, or link to the full texts of works, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose. Without financial,

legal or technical barriers other than those inseparable from gaining access to the Internet itself"

➢ **USER'S ASPECT**

Its free availability on the public internet permitting any users to read, download, copy, distribute, print, search or link to the full texts of these articles, crawl them for indexing, pass them as data to software or use them for any other lawful purpose without financial legal or technical barriers other than those inseparable from gaining access to the internet itself. (Source: Budapest open access initiative, 2002)

➢ **AUTHOR'S ASPECT**

The only constraint on reproduction and distribution, and the role for copyright in this domain, should be give authors control over the integrity of their work and the right to be properly acknowledgement and client. (Source: Budapest open access initiatives, 2002) [8]

8. NEED OF OPEN ACCESS

- ❖ Day by day the cost of published literature in print medium is increasing.
- ❖ The budget or funds are very limited and with that little money it is impossible to access such type of scholarly document.
- ❖ To acquire such scholarly document we have to face so many legal barriers.[9]

To solve these problems open access is needed.

9. OBJECTIVES OF OPEN ACCESS

The objectives of open access are:

- o To remove the barriers to access: price barriers such as cost of subscription, licensing, per article fees etc
- o Barriers to use: restrictions imposed by copyright or license agreements [9]

10. OPEN ACCESS: 3 PILLARS

Open access may be considered as borne on three pillars: -

- Open access publishing
- Open access archiving
- Open access support/advocacy

These pillars are integral in creating sustainable open access to scholarly communication.

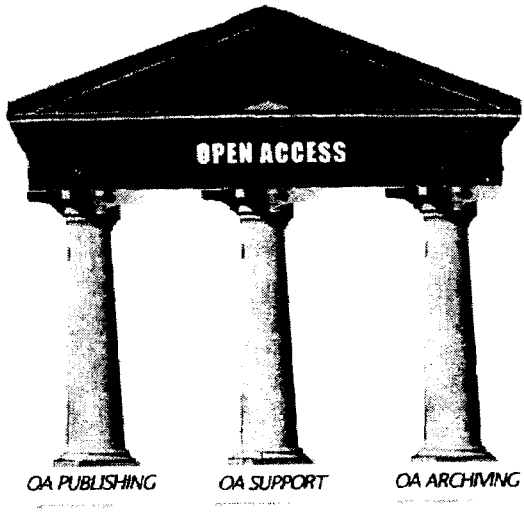


Fig: Pillars of Open Access

10.1 Open Access Publishing

An open access publication is a publication that provides immediately free online access to all users worldwide.

10.2 Open Access Archiving

Open Access archiving offers immediate solution to the need to free scholarly communication from the shackles of access barriers.

10.3 Open Access Support

Different institute, universities, government, tax-payers etc provide support to open access. [10]

11. MECHANISMS FOR OPEN ACCESS: -

Several mechanisms are in use to provide open access to scholarly material. Scholarly resources accessible via more than one open access mechanism have a much greater chance of reaching the end users than what is made available via single channel. Each channel also serves a different purpose.

11.1 Domain-specific/Institutional/Material-Specific Repositories

Authors Deposit e-copies of their research publications in an OA repository
e.g. arXiv
Indian Institute of Science
Librarians' Digital Library (LDL) (DRTC)
Vidyanidhi (University of Mysore)

11.2 Open Access Periodicals

Complete and unrestricted access to web-based OA journals
e.g. D-Lib Magazine
PLoS Biology
PLoS Medicine

11.3 Limited Access

Conventional periodicals that allow open access to certain sections of their issues (but not all the items in the issue)
e.g. Nature

11.4 Delayed OA Version

Periodicals going open access after a specified period of time from the date of publication
e.g. HighWire Press (Stanford University)

11.5 Dual Mode

Subscription-based print-on-paper edition along with OA online edition
e.g British Medical Journal [11]

12. MODELS OF OPEN ACCESS

The most important point of the arguments in the open access is about sustainability of the model.

Generally there are three types of models, which could support access to metadata (bibliographic records) and the associated scholarly digital resources:

- Centralized model
- Distributed model
- Harvesting model

12.1 Centralised Model

Under this model, authors would deposit their e-prints in a central archive. The service would have a service provider of its own, which would provide the interface through which readers would search, browse and retrieve articles. Other service providers would also expose the metadata from these articles via OAI- PMH, SRW/SRU and RSS for use.

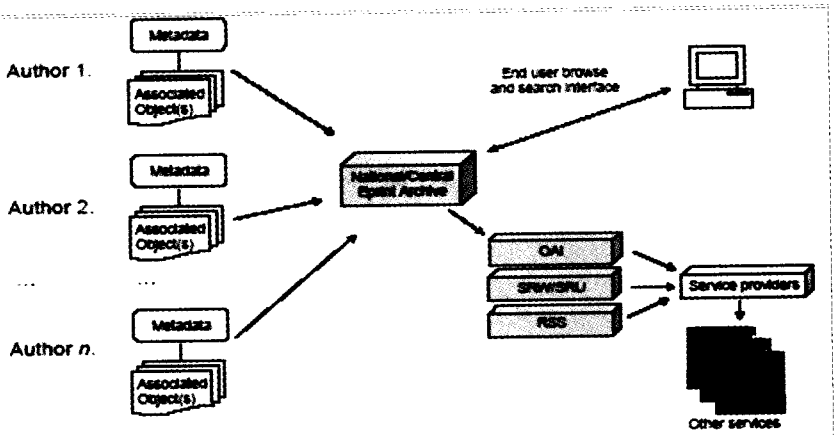


Figure 1. The centralised model

12.1.1 Advantages of this model

- Be able to standardize the protocol used,
- Be able to select the archive software
- Be able to manage preservation issues,

12.1.2 Disadvantages of this model

- It is an expensive option
- It is not reasonable or practical to expect open access journal publishers to submit articles they publish directly into a central archive.

12.2 The Distributed Model

In this model proposed services would obtain metadata in real time, as the user asked for it, and point the user at the digital resource, which would be located in a distributed archive. The services would cross-search all available archives, using the z39.50 protocol, or SRW/SRU, and present the results to the user.

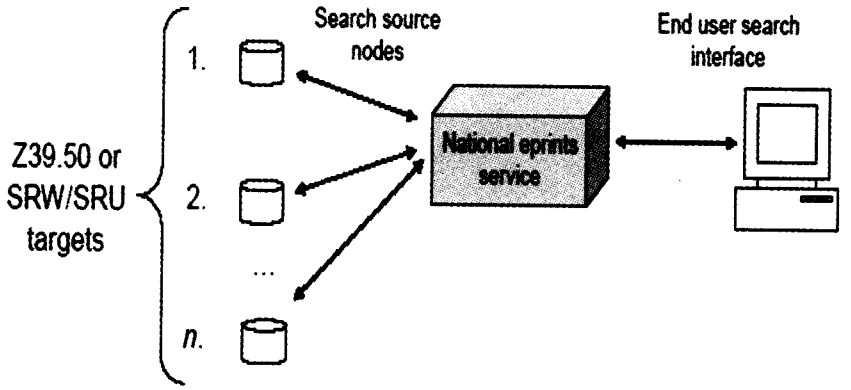


Figure 2. The distributed searching model

Fig: Distributed model

12.2.1 Advantages of this model

- There is no replication of metadata required
- The metadata retrieved are always current
- It provides a consistent look and feel for searching and retrieving
- It is cheap to implement

12.2.2 Disadvantages of this model

- This model does not permit any improvements to be made in the management of e-prints and open access journals.
- It does not permit enhancements to the metadata.
- As the number of sources to be searched increases, performance decrease.
- It can only work as fast as the slowest server in the group of archives it is searching.

12.3 Harvesting Model

This model is a variant of the distributed model in which the harvested metadata are first improved, standardized or enhanced before being made accessible to users and service providers.

In this model the proposed service would harvest and store metadata from available e-print archives and open access journals, using the open archives initiatives protocol for metadata harvesting. The service would have a service provision component of its own, which would provide the interface through which readers would search, browse and retrieve articles.

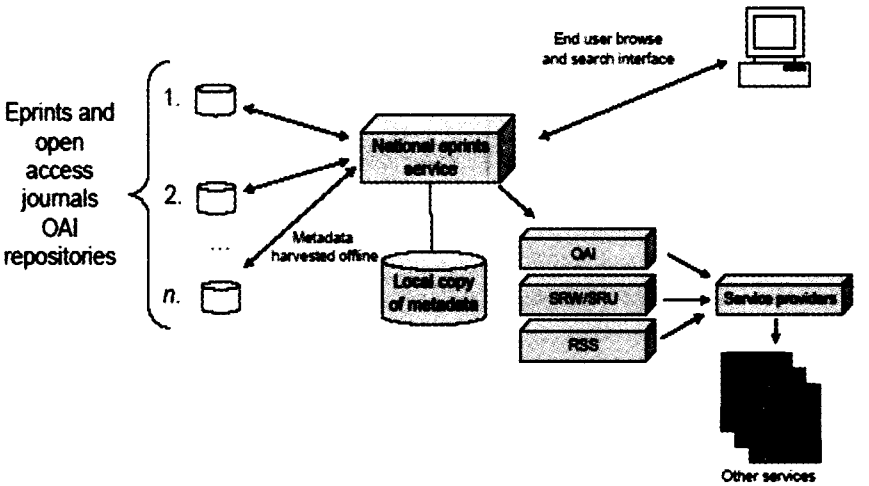


Figure 3. The harvesting model

Fig: Harvesting model

12.3.1 Advantages of this model

- The OAI-PMH is a standard protocol, which is easy to implement.
- Much of the harvesting can be carried out by automatic schedules tasks.
- It is a low cost option. [9]

13. EXAMPLES OF OPEN ACEESS MODEL

- SPARC (Scholarly Publishing and Academic Resources Coalition)
- ARROW (Australian Research Repositories Online to the World)
- BioMed Central / BioOne
- Electronic Publishing Trust for Development
- Springer Publishers Open Choice
- PLoS (Public Library of Science)
- Open Access Resources
- LDL (Librarians Digital Library)/Sdl (Search Engine Digital Library) [11]

15 .OPEN SOURCE SOFTWARE

In a simple meaning Open source software developed by uncoordinated but loosely collaborating programmers, using freely distributed source code and the communications infrastructure of the Internet. [12]

So the uses of open source software are too much but as information professional we have to know the importance of this in the field of library and information centers.

16. LIST OF SOME OPEN SOURCE SOFTWARE USED IN DRTC

LDL: Librarians Digital Library
SDL: Search Digital Libraries
Brass: Z39.50 server
DLRG: Digital Library Research Group
Manu – Thesaurus Construction
Pygmalion – MARC Retro conversion
Prometheus – POPSI generator
Viswamitra – CC classifier
Vyasa – CC Classificationist
Brass – Multilingual Z39.50 server [13]

17. NEED OF OPEN SOURCE SOFTWARE IN LIBRARY AND INFORMATION CENTRES: -

- Freely access
- Reduce library budget
- Help in collaboration
- Help in bridging digital divide. [14]

18. OPEN ACCESS STANDARDS

Open standards are publicly available and implementable standards. By allowing anyone to obtain and implement the standard, they can increase compatibility between various hardware and software components, since anyone with the necessary technical know-how and resources can build products that work together with those of the other vendors that base their designs on the standard. [15]

Definition:

An open access standards is more than just a specification whose description is freely available.

Briefly describes–

1. Open standards are technology specifications
   ---- developed collaboratively
   ---- followed universally
   ---- address common requirements and goals.

Why

- Optimize options of products & components
  Multiple vendors offering the same interfaces
  Mix & Match possible due to 'Hot Swappability'
  Choices can be made incrementally

- ❖ Reduce Risk
  - Vendor independence
  - Assurance of continued support in future
- ❖ Reduced Cost
  - Lower costs due to competition
  - Reduced cost of changing products/vendors
  - Shorter learning curve
- ❖ Inter-operability
  - Components with standard interfaces
  - Simpler & quicker integration
  - Integration across the entire chain of internal departments, external entities, customers, departments
- ❖ Higher Quality resulting from
  - Open competition
  - Broader participation of peer groups
  - Early identification & resolution of bugs [13]

19. CONCLUSION

OA movement signifies the democratization of knowledge and supports a socially responsible way to distribute knowledge. OA movement makes the same knowledge and information available to scholars in wealthy, first world nations in developing ex-communist, second-world nations, and in underdeveloped third-world nations. OAI and the existence of open archives repositories are evidence of growing desires, worldwide, for an equal and democratic distribution of resources between have and have-not nations. OA archive and journals are evidence that the world is moving in the direction of democratization of information and knowledge by removing access restrictions in the form of copyright protection or free-based dissemination policies. Individual scholars must decide when and how to maintain copyright of their articles and where to publish their research.

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Institutional Repository for Scholarly Communication

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ABSTRACT

This paper presents an overview of Institutional Repository (IR) for scholarly communication. Previously IR was called documentation, but after introducing of digitization the theme is change IR. Institutional e-print repository offers a strategic response, a systematic problem in the existing scholarly journal system. This article further discusses the repository and IR, historical prospective, contains, purposes, steps, elements, marketing of IR, software for IR, DSpace and E-Print.

Keywords: Institutional Repository, Dspace, E-Print, Open Access Initiatives, Digital archives.

1. INTRODUCTION

Institutional archives are developed, maintained and administered by an organization or scholarly society, commonly by institution, such as universities, R&D institutions, libraries and museums to other universal e-print access facilities stored in there servers. "An institutional repository is an online locus or collecting and preserving in the digital form the intellectual out put of an institution, particular a research institution ".The main purpose of an institutional repository is to bring together and preserve the intellectual out put of a Laboratory, Department, University and other entity. The incentive and commitment to change the process of scholarly communication have also begun serving as strong motivators.

2. REPOSITORY AND INSTITUTIONAL REPOSITORY: CONCEPTS

According to Oxford Advance Learner Dictionary Repository means "a place where large number of things can be kept or stored."

A definition on the web (www.enwikipedia.org)," a repository is central place where data is stored and maintained. A repository can be place where multiple database or files are located for distribution over a

network or repository can be allocated that directly accessible to the web cases without having to travel across a network".

• Institutional repository comes earlier while an institution preserve the document in such a way to retrieved and use as their needs. Previously it was called as documentation, but after introducing of digitization, the documentation has changed itself as an institutional repository or repository (*http://en.wikipedia.com*).

3. INSTITUTIONAL REPOSITORY: HISTORICAL PERSPECTIVE

A repository is a central place where data are kept for future use. In 1988 Peter Drunk's Harvard Business Review articles entitled, "The coming of the new organization" focused that an organized knowledge is the most important asset and to manage that asset as well, to ensure the organizational success.

By 2000, it was becoming easier for individual and group to disseminate contents, using desktop tools and networking which challenged universities to coordinate, share and preserve the digital assets.

In 2002, two seminar events occurred, when the Massachusetts Institute of Technology (MIT) collaborated with Hewlett Packard Corporation to lunch an open source institutional repository, entitled Dspace and the Scholarly Publishing and Academic Resources Coalition (SPARC).

In 2003, it funding from Andrew W Mellon foundation and other sources, MIT Dspace was replicated and the software released under an open sources arrangement, greatly lowering cost and a expanding development (*http://en.wikipedia.org/wiki/repository*).

4. INSTITUTIONAL REPOSITORY: CONTAINS

All sorts of institutional repository content the documents which are needed to preserve in scientific manner to get the document as the need. Institutional repository can be set only following materials:

- Pre prints of article on research report submitted for publication;
- Text of the journal article accepted for publication ;
- Revised text of the published work with comments from academic readers ;
- Conference paper;
- Teaching materials;
- Student project;
- Doctorial theses and dissertation;

- Committee papers;
- Computer Software;
- Work of art;
- Photograph and Video recording
  (*http://www.dlib.org/november12/smith/o1authors.html*).

It is important to obey the rule of intellectual property right (IPR) or copy right. To avoid the legal harassment the repository can include the pre-print article and most of the cases it should refer the sources and courtesy of the document.

5. INSTITUTIONAL REPOSITORY: PURPOSE

A repository is build on the base of patron organization to established a repository. The authority has to consider the objectives of the institution. Which think will be included and who are the communities can use the deposited materials that is important to chalk out first. Actually IR is an asset of an institution which provides:

1. Open access to institutional research out put by self archiving;
2. Institutional assets, including unpublished or pre-print vulnerable literatures;

Maharana (2005; p.581) cited CROW that, IR have two main rationales such as:

3. Scholarly publishing paradigm;
4. Institutional visibility and prestige *(Maharana B.et.al; 2005; p.581).*

6. INSTITUTIONAL REPOSITORY: STEPS

The following steps are the major milestones encountered in building an institutional repository:

i. Learning about the process by reading about and examining other IR;
ii. Developing a service definition and service plan:
   - Conduct a needs assessment of your university;
   - Developing a cost model based on this plan;
   - Create a schedule and time line;
   - Develop policies that govern content acquisition, distribution & maintenance.
iii. Assembling a team;
iv. Technology chooses & install software platform;
v. Marketing;
vi. Lunching a service;
vii. Running a service
   (*http://www.aridane.ac.uk/issues/eprint archives/intro.html*).

7. INSTITUTIONAL REPOSITORY: ELEMENTS

An IR is a digital archive of the intellectual product created by the faculty, research staff, and student of an institution and accessible to end-user both within and out side the institution. According Crow, the IR carry the following elements:

7.1 Institution defined

In this way, it represents the historical and tangible and intellectual assets and out put of an institution.

7.2 Scholarly content

The goals of establishment of an institution, an IR could contain any work product generated by the institutional faculty, student, non-faculty, researcher and staff.

7.3 Cumulative and Perpetual

That the content collected is both cumulative and maintained in perpetually.

7.4. Open & interoperable

The IR must be open access and IR system must be able to support interoperability in order to provide access with the help of search engine (Maharana B; 2005; p.582).

8. INSTITUTIONAL REPOSITORY: MARKETING

Other words to do some marketing to advertising the service on campus. Some academic are already aware of the benefit of IR, others less well versed the new technology and the ways it can help them manage digital assets. Still others are unaware that their work is risk as it currently managed.

8.1 Administration

Advocacy with in the host institution is vitally important for sustainability.

8.2 External audiences

The institutional repository welcomes recognition in the press that coverage is correlated with an increase in both submitter and end-user in exiting institutional repository. The group include both academic and central administrator such as:

- Institutional publication;
- Coordination with University public relation office;
- Web site development;
- User feedback session;

- Academic advisory group (*http://www.opensource.org/pressreleases/tiemann_press.php*).

9. SOFTWARE FOR INSTITUTIONAL REPOSITORY

Each institutional repository platform has unique strengths. This document outlines the technology choices and the software platforms available to you.

9.1. Software developer/ Distributor

- Free vs commercial software;
- Open source vs Proprietary;
- Technical support available:
  - For fee vs free;
  - By phone;
  - By mail;
  - Via online forums.

9.2. Institutional Repository Software Platform

The landscape of software platform for building IR is constantly changing. Following are the major features & benefits of leading IR software platforms:

- ARNO
- CDSware
- DSpace
- EPrints
- Fedora
- i-Tor
- MyCoRe

10. DSPACE (OPEN SOURCE DIGITAL LIBRARY SYSTEM)

Most of the repositories were like open source information repository software like Dspace. Like IR which may be called an extension of a digital library is now becoming a platform for the sharing of knowledge.

Dspace was initially developed by Hewlett Packard and MIT libraries in collaboration. The objective was to create a package that could provide an IR, which address the problem of digital preservation as a central theme. Therefore Dspace was designed as an open source application and organization could run it relatively few resources. The intention to support interoperability led to the adoption of the open archive initiative protocol for metadata harvesting (OAIPMH).

The application itself provides ways capturing, storing, indexing, preserving and disseminating digital objects (*http://dspace.org/introduction/index.html)*.

10.1 Function of Dspace

Research institution world wide used Dspace to meet a variety of digital archiving needs:

A. Institutional repositories;
B. Learning objects repositories;
C. E-theses;
D. Electronic record management;
E. Digital preservation;
F. Publishing.

10.2 Services of Dspace

The Dspace services divided in to two main areas:

i) Core services and
ii) Premium services.

10.2.1 Core Services

Which are available at no charge to communities member and consumers of Dspace content and Dspace core services of two distinct but interconnect services elements, interactive services and operation services.

10.2.2 Premium Services

Which are specialized service designed to meet the extra ordinary needs of community members and may be offered on a fee for service basis. The premium service has identified in to the following categories:

- E-conversion services;
- Metadata services;
- Custom repository services;
- User reporting service (*http://.Dspace.org/implement/leadirs.pdf*).

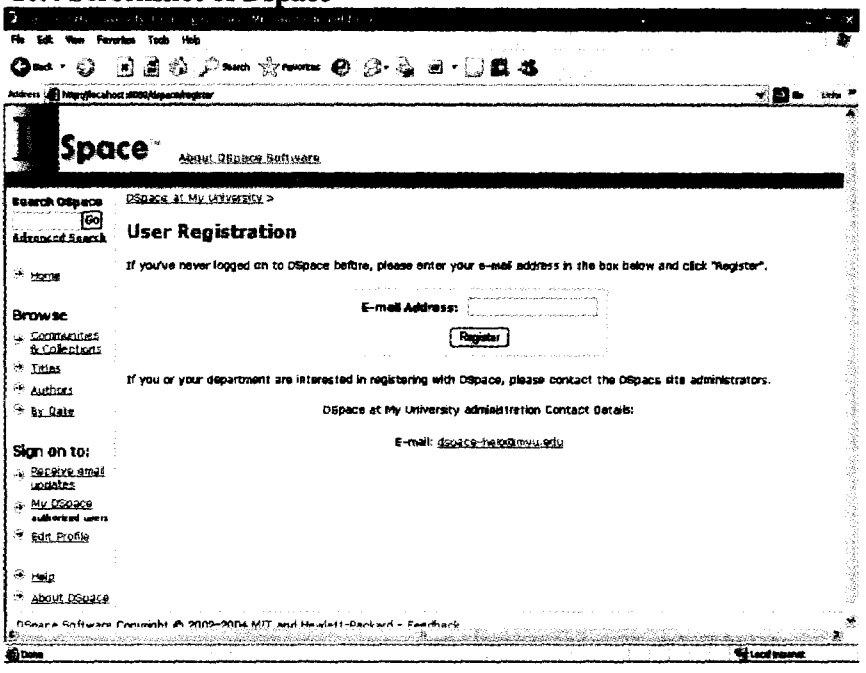
10.3 Searching and Browsing in Dspace

The searching and browsing of Dspace, following steps are required:

- open a web browser and go to the Dspace training server;
- Try to find item in Dspace;
- Find an item on the topic;
- Go to a community that interest to you and find an article that interest one of its collection;
- How many collection are in that community;
- Choose an author you know has submitted work to Dspace;
- Navigate to a different collection;
- Go to the help page and find some tips on searching in Dspace;
- Where would you direct people to find more information about Dspace;
- Find an item of interest to you and download it.

(*http://www.dspace.org?implement/policy-planning.html*).

10.4 Screenshot of Dspace



11. E-PRINT

E-print are electronic cooperatives of academic research paper. They may take the form of "pre-print" or "post-print". E-print is a free software which create online archives or an E-print archives is simply an online repository of all these materials. E-print repositories are usually made, freely available on the internet. The principle of so called "open access" is one supported by many advocates of E-print. The term "open" in the context of E-print does not always refer to access however OAI users the term in a mere technical way to indicate system inter operability.

E-print archives are becoming mere important because of

- The ever increasing cost of scholarly journals;
- Delays in publishing in print journal, which can be up to three years;
- The expensive growth of internet;
- The rapidity of advances in most scholarly fields;
- The full transfer of right from author to publisher;
- The current implication of peer reviewed;
- The imbalance between skyrocketing subscription prices and shrinking or a stable library budget is creating an economic crisis of research library *(http://www.openarchives.org).*

11.1 INSTITUTIONAL E-PRINT REPOSITORY

E-print repositories are response to a number of structural problems with the current scholarly publishing process. In this context E-print repositories create a number of potential benefits. These apply first for the researcher, secondly for the institution and thirdly for research community as a whole. For the researcher, E-print repositories have the potential to lower impact and access barrier. They create a situation where content can be disseminating widely and rapidly, it can be easily located and freely accessed. Than which E-print archives might create.

E-print repositories have the potential to free of the research communication. Better research communication makes things such as unnecessary duplication of research less likely. Initially installation of an OAI complaint E-print archive is relatively straight forward. Free software is available to do this from E-print organization. This software provides database technology to organize E-print and also a web interface for depositing them and using them *(http://eprint.monash.edu.ac).*

11.2 ROLE OF E-PRINT ARCHIVES IN ACCESS TO AND DISSEMINATION OF SCHOLARLY COMMUNCATION

Before going to elaborate the role of E-prints in access to and dissemination of scholarly communication, it is highly necessary to know about the scholarly communication system in both the traditional print journal publishing as well as digital publishing models.

Scholarly communication has been described as comprising four essential components:

11.2.1 Registration

Establishing the intellectual priority of an idea, concept or research;

11.2.2 Certification

Certifying the quality of the research and the validity of the claimed finding;

11.2.3 Awareness

Ensuring the dissemination and accessibility of research, providing a means by which researchers can become aware of new research; and

11.2.4 Archiving

Preserving the intellectual heritage for future use. These functions need to be served whatever system(s) of scholarly communication exist.

11.3 Components of an E-print Archive

The Santa Fe Convention considers the following components of an E-print archive;

- A submission mechanism;
- A long term storage system:
- A management policy with regard to submission of document and their preservation;
- An open machine interface *(http://soros.org/openaccess)*.

11.4 Types of E-print Archives

11.4.1 Disciplinary Archives

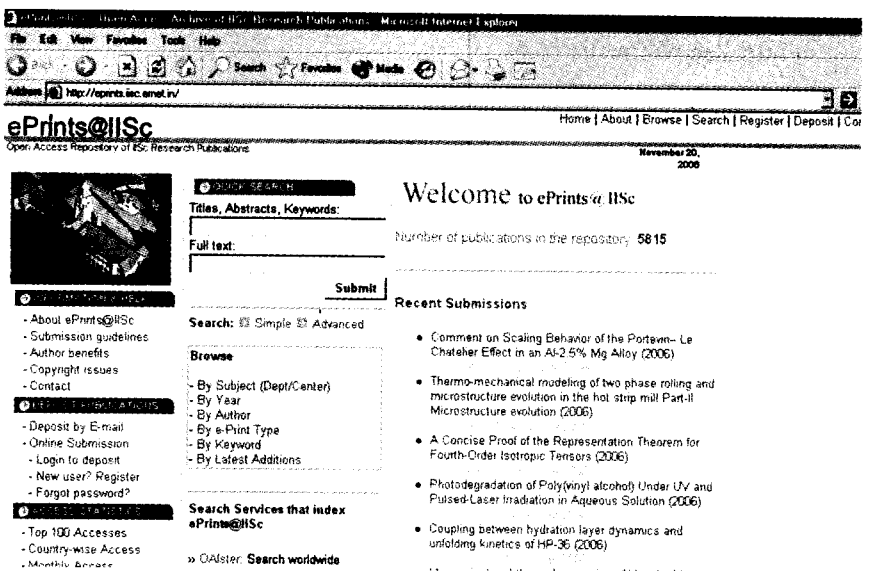
These archives demonstrate a range of types, from the archives, to publisher sponsored pre-print collection, as well as smaller, specialized archives.

There are many different types of archives. One principle is distinction is between subject bases, Disciplinary archives and Institutional archives.

11.4.2 Institutional Archives

Institutional archives are those, where authors submit e-prints to a server administered by organization or scholarly society, commonly their university or research institute *(http://www.fst.org)*.

11.5 Screenshot of E-print



12. CONCLUSION

Digital information is a driving force for knowledge base society. The global village theme birth a single knowledge base society as a blessing of information super highway. Information is a fundamental right, in these circumstances to explore the knowledge to other. The institutional repositories in India can form consortium that plan, coordinate and implement a national level object repository for the benefit of distance learners of the country.

Different type of research out put which are intellectually good for a community is an asset for parent organization as well as scholarly community. It should be digitized and preserved in electronic format so that the original functionality, layout, presentation alive with the materials itself and serve for the purpose. So it plays significant role in acquiring, storing, maintaining, disseminating knowledge for the society. More and more institutional repository should be made accessible through internet for increased benefit to the masses. The scholars, faculties, scientists all those who can contribute scholarly item to the institutional repository should be encouraged, ensuring the copy right and lawful use of their contribution to the institutional repository.

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Resource Sharing among the Technical Information Centres of Defence Research and Development Organisation

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ABSTRACT

The DRDO scientists may be fully or partially involved in R & D management activities, covering project planning (Micro and Macro), budgeting and monitoring, information management, project/group/ international leadership, human resource development and management. Special emphasis is being accorded by DRDO for human resource management by scientists with high hand of professional skills in human performance management and information management. Resource sharing becomes a vital as well as feasible device to achieve the target, especially for developing countries like India, where the Information Centres/Libraries are suffering from the shortage of finance and resources. Hence, they think about library networks for resource sharing by forming consortium. Library Consortium is a joint venture of any group of libraries to cope up the 'information crisis', resource sharing from its primary concept of library lending, now includes cooperative acquisition of books and subscribing periodicals, collection development sharing of bibliographical data, exchange of electronic documents and articles etc. Bidhan Chandra Biswas [2]. In the present environment of information explosion, it has become practically impossible for any TIC to remain self-reliant. No TIC is able to arrange all the documents on demand. Information explosion is not confined to any particular subject and its taking place in all the fields and in every country. With libraries facing manpower and monetary constraints, it is impossible to acquire all the documents in one roof and thus evolved the concept of resource sharing. Anjna [1]. 'It is due to information explosion in Science and Technology, Research and Development, Humanities, Social Sciences and almost every other fields of 'knowledge' libraries are facing manpower and monetary constraints. At present in Science and Technology, the number of periodicals available is more than 50,000, it is very difficult to acquire every publishers document under the same roof and thus

evolved the concept of Resource sharing and Networking.' Soumya, Bhattacharya[10]

Hence, resource sharing is a method of overcoming these constraints of the individual TICs in respect of their resources by way of understanding between the TICs. The article deals with concept of resource sharing and methods of resource sharing evolved in the sharing of resources as and when need arises. Data Collection, Analysis of data with different Zones, Conclusions, Findings etc.

1. RESEARCH PROBLEM

Communication today has become increasingly complex and there are impediments to efficient information services and fulfillment of comprehensive awareness between TICs and its users. It is therefore, helpful to examine different kinds of impediments experienced by different TICs and its users in Resource sharing

1.1 Objectives of the Research

The objectives of the present study are to examine various problems and methods of Resource sharing among the TICs and to identify potential contributions of TICs towards Resource sharing.

1.2 Significance of the Study

In any library or information system, the user study plays a vital role in planning, designing and introducing new information services and to assess the quality of services and their utilities.

Rapid increase in the literature has posed a big problem for the research, due to information explosion the researcher able to cover only a fraction of the larger volume of literature in the areas of research. No TIC is self sufficient. There is a compulsory need for Resource sharing among the TICs. Hence, there is significance in the study.

1.3 Justification of the Study

Today, the knowledge proliferation is so enormous that millions of pieces of information is emerging every movement, in the form of primary, secondary, and tertiary document sources. The scientific community of defence research is also contributing to this stream. The scientists are required to keep abreast of latest developments in their areas of specialization, to get information which is useful in current research programmes. The need for information depends on the context in which information sought. Different strategies are required to meet the needs in each of these situations. Resource sharing is one of the strategies to meet the information requirements of Defence scientists.

2. WHAT IS RESOURCE SHARING?

Resource sharing refers to the agreement amongst participating Technical Information Centres, where each TIC willing to share its resources with others as and when need arises.

2.1 Objectives of Resource Sharing

The objectives of the Resource sharing are;

- Maximum accessibility to information
- Avoiding duplication of materials
- Reduction in the costs

2.2 Concept of Resource Sharing

DRDO: The DRDO scientists may be fully or partially involved in R&D management activities, covering project planning (Micro and Macro), budgeting and monitoring, information management, project/group/ international leadership, human resource development and management. Special emphasis is being accorded by DRDO for human resource management by scientists with high hand of professional skills in human performance management and information management.

The concept of 'access' is a part of wider philosophy concerned with resource sharing in TICs. Access is facilitated by means of cooperative collection development and inter lending activities. Resource sharing activity is based on the concept of equivalency that is TIC should not only receive but should also give. The Resource Sharing aimed to extend the resources and services to a wider user net and make maximum availability of materials and services. The aim is to access the more resources and more information.

Few TICs are sharing their resources, facilities, and services through a network called DRONA. It became possible for a few users of the TICs to make use of the resources through a concept of resource sharing. This spirit of cooperation of sharing the resources would entail the participant TICs in a system to benefit for advancing the R & D activities of the DRDO.

The concept of resource sharing, among the TICs have become an important aspect of present day throughout the DRDO laboratories. Explosion of literature and limited budgets facing TICs towards sharing of available resources. Regional networks are playing a key role in resource sharing. Developments in the, publication industry has led to a wider range of relevant information resources. The increasing use of research organizations in India to disseminate information has resulted an increase in information availability and better access to it.[4] No TIC can stand alone in this age of networking and resource sharing. The

information requirements of scientists are bearing more and more diverse and complex. The Current Awareness Services and Selective Dissemination of Information services would not be much satisfactory unless share the resources with TICs.

The work culture in libraries has changed due to the growth of computer networks and the World Wide Web. The growth of interest in knowledge management has essentially been contemporary with that of intranets/extranets. It is no longer sufficient for libraries to depend solely on having sufficient access to internal and external information resources but to efficiently exploit what the system actually knows-not only what it owns. The successful implementation of knowledge management is that people will share what they know and reuse the know how of others. Ghosh, Maitrayee and Jambekar.[3]

2.3 Methods of Resource Sharing

The resources which are useful to several or more number of TICs can be shared. The methods adopted for resource sharing are;

2.3.1 DRONA

The DRDO Rapid Online Network Access, connects the entire 53 DRDO laboratories in the country though dialup ISDN or PSTN lines. There are 6 major regions i.e. New Delhi (Head quarters), Bangalore, Pune, Dehradun, and Hyderabad. In each of these regions there is a main router. All DRDO laboratories in a region are connected to their respective main router. In each laboratory there is a Sub router. At the Sub router E-mail, Voice Mail, File Transfer files are available.

2.3.2 Inter Library Loan

All the TICs are sharing the resources by lending the required documents through inter library loan. Nearby TICs are personally availing this service, where as the distant resource providers are utilizing the postal and other modes, but all the TICs are generally using the services of inter library loan. This service is considered to be very important resource sharing service.

Bibliographical details of document/article etc are browsed through a network DRONA, in some cases where the TIC resources are available on network, the details are communicated to concerned TIC for providing document/information on inter library loan. The resources of other TICs whose data are not available on DRONA, existence of the documents are confirmed through correspondence.

2.3.3 Union Catalogue

It is essential that each TIC personnel must know the availability of the resources, not only of own TIC but also other TICs. To facilitate this Union catalogue prepared and made available to other near by TICs. A well, prepared union catalogue serves as a major bibliography in its own right. Due to the preparation of union catalogue location of material will be easier.

2.3.4 Network of TICs

'The main problems in early operationalising the library networks include retro conversion of holdings of data, non availability of suitable software for operating larger databases and online searching in a wide area network made at prices affordable by all the libraries, lack of adequate standardization and non-availability of adequate training facilities to cover all the library staff participating in the network programs.[6] Out of the 53 DRDO laboratories only DESIDOC resources are available on DRONA. Instead of using different software's by TICs, if they use uniform format (ex. CCF), resource sharing can be more useful, as the collection of CDs/DVD ROMs, increases in a library, it becomes important for the librarian to manage and share them effectively. Benefits of sharing CD/DVD-ROMs over a network and introduces device called CD libraries/servers for sharing CD title discs over a network.

TIC networks are the natural outgrowths of TIC automation. While computerization, places the database of a particular TIC at the immediate use. Networking of TICs place the database of other TICs at immediate disposal. Creation of DRDO TICs network seems to be a far cry in the existing condition. Yet if the DESIDOC pool that strength for the purpose TIC networking will be solved.

DRDO-TICs network can be created covering the databases available at each TIC. CCF and common bibliographic format on the lines of MARC format have to be developed for the purpose of exchange of bibliographic information among the TICs. It is an integrated information management and data processing network. Networking has to be implemented in a phased manner i.e. computerisation of individual TIC and combined together, with regional network of TICs, setting up a central host computer network at DESIDOC and creation of union catalogue of holdings of each TIC and central database at the host computer (i.e. DESIDOC).

2.3.5 Mailing Lists

Mailing lists are vital communication tools used by academic and research community for sharing knowledge and to discuss latest developments and related issues in specific subject area. These also serve as forum for seeking technical assistance or sharing such knowledge in an informal way by cutting all the geographical barriers.[8]

Linkage of TICs with existing network DRONA: The whole, purpose of networking leads to resource sharing among the TICs for rendering better services. Thus if the Head, of TICs join together the dream of TICs network will become a reality.

2.3.6 Translations

Translations of documents of various categories have been gaining importance as sources of information and means of information exchange. This is particularly true of scientific and technical documents. Among the factors, which have lent increasing importance to translations are the need for rapid and wide exchange of information among scientists.[5]

2.3.7 Technical Information Centre's Consortia

TICs consortia in today's digital age are quite different from that of library networks of yester years. The main reason is that the resources that are shared in today's consortia environment are predominantly in electronic form such as E-Journals, E-Books, and databases. Hence, the technology and associated tools to support sharing the electronic resources are also important components for the success of any TIC consortia. Though the resources are accessible on the Internet, the formats in which they are available are different for different information providers.[7]

3. ROLE OF DEFENCE SCIENTIFIC INFORMATION AND DOCUMENTATION CENTRE (DESIDOC)

DESIDOC is also playing a crucial role in resource sharing among the Technical Information Centres, the various contributions are;

OPAC: This service is available on Intranet as Web OPAC. The database covers bibliographic details of documents available and can be searched by various options. The OPAC can be searched by outstation users also.

CD-ROM Search Facility: Covering bibliographic information and full articles on various topics/subjects available to the users of all the DRDO laboratories.

Reference Desk: Referred articles/documents are provided to the DRDO scientific community by DESIDOC.

Standards/Specifications Service: DESIDOC provides National and International standards like IS, ISO, ASME, MILSTD, JSS etc., to all the DRDO scientific community.

Technical Reports: DESIDOC providing technical reports on OPAC and DRONA to all the scientific community of DRDO.

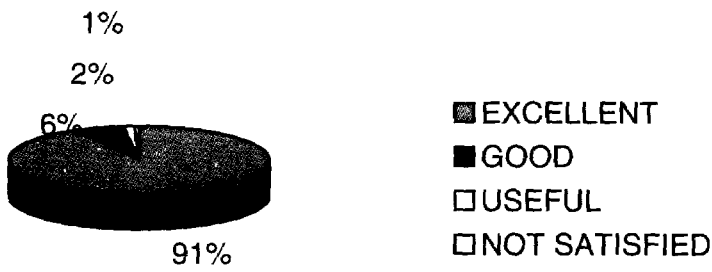
Document Supply Services: DESIDOC supplies documents to the entire DRDO community. This service provided free of cost to DRDO scientific community and on payment to the outside DRDO users.

4. RESEARCH METHODOLOGY

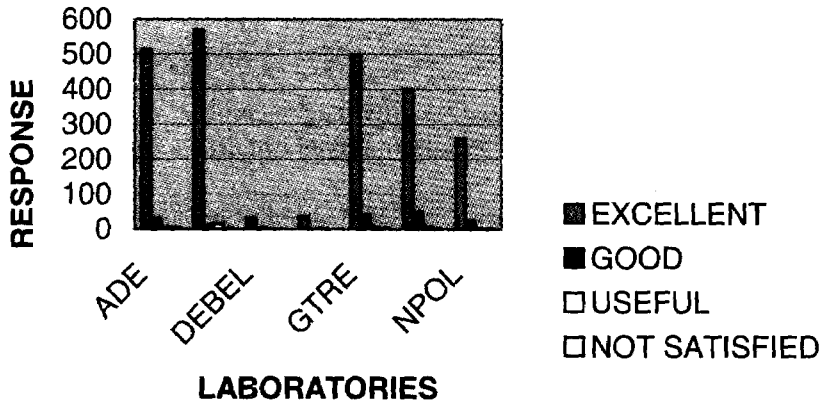
Questionnaires were circulated covering various aspects and methods of Resource sharing among the users of TICs. Interviewing of users was also carried for the purpose.

4.1 Data Collection

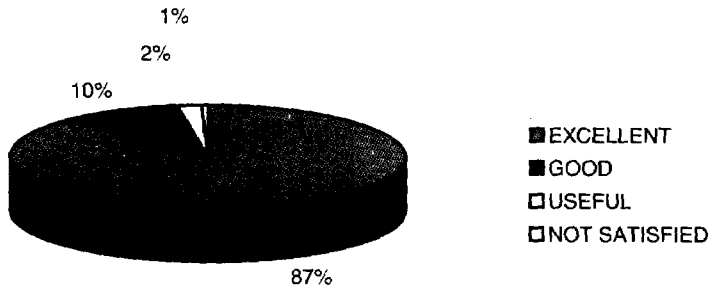
Data was collected from the TICs and its users. In all about 9995 questionnaires were circulated all over the DRDO TICs users, out of which 2759 Scientists, 2902 Technical Officers, 1418 Staff and 277 Other cadres users were responded to the study.

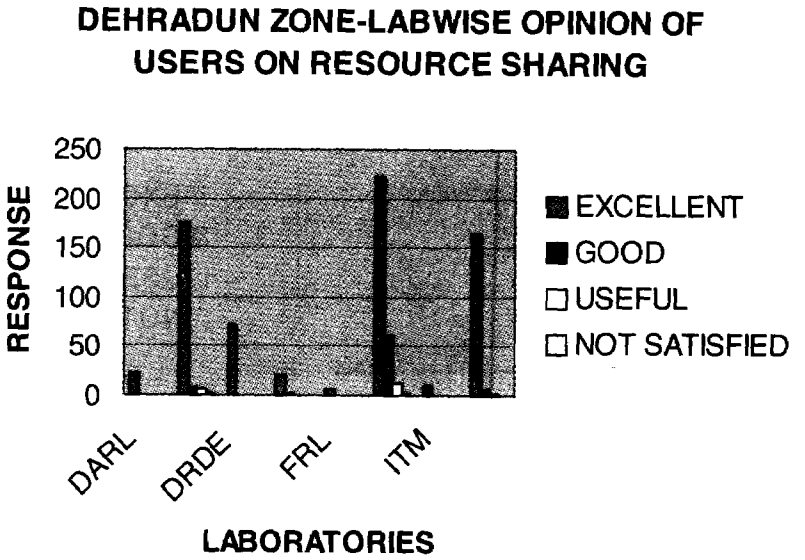


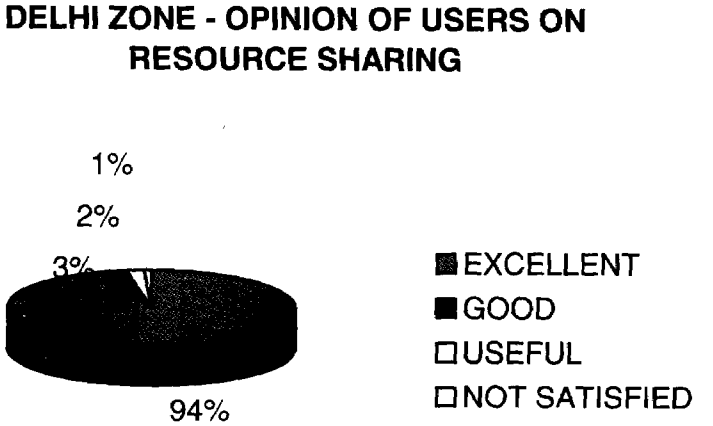
BANGALORE ZONE-LABWISE OPINION OF USERS ON RESOURCE SHARING



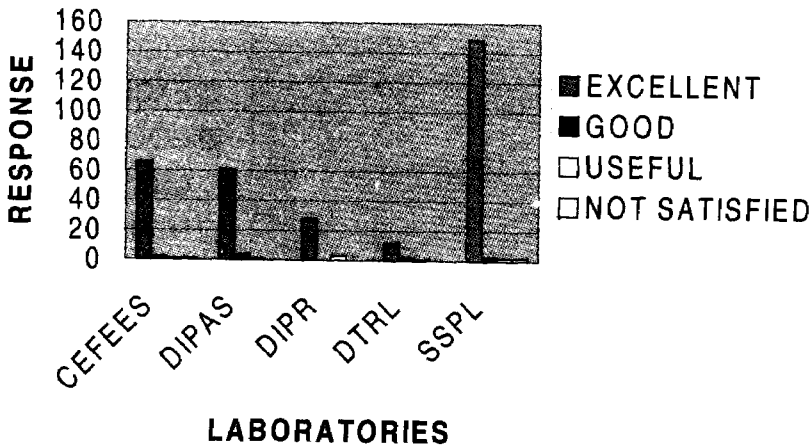
DEHRADUN ZONE - OPINION OF USERS ON RESOURCE SHARING



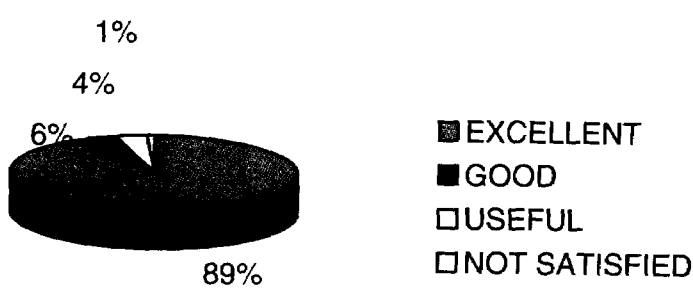

DEHRADUN ZONE-LABWISE OPINION OF USERS ON RESOURCE SHARING
RESPONSE
250
200
150
100
50
0
DARL
DRDE
FRL
ITM
LABORATORIES
EXCELLENT
GOOD
USEFUL
NOT SATISFIED


DELHI ZONE - OPINION OF USERS ON RESOURCE SHARING
1%
2%
3%
94%
EXCELLENT
GOOD
USEFUL
NOT SATISFIED

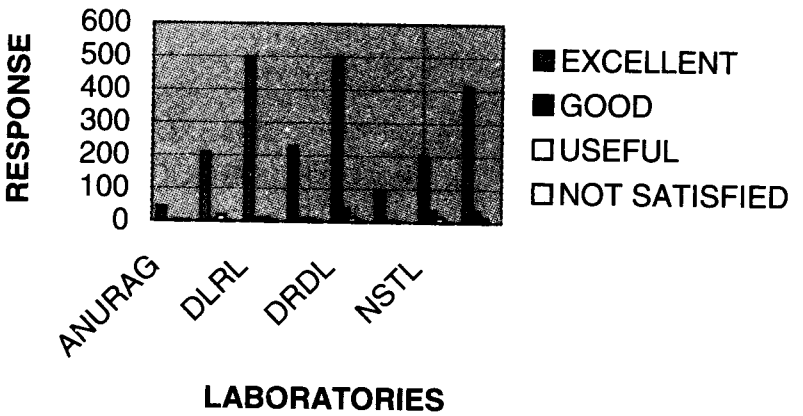
DELHI ZONE - LABWISE OPINION OF USERS ON RESOURCE SHARING



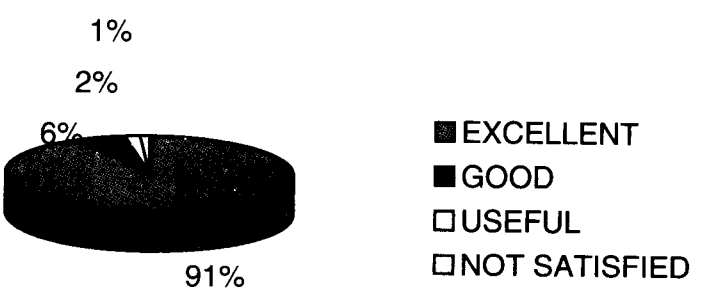
HYDERABAD ZONE - OPINION OF USERS ON RESOURCE SHARING

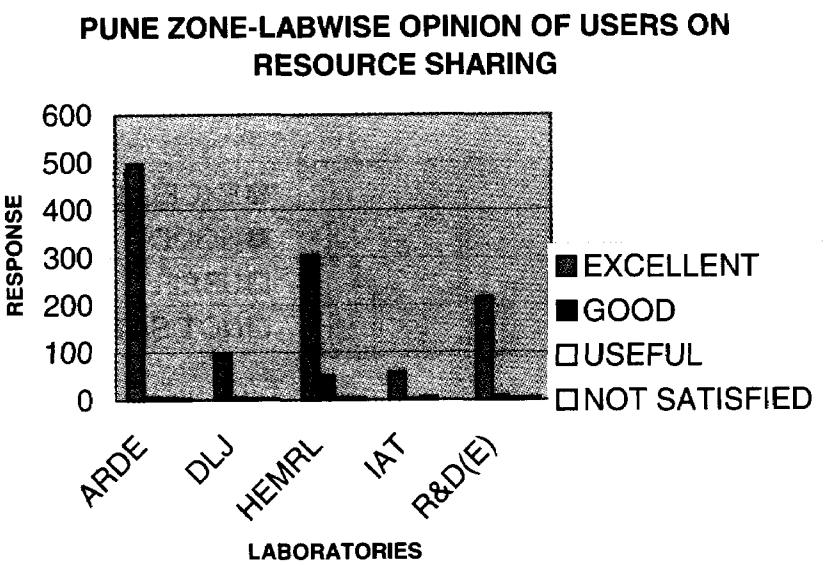


HYDERABAD ZONE-LABWISE OPINION OF USERS ON RESOURCE SHARING



PUNE ZONE - OPINION OF USERS ON RESOURCE SHARING





4.2 Analysis of Data

The data thus collected was analysed to identify responses of users on the Resource sharing among the TIC users. For this percentages were calculated. And presented in the Zonal wise bar/pie charts.

4.2.1 Bangalore Zone

The opinion of user from Bangalore zone are 91% of users expressed their opinion on Resource sharing among the TICs are 'Excellent', 6% of users expressed their opinion as 'Good', 2% of users expressed their opinion as 'Useful' and 1% of users expressed their opinion as 'Not Satisfied'.

4.2.2 Dehradun Zone

The opinion of user from Dehradun zone are 87% of users expressed their opinion on Resource sharing among the TICs are 'Excellent', 10% of users expressed their opinion as 'Good', 2% of users expressed their opinion as 'Useful' and 1% of users expressed their opinion as 'Not Satisfied'.

4.2.3 Delhi Zone

The opinion of user from Delhi zone are 94% of users expressed their opinion on Resource sharing among the TICs are 'Excellent', 3% of users expressed their opinion as 'Good', 2% of users expressed their opinion as 'Useful' and 1% of users expressed their opinion as 'Not Satisfied'.

4.2.4 Hyderabad Zone

The opinion of user from Hyderabad zone are 89% of users expressed their opinion on Resource sharing among the TICs are 'Excellent', 6% of users expressed their opinion as 'Good', 4% of users expressed their opinion as 'Useful' and 1% of users expressed their opinion as 'Not Satisfied'.

4.2.5 Pune Zone

The opinion of user from Delhi zone are 91% of users expressed their opinion on Resource sharing among the TICs are 'Excellent', 6% of users expressed their opinion as 'Good', 2% of users expressed their opinion as 'Useful' and 1% of users expressed their opinion as 'Not Satisfied'.

5. CONCLUSION

A scientist needs information at every step of research work, from the time that the germ of an idea sprouts in his mind to the time of its completion. However, problems are faced with in the area of communication of scientific information.

Scientists try to keep in touch with the new literature by browsing through the new publications. However, they may not possible to cover even a smaller fraction of the literature because of escalating costs and not available in their respective TICs. Hence, they depend on other TICs through the Resource sharing.

To meet the challenges of today it is necessary to adopt resource sharing activities. The concept of resource sharing among the Technical Information Centres has become an important aspect of present day throughout the DRDO. The spirit of cooperation of sharing the resources would entail the participant TICs in a system to benefit for advancing the R&D activities of the DRDO. Resource sharing is based on TIC needs and the principle of give and take.

Literature explosion, increasing number of users and varieties of their needs have made the collection and service functions of modern libraries highly specialized and complex. It is necessary to conduct user studies from time to time to assess the user needs and usage of Resource sharing from other TICs.

6. FINDINGS OF THE STUDY

There is an increasing awareness among the users on value and need for information for their professional as well as personal activities. It is impossible to achieve the self-sufficiency as the universe of knowledge is dynamically growing and such a growth is reflected in its publications.

Therefore, Resource sharing appears to be inevitable aspect for TIC and its information services.

7. SUGGESTIONS

1. The TICs of DRDO are building their databases through a variety of software packages developed in their laboratories. Databases in different language software's leads heterogeneity of data and its creates problems in networking. Therefore, it is suggested that a common software is to be selected looking in to all future implications and a copy of this software to be distributed to all the DRDO TICs with interface program to convert their database in to designated DRDO TIC software.

2. Co-Operative acquisition of documents to be adopted and duplication in subscription of various journals should be avoided. Instead number of journals subscribed can be increased.

3. All the TICs need to be networked for access to databases, and online journals must be subscribed by joint subscriptions(Consortia).

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Resource Sharing and Collaboration

Rajni Raina

ABSTRACT

Libraries have existed in the good olden days but those libraries were more known as store-houses and with limited resource were for the use of a very few selected people i.e. for the elite section of the society and custodian of that storeroom. These storerooms took the shape of libraries after the introduction of open access system.

The open access to books and other non book materials of today's library or the Information and Documentation Centre as these are known nowadays and the knowledge/information explosion has contributed towards the need for sharing of the resources among the libraries. Resource sharing has been made easy with the advent of modern and the latest information & communication technological innovations. Resource sharing is now-a-days practiced not by one or two libraries but also by a group of libraries located in one geographical area and even beyond. Library networks have emerged as a tool for sharing of resources of a library. Consortium is the latest buzz word in the field of Resource sharing and Collaboration & has emerged as the latest trend and technique for sharing of resources and the budget constraints and the staff crunch.

1. RESOURCE SHARING

Libraries are the places where the creation, transformation and the transmission of knowledge and information takes place besides storage and organization of knowledge.

Resource sharing, library co-operation, inter-library loan, library collaboration are the synonyms used in the library profession. Libraries cannot exist in isolation. They have to survive on the resources and even sometimes the services of other libraries. Dr Ranganathan's law that every reader his/her book is fulfilled only when the collection is fully utilized. Reader's interests are varied and it is not possible for libraries to have the collection that is of utmost interest to all its readers/users and therefore, the libraries have taken recourse to help from other libraries for satisfying the interests of their readers.

Resource of a library comprises books, CD-ROMs, VCDs, films and other materials. The value of this material is only retained when it is utilized to the fullest and to the satisfaction of the readers/users. This

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utilization of material is only possible only when users of various libraries make use of this material. Resource sharing as a technique adopted by the libraries makes the utilization of the collection to the best possible extent.

Resource sharing was prevalent in the earlier days also but its practice in the modern era of knowledge explosion is more prominent and is more in practice, the reason being more information flow, better techniques/methods, availability of online information/internet and networks.

Resource sharing has thus become an efficient tool in the modern era of information explosion for distributing or transmission of information among various libraries or a group of libraries.

2. AUTOMATION AND RESOURCE SHARING

Automation process of libraries which began late in India also contributed towards the area of resource sharing. It became an easy and manageable tool within the reach of libraries which reduced the manual operations, wastage of time and space. Automation of libraries helped in accessing the online information which is available all the time and at click of mouse. Automation of libraries is the pre-requisite for networking of the libraries or a group of libraries. Online information and networking of libraries contributed in bridging the gap of information flow among the information have and have-nots.

3. FACTORS

Libraries in the modern era cannot act as information storage rooms only but have to open the doors of those information store rooms for utilization by others and its own readers. The rising prices of the books/journals etc. has compelled the libraries to curtail its collection. Every year there is cut in the allocation of budget not only in India but all over the world. The readers needs therefore, remain unfulfilled by the libraries.

However some factors responsible for making resource sharing popular:

- Growth and flow of information
- Exorbitant price of print material
- Budget/staff/space constraints
- Advancement of information/communication technology
- User satisfaction
- Better usage of existing resources
- Better services and minimum wastage of time
- Creation of new disciplines, e.g., Biotechnology, Geophysics

- Availability of computers/library automation
- Networking of libraries

4. NETWORKING AND LIBRARIES

The introduction of computers in the libraries is in itself a big achievement for the librarians and with the convergence computers and the communication technology the networking of libraries became feasible and also possible though in India for some libraries still there is a long way to achieve the goal. The networking of libraries helps in avoiding the wastage of finances, time, efforts of the staff and also the duplication. It helps the librarian to mark the most used and most demanded titles. One can search the data-bases of even other libraries while consulting one's own library and place a request for that particular title via email. The budget constraints have not affected libraries only. Every profession is facing the constraints and the experts are devising new methods to overcome these difficulties and serve the users in a better and efficient manner. Networking has made possible for the organisation having same interests and goals to come together and formed consortium to overcome the staff and financial crunches. IITs and IIMs formed consortium under the Ministry of Human Resource Development to be able to meet the demands of the students and the faculty members without any hindrance. MCIT (Ministry of Communication and Information Technology) consortium has emerged due to these reasons.

5. USER'S DEMAND

India is marching forwards towards a knowledge based society and therefore, the libraries have to keep themselves and their collection updated which is not possible for a single library to do on its own collection and therefore, the need for Resource sharing is felt. These networks of libraries are instrumental for readers in achieving their goals and making India a knowledge-based society.

Libraries possess resources which are of interest to its clients/users/readers and they want the information expeditiously without caring about the availability/source/place of the information. The revolution of the communication technology and the library automation has made the job of librarian easy and handy. Creation of databases and the networking of libraries have changed the scope of the libraries and has become an efficient tool to meet such needs and demands of the readers expeditiously. Network connectivity gave a new lease of life to libraries in this modern age of information explosion where information travels fast and information needs are ever lasting. The knowledge-based society is purely dependent on the flow of information and its utilization. Networks like DELNET, INFLIBNET, CALIBNET, ADINET,

MYLIBNET have emerged and sustained due to these very demands of the users of the library and are serving a large base of clients/readers.

6. MCIT CONSORTIUM

The resource crunch, shrinking budget and continuously growing demands of the readers forced the libraries under the Ministry of Communication and Information Technology to come together and share the benefits of resource sharing and help the readers/scientists in realizing their dreams/goals of research. Scientists need information within the stipulated time and at their desktops/laboratories. This is possible only when they are connected to the network/library network so that they get their piece of information pin-pointedly and expeditiously at their desktops or their place or research/work without any hassles and waste of time. Constraint of time is always on top priority list of scientists and the information explosion has urged the scientist to keep pace and updated with the speed of information.

7. MEMBERS

Ministry of Communication and Information Technology comprises three Departments:

- Department of Information Technology
- Department of Telecommunication
- Department of Posts

These three departments have a number of PSU/Autonomous bodies working under them. They are:

Department of Information Technology
National Informatics Centre

- C-DAC
- STQC
- DOEACC
- ERNET India
- Semiconductor Complex
- SAMEER
- Software Technology Parks of India

Department of Telecommunication

- Telecom Regulatory Authority of India (TRAI)
- Telecommunications Engineering Centre
- Telecommunications Consultants India Ltd
- C-DOT
- BSNL
- MTNL
- Advanced level Telecom Training Centre

Department of post

These above organisations have their own Libraries to meet information needs of their scientists. These organizations spend huge amount of their budget to procure books, subscribe journals etc. for their libraries. Sometimes these libraries purchase similar information resources. To avoid this duplicity the need for sharing of information resources among these organisations was felt. Advances in computer, information & telecommunication technologies revolutionized the way in which information is acquired, stored, accessed and transferred and made it possible.

Users of library and Information services systems of MCIT are widely spread through-out India and in different locations. A number of research and development works are going on regularly and the users need to keep watch on daily updates.

8. AREA OF CONSORTIUM

Initially following are the areas where combined efforts of the entire MCIT constituents are reflected:

Digital library of ICT resources

Online News clipping service

e-journal subscription and maintenance

Automation and networking

Union Catalogue

8.1 Digital Library of ICT Resources

MCIT consortium has this area in its purview. All the three departments, Autonomous bodies and PSU(s) has number of publications like Annual Reports, Standards, Patents and many important government publications. A Digital library of such collections will be put available on the web site for general purpose in public domain wherever possible and for internal use of MCIT officials. The web server will be developed and maintained by NIC, New Delhi.

8.2 e-Journals subscription

The latest trends of e-journals have forced MCIT Libraries Consortium to go for common subscription on Consortium Platform. All the Department of the Ministry subscribes journals related to ICT in the print form or the hard copy. The users of our library system are spread across the nations and the cyber savvy in nature look forward for e-version of the magazines. The most beneficial properties of e-journals like the round the clock availability, retrieval of information at the fastest speed and mouse click access are the additional features to refer to e-

journals. In the common e-journals subscription of MCIT libraries Consortium Digital Libraries and e-journals/databases of are enlisted.

- IEEE Electronic Library(IEL)
- ACM Digital Library
- Business Source from EBSCO
- Computer Science collection from Elsevier Science
- JCC gateway

9. ON-LINE NEWS CLIPPING SERVICES

Like every organisation's library, the library systems of Ministry of Communications and Information Technology provide News Clipping services to its users as a Current Awareness Services. National Informatics Centre, New Delhi and C-DAC, Pune, have developed their software to provide this service online to its readers sitting across the country.

9.1 e-Granthalaya: A digital agenda for Automation and Networking

e-granthalaya is a library management software developed by NIC, Bangalore, and is operational in many libraries. This software will be installed free of charge for automation and networking of libraries and will be installed on the server in NIC, New Delhi.

10. UNION CATALOGUE

For resource sharing among the participating libraries of Consortium Union Catalogue of books, journals and other resources available in the member libraries will be hosted on the web site so as to avoid duplication.

11. SUGGESTIONS

MCIT has almost 18-20 libraries in different parts of the country. The manpower and the resources are therefore scattered all over the country. Some resources and the services are, therefore, duplicated. To avoid the wastage/duplicity the following model is proposed:

Central Library of MCIT

Book section	Journals section	Computer section	User services (CAS/reprographic)

11.1 Book Section

The controlling authority of all the libraries under the ambit of MCIT should be located in one place either DIT or NIC, Delhi. The books be procured and processed centrally and the database be available with all the constituent libraries so that the users can access and use the book.

11.2 Journals Section

The centralized journals subscription be also done in any designated library way keeping in mind the requirements and needs of all the constituent libraries.

11.3 Computer Section

Computer section shall be made responsible for the maintenance of the hardware and software of the libraries and the automation process and any other related problems/work.

11.4 User Services

All the services, e.g., photocopying, News-clipping service, Article Printouts etc. may be dealt with in this section and a proper record be maintained.

11.5 Manpower

The interests of the staff, their appointment and promotion and qualifications should be taken care of and a uniform personnel policy for library staff should be framed without any anomalies and overlapping.

12. CONCLUSION

The proverb "Child is born with a silver spoon in his mouth" is now replaced by new proverb i.e. child is born with a computer in his lap. We have become so used to this technology that we cannot hope to live without the computers without even a fraction of a second. We cannot be ignorant of the new happenings in and around us. We have to be vigilant and informative so as to beat the competition in the era of outsourcing and liberalisation and here the resource sharing is helping the library professionals.

The world is now-a-days called a global village and this global village has brought competitiveness and demand efficiency in service and fulfillment of the demands. The demands are some times met with-in the organization and sometimes have to met from outside also.

The resource sharing has become like a deep rooted tree in these times. No library is self-sufficient neither in terms of books nor budget. It is not only the library profession but other professions have also joined hands to curtail the rising prices and share the profits/benefits. This is the result of convergence and computerization process which has made intra and inter-connections of profession possible. To create a knowledge grid is the job of researcher or the scientists but to make available that information is the job of a librarian and the tool of resource sharing is the best available option/tool for the librarian.

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Resource Sharing in Agricultural University Libraries in Maharashtra: A Case Study

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ABSTRACT

In the state of Maharashtra four agricultural university libraries are functioning and rendering information services to the users. Considering the present needs of the users and the use of modern information technology techniques the libraries are under digitalization. Basic concept behind the digital library it is necessary to have resource sharing in agricultural university libraries in Maharashtra. Integrated information system have been presented in this paper in the form of "MAH.AGU.NET" which needs coordination and cooperation of ICAR.

Keywords: Digitalization, University libraries.

1. INTRODUCTION

Information services are the keys to the development of agriculture, agriculture education, and research and extension education in India. One of the main objectives of agricultural university libraries in India is to collect, process, organize and disseminate the much needed agricultural information to the users. In the state of Maharashtra four agricultural university libraries are rendering information services to the users given in Table 1.

2. NEED FOR RESOURCE SHARING

- For rendering efficient, effective and quality information services to the users as well as agricultural scientists and researchers in the changing scenario.
- For providing right and nascent agricultural information to the right users at the right time considering the basic concept of digital library.
- For saving the time and money of the users

Considering the informational needs of the users of agricultural university in Maharashtra, it has become necessary to have an integrated information system with the coordination and cooperation of ICAR with following objectives.

Table 1. Agricultural University Libraries in Maharashtra

Sr No	Name of University Library	Location	Estt.Year	Region
1	Mahatma Phule Krishi Vidyapeeth,	Rahuri	20.10.1969	Western Maharashtra
2	Dr Panjabrao Deshmukh Krishi Vidyapeeth,	Akola	20.10.1969	Vidarbha
3	Marathwada Krishi Vidyapeeth	Parbhani	18.05.1972	Marathwada
4	Dr Balasaheb Sawant Konkan Krishi Vidyapeeth	Dapoli	18.05.1972	Konkan

Source: Questionnaire

3. OBJECTIVES

- To improve the use of modern information technology techniques, methods and policies for rendering efficient and effective information services.
- To enable agricultural students, scientists, academic staff, research scholar and other users of library to update their knowledge in modern agriculture.
- To promote and facilitate sharing of the resources available in a group of agricultural libraries in order to provide maximum information to the users, lower operational costs and also make optimum use of national resources.
- To maximize the utilization of existing information resources.
- To provide speedy access.
- To save funds, valuable time and avoid duplication.

4. HYPOTHESES

The following hypotheses were formed:

- In the state of Maharashtra there are four agricultural university libraries are functioning and rendering information services but there is no coordination with the help of resource sharing for rendering information services to the users.

- The survey of the users needs regarding the coordination and cooperation through resource sharing between all the four agricultural universities libraries for the better use of users.

5. METHODOLOGY

In the present case study the nature of the users of four agricultural universities libraries have been examined with their needs and the necessity of resource sharing in agricultural university libraries in the state of Maharashtra through Questionnaire

- Survey method
- Personal visits

6. USERS NEED AND ASSESSMENT

The survey of the nature of users, their needs and necessity of resource sharing have been examined and given in table 2.

Table 2. Nature of users, their needs and necessity of resource sharing

Sr No	Name of Agriculture University Library	Survey of Users		Main Users	Needs	%
		quest. dist.	recei ved			
1	M.P.K.V. Library, Rahuri	50	35	Students Staff Scientists	to update knowledge, maximize information, resource sharing essential	70
2	M.K.V.Library, Parbhani	50	40	Students Staff Scientists	digitalization, every informational material is not available with all libraries, to update knowledge, maximize information, union catalogue resource sharing essential	80
3	Dr P.D.K.V. Library, Akola	50	47	Students Staff Scientists	maximize information to update knowledge, resource sharing essential	94
4	Dr B.S.K.K.V. Library, Dapoli	50	30	Students Staff Scientists	use of modern technology, to update knowledge, maximize information, resource sharing essential	60
Total Users		200	152			76%

Source: Questionnaire. Quest. dist.: Questionnaire distributed

It is observed from the Table 6 that the students, scientists and academic staff are the main users of the university library and have desires the resource sharing in agricultural university libraries in the state of Maharashtra for the better library use and services in the changing scenario.

Considering this it is necessary to have the resource sharing in agricultural university libraries in the state of Maharashtra. Model MAH.AGU.NET is submitted in this paper as a resource sharing in agricultural university libraries in the state of Maharashtra.

7. RESOURCE SHARING (INTEGRATED INFORMATION SYSTEM) IN AGRICULTURAL UNIVERSITY LIBRARIES IN MAHARASHTRA

MAH.AGU.NET

The information generation, dissemination, transfer and communication take place through diverse channels and media in a variety of content environments in the agricultural university libraries. The libraries generate information and knowledge through various bibliographical resources and that is why it is called a power house of generation of information.

The students, academic staff, research scientists are actual users of this knowledge, information and technology. This information technology is to be transferred to the farmers who are at the grass roots and who are the actual beneficiaries through extension specialists.

In view of this the university libraries are supposed to acquire primary as well as secondary sources of bibliographical literature in order to render efficient and effective services to the users for keeping them up-to-date in their field of knowledge. The scientists, technicians and extension workers must easy access to modern information services; otherwise they may lag behind in the race for up-to-date knowledge in scientific developments. The librarians and information scientists play an effective role for dissemination of information by adopting the modern information technology techniques such as "computerized information retrieval system"

The vide ramification of information communication activity requires micro level attention and has to be guided properly through the instrument of national information policy and planning.

The cost of generating, processing, disseminating, distributing and utilizing information is increasing and therefore it will be demand

considerable investment. In the rapidly advancing world today, influence of the modern information technology is becoming inevitable. The information technology policy issues that need attention are: infrastructure, human resources, financial resources, user's needs and collection development etc.

The case study revealed that the university library Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola has the infrastructure and facilities and therefore it is proposed that a network of all the four agricultural university libraries in Maharashtra should be established and university library of Dr PDKV Akola may be considered as a centre and clearing house for agricultural information in Maharashtra in order to satisfy information needs of agricultural research and management activities in Maharashtra.

For the development of this system it is necessary that all other agriculture university libraries in the state have to atomize, digitize their collections to send this centre for agriculture information. ICAR and the state government should support the centre with adequate funds.

The function of this information centre will, therefore, be two fold; one its responsibility towards its immediate clientele, and to serve other libraries and individuals in the state and also in India. Convert the library holding this to standard uniform pattern in to computerized databases. All these in house, commercial databases should be made accessible through a network from anywhere to any centre.

The extension workers, the village level workers and other government agencies engaged in the dissemination of agriculture information of one sort or another will depend on this agricultural information centre for the exchange of information and ideas. Radio and television programmes, newspapers features etc. prepared for the benefit of the agriculturists will also be supported for information by this agricultural information centre. Proposed Dr PDKV library information centre will have very close cooperation with ICAR institute libraries and the district libraries for a wider coverage of the states population. The large number of agricultural colleges can access information and work collaborately through to this information centre for the four agricultural university libraries in Maharashtra. The agricultural information centre will function as a component of the national agricultural library. For Maharashtra, it will be take on the role of the national agricultural library, such as being the repository of agricultural publications of the state, centre of information on holdings of all state libraries, etc.

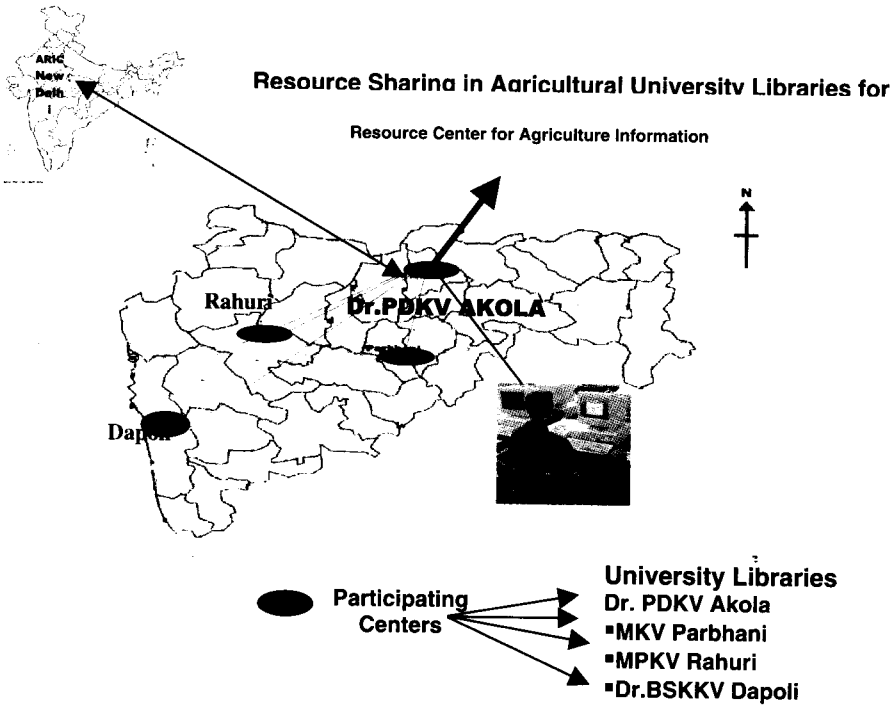


Fig. 1

Figure 1 depicts a concept where in a network is in place, consisting of a super node at New Delhi and the agriculture university libraries in Maharashtra will be connected via network to each other.

Considering that each agricultural library in Maharashtra maintains its own data and each library is a node. These nodes will be connected to each other with DR PDKV library framing the central node for Maharashtra network framing a network pattern.

Similarly, all the central nodes of different states can then be connected to the super node placed at Delhi. The data servers at each location will then be able to communicate with each other through systematic application of various networking protocols.

For the users a computer search site can be developed that will enable them to access valuable information placed at any of the library locations through the established network pattern.

8. COORDINATION AND COOPERATION OF ICAR AND STATE GOVERNMENT

- There should be adequate funds for purchase of the information technology products and ICAR and State Government should take proper steps in this regard.
- Users training programme on information search strategies should be organized in the agricultural university libraries and ICAR institute libraries at regular intervals.
- It is necessary to know the needs of the users some techniques like survey, interview or questionnaire should be arranged by the university and ICAR libraries.
- Staff training programme in connection with information technology should be arranged in university and ICAR institute libraries.

9. CONCLUSION

It is concluded that now a days the work and responsibility of the librarians have been increased; every library has to modernize their operation to the newer challenges. The situation has change where libraries cannot remains isolated. They can keep in touch with other libraries and therefore the development of integrated agricultural information system in agricultural university libraries and other libraries is better useful in services to their users.

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Resource Sharing in Digital Era: An OAI Approach

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ABSTRACT

The concept of resource sharing has remained the same over the years but the mode and the medium are changed in the present era due to the impact of the invading technology of IT. Its application makes possible more efficient resource sharing arrangements than ever. This paper considers the use of the Open Archives Initiatives Protocol for Metadata Harvesting as a mechanism for sharing metadata records between the gateways, repositories, e-journal archives in order to build cross-subject resource discovery services. In this paper I would also discuss the tools for metadata harvesting and some useful OAI Compliant software.

Keywords: Resource Sharing, OAI, Sharing, Metadata Harvester.

1. INTRODUCTION

Information technology (IT) have been playing substantial role in library and information systems and services ever since its inception. The revolution in IT is registering significant changes in all types of libraries. The libraries and information centers are facing unprecedented crucial resource building problems. It is strongly felt that IT /internet technologies can enable, empower and enrich libraries astoundingly in information resource building and in resource sharing.

Resource sharing of scholarly writings, peer-reviewed articles truly found its realization in practice with the advent of open access movement. The movement seeks to make scholarly, peer reviewed articles, report, thesis, presentations, e-books freely available in various repositories any where across the world. But with the growing number of digital repositories in the web, it becomes difficult for the users to visit individual places in search of information. Many organizational repositories have not been indexed by the search engines. Such mechanisms are therefore required by which the repositories can share the resource and work in coordination to provide broader preview to the users. The mechanism, which provides the ability to the information systems to work in coordination, has been termed as 'interoperability'.

Open Archives Initiative is one of the landmark efforts to ensure the availability of digital resources of many repositories at the user's end.

2. INFORMATION TECHNOLOGY AND RESOURCE SHARING IN DIGITAL AGE

Resource sharing has been a necessity due to the exponential growth of published documents in the recent past, increasing cost of information sources, technological advancement that offer newer methods of information processing, retrieval and dissemination. In Library co-operation a very old concept and a form of resource sharing can be traced. There are large instances of such cooperation among libraries in the library literature.

Need of resource sharing was realized by libraries a long back. Besides entering into inter-library loan practice, libraries also thought seriously of resource sharing in many other areas, such as co-operative acquisition, co-operative cataloguing, co-operative classification, etc. Inter-library loan has been practiced as one of the most popular resource sharing activity amongst libraries. Inter-library loan in a traditional library is severely affected by barriers of information communication, such as apathy of the lending library, distance, language, time etc. A computerized inter-library loan system overcomes these limitations. For resource sharing, the participating libraries need to come together and cooperate in two broad areas [1]:

(a) Developing the collection on shared basis, and
(b) Developing services for exploiting such collection.

Developing the shared resources is of great importance and central to the concept of resource sharing. In developing the shared resources, the focus is first on eliminating duplication in the acquisition of various participating libraries to the extent possible. Thereafter, the focus is on the selection of such publications, which the participating libraries agree to share, and later on their acquisitions. The efforts of participating libraries in developing the shared resources are, therefore, directed in two distinct directions:

(a) Rationalization, and
(b) Acquisition.

There are several limitations to the resource sharing in the print environment as it existed till recently [2]:

(a) Open access to shared resource not feasible;
(b) Service depends upon library performance; and
(c) Access to shared resource at a cost.

User services are critical to the resource-sharing program for its performance and effectiveness in providing access to shared resources. The libraries as are required to organize and provide the user services are not always fully equipped to meet such obligations. However, modern information technology has made the task of resource sharing very simple and convenient. The new technology brings forward to the information field many products and services which have changed the nature of fundamental library objectives and operations. There are two technologies that have contributed to these revolutionary changes. These are Computer technology and Telecommunication technology.

Over the last two decades the libraries have witnessed impact of information technology that has been affecting the structure of the services to a great extent. Moreover, the problems of space, standardization, professional development of the staff, challenges posed by new technologies, drastic cuts in the library budgets have aggravated problem of the present day librarianship. However, the solution to the problems of information explosion, ever changing needs of users, increasing amount required for subscription to same number of periodicals, shrinking library budget, and devaluation of rupee and its impact on the library acquisitions can best overcome upon certain level by the following means [3]:

(a) Use of computer and communication networks for resource sharing;

(b) Use of national and international databases through communications networks; and

(c) Use of the technology like Open Access Initiatives for harvesting scholarly articles metadata from the various OAI complaint intuitional repositories.

Various Resource Sharing networks have been observed at local, regional, national and international levels. Normally, three levels of national resource sharing networks exist [4]:

(a) **Local:** Information is stored in the local libraries in the form of Union Catalogue for local collection available in local libraries.

(b) **Regional:** Information is stored in regional libraries and services are provided on broad subject area basis.

(c) **National:** National Union catalogue is prepared on national basis and services are provided to users based on national resources. Given the wide scope for exploiting resources and facilities available in the participating libraries, it is possible to work out a number of models for developing resource sharing programs. There are four existing models, which have been presented in Table 1.

Table 1. Various Models to Resource Sharing

Models	Aims and Funding	Examples
1. Centralized Collection Development and Services at National, or Regional Level	Resources: acquired centrally and stored at a Single site. Funding: Contribution by Participating libraries. Grants are also sought from government and private agencies.	National Lending Library, UK
2. Centralized Collection Development and Services By Subject	Resources: Subjects specific collection of documentary resources. Acquired centrally and stored at a single site City, region, or country may limit the geographic distribution of libraries. Funding: Marketing of services and grants from the government and private agencies.	National Science Library at INSDOC, New Delhi
3. Centralized Collection Development Organizational Level	Resources: Libraries belonging to a single bigger organization collaborate. The shared collection is acquired centrally at a single site. Funding: Organization backing the Library provides funds. The participating libraries may also contribute towards the central funds	CSIR,DRDO, DOE, ISRO
4. Coordinated Collection Development at Institutional Level	Resources: Eliminates duplications. Serves at the level of participating libraries. The geographical area of cooperation could confine to a city, region, or country. Funding: The individual libraries determine their level of support. The higher their budget the higher their support. User libraries pay for the services they avail of.	DELNET, BONET and MALIBNET

IT application makes possible efficient resource sharing arrangements. Its impact on resource sharing is twofold:

- IT as a facilitator/means of resource sharing
- IT as a container/form of existence of resources to be shared

These two aspects have nowadays become inseparably intertwined in new scholarly communication system that has inevitably been based on capabilities of networks and networks of networks like Internet. Present day IT based networking evolved out of [5]:

- Interlibrary Loan Concepts
- Reciprocal Borrowing
- Referral Services

Resource Sharing Possibilities: Some of the resources sharing possibilities are mentioned below:

- Accessibility
- Conveniences
- Empowerment
- Cost-Saving
- Efficiency

Barriers to IT in Resource sharing: Still in the developing country like India there are number to barriers to IT in resource sharing, some of them are:

- Lack of funding
- Poor IT infrastructure
- Absence of Networking
- Lack of skilled human resources

Resource sharing using IT provides number of benefits some of them are:

- Increase in access to a broader range of teaching-learning support resources
- Increase in research productivity
- Increase in instructional effectiveness
- Increase in efficiencies in the administration of lib. Resources
- Facilitated resource sharing
- Competitive advantages

3. OPEN ACCESS INITIATIVES

With the growing number of repositories of digital repositories in the Web, it became difficult for the users to visit individual places in search of information. Many organizational repositories have not been indexed by the search engines. Such mechanism is therefore required by which

the repositories can share the resources and work in coordination, to provide a broader purview to the users. The mechanism which provides the ability to the information systems to work in coordination has been termed as Interoperability. Open Archives Initiative is one of the landmark efforts to ensure the availability of the metadata of digital resources of many repositories at the users' end.

About Interoperability and Open Archives Initiative

In most generic way, interoperability is the ability of systems, organizations and individuals to operate together to achieve a common goal. In digital libraries *search interoperability* is the main concern. Priscilla Caplan [6] defined *Search Interoperability* as 'the ability to perform a search over diverse set of metadata records and obtain meaningful results'. To bring such interoperability among digital libraries, remarkable effort has been made by Open Archives Initiative (OAI). Open archives initiative develops and promotes interoperability standards that aim to facilitate the efficient dissemination of content. The Initiative is supported by the Digital Library Foundation, the Coalition for Networked Information and National Science Foundation. The Open Archives Initiative has its roots in an effort to enhance access to e-print repositories (archives) as a means of increasing the availability of scholarly communication.

Prerequisites to develop metadata harvesting protocol

To facilitate metadata harvesting there needs to be agreement on:

- ,Transport protocol–HTTP or FTP or other such protocol
- Metadata format–Dublin Core or MARC or other such format
- Metadata Quality Assurance–mandatory element set, naming and subject conventions, etc.
- Intellectual Property and Usage Rights–*who* can do *what* with *what*?

About OAI-PMH

The Open Archives Initiative Protocol for Metadata Harvesting provides an application-independent interoperability framework based on metadata harvesting [7] that can be used by a variety of communities who are engaged in publishing content on the Web. It provides a set of rules that defines the communication between systems (like FTP or HTTP in Internet). That's why even though the protocol actually uses HTTP as a transport mechanism between digital libraries, it is popularly known as the "HTTP of Digital Libraries" [8].

The protocol was developed with an objective to ensure interoperability between e-print repositories only, later in version 1.0/1.1 all document like digital objects also brought into its purview and finally the latest version 2.0 supports all kinds of digital resources. The protocol

is based on HTTP and XML. But the greatest limitation is that it doesn't support the previous (older) versions.

Why use OAI-PMH?

- Implementation is quite simple as compared to distributed search protocol (Z39.50).
- Search process is faster in centralized search mechanism because the metadata collected from different repositories are kept at local server and retrieved from there at the time of search. Whereas in distributed search mechanism (Z39.50) metadata is retrieved from different repositories at the time end-user submits a search query.
- The service providers can modify the display of collected metadata as per their metadata policy.

How OAI-PMH Works (Structural and Functional Model)?

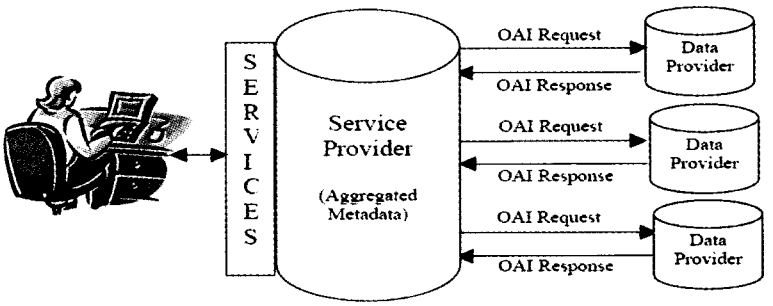
The OAI-PMH uses HTTP as Internet protocol and supports both GET and POST HTTP verbs (request methods). GET retrieves information in any format whereas POST requests to pass the information with HTML forms. XML for encoding and exchanging information and qualified and simple Dublin Core as metadata schema, still it supports other metadata schemas like MARC21, EAD, ONIX, METS, etc.

Key Players in OAI-PMH [9]

- **Service Provider:** A service provider issues OAI-PMH requests to data providers and uses the metadata as a basis for building value-added services. These repositories send requests using 6 OAI-PMH verbs
- **Data Provider:** A data provider maintains one or more repositories (web servers) that support the OAI-PMH as a means of exposing metadata. These are the repositories which process the request and respond to service providers with appropriate OAI-PMH responses.

The protocol divides the whole universe into two, i.e., Service providers or metadata harvesters are the repositories (web servers) that issues requests to other repositories to get the metadata. There is a standard set of six OAI-PMH verbs (request syntax) used to send request to data providers. The request is transmitted according to the rules of HTTP over the Web. Data providers receive these requests and reply with appropriate OAI-PMH responses in valid XML format specified by the OAI-PMH protocol. Thus while receiving the response, the service provider can understand who is the metadata provider (*Identify* verb), what is the metadata format (*ListMetadataFormat* verb), and what are different sets or divisions of that metadata format (*ListSets* verb). The service provider can get specific metadata by using the verbs like

GetRecords, *ListIdentifiers*, *ListRecords*. Remember that a repository can act both as service provider as well as data provider, or only a data provider or service provider.



Interaction between service provider and data provider and the process of metadata harvesting

Fig. 1

Some facts about OAI-PMH

- OAI-PMH is not a search engine, or a search tool, or a database.
- It only provides set of rules to move the metadata not the content of the digital resource from one repository to another. The content remains in the source repository only.
- A repository can act both as service provider (or harvester) and data provider or only service provider or data provider
- The protocol is not restricted only to support simple (unqualified Dublin Core), but can support any metadata schema which can be provided in XML format.

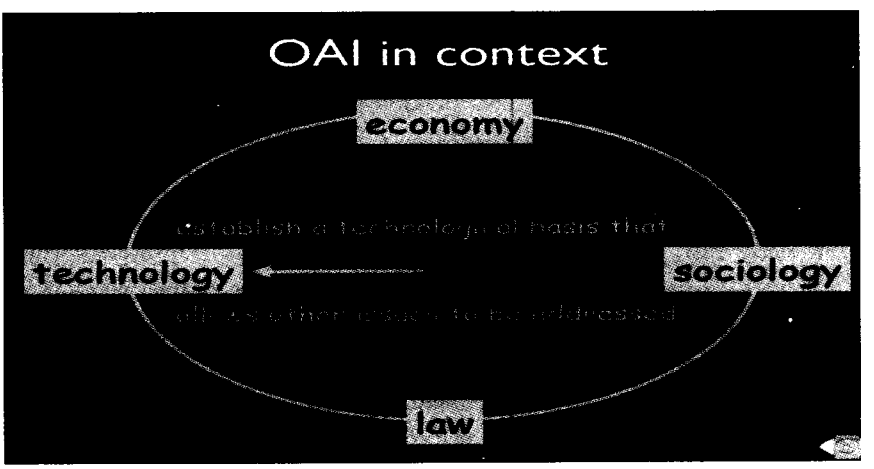


Fig. 2

OAI in context establish a technological basis that allows other issues like economical, sociology and law to be addresses.

Features of OAI-PMH

- **Flow Control (resumptionToken):** OAI-PMH requests may return list of records, headers (unique identifiers) and sets. In some cases data providers send incomplete lists with resumptionTokens so that the service provider can issue further requests to complete the list. Following optional attributes can be added as resumptionToken elements – expirationDate, completeListSize, cursor.
- **Error and exception conditions:** In case of error or exception conditions, repositories indicates OAI-PMH errors using following Error Codes – badArgument, badResumptionToken, badVerb, cannotDisseminateFormat, idDoesNotExist, noRecordsMatch, noMetadataFormats, noSetHierarchy.
- ***Selective Harvesting:*** By selective harvesting the service provider issues requests to harvest a selective portion of the repository. There are two selective harvesting criteria – datestamps and setmembership.

What are the OAI-PMH Verbs?

Here '*verb*' means request type which the service provider/harvester sends to get responses from data providers. There is a standard set of six verbs:

- Identify
- ListMetadataFormats
- ListSets
- GetRecord
- ListIdentifiers
- ListRecords

	Verb	Function
Metadata about the repository	Identify	Description of repository
	ListMetadataFormats	Metadata format supported by the repository
	ListSets	Sets defined by repository
Harvesting Verbs	ListIdentifiers	Retrieves unique identifiers of the item
	ListRecords	Used to harvest records from the repository
	GetRecords	Retrieves individual metadata record from the repository

Major Software supporting OAI-PMH [10]

OAI Harvester Software

- Arc (*http://arc.cs.odu.edu/*)
- Citebase (*http://citebase.eprints.org/cgi-bin/search*)
- CYCLADES (*http://www.ercim.org/cyclades/*)
- DP9 (*http://arc.cs.odu.edu:8080/dp9/index.jsp*)
- MeIND (*http://www.meind.de/*)
- METALIS (*http://metalis.cilea.it/*)
- my.OAI (*http://www.myoai.com*)
- NCSTRL (*http://www.ncstrl.org/*)
- Perseus (*http://www.perseus.tufts.edu/cgi-bin/vor*)
- Public Knowledge Project – Open Archives Harvester (*http://pkp.ubc.ca/harvester/*)
- OAICAT (*http://www.oclc.org/research/software/oai/cat.htm*)
- OAI Repository Explorer (*http://re.cs.uct.ac.za/*)
- OAIster (*http://oaister.umdl.umich.edu/o/oaister/*)
- OASIC (Open Archvies en SIC) (*http://oasic.ccsd.cnrs.fr/*)
- OAIHarvester (*http://www.oclc.org/research/software/oai/harvester.htm*)
- DLESE OAI Software (*http://dlese.org/oai/index.jsp*)

How open is open?

The OAI Protocol is 'open' in the sense that it provides a machine interface to the data provider. It does not necessarily mean 'open' in the sense of making information freely available to anyone. The OAI repositories are unlikely to be freely available to all, at least initially. Because the protocol is layered on top of HTTP, we will make use of existing mechanisms within the Web server to restrict access using HTTP Basic Authentication or client IP address validation. In theory there is no reason why OAI service provider and data provider interactions couldn't be secured using SSL.

4. AN OAI APPROACH OF RESOURCE SHARING

In recent time resource sharing concept is not only confined to sharing of resources among the libraries or document delivery, but the sharing of metadata of various resources available in the institutional repositories, open journal archives and subject gateways using various protocols like OAI-PMH and Z39.50 are also considered as a new emerging trend in resource sharing, especially in scholarly communication.

The list of the software is long in various areas like Content Management, Digital repository, Electronic Journal system, Subject

Gateway, Library Automation software, etc. which supports metadata harvesting or OAI complaint, some of them are:

i) **Content Management and Digital Repository software** → ***DSpace, Greenstone, Fedora, Eprint*** and ***CDSware*** are the software which allows harvesters like Public Knowledge Project (PKP)–Open Archives Harvester to harvest the metadata of the scholarly articles, presentation, thesis, etc.

ii) **Journal Systems software** → ***Hyper Journal*** and ***DPubS*** (Digital Publishing System) *allows OAI service providers to harvest metadata records for its content and thus permits implementers to share metadata with others.*

iii) **Subject Gateways** → *RDN* took part in the alpha test phase of the OAI protocol. It implemented a simple data provider consisting of about 400 metadata record describing social science and philosophy internet resources.

iv) **Library Automation Software** → ***iVia*** is library automation software which supports the OAI protocol for metadata harvesting.

How it Works?

There are two classes of participants in the OAI-PMH framework:

- **Data Providers:** Data Providers or repositories administer systems that support the OAI-PMH as a means of exposing their metadata using OAI-PMH protocol. Here *data* means any kind of digital content, including text, images, sound, and multimedia.
- **Service Providers:** Service Providers, or harvesters, use metadata harvested via the OAI-PMH as a basis for building value-added services, such as building subject gateways, email alerts, etc

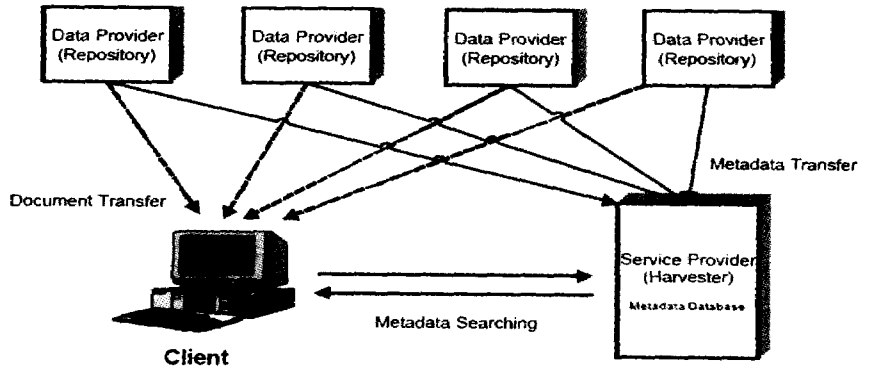


Fig. 3

There are various harvesting software's like PKP, DLESE, OAICat, etc. which harvest the metadata of resources from various OAI complaint repositories, journal systems and subject gateways and build a common metadata repository. The harvester works as an aggregator of the resources from different repositories into one place. It also provides the search service, Browse Service and Linking Service to the User.

OAI-PMH also supports selective harvesting, which help administrator of the harvester to harvest only selected or related resources, in that way it prevents harvester from harvesting the junk metadata or metadata which is not related to their interest.

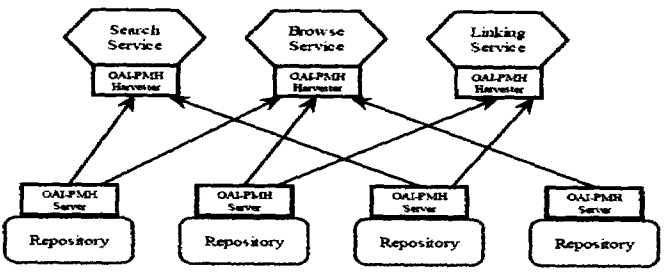


Figure - Simple Data Provider, Service Provider Topology

Fig. 4

Thus by using the OAI-PMH and harvester technology we can share the resources and provide a single cross searching platform to the users, they can search various repositories from one interface. One of the best example of this kind of platform is SDL of DRTC (ISI), which provide the facility of searching metadata harvested from various repositories related to Library and Information Science.

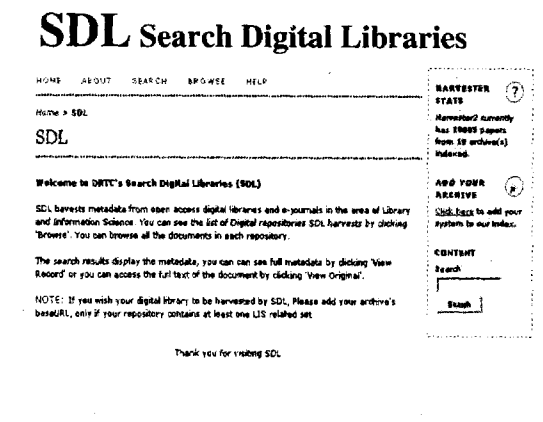


Fig. 5

Finally, we can say that OAI has provided one of the most important and efficient medium for resource sharing in present time and it's getting more and more momentum all over the world.

5. CONCLUSION

So far potential part of OAI–PMH to be played in resource sharing in the present scenario has been described. Hence, any improvement in resource sharing would heavily depend on the newer features that could be added and developed on the earlier version.

In the current version some features that are welcomed: more OAI complaint software, backward compatibility of the future version and metadata creation standardization and vocabulary control at the metadata level.

The trend, so far, in software development the number of OAI complaint product is in slow progress. It needed to be in on a faster track to provide access to as many as possible repositories. It's not only creating a standard but also to try keeping that standard unique instead of having multiple standards ensuing into non-standardization. So it is a not only a theoretical model but a existential necessity to have a single protocol for exchanging metadata across the repositories to have a unified approach to information distributed over the world.

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Implications of Information Commons in Changing Library Environment

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ABSTRACT

This article deals with the concepts and definitions of Information Commons (ICs). The success of ICs relies on being truly common and not restricted to certain members of a community. The policies of many library associations recognized the need for "access to information and freedom to read". Discussed the role played by Internet, enabling democratic access to information in ICs and in publishing environment. The mission for any library's ICs are to integrate the functions like spaces, information resources, technological resources, production resources and support services are outlined with their characteristics. Further Digital commons are defined with the issues related to access, legislation, licensing and cost raised from the implementation of ICs. The ways of creating and accessing the journals via Open access is reviewed with the new phenomenon of Creative Commons, which aims to provide a balanced approach and ownership and allowing public to use. The need for human resource development is stressed, as library professionals are to be the knowledge managers to handle the ever changing library services due to the information technology applications. It concluded that the library professionals should take ICs as a challenge and work towards it.

1. INTRODUCTION

It is undeniable that libraries have undergone massive changes in the past few years. They are no longer just keepers of information but also creators of information, social places, community meeting places and training providers. The advent of the World Wide Web has changed the very nature and structure of society, impacting how people conduct their personal, social, professional, and academic lives. The way people access and use information is changing, and so libraries need to change the way that they serve users. Research has shown a downturn in loans and photocopying, which suggests that students are using resources online. Libraries need to acknowledge and encompass new technologies and provide environments where users can relax and enjoy using the newly added electronic resources to their collections. While these resources offer many benefits, they also present many challenges. Information

commons support the important relationship between information technology and academic scholarship by providing areas in libraries that provide a full-range of library resources and productivity software.

The Information Commons (ICs) is a relatively new concept in librarianship. It is derived from the historical commons–resources that are freely available for the benefit of all in society to build relationships and cultural democracy. The ICs is an evolution of information technology centres that already exist in many libraries, and a renewed emphasis on libraries as places of community-building. It can meet these needs, as long as they are open to as many people as possible. The success of the information commons relies on being truly common and not restricted to certain members of a community. The ICs are often separate buildings within a library complex or a redesigned space within an existing building, providing a range of resources similar to those already in many libraries including room booking, word processing, printing, communication software and access to licensed databases. Commons are bright, welcoming and open spaces. As they are often designed when libraries are built or renovated, there are fewer limitations on placement of computers, wall outlets, wiring, and lighting, which can allow libraries to make radical changes to physical organisation in a building. Resources in the commons go beyond text-based information and can include audio, video and multimedia. Information commons are a space where users are encouraged to stay and work for long periods of time, often collaboratively, and reference and technical departments work together to create integrated reference and information assistance to users. It stress the need to integrate these services in the organisation to cope with increased demand for librarians to have advanced reference and IT skills, and to answer questions that are of a different nature to those traditionally asked in reference situations.

2. DEFINITIONS

The information commons comprises two halves–the physical of information commons as space, and the virtual, of resources and values as a platform for access to and advocacy for ideas. ICs are not just about resources, but about relationships and community between the creators and users of information. The American Library Association's Office of Information Technology Policy has defined the concept as–"Information commons ensure open access to ideas and the opportunity to use them. These commons are characterized by values and laws, organizations, physical and communication infrastructures, resources, and social practices that promote sharing, community and freedom of information. They encourage people to learn, think, and participate in democratic discourse, fundamental to ensuring an informed and active citizenry. In short, information commons are essential to democracy". Information

commons is generally a specific location designated to deliver electronic resources for research and production that is maintained by technically proficient staff.

3. INFORMATION COMMONS

The aim of the commons is to provide access to information for all, and the values of free access to information and freedom to read are entrenched in the history of librarianship. Many library associations have recognised these values in policy statements (Australian Library and Information Association 2001; International Federation of Library Associations and Institutions 2002). The commons support the notion of resources for all. Commons are an equaliser – available to all without prejudice or preference. Democracy is fostered by the very nature of the ICs, and encouragement of discussion and learning. ICs as a concept organises several issues that are at stake in the digital era and provides context and a cohesive banner. It stresses the importance of the public domain and the free exchange of ideas and information. The ICs have a major role in community building physically within the library, and virtually between information users and creators. The design of ICs is based on users working together. Extra room is provided between computers to facilitate sharing, and talking is encouraged. To counter increased noise, many commons also have quiet areas for individual study.

Virtually, the ICs provide access to many resources that enhance community building. Through the Internet, users are exposed to Usenet, bulletin boards, blogs, and chat services. The growth of self-published information has increased communication possibilities between information creators and users. Users can now not only read new work, but comment on it in context where it can be read by the creator and by the public. Librarians too, can communicate more with their users through websites, email lists, and virtual reference. The Internet enables democracy because it is free of many restrictions that exist in the non-virtual world such as time and space, and it evolves through creation by individuals, not bureaucracies. Libraries have always provided community roles such as collecting local history, holding meetings, exhibitions and cultural events, but technical innovations have extended the scope of a library's ability to connect with communities well beyond walls and outreach services. Apart from enhancing the lives of people in their communities, community building makes the future of the library more secure by ensuring that it is indispensable at the centre of society.

Information Commons conceptualizations are of three basic types:

- The world of information, especially digital information on or via the Web, as the macro-Commons;

- Areas, modules, or components of an institution with a high concentration of computer / digital technologies, peripherals, software options, and network infrastructure, as a more localized or micro-Commons; and
- Integrated centers for research, teaching, and learning, with a strong digital focus and often housed in or at least inclusive of a library, a more integrated Commons ("continuum of service").

The mission of the any Library's Information Commons is to integrate in design and function the Library's: (i) spaces, (ii) informational resources, (iii) technological resources, (iv) production resources, and (v) support services in such a fashion that users experience a seamless environment for contemplating, planning, researching, and bringing to finished product their academic, intellectual and, at times, personal work. The ICs intends to accomplish its mission in close collaboration with Access and Outreach Services, Library Systems, other Library units and the Faculty Center for Teaching.

4. CHARATERSITICS OF INFORMATION COMMONS

ICs focus strongly on the physical aspect of the concept. Commons websites emphasize the availability of room booking systems, software, Internet access and the notion of the ICs as research space. There is not yet the drive towards information commons as a forum for advocacy and access. It is likely that, some libraries will be quicker to adopt and implement the idea of information commons as a forum for advocacy and access than others, and some libraries may reject this aspect. However, it can be argued that the physical, virtual and advocacy aspects of the ICs are all interrelated, forming a technology cluster, and thus each aspect of it as an innovation should be investigated together rather than separately.

The characteristics of information commons include:

- ❖ Generally established when library buildings are significantly renovated or newly built
- ❖ Collaborative study areas
- ❖ Electronic room, PC, and lecture theatre booking systems
- ❖ Expanded PC services, including CD-ROM burning, scanners, web cams, printing
- ❖ Integrated information and reference desks
- ❖ Standardised PC login, authorisation and software

Many information commons have a comprehensive website detailing services and resources. Several also have photographs of the space, emphasising the attraction of design in information commons.

5. DIGITAL COMMONS

The digital commons are which are accessed by users through network. They are in the form of digital material like e-journals, institutional repositories, web site of the library / organization, OPAC, etc. For developing such type digital commons the following are to be considered: Purpose, Scope, Ownership and Copyright, Formats, Length of preservation commitment, Metadata, Migration and Authority for decisions. Most of this is developed using particular institutional repository software. The features of it are:

- To accommodate different types of publications.
- To offer different levels of access for different types of users (administrators, editors, reviewers, authors) in order to facilitate workflow management.
- To accommodate staff members, who can handle digital commons, by answering the users query?
- To allow for simple metadata input like title, author, abstract, keywords, date, etc.
- To work with textual documents and possibility to accommodate the associated non-text files (images, data sets, video clips, etc.) and
- To support full-text and descriptive metadata (authors, title, keywords, abstracts) searching of textual documents.

6. ISSUES FOR INFORMATION COMMONS

The concept of ICs has become more pertinent in an era where more information is delivered and created digitally. New methods of information creation, distribution and retrieval have raised questions about who should have access to information, in what manner, at what cost. There must be a critical mass of fundamental commonalities for designing the information commons. They are identified as logon procedure, common GUI and menu approached, and core sets of software resources. Four issues have arisen from the implementation of ICs–access, legislation, licensing and cost.

6.1 Access

Information is increasingly owned by organisations that place strict terms of use and limits on the individuals that are authorised to access it. Restricted access to information, particularly scholarly databases, has become widespread, despite predictions that information would be freely exchanged amongst individuals in the so-called information age. Common ownership of information is being eroded at the expense of being a consumer of information products. Dorman observes, "Collection development is becoming the art of the annual lease, rather than the art of the permanent purchase". Access to information will continue to be tumultuous for some time. The digital communications revolution has given us new ways to store material; to use, modify, aggregate and sort

material; and new ways to access and distribute materials. These developments in technology have been accompanied by experimentation with a variety of business models governing the supply and distribution of electronic materials. Governments must "provide access to the library's information resources, regardless of the format in which material is held, and including print, tape, disk, CD-ROM and networked electronic resources" and that this is a core service of public libraries

6.2 Legislation

Changes in legislation and new interpretations of the law can have a major impact on the ability of libraries to provide information. The role of copyright is to balance the rights and to encourage the continued creation of new ideas. Libraries are reliant on fair use and first sale provisions in copyright legislation around the world, but owners have introduced filters, encryption and licenses on information, changing the nature of access. Few projects argue that there need to be legislative changes in order to swing the balance of copyright to creators, and to encourage more work to enter the public domain where it can be used by anyone. Librarians should work towards legislative change to achieve equitable access for all by, "observing laws and regulations governing access to information and ideas but working towards the amendment of those laws and regulations which inhibit library and information services in meeting the obligations and responsibilities".

6.3 Licensing

An extensive amount of information made available digitally is now accessible only if librarians accept the terms of licenses and payments. Licenses are not always negative, as they can clarify aspects of the Copyright Act, but they mean more work for librarians in managing access to resources. Digital resources including software, websites, databases, DVDs and audio attract a myriad of licensing and condition. McDonald suggests that libraries now need license negotiation skills. Librarians need to ensure that they can negotiate licenses that are equitable and acceptable to all parties. However, many types of licenses are not negotiable, and this may affect purchasing decisions. Several projects aim to change the restrictive licensing culture. Open Access is a new model for creating and distributing journals, aiming to make research available at no cost to readers on the Internet.

In a similar way to Open Access, Creative Commons (CCs) is a project designed to promote the intellectual commons by helping content creators to license their work in ways that encourage sharing of work in ways that are less restrictive than the Copyright Act. CCs aims to provide a balanced approach to ownership and control of work, creating licenses where creators can reserve some rights, but allow public use of their

work for some purposes. Licensed content includes writing, art, music, and film. The list of projects working for access to the public domain and new licensing models continues to grow rapidly. ICs have been used, in fact, on two parallel levels. On one level, it has been used to denote an exclusively online environment in which the widest possible variety of digital services can be accessed via a single graphical user interface (GUI) and potentially searched in parallel via a single search engine from any networked workstation. On a second level, the phrase ICs has also been used to denote a new type of physical facility specifically designed to organize workspace and service delivery around the integrated digital environment. The emergence of the ICs concept on both the virtual and physical levels poses a fundamental question of organizational planning and design.

7. NEED FOR HUMAN RESOURCE DEVELOPMENT

There are some issues that academic libraries should consider when making decisions about ICs. First, administrative interest and support are critical because there are difficult decisions about resources and staffing. There will probably be costly architectural issues. There is certainly expensive equipment issues that are ongoing since hardware and software continually need to be replaced or upgraded. Secondly, redefining professional roles and responsibilities is a serious challenge. Administrators must sensitively handle the resistance some staff will have. Ongoing training is obviously an important factor; it is crucial that information. In fact, "the most profound attribute of the electronic revolution is that the means of delivering information have become inextricably bound up in the information itself." Information delivery has also become inextricably tied to the continuum of scholarship from initial idea to final product. As Beagle notes, the ICs creates "a synergy between the user support skills of computer staff, the information skills of reference staff, and the productivity skills of media staff." This dynamic invites staff retraining and role redefinition, and a fresh attitude towards identifying and establishing innovative library services based on the ways users look for and use information. Creating ICs certainly increases the many contributions academic libraries already make to their communities.

Librarians need to maintain awareness of advancements in technology and to continually seek solutions for users and library management that do not impact upon provision of existing resources. The users of the present and future library facility and IC should have a strong voice in identifying the requirements (virtual and physical) of the IC and the service needs that it should address. The librarian, the planner, and the architect also have an important role in the planning process- to visualize the physical space of the IC in multiple dimensions. The

challenge is to develop working spaces that facilitate integrated IC activities, including collaborative learning. To enable the ICs, librarians need to gain new skills, embrace role and organizational change and re-examine values. Librarians need to know license negotiation and advocacy skills to change the power-relationship between journal publishers and libraries. License negotiation skills will enable librarians to better understand the complexities of resource licensing and to gin better conditions for libraries and their users. By open access initiatives, they are now aware of alternatives to current licensing models. They should also acquire advocacy skills to promote the benefit of open access to faculty and students.

For public libraries, the shift is required in providing information and the need for organizational structures. Reference services and computer access rules may need to be modified as per the library. Librarians need to learn computer skills and the changes required to accommodate ICs should be made in consultation with the users. Libraries need to be in forefront of the issues in partnerships with other sectors of the community in advocating for the ICs as, "there is a growing realization that what constitutes genuine access to information transcends connectivity". Librarians can partner with projects like open access to create a powerful working environment to enhance the availability of information for the public. The initiative may include workshops, resources for researching the information commons, and a blog highlighting the work of other projects in the commons. Therefore for effective service delivery in the ICs require a "hybrid", "mixed skills" support staff, or one with increasingly specialized skills. Traditional reference staff requires new training and skills to be effective. Gaining additional knowledge broadly applicable to new technology must be paired with relevant specialization in particular topics (both technical and subject-based) as well as an ability to make effectively targeted referrals. ICs has both empowered and challenged the staff in many ways.

8. CONCLUSION

Information commons are an acknowledgement of how information will be accessed and used in the future, and a concept that brings clarity to the diverse issues within it including access, decreased funding for libraries, and the need to end community disintegration. Information and resources will continue to change, but with new models of integrated service delivery, librarians will be more to adapt to the future while recognising the importance of inclusive, user-focused services. ICs provide an opportunity to redefine service delivery in integrated IT and reference departments and to create collaborative work environments. ICs foster the values of democracy and free access to information and help to build community. Challenges will arise from conflicts over the

role of the market and the redefinition of reference and IT roles. ICs may be able to revitalize libraries as information providers, but only if the issues, legislation, licensing and cost can be addressed successfully enough to allow a wide range of libraries to adopt the concept. The ICs create a synergy between the user support skills of computer staff, the information skills of reference staff and production skills of media staff. Physically it offers the flexible work space wherein all staff needs to apply their combined expertise adaptively to the rapidly changing needs of a highly demanding user community.

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Information Commons and Right to Information

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ABSTRACT

The right to information (RTI) has been given to the Citizens of India to secure access to information under the control of public authorities. This paper explores possibilities of application of Information Common to RTI to make it more feasible. Application of "Information Common" will not only reduce the work load of Government Departments but will also help public to get information in hassle free environment.

1. INTRODUCTION

1.1 Right to Information

The right to information came to statute book as the Right to Information Act, 2005 (22 of 2005). It is an act to provide for setting out the practical regime of right to information for citizens to secure access to information under the control of public authorities.

1.2 Information Common

Information common is an integrated, central facility providing access to the technology required to identify, locate, retrieve and manipulate information.

1.3 Discussion

Under the RTI Act the word "information" means any material in any form, including records, documents, memos, e-mails, opinions, advice, press releases, circulars, orders, logbooks, contracts, reports,; papers, samples models, data material held in any electronic form and information relating to any private body which can be accessed by a public authority under any other law for the time being in force.

As per the act, the Central Public Information Officer or State Public Information Officer, as the case may be on receipt of a request under section 6 shall, as expeditiously as possible, and in any case within thirty days of the receipt of the request, either provide the information on payment of such fee as may be prescribed or reject the request for any of

the reasons specified in sections 8 and 9. In case the required information is not provided to the applicant in the specified time, then the person can appeal to the Senior Information Officer.

Though, the act has several provisions to safeguard the interest of the applicant. There is a penalty of Rs250/- per day subject to maximum limit of Rs25000/- but in practical, thousand of applications are lying in the Departments for action and so for only few officers have been penalized for delay in supplying information.

It is very time consuming. First a person has to go to security officer to get a pass to get entry into the Office, then the person has to locate Cash Section to deposit fees for the information and after obtaining cash receipt the person can submit the application in the office of the Central Public Information Officer (CPIO). After receiving the application, the CPIO send it to the concerned Department. The Department compiles the information and sends it to the CPIO who then send it to the person which normally takes more than a month. If a person has to take photocopy of any file or document, the process takes another month. Even if a person gets the desired information but due to loss of time the purpose of information may be lost.

The delay in supply of information is due to the physical nature in which it is handled; big thick dusty files, which one can see in any Government Department. Seeking information is still synonymous to multiple visits to the Office and one cannot be sure, whether he or she will get desired information or not.

2. APPLICATION OF INFORMATION COMMON TO RIGHT TO INFORMATION

The problem can be solved by creating 'information common' consisting of Record Room, Facilitation Center and Libraries in the Central Government Departments and for State Governments, District Administration can also be involved where facilities like Computer, internet connection, photocopy can be provided to the public. Such Information Common can also be used as "One Day Governance" as is being practiced in Gujarat where one can get all type of Income, Caste, Domicile certificates in just 24 hours. The services like renewal of Ration Card, Driving License, Registration of Vehicles, Status of Passport can also be added gradually at nominal charges which will help to generate revenue and these Information Common can become self sustainable. This IT enabled services will bring transparency and eliminating chances of delay, harassment, nepotism & corruption.

The Information Common can also involve the Library & Information professionals in dissemination of information who have expertise and experience to deal such cases and they can disseminate the desired information pin pointedly, expeditiously and exhaustively to the public.

The Information Common can be connected to the different Departments of the organization by intranet. The records and documents which does not involve any third party and which does not require any permission from Senior Officers may be kept in the record room for supply of information to the public instantly.

Further, each Information Common can be connected to a hub under the Central Information Commission (CIC) or State Information Commission (SIC). It would facilitate further to get most of the information instantly. It would also be helpful to the public to use the information resources equally and ubiquitously and unique identity can also be generated for each application ensuring that there is no bias and prejudice on any account. Such hub would also be helpful to CIC/SIC to monitor progress of the applications and delays thereof.

Governments should also create such atmosphere and transparency in their Departments so that most of the required information relating to day to day needs of public is available online.

3. CONCLUSION

There could be situations where the Departments may be flooded with applications under RTI Act. In that situation they would be busy furnishing information rather than doing the work for which they have been created. Information Commons, as suggested above can reduce work load up to 80%. They can also reduce paper work and purpose of enacting of RTI Act could be achieved.

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Information Technology, Information Commons and the Changing Nature of Academic Libraries

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ABSTRACT

With the advent of Information Technology (IT) accessing information and the recent move towards cooperative learning and mass/group study have brought changes in the way students/users use academic libraries and its resources. Academic libraries have experimented with new habits to merge information resources, technology, and research assistance. Some have rebuilt their physical areas and redesigned services to meet the new challenges by adopting the idea of the information commons or a central location that provides computers, information resources in various formats, and staff assistance. Although they may share similar goals and some common features, academic institutions have taken a variety of approaches in designing, funding, and staffing their information commons. This article is an overview of thematic description of the situation and how it all can be implemented and advantage can be cropped up and the various proposed ways are thrown to be implemented in Indian environment.

1. INTRODUCTION

Information Technology has changed the entire approach of the libraries in general and libraries attached to the academic institutions in particular. The very basic process of library activities has also been changed. In almost all cases of library activities either computer has been replaced completely or partially to the manual handling of library activities. Libraries use necessary technology for users to use their own services created by them but also make necessary arrangement for access to scholarly electronic resources. The physical areas covered in libraries have been changed to accommodate the additional technological

facilities necessary to provide users with the tools to use library resources successfully and to meet their information demands. It is also seen that there is increasing demand for access to information available in several formats and the tools that can be used to integrate information into products. Different technologies help students to understand various services and the organisation and distribution of services. This expansion of series of technologies changes the library activities especially academic library in terms of library resources as well as library as a physical entity.

2. PHYSICAL LIBRARY

The academic library is not predestined by technology. Physically speaking library buildings remain vital for a number of reasons. Firstly the fact that prints form of information is still vital today and it does not seem to be obsolete in any time to come. As Crawford observes that prophesies of the death of print and the all-digital future [that] began in the late 1980s... are now declining into the oblivion they deserve (Crawford 1988)". The publishers also show their deep inclination for the print world. This view is again corroborated by Mann "publishers continue to publish in print and show little inclination to move to a digital format as the main mode of disseminating information. Books are published in increasing numbers every year, and libraries continue to purchase large quantities of books to add to their collections (Mann 2001). "Many professional still want theta print form should persist despite their digital counterpart. Looking in defence at the observation made by Schevitz similarly, there are over 100,000 academic journals, but only approximately 6 to 8 percent of them are available online in full text and more than half of those can be accessed only by subscription (Schevitz: 2002)."

Many questions are in queue to be raised why does the print form continue to persist in an age passionate with technology? Digitisation process is expensive at least at the initial level. At present the expense of publishing in digital form or converting material to digital far outweighs the cost of print. Additionally, publishers often require a print subscription with electronic access, resulting in libraries continuing to add to print journal collections even when they have full text electronic access. This happens in most cases. Few examples can be cited in Indian context. MD University, Rohatk participates to UGC's Inflibnet's e-resources programme. It subscribes a large number of journals however many of the print journals are in subscription despite the duplicacy. Because it is the users' demand especially in the field of some pure sciences, biosciences, etc., academic libraries generally acquire full-text databases to replace journal subscriptions and/or increase access to full

text journals, not for full text access to books. This is a hard fact in practice.

The trend is also changed in the context of higher education. Many factors determine the teaching-learning process. Henshaw remarks, "Another factor influencing change in academic libraries is the shift toward cooperative learning. Recent trends in education emphasizing collaboration and group study are causing a demand for new resources. The need for "knowledge creation" workspace has encouraged librarians, faculty, and computer specialists to work together to provide the necessary technology, information, and services (Henshaw 1994)." Traditionally speaking libraries provide study space inside the library, and are now including more group study facilities that have technology for access to both physical collection and electronic resources.

It has become a common phenomenon that a physical presence is also necessary to provide traditional services for users e.g., open access to the collection, browsing the journals, reprography, circulation etc. Work areas for librarians and staff, quiet study space, and storage for print collections also require the physical areas in the library. Even with the shifting emphasis from print to electronic, there is a continuing need for physical space for collection growth and for the technology to use both the physical collection and the electronic resources.

3. FRESH DEMANDS

The need for new services combined with the expectation that traditional services will continue to be available but also forces academic libraries to examine new ways of providing the resources the users require. Users now expect access to information in a wide variety of formats, including print, electronic, and multimedia, leading to a greater need for research assistance from librarians. Students require the expertise of an information specialist to make the most of the resources available and find the information they need, and the librarian's role will become increasingly essential as students seek guidance in navigating through the many layers of electronic information resources. Michalak finds that new sources of digital information and the broad array of electronic resources available will also require educating students to prepare them to be self-sufficient information seekers. Students will continue to rely on librarians for assistance with research strategies, managing large amounts of information in diverse formats, and evaluating and selecting appropriate information (Michalak: 1994).

Technical services are in the rise in the university campus. Users especially students demand more technical assistance from the libraries. The technical assistance may differs from institutions to institutions and

many factors determines these services. Technology required for completing coursework has moved beyond the basics of e-mailing a document or downloading a file. Understanding how to use PowerPoint, Adobe Photoshop, and web authoring tools has become necessity for students. Incorporation of these technologies in the library is a logical step toward providing students with the technology and information they need at the place they need it. There is a paradigm shift in the use of library services by the students and the services provided by the library staff. Gosling says even with continual electronic access (24/7), students still demand longer library hours to have a place to study (Gosling 2000)." In addition to offering silence study space, libraries are natural gathering places for groups to study and provide social space for students to meet between classes. These features will be more important in the future as remote access to information isolates users and students seek learning and social spaces where they can interact with others. University and college campuses are now attempting to collate learning resources with other services for the convenience of users. Although it is not a common phenomenon that other services should be available in the library buildings still it has been implemented in many libraries as Clayton detects "a growing trend is incorporation of non-educational services adjacent to or within the library that students can use in conjunction with a visit to the library. Many academic libraries are now adding coffee bars and cafes to lure students (Clayton 2002)." This may be helpful to make the students gather near the building or inside the library. Further students may see others using the library and tempted to use the same.

4. INFORMATION COMMONS REVISITED

As it is discussed earlier that the trend in library use is changed. If this persists further the definition of the libraries will be forced to be changed from the glossaries. Many of us had already visualised much before as Wood & Walther "the library of the future has been described as "a portal through which students and faculty will access the vast amount of information resources in the world and less a place where information is kept" as focus shifts from ownership of information to access to and management of information (Wood & Walther 2000). In order to meet the new demands of users, libraries are developing new models for providing access to electronic resources and digital information and assisting students in their academic pursuits. Libraries are redesigning their services and space to accommodate the changing needs and the demands for technology. One model for providing integrated technology and information resources is the Information Commons. The Information Commons (IC) can be a redesigned section of an existing library, a new addition, or a merged library/technology organization in a new building. It is defined as "a new type of physical

facility specifically designed to organize workspace and service delivery around [an] integrated digital environment (Beagle 1999)." So the definition of Information Commons (IC) is required at this stage. In its simplest form, the IC is a central location within a library where access to technology and reference service is combined. Computer workstations are grouped together with a help desk and print reference resources nearby. Students can use workstations to access the OPAC services, search the Internet and electronic databases, and use productivity software to prepare assignments with print resources, technical help, and professional research assistance readily available. This arrangement provides students with "access to productivity software and tools as well as electronic information resources from each library workstation (King 1998)" Other IC features generally include collaborative learning spaces, multimedia workstations, hi-tech classrooms, and group study spaces. These features are designed to enhance group learning, to encourage faculty to incorporate technology and new information resources into their curriculum, and to provide a technologically advanced setting for conducting library instruction.

There are several advantages for students with this type of facility. Students can start the research process; locate, evaluate, and select the information they need; get research or technical assistance; and complete assignments from one location. This integrated access to information and technology, combined with the availability of multimedia tools and staff assistance, eliminates the need for students to go to different locations to prepare assignments or to get help when they need it. In theory, the availability of trained staff for research assistance (e.g., professional librarians) and help with technology questions at the point of service provides students with the guidance they need to achieve academic success.

Challenges are ahead of ICs. The most difficult one is the need for trained staff. With student demand for twenty-four-hour access resulting in more library hours, an IC can be staff intensive. Assistance must either take the form of cross-trained staff that can handle both technology questions and provide research assistance, or a joint staffing arrangement with experts in both information resources and technology available to provide the appropriate types of service on demand. Training must keep pace with technology changes and system upgrades. Adequate training can involve a great deal of time and money, which are often in short supply in busy, underfunded academic libraries. There is also the expense of additional computer equipment and upgrades. Thin client workstations that provide OPAC, Internet, and database access may be suitable for basic access, but supporting a full range of software and/or multimedia tools for preparing projects from beginning to end is beyond

the capacities of "dumb terminals" and requires more robust equipment. Scanners, other hardware, combined with expensive software for web authoring and multimedia; dictate a need for substantial sources of funding. Equipment replacement costs also challenge a library's tight budget. Ready access to information in an electronic format that can be easily printed or downloaded may also affect the quality of research. The increased access to full text information available through electronic resources may tempt students away from using better or more relevant information that exist in print or digital formats. There is a temptation for students to settle for information that meets the "three Fs" requirement: first, fastest, and full text. The lack of proper research skills and the will to use them means students may fail to find the best and most appropriate information. The urge to "cut and paste" is also a drawback. The ability to move quickly from a full text article in a database to a word processing document can lead to short cuts and sloppy work habits. The opportunity for research skill deficiencies to develop means librarians will have to play a larger role in instructing students and providing assistance in this new joint information and technology environment.

5. THINKING OF PRACTICE IN INDIAN CONTEXT

How to be success in ICs is the real problem. Are these facilities anything more than just glorified "tech labs" or do they offer value-added services? The Indian universities can go ahead with this experimentation. More or else educational institutions do practice this but they did not identify these services with specific names, e.g., IC etc. MD University provides technical facilities at its Net lab, which is inside the central library itself. Many a times the library staff inquires the student's requirements and assists also in formulating the query and clarifies their information needs. Sometimes the services are of such type as if the students learn in their respective classrooms. Further it can be strengthened. Many technical universities may be doing so.

6. CONCLUSION

If the Indian universities do so entire university community will be beneficiary to it. The image of the library services will be enhanced. The authorities will give more interest in it. The technical staff will be more trained with new skill with primary teaching/subject knowledge also. More budgets may require but the authority can think of to go ahead with this also. After all, this facility is for its own community only. The qualitative upgradation in education will be projected. Other special facilities may cut

from different teaching departments do that the budget may get balanced and the university may not have heavy financial burden.

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Sri Venkateswara College Library in the Light of the Emerging Concept of Information Commons in Indian Context

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ABSTRACT

The article highlights the services provided by Sri Venkateswara College Library in the light of the emerging concept of information commons. It concludes by giving some suggestions in this direction.

1. INFORMATION COMMONS

Information commons is an emerging concept. Beagle defines that, "information commons creates a synergy between the user support skills of computer staff, the information skills of reference staff, and production skills of media staff. Physically, it offers the flexible work space all staff needs to apply their combined expertise adaptively to the rapidly changing needs of a highly demanding user community."[1] On the other hand, in Whitchurch's words, information commons is, "a centralized location where the common activity is to find, use and create information. It is a place where research, group collaboration and consultation can all be done with the help of appropriate technologies in support of the patrons."[2]

2. INFORMATION COMMONS AND ACADEMIC LIBRARIES

Advances in information technology have posed challenges to libraries and librarians. The users have been demanding electronic resources of information. Even Cowgill says, "electronic resources have become an important and prominent part of library collections because of the rapid development of the Internet and the world wide web. The fundamental structure and organization of university libraries' services

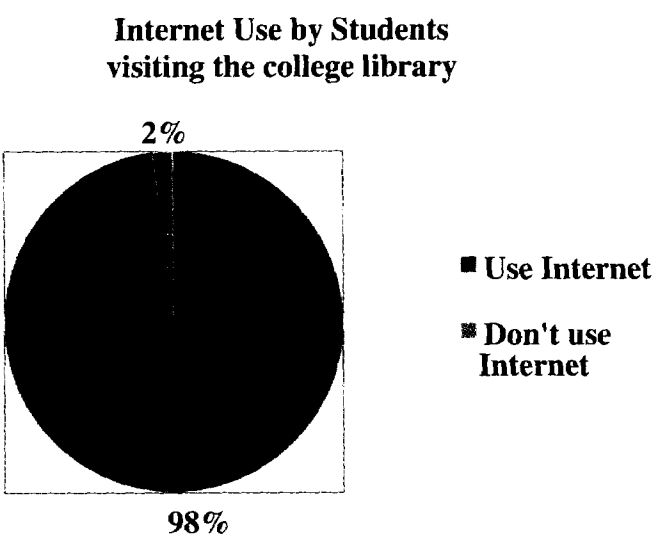
have been impacted by patron demands for accessibility to such resources."[3]

3. SRI VENKATESWARA COLLEGE LIBRARY

The college has a local area network which connects library, all the laboratories and administration section. Through the local area network, the staff members can browse the Internet and work on the Student Information System, while the students can browse the Internet.

The faculty members and students are day-by-day increasing the use of computers for writing papers and internal assessment assignments respectively. In one of our earlier survey, we found that 98 per cent students out of the total number of students visiting the library use Internet Café, which is a high percentage.

Few syllabi like B.Com. (Honours), B.Sc. (Life Sciences) and B.Sc. (Honours) Biological Sciences have recently introduced a paper on computers.

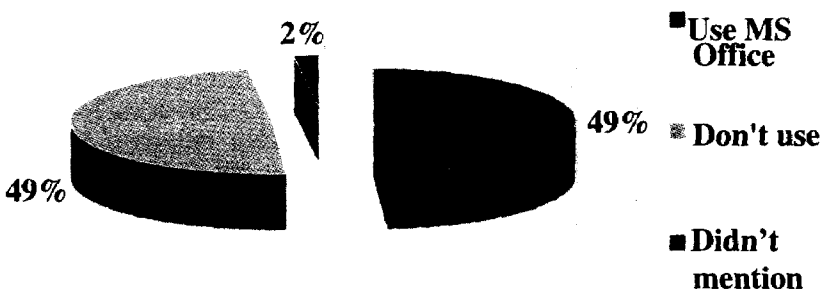


The college has an Internet Café, which is divided in two portions– one each for staff members and students. Six computers have been installed in the staff Internet Café and fourteen in the students' Internet Café. The computers in the staff section have Windows operating system and those in the students section have Linux. The faculty members use the computers for preparing notes for class lectures and also for writing research papers. The faculty has been giving the facility of printing also. One of the computers in the staff section has internet connectivity through University of Delhi (DU). This computer is used by the staff

members to access the priced electronic journals subscribed by DU. The connectivity has also been provided in all the science laboratories.

Linux operating system is being used in the students' section because students download excessively in Windows environment. The students use the Internet Café for accessing information for their internal assessment assignments. In a few cases, students are allowed to use MS Office in the staff section for assignments. One of the computers in the staff section has been reserved for use by visually challenged students of the college. Jaws software has been installed on this computer and a dedicated printer is attached to it. In one of my earlier survey, I found the following:

Use of MS Office for Class Assignments



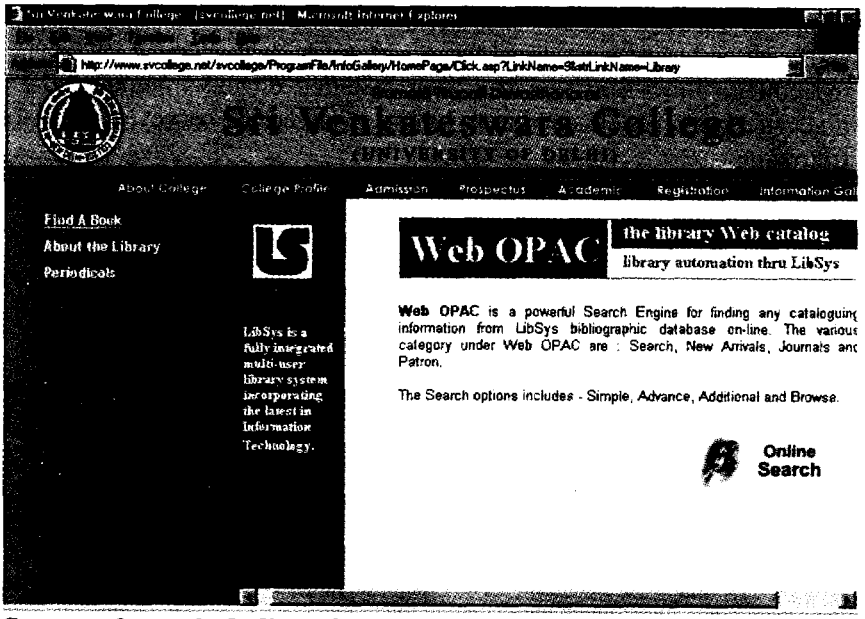
During personal interaction with the students, we found that 49% students' non-use of MS Office does not necessarily mean that they do not know working with MS Office but most of they do not have a computer at their home and in the library, we don't have MS Office in students' Internet Café.

The future prospects include providing more computers for the students with MS Office for preparing internal assessment assignments.

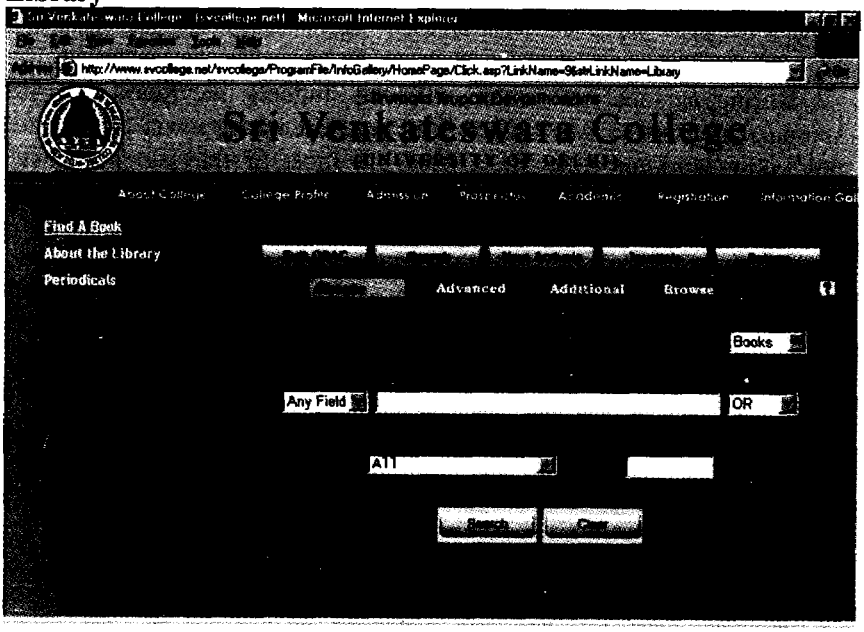
A seminar hall has been built on the first floor of the library reading hall. It is used for organizing seminars, conferences, workshops and lectures for staff and students. It is equipped with overhead projector and internet connectivity.

4. SRI VENKATESWARA COLLEGE WEBSITE

The college website provides link to library's online catalogue. The online catalogue gives information regarding books, current issues of periodicals and back volumes of periodicals available in the library. The online catalogue can only be accessed by the staff and the students of the college because a unique identification number assigned by the college is required to access the catalogue.

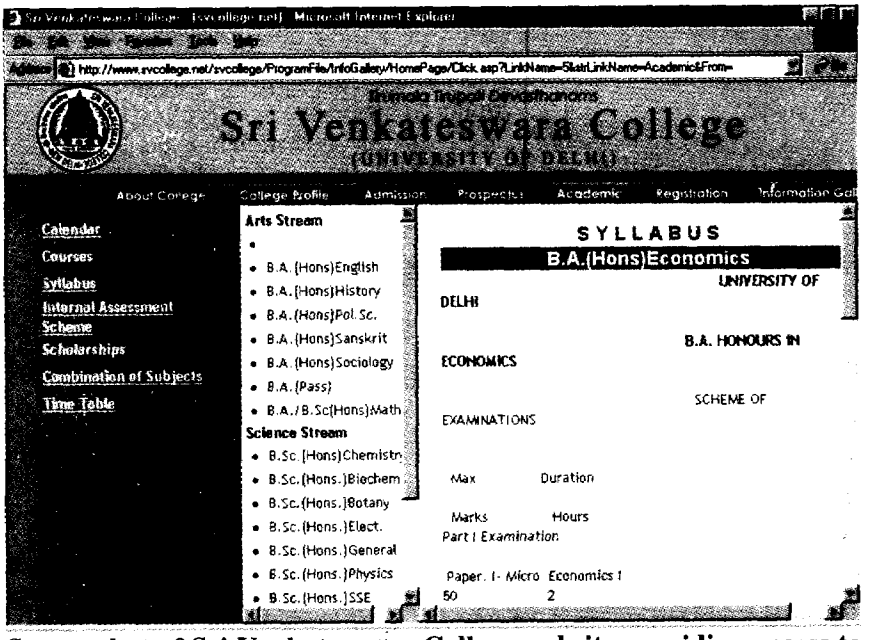


Screen shot of Onliine Catalogue of Sri Venkateswara College Library



Screen shot of various levels of searches in online catalogue of Sri Venkateswara College Library

Syllabi of different undergraduate courses available in the college have also been made available through the website. Anyone, who is interested, can access it.



Screen shot of Sri Venkateswara College website providing access to syllabi

5. CONCLUSION

Computer literacy is quite common among the faculty members and the students of the college. This has lead to a demand for a physical space where the faculty and the students can have access to computers, for Internet browsing and for writing assignments. Consequently, Internet Café has been established in the library.

The creation of an information commons in an academic library will be a qualitative enhancement to its services and attracts more users.

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What is expected of College Libraries in the Light of Information Commons

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ABSTRACT

The paper defines what information commons are. It traces the information commons as one of the resources useful to provide services observes academic libraries as information commons. Describes the Internet use among college libraries of Gulbarga city and then discusses the things to be done or what is expected under the present circumstances.

1. INTRODUCTION

Large amounts of data, information and other intellectual resources have been made available as public goods for the general benefit on the Internet. The information that is freely accessible for use by all constitutes a public commons in information. This information commons has had substantial positive effects on the well being and growth of society. Information is a highly valuable resource. As increasingly rich Web resources become available across all college disciplines and occupational programs, the question is not whether but how best to integrate them into instructional efforts. One approach is for librarians to form partnerships with classroom faculty to create course-related instructional exercises that include Internet resources. Librarians always have occupied a critical intersection point between the user with information needs and the worlds of resources available.

2. INFORMATION COMMONS

The information commons consists of information that is freely usable by anyone with no intellectual property rights interfering with the use. No one has an ownership interest in what is often referred to as "public domain" data or information and thus we are all free to use it for whatever purposes we see fit. Ideas, thoughts, facts, concepts, and mathematical formulas all fall within the public domain. The "information commons" currently accessible to all library patrons is

likely to shrink as society makes larger and larger volumes of information available only in digital form if the ability to read those copyrighted digital works is made available only on a user fee basis. The Internet is another form of public commons with obvious widespread public benefits.

As we move into the age of information, destruction of the information commons or failure to build it at all is not inevitable. Because retention of an expansive information commons has vast long term public benefits, numerous individuals, business entities, and government policy makers are continually striving to seek approaches and practices that help preserve and foster the commons. Administrative, political, and legal techniques developed to deal with destruction of the commons in the environmental arena provide some valuable insights in how the information commons might be spared of its seemingly inevitable destruction.

With the evolution from the Internet (text-based) to the world wide web (graphical user interface and hyperlinking) in the mid-1990's, and ever-greater access to electronic information resources, information commons have proliferated into hundreds of institutions and continue to evolve into more effective delivery of patron services. The library is expected to serve and meet the needs of the full range of student and faculty as their primary patrons. Information literacy is the curriculum that LIS professionals teach within the information commons framework.

The information commons concept focuses on the need to provide

- Research guidance and technical support for patrons, who need access to information in all formats, with an ever-increasing quantity of digital resources;
- Access to appropriate hardware and production/presentation software to process the acquired information as needed and support for these hardware/software resources;
- Appropriate physical spaces to allow, support and enhance patrons' research and production

Most common elements of integrated services in an information commons are

- It is physically located on one or more floors of a library
- Provides access to traditional library services, "high-touch" and face-to-face–provides general information library catalog access, reference/research services, reserves, circulation, interlibrary loan/document-delivery, etc.

- Constitutes a high-technology-rich environment, "high-tech" and easy, often high-speed remote access–networks, public access computers and other high-tech equipment of various types as needed
- Provides resources (hardware, software, support) for what was formerly a "computer lab" plus various specialty computer labs (scanning image and optical-character-recognition/OCR lab, a multi-media, digital video processing lab, etc.) integrated in terms of space, desks, staff, training, etc., into the traditional library services

3. ACADEMIC LIBRARIES AS INFORMATION COMMONS

Academic libraries provide the real and virtual spaces in communities for free and open exchange of ideas to the academic community–teachers, students' etc. In almost every school, college, libraries make knowledge and information available to all. They are the place where teachers and students can find anything and everything in relation to their academic pursuit. Libraries serve as the source for the pursuit of independent thought, critical attitudes, and in-depth information. The mission of academic libraries is to provide the resources required by the academic community.

As libraries serve to prepare students for a lifetime of civic participation, they also encourage the development of civil society. They provide the information and the opportunities for dialogue that the academic community needs for their pursuit. Libraries build social capital and encourage civic engagement by developing community partnerships, facilitating local dialogue, and disseminating local data. Ever since their proliferation academic libraries have played a key role in educating the citizens of tomorrow. They have also supported education by providing resources for curriculum-based and lifelong learning.

For centuries, libraries have served as the Information Commons in communities. They have offered free and open spaces to all. In the digital age, libraries throughout the world serve any category of communities as information commons. At the dawn of the information age, libraries are experiencing new vigor. Nearly every library now offers free public access to the Internet. Thanks to technology and worldwide collaboration. What began in the 1950's as the automation of materials processing led to the deployment of computerized databases for locating information in the 1970's. Now libraries are offering direct access to the Internet, supplemented by purchased commercial databases, plus unique local collections converted to digital formats, thereby creating digital libraries available anywhere, anytime. This capacity to deliver information directly and just-in-time to users helps connect collections and reference services directly to a population with an insatiable demand for information access. Over the years ahead, libraries will share more

and more resources, offering seamless access to a rich collection of valuable, interesting resources.

4. INTERNET AMONG COLLEGE LIBRARIES IN GULBARGA CITY

There are forty colleges offering various degree programs of which a majority does have access to Internet (Table. 1) and the facility is also extended to the students. Expect one medical college; Internet is not a part of library. The purpose of which it is used general sending e-mail, etc. Use of Internet purely for academic reason is absent. In a nut shells, the Internet is being uses like a cyber café without any financial implications. Even no one monitor what they are searching? Leave apart any user policies. The term information commons is totally alien to librarians as well as students.

Table 1. Access to Internet in colleges

Types	No. of colleges	Internet services
First grade degree colleges affiliated to various universities	15	8
Engineering, MBA, MCA, BCA, BBM, PGDBM	10	9
Law colleges	2	2
Medical and Dental colleges	4	4
B.Ed. And B.P.Ed.	9	0
Total	**40**	**23**

5. WHAT IS EXPECTED?

Under the circumstances the college libraries have to adopt certain strategies to utilize the best fruits of information commons. These include

5.1 Education to Librarians

There is a necessity to educate librarians regarding the structure of Internet; the way it can be used for providing effective services, the nature information commons, its impact on library services, legal and ethical issues in dealing with the information commons etc. if the librarian is educated on all these aspects. He can be able to make best use of the Internet and information commons.

5.2 Information Literacy

No longer divided by geographic, linguistic, or economic barriers, electronic information can span boundaries and reach into any neighborhood. Access to an abundance of information does not

necessarily mean access to a diversity of sources. The vast majority of Internet sites are designed for people with average or advanced literacy levels. The academic community needs sophisticated information literacy skills to succeed in the twenty-first century and to fulfill their roles. Even those already proficient at finding, evaluating and applying information to solve daily problems can be overwhelmed by the proliferation of information and the difficulty of sorting through it. To cope successfully, they must be able to identify, evaluate, apply and communicate information efficiently, effectively, and responsibly. They will have to become information literate to flourish in the workplace as well as to carry out the day-to-day activities of citizens in a developed, democratic society. Librarians have to work in collaboration with community and education groups to identify information needs, initiate a dialogue aimed at encouraging a more information-literate populace, and facilitate the development of skills to utilize information strategically.

The rapid growth of the Web is estimated to double in size every year, though some sources estimate this level of growth every six months. Much of the information available over the Internet has no validation like peer review to guide users. Much of the authentic and official information is licensed and restricted to those who have invested and contracted for access. The complexity of finding, evaluating, and utilizing information in the electronic age has become a major challenge. Librarians need to ensure that the students have the information literacy skills in the digital age.

5.3 Change of role

Librarians are well positioned to lead the charge to ensure that users can exercise their 21st century information rights. Librarians are committed to ensure the free flow of information in our society and understand what is at stake. Librarians must pick up the gauntlet and join forces with computer professionals, educators, cultural organizations, journalists, public officials, public interest groups, and the general public to ensure that everyone has access to a free and open information commons.

Working together librarians must recognize the importance of information commons to the advancement academic life and thereby civic society. Hence the professionals must

- Undertake research that demonstrates the contributions of public access to the advancement of science and the arts.
- Compile anecdotes about the positive effects of access to information and the negative impact when access is denied.
- Articulate the positive economic value of the social outcomes of the commons and how it outweighs the negative impacts on the market.

- Identify individuals and groups with common concerns, looking far beyond the normal sources for allies.
- Build coalitions to promote public access, to extend our reach, to increase our strength and influence, and to galvanize grass roots action.
- Seek opportunities to testify at relevant hearings and forums and urge that public interest representatives be named to various task forces and advisory councils on information issues at the local, national, and international levels.
- Support growth, connectivity, and digitization by local libraries, schools and other cultural organizations and make their valuable resources readily available over the network.
- Focus more attention to the importance of the information commons and attempts to erode the public sphere.
- Collect data about "Where's the harm?"; assemble facts and document the case; make the issues local; and use good examples, anecdotes, and stories.
- Take every opportunity to educate the public.
- Develop a public awareness action plan that mobilizes support, holds politicians accountable for their views, and encourages community involvement.
- Establish local free nets and other communication vehicles to share community concerns, information, events, and opportunities.

5.4 Formation of Acceptable Internet Use Guidelines

Educational institutions play a unique role in promoting intellectual freedom. Internet access has to be made available to students, faculty and staff. They serve as a point of access to information and ideas and as a learning laboratory for students as they develop the critical thinking and problem solving skills needed in a pluralistic society. The Internet allows such institutions to expand and expedite access to information. The students, faculty and staff shall be allowed to access Internet resources. The college shall not be held accountable for the accuracy or decency of data retrieved via the Internet.

Internet access is available for academic research and course assignments in campus libraries and designated computer labs, and for career, college, and employment information. The College shall not provide personal e-mail accounts for students but may allow access to free mail services via the World Wide Web. E-mail access shall be provided only for academic or course-related communications. E-mail attachments must be no larger than 100 KB and must support college course work.

Users should exercise caution when transmitting personal or sensitive information via the Internet. The College should accept no responsibility for harm caused directly or indirectly by use of the Internet.

5.5 Acceptable Use

Acceptable use includes Internet access supporting instructional, cultural, and social and community service programs of the College. All use of the Internet must be in support of education and research. Community residents will be referred to local public libraries providing Internet access.

5.6 Unacceptable Use

Unacceptable use includes any activity, which is not related to educational, or research needs, including:

- Use of the Internet for personal, recreational, political or commercial purposes.
- Any use, which may consume large amounts of bandwidth for, prolonged periods of time.
- Downloading to or installing any file or program on the hard drive of any Internet computer.
- Accessing FTP sites for the purpose of downloading any program to a floppy disk.
- Text, graphics or other files retrieved for research purposes may be printed or saved to floppy disk using the "File--Save as" command.
- Non-academic use of any chat, e-mail or messaging service. E-mail attachments larger than 100 KB.
- Game playing from any Internet site, including Web sites, MOOs, MUDs, etc.
- Any display of images, sounds or text which could create an atmosphere of discomfort or harassment for others.
- Violating copyright laws and fair use provisions through inappropriate reproduction or dissemination's of copyrighted text, images, or other resources.

5.7 To begin with

In the case of the Internet, libraries shall offer freely available sites for equitable access to the network, and to the information resources available through it like a cyber cafe. They also offer the advantage of being network information resource providers themselves. The Internet has the potential to link libraries further for electronic sharing of full text, graphic, and multimedia library resources. The electronic reference desk is a promising use of the Internet in which users could ask questions get

answers. Utmost care must be incorporated while identifying the websites (of the information commons) that are to be selected for inclusion in acceptable service.

6. CONCLUSION

Information that is freely available in Internet is called information commons. Academic libraries provide the real and virtual spaces in communities for free and open exchange of ideas to the academic community. Some data bases are available any where and any time. This is capacity to deliver information directly and in-time to users helps connect connections and reference services directly to a population with an insatiable demand for information access. Table 1 indicates that information commons is totally alien to librarians and students. So college libraries have to adopt certain strategies to utilize the information commons. They include education to librarians, information literacy and enumerated the change of role of information commons. Educational institutions play a unique role in promoting intellectual freedom. Internet access has to be made available to student, faculty and staff.

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Application of RFID Technology in Libraries: An Automated System of Circulation, Security and Stock Management

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ABSTRACT

The Cornerstone of the 21st Century libraries will operate with such simplicity that users will be able to check materials in and out themselves and find what they want almost instantly without the assistance of library staff. RFID is the such new wireless communication technology to be used in library for security and efficient tracking of library materials throughout the library, including easier and faster charging and discharging, inventorying, and materials handling. The article provides about RFID, its components, the pros and cons and automated system of RFID in Libraries. The purpose of this article is to give a general view of the RFID technology and the role it will play when enclosed in library system.

1. INTRODUCTION

For many years, libraries have used a combination of technologies to reduce the likelihood of theft, improve stocktaking, and speed up issue and return procedures. But using RFID is capable of incorporating and improving upon existing systems within one technology. It is a combination of Radio frequency based Technology and microchip Technology. It is a technology that allows faster self-checkout and self-returns, improving shelf management and inventory control, and providing better theft protection. RFID can be an alternative to barcodes and electromagnetic security.

2. RFID SYSTEM COMPONENTS

RFID technology collect, uses, stores, and broadcasts data. Components of RFID Library Systems are Comprehensive and Optional.

2.1 Comprehensive RFID System

It consists of three main components: tags, readers, and the application server.

2.1.1 *Tag*

RFID tag consists of an antenna and very small radio receivers with a microchip. The microchip is programmed with distinctive information about the item. The size of a tag is from the size of grain of rice to two-inch squares depending on their application.

Tags can be passive, active or semi-active. An active tag contains some type of power source on the tag, whereas the passive tags rely on the radio signal sent by the reader for power. Semi-passive RFID tags contain a small battery that boosts the range. Passive tags are generally used in libraries.

Tags frequencies can be low frequency (LF) or high frequency (HF). Mostly library applications use HF tags (13.56 MHz) with a read rang of approximately one meter.

Tags may be read-only, write once read many (WORM) or read/write.

2.1.2 *Readers (Sensors)*

RFID readers, also called interrogators, first and foremost are used to query RFID tags in order to obtain identification, location, and other information about the device or product the tag is embedded in.

There are two types of RFID readers:

RFID read-only readers. As the name suggests, these devices can only query or read information from a nearby RFID tag. These readers are found in fixed, stationery applications as well as portable, handheld varieties.

RFID read-write readers. Also known as *encoders*, these devices read and also write (change) information in an RFID tag. Such RFID encoders can be used to program information into a "blank" RFID tag.

2.1.3 *Application Server*

Application server involve in communicating or linking with other system. It is a gateway between the library system components and the library circulation system, to identify and configure all library system components, and track and direct all library system transactions. The application server is an interface to the library circulation system and other subsystems using the Standard Interchange Protocol (SIP). The

application server maintains two-network connection via two different Ethernet cards, one to the library system networks, and one to the library's circulation network.

2.2 Optional RFID Library System

It includes the four components: RFID label printer, handheld reader or Inventory wand, and External Book Return Chute and Material Sorting Conveyor system.

2.2.1 *RFID Label Printer*

A RFID-printer is used to print the labels with an individual barcode, library logo etc. When the print is applied, it simultaneously programmed the data in to the chip. After this process, the RFID label is taken from the printer and self-adhered to the book.

2.2.2 *Handheld Reader or Inventory Wand*

The portable Handheld Reader or Inventory Wand can be moved along the items on the shelves without tipping them out or removing them.

2.2.3 *External Book Chute*

Library can offer distinct services, which is very useful for users like ability to return books during off hours.

2.2.4 *Material Sorting Conveyor System*

After an item goes down the chute, it is directed to a conveyer belt that moves it up and across RFID readers that read the tag and reactivate the security bit.

3. PROS AND CONS OF RFID APPLICATION IN LIBRARIES

3.1 Pros of RFID Application in Libraries

- Fully Automated check-out/check-in
- Non line-of-sight technology
- Multiple items can be read simultaneously
- Multiple return boxes at public locations
- Reliable security
- High speed inventorying
- Finding (misplaced) books by handheld reader
- Automated material handling
- Long tag life
- Data can be write, read, erase, re-write on the tag
- Wide range of solutions

3.2 Cons of RFID Application in Libraries

- High cost
- Exit gate sensor (Reader) problems
- Invasion of user Privacy
- Lack of Standard
- Removal of Tags

4. HOW RFID SYSTEM WORK IN LIBRARIES?

The following steps are involved in RFID library system:

Step 1. Programming and verification of the barcode label in all library loans able materials.

Step 2. A patron brings the library materials they wish to checkout to either the Circulation desk or Patron Self-Check out station.

Step 3. When the patron exits the library, they will pass through the sensors installed at each exit; any library materials the posses will be detected.

Step 4. Discharging the materials either Circulation desk or Book Drops station.

Step 5. Automated materials sorting by category into separate bins or cards through conveyor systems.

Step 6. Identify the misplaced items and inventory control.

For the above RFID library system the following stations are required:

4.1 Tagging and Verification Station (Programming Station)

The library materials are books, magazines, music cassettes, videos, CDs, DVDs and the process of tagging in these materials is a very simple. A small printed-paper label, containing a very flat antenna, is affixed to the inside cover or surface of all "loan able" items. Scan existing bar code or programmed the data into the chip. Once a tag has been programmed, it can be reprogrammed at a later time, but it is strongly recommend that once the barcode number has been programmed into the tag, the number is "locked "and may not be changed. Other information may, however, be changed easily at any time. The information into the barcode chip may be Location, Collection, Item type and Security bit, etc.

4.2 Staff Borrowing Station (Circulation Desk)

In circulation desk, a reader is the interface for library personnel into the intelligent library borrowing station. It functions much like a barcode scanner, but barcode need a line of sight when the reader read the tags according to their frequency. It connects to the keyboard

wedge. With the circulation system workstation is check-in or checks out mode, the library staff simply place a book on the staff borrowing station reader, or passes them over it. The circulation circuit information is then passed to the circulation system. An Ethernet cable is attached to the staff borrowing station reader so that the status of any materials checked in or checked out at the circulation desk also gets reflected on the library system application server. When the transaction is complete, a receipt print out showing the materials checked out and their respective due dates. The staffs borrowing reader has a slim profile. It can be placed either on top of the counter or under the table.

4.3 Automated Checkout

Users can also issue books to themselves using this technology, making circulation faster and easier. They can checkout a number of items at once, making the self-checkout process without the aid of library staff. The use of RFID reduces the amount of time required to perform circulation operations.

The Patron Self Check-out station is basically a computer with a touch screen, which guides the users the check process and a built-in RFID reader, plus special software for personal identification, book and other media handling and circulation. After identifying the patron with a library ID card, a barcode card, or his personal ID number (PIN), the patron is asked to choose the next action (check-out of one or several books). After choosing check-out, the patron puts the book(s) in front of the screen on the RFID reader and the display will show the book title and its ID number (other optional information can be shown if desired). It updates the library's database with the checked-out status within milliseconds. The patron then confirms that he has finished the checkout process and a receipt is printed, showing which books have been borrowed and the return date. The patron self-checkout station will display error message to the Patron if there is a problem with their account or any part of process. This process is based on ATM system.

4.4 Security Station (Anti-Theft Detection)

Many libraries choose to abandon their electromagnetic (EM) systems in favor of using the RFID tag. The Anti-Theft Gate is used to detect RFID tag that is equipped with EAS (Electronic Article Surveillance). It can detect the RFID tags within specified range (generally 1-meter) without interference of magnetic items. The sensor communicates with the application server in real time to determine if the materials have been properly checked out. Audio or visual alarm indications are activated if items in the interrogation field are not properly checked out. The sensors are also equipped (tuning) with relays that give the system the ability to trigger CCTV system when an

alarm is activated. Security is managed differently according to the tag suppliers, however an RFID system may manage security using a "theft" bit on the tag that can be turned on or off in the CKI/CKO process or it may interface with the library management system.

4.5 Book Drop Station (Automated Check-In)

Automated check-in system can be used to Check-In (return) of items (books) 24 hours a day via internal or external book drops boxes. In this case the patron identifies himself/herself, chooses return and then puts one book or a stack of books, the book is identified by a RFID reader, which is mounted in above drop station they are automatically checked into the library's database. Patron's record is updated immediately. Borrowers can receive a check-in receipt, detailing check-in date and time when using an RFID Self Check-in system. In this system the security bit on the tag will also be reactivated at this same time. If the books were to be taken through the gate now, an alarm would sound.

4.6 Book Sorting Station

In the automated check-in system, patrons are instructed to insert one item at a time into the chute. After an item goes down the chute, it is directed to a conveyer belt that moves it up and across RFID readers that read the tag and reactivate the security bit. Item are then sort by category into separate bins or onto separate carts according to library defined criteria and library shelving location. This can be done using the sorting information programmed (SIP) into the tag. There is virtually no limit to the number of sorting locations that can be created. In the automated sorting process, items without RFID tags are delivered to the exception bin. This significantly reduces the amount of staff time required to ready materials for re-shelving

4.7 Stock Management (Inventory Control)

Librarians can also maintain their inventory using a potable inventory scanner. The stock management solution is designed to cover three main requirements:

- Search for individual books requested
- Inventory check of the whole library stock
- Search for books, which are miss-helved

All these functions are performed by passing the portable scanner near library tagged materials on the shelves to gather their identities without tipping them out or removing them. In an inventory check situation, the identities collected are compared with the database and a discrepancy report could be generated. Using wireless technology, it is possible not only to update the inventory, but also to identify items,

which are out of proper order. Another benefit of the portable inventory reader is its capability to conduct offline check out transactions, such as in a book mobile or if the library's circulation system goes down. The check out information would then be uploaded to the application server when the bookmobile returns or when the circulation system comes back up.

5. CONCLUSIONS

It is quite clear that trend in libraries is toward RFID Technology. But we should wait for an appropriate time to follow that trend. Under what circumstances might the library consider moving forward with RFID technology?

- When sufficient fund for replacement of self-check machines, security gates or barcode readers because it's very costly component of RFID technology.
- When the cost of RFID tags drops to Rs 5/- or less per tag at present the cost is Rs 15-20/- per tag.
- When the Standards for RFID tags define how all RFID vendors readers and software write data to a tag so that tag is readable.

Once the idea of RFID libraries takes a concrete shape, it surely will convert most big and prestigious libraries into RFID libraries. According the some reports, approximately 7 libraries in India began using RFID systems to replace their electro-magnetic and bar code systems, and 20 more are moving in the RFID direction.

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Barcodes: Ease for Library Operations

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ABSTRACT

Technology is fast growing. Traditional library concept is replaced by automated systems. Bar-coded stickers and identity cards replaced borrower's card and book cards. Barcode technology has got implemented in Indian libraries less than a decade ago. Thanks to the new generation library software like SOUL, Alice for Windows, etc. that help to generate barcode labels. This has eased the library operations to a great extent. Barcode is a machine-readable code, which requires a hand-held or mounted laser scanner to read the data. The function of Barcode scanner is to read the image represented by the barcode using the emitted laser rays. In an automated library system accession numbers of the documents are digitally represented by the barcodes. The scanner sees and measures the absence or presence of light in the code's bars and spaces, and converts that information into an electrical signal that can be translated into computer data.

Keywords: Technology, barcodes, automation

1. INTRODUCTION

Information has become the bread and butter of any organisation. Technology has developed to share the burden from man. So by the fusion of Information and Technology man has gained a lot in day today life. In modern world information systems are becoming vital for proper management of organizations. Modern libraries depend a lot on new technological gadgets. One of the main activities of any academic or public library is the charging and discharging of books. Earlier we use to carry out these functions with the help of different charging system like Newark system, Browne system or Ledger system. But now these systems are getting replaced by barcodes and slowly by RFID systems. Every library staff is very familiar with the black and white perpendicular markings on back cover of almost every book, which denotes the ISBN. These markings are called barcodes.

What is barcode? It is method of automatic identification and data collection. The benefits of using barcode are innumerable. Barcodes are fast, easy and accurate data entry method. The correct use of barcodes

can decrease employee time required and increase an organization's efficiency. Barcodes have proved to increase efficiency, production and reduce labour costs. The first patent for a barcode type product was issued to inventors Joseph Woodland and Bernard Silver of Philadelphia's Drexel Institute of Technology on October 7, 1952. The Woodland and Silver barcode can be described as a "bull's eye" symbol, made up of a series of concentric circles. Barcode was first used commercially in 1966. The first product to have a barcode included was a packet of Wrigley's Chewing Gum. Originally barcodes stored data in the widths and spacings of printed parallel lines, but today they also come in patterns of dots, concentric circles, and hidden in images.

2. HOW IT WORKS?

A barcode is a series of vertical lines with varying width (called bars) and spaces. Bars and spaces together are named "elements". Different combinations of the bars and spaces represent different characters. A linear barcode is a binary code (1s and 0s). When a barcode scanner is passed over the barcode, the light source from the scanner is absorbed by the dark bars and not reflected, but it is reflected by the light spaces. A photocell detector in the scanner receives the reflected light and converts the light into an electrical signal. The data in a barcode is just a reference number which the computer uses to look up associated computer disk record which contains descriptive data and other pertinent information. The mapping between messages and barcodes is called a symbology. To be scanned, there must be accurate printing and adequate contrast between the bars and spaces. Scanners employ various technologies to "read" codes. The two most common are lasers and cameras. Scanners may be mounted one or hand-held. There should be a distinction drawn between the code, which is a structure for the conveyance of data, and the symbol, the machine-readable representation of the code.

3. BARCODING SYMBOLOGIES

Few commonly used barcoding symbologies are:

Codabar
Code 39
Code 128
Code 93
Code 11
EAN 13

Codabar

Codabar is a very accurate, self checking symbology, which is widely used in libraries and for identifying packages in delivery systems.

The codes can have variable lengths and can represent the digits 0-9 and six other characters ($ - /.: +).

Code 39

Code 39 developed by Dr David Allais, is widely used in logistical and defense applications. It can represent the digits 0-9, all upper case letters and six other characters (/, SPACE % + $). It is widely used in commerce and industry and there is no limit, in theory, to the number of characters that can be represented. However, codes tend to be relatively long, which places a practical limit on what can be encoded. There is a less well supported extended version, which covers all 128 ASCII characters. Check digits are optional. Code 39 is still in use today, although it is less sophisticated than some of the newer barcodes.

Code 128

This code can represent the complete range of 128 ASCII characters. It is an alternative to Code 39, a key feature being its ability to encode control characters (Linefeed or carriage return) as well as printable characters. Check digits are included as standard. In our library we are using code 128 for generating barcodes of accession number.



0123456789

Representation of barcode generated using Code 128

EAN 13

The ISBN numbers found on books are encoded using a subset of the EAN 13 system, where the codes are prefixed with 978. The digits that make up the ISBN number then follow. EAN stands for European Article Number. An EAN 13 number is made up of 13 digits, in four groups.

4. BARCODE READERS

There are three basic types of barcode readers: fixed, portable batch, and portable RF. Fixed readers remain attached to their host computer and terminal and transmit one data item at a time as the data is scanned. Portable batch readers are battery operated and store data into memory for later batch transfer to a host computer. Some advanced portable readers can operate in non-portable mode too, often eliminating the need for a separate fixed reader. Portable RF Readers are battery operated and transmit data real-time, on-line. More importantly, the real-time, two-

way communication allows the host to instruct the operator what to do next base on what just happened.

A basic barcode reader consists of a decoder and a scanner, (a cable is also required to interface the decoder to the computer or terminal). The basic operation of a scanner is to scan a barcode symbol and provide an electrical output that corresponds to the bars and spaces of a barcode. A decoder is usually a separate box which takes the digitized bar space patterns, decodes them to the correct data, and transmits the data to the computer over wires or wireless, immediately or on a batch basis.

5. SOFTWARES

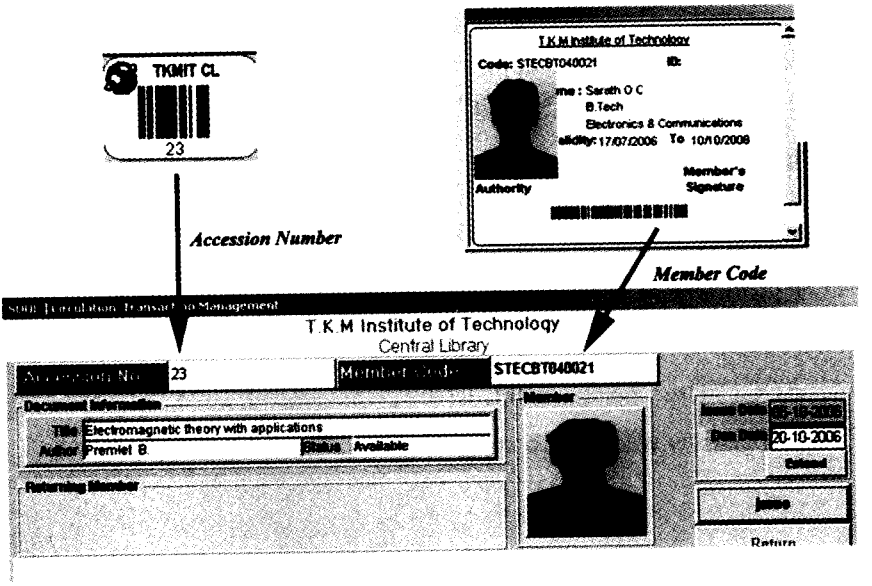
Modern library softwares like SOUL, Alice for Windows etc supports to generate barcodes for accession number and members card. In addition to this, softwares like LabelWorks or BarTender UltraLite can be used for generating the barcodes. Both these softwares have option to incorporate library name and logo along with the accession number. Barcodes can be printed using thermal transfer printer or laser printers. Thermal transfer printers are required when you need either to print one label at a time or when you need to print a roll of labels so that labels can be applied by applicators directly to boxes. They are fast and produce excellent quality barcodes.

Thermal transfer refers to the print head heating up and melting a ribbon onto the label surface. Most thermal transfer printers can also produce "direct thermal" labels, but paper instead of a soft ribbon wears out the print head 10 times faster; another disadvantage of thermal printing is that most thermal labels cannot be read with IR light and deteriorate in sunlight to non-readability over time. The media cost is about the same as laser and direct thermal. Therefore thermal transfer printing is far more popular than thermal printing for serious label production. Printed labels are pasted inside the book to protect from wear and tear; tapes are sticked against the barcode sticker.

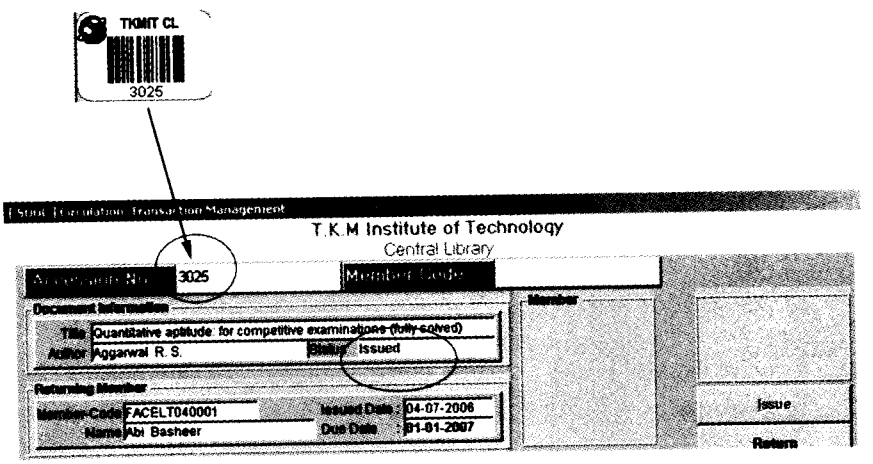
6. CHARGING AND DISCHARGING

While issuing a book accession number is scanned at the transaction management module screen. It will take fraction of seconds to scan the Accession Number. Title of the book, Author and Status as available will be displayed. And while scanning the members Identity card Photograph of the issuing member will be displayed.

On returning the book following details will be displayed on scanning the accession number: Title of the book, Author and Status as Issued, Member-code, Name, and Date of issue and Date of return.



Display of issuing status



Display of returning status

7. LIMITATIONS FOR BARCODES

Barcodes are slowly getting replaced by RFID tags (Radio Frequency Identification System). RFID tags communicate through Radio waves. Barcodes has got certain limitations compared with RFID. Barcodes gets damaged on regular handling. Barcodes can be counterfeited. Need to be on directional, requires line of sight for

scanning, it cannot exceed a range more than 15 cm for reading, individually books need to opened and scanned. Scanning limited to one barcode at a time. Not possible to detect theft of items.

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Resource Sharing in Agricultural University Libraries in Maharashtra: A Case Study

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ABSTRACT

In the state of Maharashtra four agricultural university libraries are functioning and rendering information services to the users. Considering the present needs of the users and the use of modern information technology techniques the libraries are under digitalization. Basic concept behind the digital library it is necessary to have resource sharing in agricultural university libraries in Maharashtra. In view of this integrated information system have been presented in this paper in the form of "MAH.AGU.NET" which needs coordination and cooperation of ICAR.

Keywords: Digitalization, University libraries.

1. INTRODUCTION

Information services are the keys to the development of agriculture, agriculture education, research and extension education in India. One of the main objectives of agricultural university libraries in India is to collect, process, organize and disseminate the much needed agricultural information to the users. In the state of Maharashtra four agricultural university libraries are rendering information services to the users given in Table 1.

2. NEED FOR RESOURCE SHARING

- For rendering efficient, effective and quality information services to the users as well as agricultural scientists and researchers in the changing scenario.
- For providing right and nascent agricultural information to the right users at the right time considering the basic concept of digital library.
- For saving the time and money of the users

Considering the informational needs of the users of agricultural university in Maharashtra, it has become necessary to have an integrated information system with the coordination and cooperation of ICAR with following objectives.

Table 1. Agricultural University Libraries in Maharashtra

Sr No	Name of University Library	Location	Estt.Year	Region
1	Mahatma Phule Krishi Vidyapeeth,	Rahuri	20.10.1969	Western Maharashtra
2	Dr Panjabrao Deshmukh Krishi Vidyapeeth,	Akola	20.10.1969	Vidarbha
3	Marathwada Krishi Vidyapeeth	Parbhani	18.05.1972	Marathwada
4	Dr Balasaheb Sawant Konkan Krishi Vidyapeeth	Dapoli	18.05.1972	Konkan

Source: Questionnaire

3. OBJECTIVES

- To improve the use of modern information technology techniques, methods and policies for rendering efficient and effective information services.
- To enable agricultural students, scientists, academic staff, research scholar and other users of library to update their knowledge in modern agriculture.
- To promote and facilitate sharing of the resources available in a group of agricultural libraries in order to provide maximum information to the users, lower operational costs and also make optimum use of national resources.
- To maximize the utilization of existing information resources.
- To provide speedy access.
- To save funds, valuable time and avoid duplication.

4. HYPOTHESES

The following hypotheses were formed:

- In the state of Maharashtra there are four agricultural university libraries are functioning and rendering information services but there is no coordination with the help of resource sharing for rendering information services to the users.
- The survey of the users needs regarding the coordination and cooperation through resource sharing between all the four agricultural universities libraries for the better use of users.

5. METHODOLOGY

In the present case study the nature of the users of four agricultural universities libraries have been examined with their needs and the necessity of resource sharing in agricultural university libraries in the state of Maharashtra through Questionnaire

- Survey method
- Personal visits

6. USERS NEED AND ASSESSMENT

The survey of the nature of users, their needs and necessity of resource sharing have been examined and given in table 2.

Table: 2. Nature of users, their needs and necessity of resource sharing

Sr No	Name of Agriculture University Library	Survey of Users		Main Users	Needs	Percent
		quest. dist.	received			
1	M.P.K.V. Library, Rahuri	50	35	Students Staff Scientists	to update knowledge, maximize information, resource sharing essential	70
2	M.K.V.Library, Parbhani	50	40	Students Staff Scientists	digitalization, every informational material is not available with all libraries, to update knowledge, maximize information, union catalogue resource sharing essential	80
3	Dr P.D.K.V. Library, Akola	50	47	Students Staff Scientists	maximize information to update knowledge, resource sharing essential	94
4	Dr B.S.K.K.V. Library, Dapoli	50	30	Students Staff Scientists	use of modern technology, to update knowledge, maximize information, resource sharing essential	60
Total Users		200	152			76%

Source: Questionnaire. **Quest. dist.**: Questionnaire distributed

It is observed from the Table 6.1 that the students, scientists and academic staff are the main users of the university library and have desires the resource sharing in agricultural university libraries in the state of Maharashtra for the better library use and services in the changing scenario.

Considering this it is necessary to have the resource sharing in agricultural university libraries in the state of Maharashtra. The model MAH.AGU.NET. is submitted in this paper as a resource sharing in agricultural university libraries in the state of Maharashtra.

7. RESOURCE SHARING (INTEGRATED INFORMATION SYSTEM) IN AGRICULTURAL UNIVERSITY LIBRARIES IN MAHARASHTRA

MAH.AGU.NET.

The information generation, dissemination, transfer and communication take place through diverse channels and media in a variety of content environments in the agricultural university libraries. The libraries generate information and knowledge through various bibliographical resources and that is why it is called a power house of generation of information.

The students, academic staff, research scientists are actual users of this knowledge, information and technology. This information technology is to be transferred to the farmers who are at the grass roots and who are the actual beneficiaries through extension specialists.

In view of this the university libraries are supposed to acquire primary as well as secondary sources of bibliographical literature in order to render efficient and effective services to the users for keeping them up-to-date in their field of knowledge. The scientists, technicians and extension workers must easy access to modern information services; otherwise they may lag behind in the race for up-to-date knowledge in scientific developments. The librarians and information scientists play an effective role for dissemination of information by adopting the modern information technology techniques such as "computerized information retrieval system"

The vide ramification of information communication activity requires micro level attention and has to be guided properly through the instrument of national information policy and planning.

The cost of generating, processing, disseminating, distributing and utilizing information is increasing and therefore it will be demand considerable investment. In the rapidly advancing world today, influence of the modern information technology is becoming inevitable. The information technology policy issues that need attention are:

infrastructure, human resources, financial resources, user's needs and collection development etc.

The case study revealed that the university library Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola has the infrastructure and facilities and therefore it is proposed that a network of all the four agricultural university libraries in Maharashtra should be established and university library of Dr PDKV Akola may be considered as a centre and clearing house for agricultural information in Maharashtra in order to satisfy information needs of agricultural research and management activities in Maharashtra.

For the development of this system it is necessary that all other agriculture university libraries in the state have to atomize, digitize their collections to send this centre for agriculture information. ICAR and the state government should support the centre with adequate funds.

The function of this information centre will, therefore, be two fold; one its responsibility towards its immediate clientele, and to serve other libraries and individuals in the state and also in India. Convert the library holding this to standard uniform pattern in to computerized databases. All these in house, commercial databases should be made accessible through a network from anywhere to any centre.

The extension workers; the village level workers and other government agencies engaged in the dissemination of agriculture information of one sort or another will depend on this agricultural information centre for the exchange of information and ideas. Radio and television programmes, newspapers features etc. prepared for the benefit of the agriculturists will also be supported for information by this agricultural information centre. Proposed Dr PDKV library information centre will have very close cooperation with ICAR institute libraries and the district libraries for a wider coverage of the states population. The large number of agricultural colleges can access information and work collaborately through to this information centre for the four agricultural university libraries in Maharashtra. The agricultural information centre will function as a component of the national agricultural library. For Maharashtra, it will be take on the role of the national agricultural library, such as being the repository of agricultural publications of the state, centre of information on holdings of all state libraries etc.

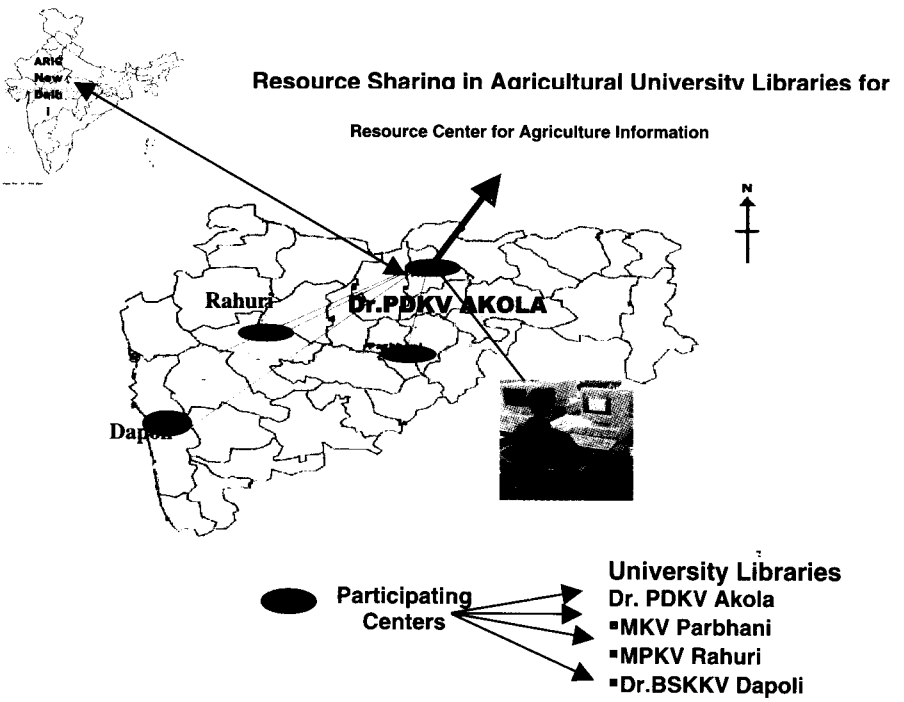


Fig. 1

The fig. 1 depicts a concept where in a network is in place, consisting of a super node at New Delhi and the agriculture university libraries in Maharashtra will be connected via network to each other.

Considering that each agricultural library in Maharashtra maintains its own data and each library is a node. These nodes will be connected to each other with DR PDKV library framing the central node for Maharashtra network framing a network pattern.

Similarly, all the central nodes of different states can then be connected to the super node placed at Delhi. The data servers at each location will then be able to communicate with each other through systematic application of various networking protocols.

For the users a computer search site can be developed that will enable them to access valuable information placed at any of the library locations through the established network pattern.

8. COORDINATION AND COOPERATION OF ICAR AND STATE GOVERNMENT

- There should be adequate funds for purchase of the information technology products and ICAR and State Government should take proper steps in this regard.
- Users training programme on information search strategies should be organized in the agricultural university libraries and ICAR institute libraries at regular intervals.
- It is necessary to know the needs of the users some techniques like survey, interview or questionnaire should be arranged by the university and ICAR libraries.
- Staff training programme in connection with information technology should be arranged in university and ICAR institute libraries.

9. CONCLUSION

It is concluded that now a days the work and responsibility of the librarians have been increased; every library has to modernize their operation to the newer challenges. The situation has change where libraries cannot remains isolated. They can keep in touch with other libraries and therefore the development of integrated agricultural information system in agricultural university libraries and other libraries is better useful in services to their users.

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WINISIS: A Library Database Management System

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ABSTRACT

WINISIS is a windows based version of CDS/ISIS a software developed by UNESCO. It has all the features required by a library database management system. The software being GUI based software is more user-friendly as compared to CDS/ISIS which is CUI based software. The software is capable of all the jobs related to library database management right from the creation of a new database to importing/ exporting the data. In addition, the software is also useful in card catalogue printing. Although card printing may not be required in large libraries but still small libraries can print their catalogue and can maintain both physical form as well as OPAC. The best thing about WINISIS is that it is free downloadable software and it can be downloaded from the website of UNESCO after completing certain formalities. The present paper elaborates the features of WINISIS, creation of new Database, creation and editing of Data Entry Worksheets, creation and editing of Print Formats, entering the records, editing the records, searching the database, printing the catalogue cards and importing/exporting the data.

1. INTRODUCTION

Nowadays computers are being used in every sphere of life and libraries are not exception to them. Libraries in advanced countries started using computers in way back in 1960's. Apart from the hardware required to perform the various activities, libraries need some software too. There are a number of library software available in India. Some of these are Libsys, Alice for Windows, Troodon, Techlibplus, Soul, WINISIS, etc. The commercial library software is costly and small libraries can not afford these. CDS/ISIS for Windows (WINISIS) is an information retrieval package developed by UNESCO which runs under Microsoft Windows.

2. WINISIS

UNESCO released CDS/ISIS for Microcomputers in 1985. It was called officially CDS/ISIS mini-micro version but usually called CDS/ISIS or simply ISIS. Since 1989, when most of the new microcomputers were supplied with a new operating system called Microsoft Windows, it was inevitable that the users of CDS/ISIS would call for a Windows version and UNESCO began to develop in 1995[2]. The development of the Windows version was the result of strategic development policy decision aiming at maintaining the leading role CDS/ISIS has played and is still playing on the international scene. The first formally released windows version was 1.3 which was released in January 1999. This was followed by versions 1.4 and 1.5. WINISIS 1.5 build 3 (Standard) and WINISIS 1.5 build 7 (Arabic enabled) are the latest official versions. The software comes in three languages: English, Arabic (Egypt) and French. It contains as well an example database in Arabic and English.

3. FEATURES OF WINISIS

The major features of the CDS/ISIS for Widows software are:

- It can handle variable length records, fields and sub fields, thus saving disk space and making it possible to store greater amounts of information;
- It can handle repeatable fields;
- It has a data base definition component allowing the user to define the data to be processed for a particular application;
- It has a data entry component for entering and modifying data through user-created data base specific worksheets;
- It has an information retrieval component using a powerful search language providing for field-level and proximity search operators, in addition to the traditional and/or/not operators, as well as free-text searching;
- It has a powerful sort and report generation facility allowing the user to easily create any desired printed products, such as catalogues, indexes, directories, etc.;
- It has a data interchange function (Export/Import facility) based on the ISO 2709 international standard used by leading data base producers;
- It has an integrated application programming language (CDS/ISIS Pascal and the ISIS_DLL), allowing the user to tailor the software to their specific requirements;
- It allows the user to build relational data bases, though CDS/ISIS is not based over a relational model;

- It allows designing complex user interfaces with the help of powerful hypertext functions.
- No conversion is needed when moving from CDS/ISIS DOS to CDS/ISIS for Windows. However, formatting language functions are just 95% compatible. In some cases you may find some syntax errors appearing: you may have to adapt your display format to the new one. In terms of search engine, the two versions are totally compatible: both can use the same I/F (inverted file). The data entry worksheets are also compatible but the screens will appear different.
- WINISIS is 100% compatible with all Windows Operating Systems.
- A number of manuals are available for this software, including the official reference manual, recently updated and the CDS/ISIS Handbook. Other manuals contributed by independent authors are also available on internet.

4. HOW TO GET WINISIS?

The latest version of WINISIS is available free of charge through the Network of National Distributors of UNESCO or can be requested by filling the appropriate online request form available at http://www.unesco.org/isis/individual_request.html for Individual users and http://www.unesco.org/isis/institution_request.html for Institutional users. Alternatively the request can also be sent through fax: +33 1 45 68 55 82. In case of online request the license to download WINISIS and the procedure how to download is communicated through e-mail. In India the software is distributed by Department of Scientific and Industrial Research.

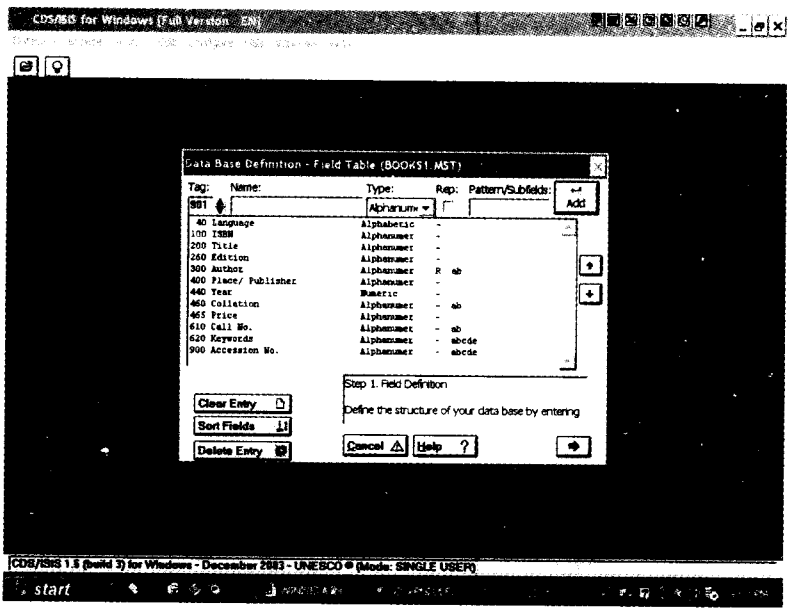
5. INSTALLATION

The installation of WINISIS is very simple. Just double click the exe file of WINISIS and follow the onscreen instructions. Those who do not have advanced knowledge of computers can select all the default options during onscreen navigation. After installation the program can be run from the start menu or with the help of shortcut on your desktop.

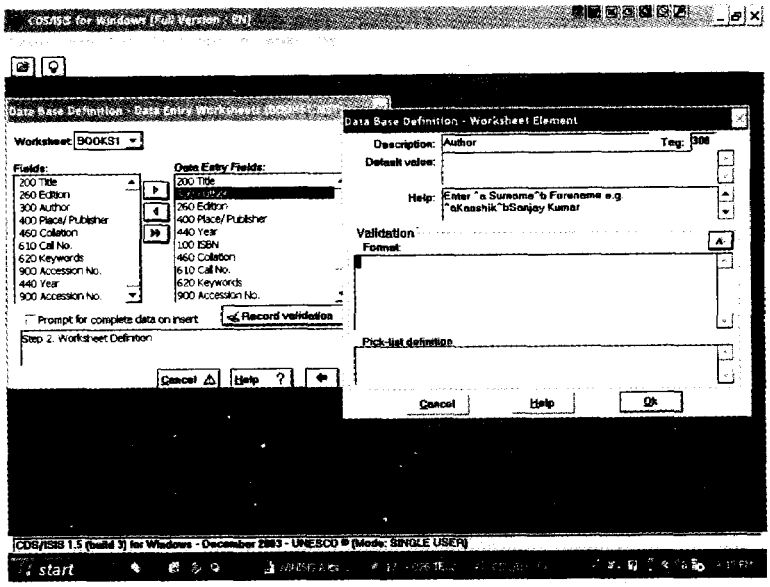
6. CREATION OF NEW DATABASE

While running for the first time WINISIS will appear with a couple of default databases. However it is advisable that users should create their own database/s according to their requirements. It can be created by pointing the mouse on database menu and then clicking the new option. The database name must be limited to maximum six character length. After naming the database following four steps are to be completed for creation of a new database.

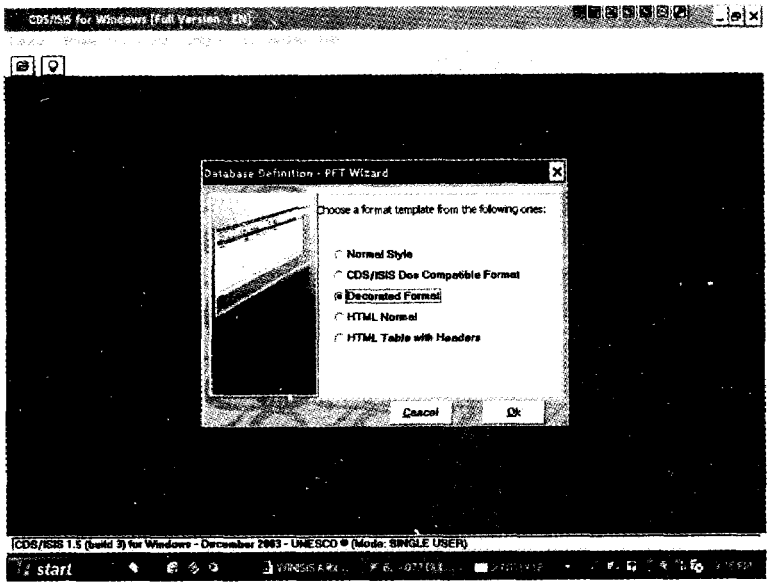
Step1. *Field Definition Table (FDT)*: The FDT defines the fields that may be present in the database. At this step certain parameters are to be set like tag, name, Type, repeatable and subfields. Users can set their own tags or can use standard tags like CCF or MARC tags. Name should be descriptive like Author or Title, etc. in type column the type of characters (alphabets or numerals, etc.) is to be specified. Until and unless it is sure that the data in a field will contain only one type of characters, it is better to select alphanumeric type. Repeatable fields are those which can occur more than once in the same record like Authors can be more than one of a document. Check the box for repeatable fields and leave it for other fields. Some fields can have subfields like Title can have subtitle as a subfields. If a field is to be divided into subfields then provide here list of subfields without any punctuation or space like abcdef. The single mouse click on the green arrow takes to the next step. The complete FDT will looks as shown below:



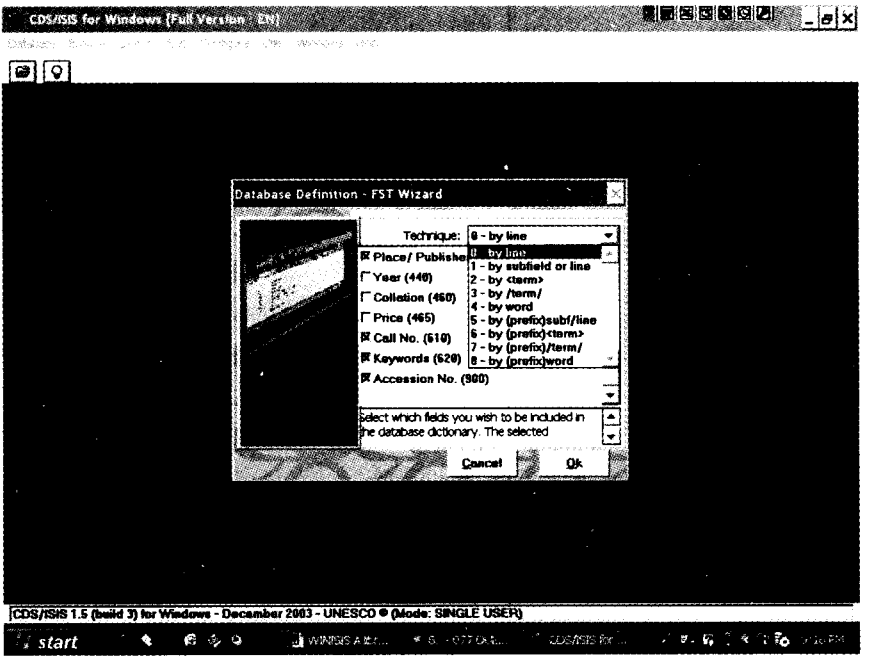
Step2. *Data Entry Worksheet:* Here the fields and their sequence required to be appeared is to be set. Certain parameters also to be set like: Description, Default value, Help, Validation format, pick-list definition, etc. Description allows using a different name on the worksheet from the name used in FDT. In default value, data can be provided if it is sure that in most of the records it will appear like Eng for English as the language of the documents. In help, instructions for the data entry people can be provided. In validation, the data can be formatted with conditional rules like year field can not contain more than four characters. In pick-list, the values can be defined which will appear for pick up while data entry.



Step3. *Display Format:* The display format means the way the records will appear while browsing the database or displaying the search results. Users can create different display formats for different purposes, but the default format must have the same name as of the database. Users can either use any of the five formats of WINISIS or can create their own. WINISIS have Normal style, CDS/ISIS DOS compatible, Decorated, HTML normal and HTML table with header formats. Users can modify these formats according to their requirements. Normal style can be used for catalogue cards and Decorated is good for default.



Step4. *Field Selection Table (FST):* This is the most complicated form to understand. The selection of terms from the database records to go on to the index file is controlled by the FST. Here it is better to use the services of the Dictionary Assistant. This will provide a dialog box as seen below:

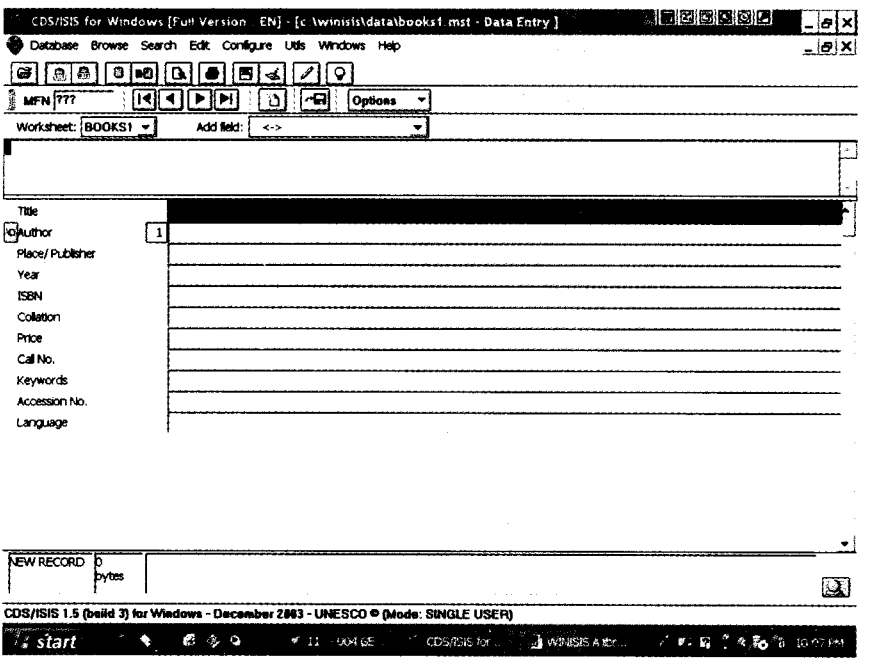


Here user has to select the fields which are to be indexed. Check the box for fields which are to be indexed leave others. The second parameter is the indexing technique. The options are 0 to 8. 0- by line means that the whole field contents will be indexed as a single term. 1- by subfield or line means that each subfield will be indexed. 2-by <term> means that the words or phrases entered between angular brackets will be indexed. 3-by/term/ means that the words or phrases entered between slashes will be indexed. 4-by word means that each word (except stop words) in the field will be indexed. The most commonly used techniques are 0- by line and 4-by word.

After completing the whole process of creating a new database, if a user thinks that any of the above viz. FDT, Data Entry Worksheet, Print Formats and FST is not suitable to his requirements, then he can modify the same at a later stage. The Data Entry Worksheet, print Formats and FST can be modified at any stage but it is better to modify the FDT after entering a few records because changes in FDT may cause problem of uniformity in records. The users can edit any of these from the Edit Menu and then selecting the appropriate option.

7. DATA ENTRY

After setting up the database, the job of data entry is to be started. For this purpose open your database through the database menu and open option. Then through the Edit menu select data entry, a blank Data Entry Worksheet is presented to you for Data Entry. Click on a field and enter the data, after completing press Enter key and you will reach in the next field. After completing the all fields the record can be saved by clicking on an icon of Save provided on the top of Data Entry Worksheet. For new record click on the icon of Blank Worksheet provided just left of Save icon. If a new occurrence of a field which is already present in the record is required to be added, the field can be added provided the field is a repeatable one by clicking on the button to the left of the field name.



8. EDITING THE RECORDS

The records entered in the database can be edited as and when needed. The procedure is same that of Data Entry. Global changes like: global add, global delete and global replace can also be used if any change is required in many or all records.

9. UPDATING THE INVERTED FILE

When some records have been created or some change is made to the existing records, the search can not be made on new data. It is so because the inverted file is not updated. To update the inverted file Select Database then I/F update and click OK. At the end click on the

completed button. However Automatic update of inverted file can also be set through the Configure menu and then system setting, options and checking the Automatic Inv. File option. In this way as when you will leave the database inverted files will be updated automatically.

10. BROWSING THE DATABASE

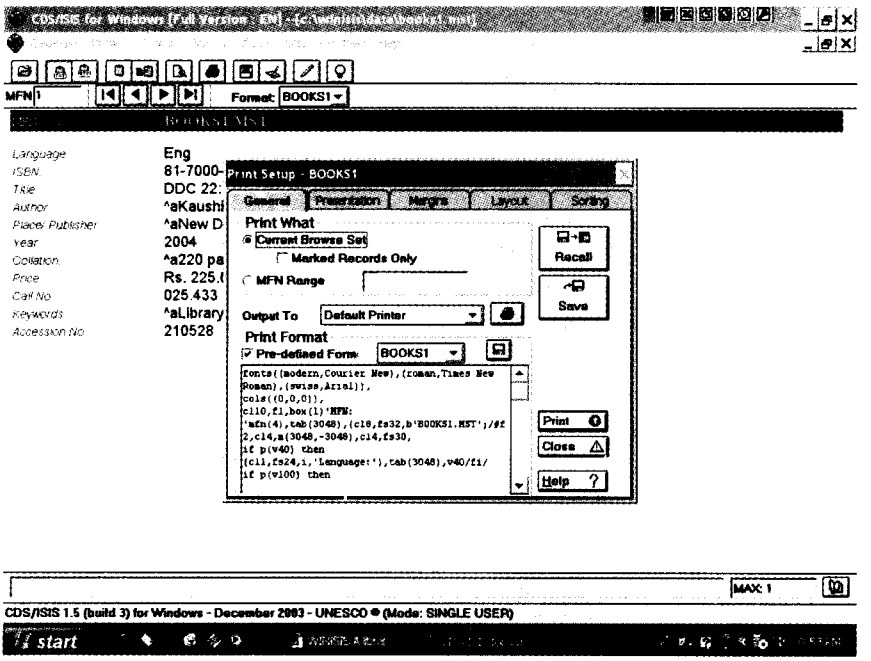
Each time the database is opened it starts in browse window. Here you can browse records by their record number or one by one by going forward or backward. The look of the records will depend on the print formats. However you can select the appropriate print format if you have created more than one.

11. SEARCHING THE DATABASE

There are two search forms in WINISIS called Expert Search and Guided Search. In expert search, the searcher should be able to form proper search terms, but in guided search even a layman can search a term occurred in any of the fields. Even use of Boolean operators can be made here as well. The search can be done through the search menu and then selecting the appropriate methods e.g. Expert Search or Guided search. After specifying the search terms click on execute and then on display for displaying the search results. The truncation facility is available in WINISIS search. The truncation symbol is a dollar sign ($). This facility can be best utilized in searching the records according to class numbers. The search can be sharpened by using various proximity operators and free text searching.

12. SORTING AND PRINTING

The printing of cards can be done in two ways with the help of WINISIS. The cards can be printed by copying the records from the display to the clipboard and then by pasting these into a word processor. Finally the cards can be printed with the help of word-processor. In another way the printing can be done through Database → print menu or by clicking on the printer icon. Here in print setup window, certain parameters have to be set. In general tab MFN range, output mode and print format are to be set. In presentation tab Font type, size, style etc. can be changed. In margin tab the margins are to be set. In layout tab no. columns, maximum no. records per page, whether page numbers to print or not, etc are to be set. In sorting you can decide on which field you want the cards sorted. Here up to four sort keys can be specified. Here it is also to be specified whether the heading and/ or records to be repeated or not. After setting all the options the printing can be done.



13. DATA INTERCHANGE FACILITY

WINISIS allows import and export facility. The data in ISO 2709 format from any software can be imported in the database of WINISIS. The selected records or the whole database can also be exported from WINISIS in ISO 2709 format. The procedure of import and export is simple. Through Database → import or Database → export, the data can be imported/ exported. The name of output file or input files, the range, etc. are to be specified here.

14. LIMITATIONS OF WINISIS

Although WINISIS is a very good Library Database Management Software but still it has certain limitations. While data entry there is no provision of duplicate check which otherwise can save lot of time of library staff. Secondly when a record is logically deleted the data stands in the database which is very confusing while browsing the database. The other housekeeping jobs like acquisition, circulation, serials control can not be automated merely with this software.

15. CONCLUSION

WINISIS is very good software for the small libraries, which can not afford costly software. As it is free the libraries can easily get this and can make use of it. The functions relating to database management can be performed with this software with utmost perfection. The search facilities of the software are tremendous. The sorting and printing can be adjusted according to needs. The data interchange facility in ISO 2709

format keeps the options open to shift from WINISIS to other software and vice versa. The software can not be called a full library automation package as some of the housekeeping jobs can not be performed with this. However, few of these can be performed with little programming in any programming language.

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Wireless Networking: A New Emerging Concept in Library and Information Networking

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ABSTRACT

The emergence of networking has led the new horizons in resource sharing among the libraries. Besides improving services and operations for a better performance, libraries are also able to evolve effective computer networks towards optimum utilization of resources and facilities. Wireless networking is emerging as a new concept in networking. This paper discusses the fundamentals of wireless networking and its prospects for libraries and information centers.

1. INTRODUCTION

The information and communication technology has completely changed the scenario in the services of library and information centers, particularly the use of computers are leading in present environment (Dhiman, 1998). The advent of computers and modern telecommunication technologies has made possible the needed information available instantaneously. Internet and world wide web (www) access are growing at a rapid pace. This is probably the only mode of accessing databases, electronic journals and other multimedia databases online. This all has been possible with the help of networking.

2. THE NETWORKS

In the simplest term, a network consists of two or more computers that are connected together to share information. All networking, no matter how complex, builds off this simple system. The networks aim at evolving a mechanism of partnership in which each member has something useful to contribute to the others in the network. In the words of Chen (1994), the computers are the brains of a new world information age and the networks are the arteries and veins of the pumping information from place to place. Internet, the information superhighway promises to be the network that brings together all other networks from the local to the global.

Computer networks enable remotely placed computer systems to communicate with one another. The distance between these computers can vary from a few feet to thousands of kilometers. Depending upon the distance covered in networking, the networks may be of following types (Dhiman, 2003):

LAN, MAN and WAN

LAN or *Local Area Network* is the network, which covers the less distance or simply saying situated in nearby areas or the buildings. *MAN* stands for *Metropolitan Area Network*, which are networks of metropolitan cities like Delhi, Chennai or the Kolkata. *WAN* is the *Wide Area Network*, which may cover the entire world. Internet and www are in existence only due to the emergence wide area networks. These are being used to provide resource sharing between systems separated by countries. Users connected to these networks are able to share databases, software's and other computing resources (Murthy, 1996). A network typically includes four things, besides the computers themselves:

- *Protocol:* a set of communication rules to make sure that everyone speaks the same language;
- *Network interface cards (NICs):* cards that plugs into the back or side of your computers and lets them send and receive messages from other computers;
- *Cable:* the medium to connect all of the computers together; and
- *Hub:* hardware to perform traffic control.

Further depending upon the technology used in defining its architectures, a network may be of two major types:

Peer-to-Peer: A peer-to-peer network doesn't have any dedicated servers or hierarchy among the computers. All of the computers on the network handle security and administration for themselves. The users must make the decisions about who gets access to what?

Client-Server: A client-server network works in the same way as a peer-to-peer network except that there is at least one computer that is dedicated as a server. The server stores files for sharing, controls access to the printer, and generally acts as the dictator of the network.

3. WIRELESS NETWORKING

Wireless technology refers to the technology that enables two or more computers to communicate using standard network protocols, but without network cabling. Strictly speaking, any technology that does this could be called wireless networking but the current buzzword however, generally refers to wireless LANs. These networks are the results of LANs and mobile computing, which have called the attention of

equipment manufactures. Though wireless network is the network that is developed without aids of the cable connections but the existing wired network can be extended with WLANs by installing a wireless access point in any building. The important things to be kept in mind while going for WLANs may include the following:

3.1 Choosing a Wireless Standard

In early beginning several proprietary products were in existence in market but now a days they are mostly conforming to the Institute of Electrical Engineering (IEEE) 802.11. This IEEE 802.11 standard specifies the wireless transmission of data on a certain frequency band at a specific speed between a wireless client and the access point.

Wireless access must be Wi-Fi certified. Wi-Fi certification seal certifies that your equipment will interoperate with any other Wi-Fi certified equipment. Wi-Fi is a trademark of the Wi-Fi Alliance formerly the Wireless Ethernet Compatibility Alliance, the trade organization that tests and certifies equipment compliance with the 802.11 standards. Wi-Fi replaces the cable that runs from a computer to a network socket in space and cultures the wall with an invisible radio link (Jange and Sherikar, 2005). For example, Wi-Fi (IEEE 802.11b) is a radio standard used for wireless computer networking that replaces costly coaxial cables with a band of microwave spectrum that would be possible to set up a series of receivers with overlapping ranges to provide a network that bypasses conventional telecoms networks and enables access to networks from mobile terminals. A worldwide group of visionary amateurs sees Wi-Fi as the perfect way to break free from government regulation and the giant telecom companies (Glaskin, 2002). The benefits of Wi-Fi technology could be as under:

- It uses an unlicensed bit of the broadcast spectrum, this means less regulatory controls in many countries;
- It offers faster and cheaper net connections;
- Allows for a more dynamic network to be grown and frees network devices from cables;
- No enforced time limits to connect.

Wi-Fi technology's visible infrastructure for networking is:

- Spread out at a larger table in a quieter area of the building;
- Make fast broadband connection and download files;
- Save files permanently to one's own device;

- Make possible to move about without breaking the network connection as Wi-Fi is flexible network.

The Wi-Fi standards come in several flavours such as 802.11a, 802.11b, 802.11d, 802.11e, 802.11f, 802.11g, 802.11h and 802.11i etc. (Gonsai and Soni, 2005) and determining which one to use can get confusing. IEEE 802.11i is the latest member of the wireless standard family, which provides an alterative to wired equivalency privacy (WEP) with new encryption methods and authentication procedures. IEEE 802.11i specifies speeds of 54 Mbps over the 2.4 GHz radio frequency band and is designed to be backward-compatible with 802.11b networks.

3.2 Networking and Functionality

Aside from acting as a relay between the wireless devices and the wired network, many access points today are able to perform many of the functions that traditional routers serve - DHCP (doling out IP addresses to both wired and wireless clients on your network), switching and bridging are a few. What actually should be used depends heavily on what your existing network already has. If a DHCP server on your network is already there, you might not use the DHCP functionality of your access point. However, the more functionality the access point offers, the more flexible it allows you to be with your entire network configuration. A wireless computer can 'roam' from one access point to another with the software and hardware maintaining a steady network connection by monitoring the signal strength from in range access points and locking on to the one with the superior quality (Quellet and Padjen 2002).

3.3 Security Functionality

Wireless networking obviously provide potential security issues, as an intruder does not need physical access to the traditional wired network in order to gain access to data communication. 802.11 standard attempts to address that is allowed to send traffic on the WLAN (authentication) and how traffic sent on the WLAN remains private and maintains integrity. Wireless Equivalent Privacy (WEP) is the security technology that is standard with all Wi-Fi equipments and was the first 802.11 attempts at security. There are some drawbacks to relying on WEP to secure your wireless LAN - it has proven vulnerable to attacks. The next generation 802.11 securities is Wi-Fi Protected Access (WPA) and it's more secure than WEP. Most access points on the market today support WEP and WPA. Further, Wi-Fi networks have limited range with home router, for e.g., using 802.11b or 802.11g might have a range of 150 ft (46 m) indoor and 300 ft (92 m) outdoors. How much security you need or want on the WLAN depends on what kind of data you are protecting?

3.4 Initial Setup and Management

Most wireless access points on the market today offer an easy-to-access web-based management program. For the most part, all you have to do to get started is to connect a computer to the access point via its one of its Ethernet ports, open your web browser and go to the default IP address of the access point. Browser-based software will walk you through the steps of the initial setup. Another important thing to consider is how you will be able to upgrade your device's firmware. As wireless functionality and standards evolve, you may need to upgrade the firmware that makes the access point compatible with other wireless devices and able to operate with newer technologies you might install in your building.

Besides, some hardware features and other features likely to be considered may include:

3.5 Power over Ethernet (PoE)

This feature allows power for the access point to be delivered via one of its Ethernet ports instead of requiring an electrical outlet. PoE requires an additional piece of hardware, which can be expensive. But if you have an available electrical outlet for your access point, you probably don't need this feature.

3.6 Automatic Channel Selection

This feature comes into picture while you try to install more than one access point. When a second access point is added to an existing wireless network, the automatic channel selection feature does exactly what it says - it automatically finds a channel to operate on that does not conflict with the operating channel of the original access point.

3.7 Removable/Upgradeable Antennas

The range of your access point can sometimes be improved by upgrading the access point's antennae. If your access point comes with detachable antennae, you will be able to do this down the road.

3.8 Cost

Certainly the wireless transmission and reception equipments are generally much more expensive than the wired components. But the cost differs depending on the requirements and manufacturing company (Miller, 2003). Many reliable and bug-free Wi-Fi products are in the market and competition amongst vendors has lowered prices considerably since its inception. Further the cost of wireless networking may be compared with the cost coming in extending the current wired network.

3.9 Wireless Network Adapters

Sometimes these are also called wireless NICs. These are needed when you are going to expand your current network with other access points. But these adapters, which you are going to purchase must be Wi-Fi certified. One way to ensure that the adapters you loan out will work with your access point is to purchase adapters that are the same brand as the access point or actually say in the product documentation that they work with your specific access point model. The two most common form of wireless adapter are the PC Card (also called PCMCIA cards) and the USB adapter. Almost all wireless-capable devices today come with at least one USB port. In order to use the PC Card, a device needs to have a PCMCIA slot - still fairly common in notebook computers today.

4. TYPES OF WIRELESS NETWORKING

According to Gonsai and Soni (2005), wireless networks may be divided into two categories as under:

- *Ad hoc* or *Peer-to-Peer Wireless Network*, which consists of a number of computers each equipped with a wireless networking interface card. Each computer can communicate directly with all of the other wireless enabled computers. They can share files and printers this wary, but may not be able to access wired LAN resources, unless one of the computer acts as a bridge to the wired LAN using special software. Each computer with a wireless interface communicates directly with all of the others.

- Another Wireless Network is that which use an *access point* or the *base station.* In this type, access point acts like a hub, provides connectivity to the wireless computers. It can connect the wireless LAN to a wired LAN, allowing wireless computer access to LAN resources, such as file servers or existing Internet connectivity.

  Further the wireless networks may be with *dedicated hardware access points* or the HAP such as Apple' Airport Base station or Web Gear's Aviator PRO and the other with *software access points* which run on a computer equipped with a wireless network interface card as used in an *ad hoc* or *peer-to-peer* wireless network. Vicomsoft Internet Gateway suites are software routers that can be used as basic software access points and include features not commonly found in hardware solutions, such as Direct PoE support and extensive configuration flexibility.

5. USEFULNESS AND DRAWBACKS OF WIRELESS NETWORKING

As with any technology decision, there are merits and demerits in choosing the wireless networking. Some money is needed to opt wireless networking as the case with all other project, but committing the money

and staff time to providing it is must for it. If there are other resources or services you could develop with that money that would be more heavily used, then installing a wireless connection may not be your number one priority. However if you have lots of patrons who have asked to use their wireless-enabled devices in your building, you have a good reason to devote library resources to getting up and running with wireless. It might even be the case that the library itself has, or will have, wireless devices available to check out to patrons. In that case, a wireless Internet connection is a must.

5.1 Usefulness

If we opt wireless networking in any library, its following usefulness may be observed:

- The first thing is the saving of space. If you have decided you need to increase your library's capacity for public access computing, wireless can help to solve crucial space issues. Wireless network can help to maximize public access computing in your existing space. If you are in a building where you could add more network drops but you simply do not have the space to add more workstations and desks to hold those workstations, a wireless connection can help you to expand your capacity without taking up more space. Users can simply work with wireless devices in existing seating areas that are not dedicated to computer workstations.
- Wireless networks can serve as an extension to a wired network. There are the cases where extending the present networks would require installing additional cabling that is cost-prohibitive. Installing fiber optics might involve upgrades to existing edge switches, but wireless LANs can be easily implemented to provide seamless connectivity to remote areas with a building. In wireless networking there would be no additional wires. This is good if you are in a building where you cannot add wires through the walls and ceilings, such as a historical building or a building made of solid concrete/cinder blocks, or if you simply don't have the budget to have more wiring installed. But don't forget that your wireless access point will need a wired network drop of its own.
- It can give library staff mobility and flexibility. Wireless internet access opens up the possibility of "roving reference" and other types of on-the-spot help, with library staff bringing resources to users.
- Its set up is relatively easy. Once you have taken into consideration the items in the steps, you will have answered most of the questions you need to answer in order to install a wireless connection. When you're prepared, the actual installation can be quite simple.

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Copyright Issues in Digital Age: An Overview

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ABSTRACT

Copyright laws protect intellectual property in creative expressions in the literary and artistic fields. The paper presents overview of the copyright. The paper describes the object of copyright, scope of copyright and author and ownership of copyright. The paper also discusses copyright in India. Copyright amendment in Digital age also discusses in the paper

1. INTRODUCTION

Copyright means the exclusive right to do or authorize others to do certain acts in relation to literary, dramatic, musical and artistic works, cinematograph film and sound recordings. The concept of copyright originated with the slogan "To every cow her calf; therefore to every author his copy", given by Irish King DIArmid in 6th century A.D. The nature of the acts varies according to the subject-matter. Basically copyright is the right to copy or reproduce the work in which copyright subsists. The term of the copyright is the life of the author of the work plus sixty years with certain exceptions. Copyright is one of the most commonly used but least understood words.

2. OBJECT OF COPYRIGHT

The object of copyright law is to encourage authors, composers, artists and designers to create original works by rewarding them with the exclusive right for a limited period to exploit the work for monetary gain.

3. SCOPE OF COPYRIGHT

Copyright is a creation of the statute. No person is entitled to copyright or any similar right in any work except those provided under the copyright Act. Copyright law is, in essence, concerned with the negative right of preventing copyright of physical material existing in the field of literature and the arts.

4. AUTHOR AND OWNERSHIP OF COPYRIGHT

An author may create a work on his own behalf or at the instance of another person for valuable consideration or in the course of employment by another person. In the first case the author is the owner of the copyright in the work. Authors who write books or compose music come under this category. In second category, in the absence of any agreement to the contrary, the person at whose instance the work is made is the owner of the copyright work. In the case of third category, the ownership depends upon the nature of employment.

5. COPYRIGHT IN INDIA

Copyright had come into existence after the printing process became mechanized which enabled reproduction of books and monographs, in large quantities. In India, the first legislation on copyright was passed in 1914. It was based mainly on the U.K. Copyright Act, 1911. After independence the Indian Copyright Act, was enacted in 1957. It came into force on 21st January, 1958. This act was periodically revised in 1983, 1984, 1992, 1994 and 1999 to incorporate further advancements in the technology. The Copyright Act provides the basic law so far as copyrights are concerned, the Copyright Rule contains the rules and regulations as well as various procedures and the International Copyright Order extends copyright protection to works of nationals of specified foreign countries.

6. COPYRIGHT AMENDMENTS IN DIGITAL AGE

With the increase in importance for knowledge and information, the demand for protection of the same is imminent. It is often said that copyright law must achieve a 'balance' between the benefits to the society of rewarding and encouraging creative activity, and the benefits to society of access to material for socially desirable purposes such as research and education.

6.1 Digital Millennium Copyright Act and EU Copyright Directives

DMCA was signed into law on October 28, 1998. EU copyright directives (EUCD) came into effect on 22 May 2001. It is EU's implementation of the 1996 WIPO Copyright Treaty. It is a highly controversial directive like DMCA. In its final form, it includes only very narrow exceptions to anti-circumvention measures and exclusive rights. It is generally regarded as a victory for copyright owning interests (Publishing, film, music and major software companies) over copyright users' interests. Many important details are not specified in the directive and as a result, EU member states have significant freedom in certain aspects of directive implementation.

6.2 Copyright Amendment (Digital Agenda) Act 2000

This amendment came into effect in on 4th March 2001. It was first released for public comment in 1999. This bill too has been drafted to comply with the WIPO treaties, 1996. WIPO Treaties adopt international copyright standards which specifically apply to copyright protection in the online era.

7. CONCLUSION

The concept of copyright is founded on the dual premise that authors have a right to a return on the results of their intellectual efforts while the public has right to benefit from the knowledge which authors make available. The intent of copyright is to advance the progress of knowledge by giving an author of a work an economic incentive to create new works. On the basis of above said discussion I can say copyright act is very useful for author.

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Copyright under TRIPs Agreement and the Indian Law: An Overview

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ABSTRACT

Intellectual creativity in the form of writings, art, sculpture and drama being regarded as property and deserves to the protection on the premise that without giving any kind of incentives, the creativity does not takes place effectively. If creativity comes to standstill there will be enormous economic and cultural loss to the society. Copyright is such an incentive given to the authors and creators to promote their creativity thereby leading towards individuals and nations economic progress. Copyright is a form of intellectual property provided to the authors and creators of literary, scientific, artistic, musical and dramatical works. It is a valuable asset of the proprietor of copyright can be exploited it to his benefit through making copies or reproducing it thereby distributing or selling it to the public. The copyright is a proprietary right can be owned, used, assigned and licensed like buildings, land and cars. For affording such a protection numerous legal instruments have been devised national and international level. At international level the Trade Related Aspects of Intellectual Property Rights (TRIPs) Agreement under GATT/WTO is one among many such instruments. The TRIPs is one of the major agreements of GATT/WTO aiming at protecting and promoting the Intellectual Property Rights (IPRs) generally and the copyright and related rights of the authors/creators within the member countries particularly. As per the obligations under the TRIPs Agreement, all the member countries of WTO are supposed to formulate their own system of copyright protection and implement

through the national legislation following an agreed set of minimum standards under TRIPs. India is a member of this agreement took many such initiatives to fulfil its obligations by providing effective protection to the IPRs through many bills and legislations. The aim of this paper is to discuss various provisions of TRIPs agreement and the Indian Copyright Act, 1957 with regard to copyright issues and evaluate to what extent the Indian law on copyright is conformed to the agreed set of minimum standards of TRIPs.

1. INTRODUCTION

The concept of 'copyright' is necessarily a development of modern civilization. At ancient times works of art and literature were brought out basically to earn name and fame. At late in the 13th century the importance of the works of art and literature became the subject of economic significance. The original thoughts and ideas reduced in writing was became the matters of protection as authors and creators felt that they were having some economic interest in their works as 'copyright'. This led them to attach more importance to protect their interest in their works as a matter of copyright against the persons who tries to make it as of their own creations without authorization of original authors and without payment of any consideration i. e, royalty.

Protection of copyright in original works began to develop only after the invention of the printing press, which made it possible to produce copies of a work, particularly, literary work, in large numbers at a low cost. Further the technological development has made reproduction of copyright material easy and cheap, but at the same time it has made piracy of copyright work easy and simple thereby created difficulty to control the menace. The seriousness of piracy in copyright work was realized only after the development of gadgets like photocopy (Xerox) machines, tape recorder, videocassette recorder and magnetic tape. These technological innovations made copyright violations wide spread. Then it was thought this wide spread violation of copyright would lead towards economic loss of individual author as well as the nation.

To check the piracy of copyright some countries have adopted their own methods. In England the courts have evolved a new weapon called Anton Piller order. In some of the European countries a special levy is imposed on recording equipment and blank cassettes and the amount thus collected is distributed to copyright owners of works. The Indian Copyright Act, 1957 has provided very severe punishment for copyright infringement and empowered the law enforcement authorities to enter any premises suspected of infringing activities and seize the infringing copies of works.[1]

For avoiding anomalies of copyright systems adopted by the different countries of the world, need was thought to devise a uniform set of principles to protect and regulate copyright activities internationally. In this direction some international treaties like the Berne Convention, 1971, the Universal Copyright Convention, 1971, and the TRIPs Agreement have been brought about.

Berne Convention for the Protection of Literary and Artistic Works, initially entered in 1885 basically by the European countries and revised several times to cope with the technological changes in the field and the latest revision taken place in Paris in the year 1971. The Universal Copyright Convention (UCC) initially entered in 1952 by the US, Russia and some Arab countries as parallel to the Berne Convention and revised at several times. The recent revision took place in 1971. The TRIPs is multilateral agreement under GATT/WTO entered in the year 1994.

Law on copyright in India has always been kept in place in accordance with the international standards as laid down in by all these international copyright instruments.[2]

2. MEANING OF THE TERM COPYRIGHT

In a simple meaning 'copyright' means right to make copies or reproduction right. It means that the right of making copy will available only to the author or creator of the works, which are copyrightable. The right of making copies or reproducing the works made available only to the original author or creator of the works and extended to the persons who have been assigned, transferred or licensed the copyright they are eligible to make copies or reproduce the works. If anybody else other than these persons mentioned makes copy or reproduces the material without the permission or license of the copyright holder or owner they will violate the owners/proprietors right and they will be punished in accordance with law.

Copyright derives from the expression of "Copie of words" first user in the context, according to the oxford dictionary in 1986. The work "Copy" alone probably dates from circa 1485 and was used to connote a manuscript or other matter prepared for printing.[3]

The Oxford English Dictionary defines 'copyright' as 'the exclusive right given by law for a certain term of years to an author, composer etc., (or his assignee) to print, publish and sell copies of his original work.[4]

Chambers Encyclopedia defines copyright in its most elementary form as 'the exclusive right to multiply copies of a book.[5]

In colliers Encyclopedia (1956), copyright is defined as a privilege or franchise granted by the Government to authors, composers and artists, ... which entitles them to the exclusive right of printing or otherwise multiplying, publishing and vending copies of the copyrighted literary or artistic production.[6]

In legal parlance that we cannot find a direct and clear definition in the TRIPs agreement and in its referred instrument the Berne Convention. The Berne Convention does not defined the term copyright as it is meant for providing protection to the literary and artistic works as such it defines only the terms 'literary' and 'artistic works'. However, the Universal Copyright Convention, 1971 defines the term in a different way not in an exact sense. Article 1 says each contracting state undertakes to provide for the adequate and effective protection of the rights of authors and other copyright proprietors in literary, scientific and artistic works, including writings, musical dramatic and cinematographic works and paintings, engravings and sculpture. Article V covers the rights mentioned in Article 1 by including the exclusive right of the author to make, publish and authorize the making and publication of translations of works protected under this convention.

However, section 14 of Indian Copyright Act, 1957 clearly and comprehensively defines the meaning of copyright. It means the exclusive right to do or authorize others to do certain acts in relation to: 1) literary, dramatic or musical works, not being a computer programme, 2) computer programme, 3) artistic work, 4) cinematograph film and 5) sound recordings.

3. NATURE OF COPYRIGHT

3.1 Statutory Right

The copyright is a statutory right. It means that this kind of right is being recognized and protected by specific statutes for specific works by the national legislation and international treaties. Without such a recognition and protection by the specific instrument there will be no copyright in the works. There is no such thing as a common law copyright like trademarks protection. At international level, there are number of treaties like Berne Convention, 1971 recognizes and protects the literary and artistic works; Universal Copyright Convention, 1971 provides copyright protection to the literary, scientific and artistic works; the TRIPs Agreement provides for the protection of copyright and related rights and it requires to the compliance of the Berne Copyright Convention, 1971. In December 1996, the World Intellectual Property Organization (WIPO) adopted two treaties: the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT). These two treaties provide for regulating Internet activities. India is

member of all these treaties and it is very much equipped to confirm to all these international treaties by transforming the Copyright Act, 1957 through amendments at several times incorporating new and uncovered areas at earlier times.

3.2 Intellectual Property Right

Copyright is a kind of intellectual property rights like patents, trademarks, industrial designs, geographical indications, integrated circuits and trade secrets. It is intellectual property because it is a creation of intellect, idea or thought protected when it is been reduced in writing or found in the form of expression. Mere idea or thought cannot be protected as a matter of copyright. The concept of intellectual property in the work as distinguished from the physical property in the material containing the words developed by leading philosophers and writers,[7] but treated similarly as equivalent to the physical property as regarding their benefits.

3.3 Negative Right

Copyright is a negative right because it prevents or prohibits the copying of physical material of the works by the third parties other than the owner or authorized persons.

3.4 Exclusive Right

The holder or proprietor of copyright or their assignees or licensees is having the right to make copies or reproduce and sell the material in which works copyright subsists. They can exploit the copyrighted work by excluding others from doing so.

4. REGISTRATION IS NOT COMPULSORY

Copyright get starts automatically when the copyrightable work comes into existence and enforced by the proprietor. Neither the TRIPs Agreement nor any international treaty requires for the compulsory registration of the copyright. Equal protection will be available to the works whether they were being registered or not. Though there is provision for registration of copyright under Indian law, but it is not a mandatory requirement.

5. SCOPE OF COPYRIGHT

Copyright subsists in expression and not in ideas, procedures, and methods of operation or mathematical concepts as such. Copyright subsists in expression, form and contents of ideas reduced writing and made available on some tangible things which covers all original literary and artistic works. This encompasses diverse forms of creativity, such as writings, including scientific and technical texts and computer programmes; databases, musical works, audiovisual works, works of fine

arts, including drawings and paintings and photographs. There is also a concept of related or neighbouring rights attached to the copyright which protects the contributions of others who add value in the presentation of literary and artistic works to the public: performing artists, such as actors, dancers, singers and musicians; the producers of phonograms, including CDs and broadcasting organisations.[8]

6. DURATION OF THE PROTECTION

Copyright is a limited right in the sense it is available for certain duration only. After the expiry of the specified term, the work will deem to be fallen in the public domain then anybody may exploit and use the work without fear of infringement actions. Specific and different term of protection is accorded to specific and different works by different instruments on the bases their nature. This is an overview of the term of copyright protection available under TRIPs and Indian law can be seen in this table.

A comparative table of term of protection available to some works under Indian Copyright Act, 1957 and the TRIPs Agreement

Works	Indian Law	TRIPs Agreement
Literary, dramatic, musical or artistic.	For life of the author and 60 years after his death	For life of the author and 50 years after his death
Cinematographic	60 years after the work has been made available to the public.	50 years after the work has been made available to the public.
Photographic and applied art	60 years	A minimum of 25 years.
Sound recording	60 years	50 years
Performers	60 years	50 years
Broadcasting	25 years	20 years
Computer programmes	60 years	50 years

This table indicates that there are some differences between the Indian law and the TRIPs Agreement as regarding the term of protection given to the different works in which copyright subsists. Indian law is more standard and comprehensive than the multilateral agreement on TRIPs.

7. RIGHTS OF THE OWNER OF COPYRIGHT

Copyright consists of bundle of rights in the works of author or proprietor. These works are literary, dramatic, musical and artistic works;

cinematograph film; sound recording and computer programmes. Upon these works the author or proprietor will enjoy these rights:

- Economic rights which includes reproduction rights, publication right, performance right, right to communicate to the public, cinematographic and sound recording right, translation right, adaptation right, right to claim the ownership of the works.
- Moral rights which includes rights to claim the authorship and right to restrain or claim damages for any distortion, mutilation, modification or any other act done to his work if such act is prejudicial to his honour or reputation.
- Right to claim share in re-sale price of a work
- Right to administrative remedies
- Right to claim the possession of the infringing material
- Right to take civil and criminal actions against copyright infringement activities.

The TRIPs Agreement requires the compliance of the Berne Convention, which provides for the moral right to the author under Article 6*bis* but the TRIPs agreement exclude from the protection expressly. Whereas Indian law expressly provides for the protection of moral right of author.

8. PRESENT STATUS OF INDIAN LAW

Presently the position of Indian law on copyright and related rights in comparison with the international standards specifically the TRIPs agreement is far better. India always remained forward in maintaining the international standards by incorporating them into the legislation from time to time with the pace of development in the field. Several time the Copyright Act, 1957 has been amended to update and conform itself to the TRIPs Agreement. It has been amended in 1999, providing 60 years term of protection to the computer programmes and scope of infringing act of copyright in computer programmes has been curtailed. But it didn't contain provisions to face the challenges posed by the Internet and the enforcement of copyright in the digital age.[9] The challenge to copyright posed by the digital and online environment of information society with the possibility of works protected by copyright being recorded, stored and made available on demand in digital form all over the world through electronic communication networks such as the internet and with the threat of unlimited perfect quality copies being made of them are not therefore a matter for national laws. Only a global approach will provide the protection required.[10] In this direction in the month of December 1996, the World Intellectual Property Organisation

(WIPO) adopted two treaties namely, the WIPO Copyright Treaty (WCT) and the WIPO Performances and Phonograms Treaty (WPPT) commonly known as Internet Treaties. India has signed these treaties to address the issues of the definition and the scope of rights in the digital environment and some of the challenges of online enforcement and licencing.[11]

9. Role of Libraries in Protecting the Copyright

There is a close congruence between the protections of intellectual property rights specifically the copyrights and the libraries. Almost all talented, creative, reputed and original works of literature, scientific and art will be made available in libraries and museums. Libraries and museums are the storehouses of creative knowledge in the form of books, encyclopedias, dictionaries, texts and now in digital form. They are the guardians of this valuable knowledge. They are required to be preserved, observed and honoured the intellectual property rights i.e. copyrights of the authors and creators of works otherwise it will be loss to the persons directly connected with these works like authors and to the nation as copyright consists of economic value. The copyright contributes to national economy to a very great extent in the form of excise duty, sales tax, income tax the also in the form of generating employment.[12] Library should be very much equipped to protect economic rights of the owners of the copyright and income generation activity of the government thorough curbing copy, reproducing and piracy. Massive copying and reproduction by taking photocopies or Xeroxing is being wide spreadly prevalent in libraries. Copyright piracy is a phenomenon prevalent worldwide. Piracy means "unauthorized reproduction, importing or distribution of whole or of a substantial part of works protected by copyright".[13] These all leads to loss to the owners of the copyright. Besides, economic loss and also adversely affects the creative people such as authors and artists and their legitimate due. The libraries commonly encounter these problems of copyright infringements[14]:

- Copying by library users
- Copying for users and inter-library loan
- Copying for internal use
- Copying of sound and images
- Performance to the public of a video or CD
- Lending to the public
- Copying electronic information
- Creating an electronic collection and electronic document delivery

However, the libraries are permitted to make copies or reproduce the material for specific purpose in which cases the infringement of copyright will not arise. The U K copyright Act, 1988 provided some kind of authorization to librarians to make and circulate copies or

reproduced materials for the purpose of education and research in certain circumstance.[15] The Indian Copyright Act, 1957 also provided certain exceptions to the infringement cases under which libraries and museums can make copies or reproduce the original copyrighted work. It has allowed making a maximum of 3 copies for the use of public library and reproduction of unpublished work kept in a museum or library for the purpose of studying or research.[16] The Berne Convention under Article 9(1) and (2) allows member states to provide for exceptions for copying as long as the activity can pass the 'three step test'.[17] Article 9(1) read as follows: "Authors of literary and artistic works protected by this Convention shall have the exclusive right of authorising the reproduction of these works in any manner and form". Article 9(2) reads- "It shall be for legislation in the countries of the Union to permit the reproduction of such works in certain special cases, provided that such reproduction does not conflict with a normal exploitation of the work and does not unreasonably prejudice the legitimate interest of the author." Thus, the Berne Convention provides effective protection and exception to the paper environment, but there is a doubt as regarding the digital environment. Do the words 'in any manner and form' in Art. 9(1) includes material in digital format? If they do, there is scope for exceptions for the use of digital material as long as it passes the three test of Art. 9(2) of Berne Convention.

10. CONCLUSION

Copyright is an effective tool for socio-cultural and economic growth of any given country; it should be the prime concern of the system to respect the rights of the authors and creators of works. Though the different legal instruments of national and international provides for effective protection and enforcement of copyrights, the violations and infringement activities still going on large scale and increasing day by day due to arrival of new technology. This menace cannot be curbed only through some legal instruments to whatever extent they may be stringent. Effective copyright protection is possible only where there is a public consciousness combined with honest civil society.

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Implication of IPR in the New Digital Environment: Some Concepts for Librarians and Libraries

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ABSTRACT

In this paper aspect of Implication of Intellectual Property Rights in the new Digital Environment: some concepts for libraries have been discussed. The sweeping digital environment all over the world, the owners of the copyright of the Intellectual works are confronted and exploited by a variety of technological innovations has been discussed. It is shown that the fast growing digital medium entails increased chances of infringement of IPR and changing role of libraries and librarians has been discussed.

INTRODUCTION

One of the most important technological events of the last two decades was the invasion of digital media and the growth of digital media has been increasing tremendously during the last few years. These digital media have given birth to the digital libraries, which have given us powers we never had with traditional libraries. Digital information can be accessed rapidly around the world, copied for preservation without error, stored compactly, searched very instantly, manipulated and transmitted very easily. Due to "malleability" the ease of manipulation and easy transmission of digital data through data communication networks have given the library users a great advantage in retrieving specific information in one hand and a gain make vulnerable to copyright infringement, tempering and unauthorized distribution on the other hand. The manipulation of digital data constitutes a real threat for the information creators and distributors of digital information.

Intellectual Property Protection (IPP) has gained wide acclaim due to Trade Related Intellectual Properties (TRIPs) agreement of 1994. Then, IPP and IPR have got unforeseen and unprecedented importance even in developing countries. According to the Minister of Industry and Commerce, Government of India, the Indian Government has decided to set up world-class IP officers in Delhi, Mumbai and Kolkata (The Hindu, 27th April, 2003). IPR Appellate Board, headquartered at Chennai is empowered to adjudicate all disputes under the TRIPS and the issues arising out of the Acts for various forms of IPR (The Hindu, 17th April, 2003).

Intellectual Property Rights can be defined as the rights given to persons over the creations of their minds. They minds. They usually give the creator an exclusive legal right over the use of his/her creation for a certain period of time and thus protect the owner against unauthorized copying or imitation.

The field of IPR is very wide and generally takes 7 main forms viz., Patent, Trademark, Copyright, Layout Design of Integrated Circuits, Protection of Undisclosed Information and Geographical Indications. Any person who is in the state of creating, handling and using any one of the forms of Intellectual Properties should have the knowledge about what is Intellectual Property Right, How to acquire it, what constitutes its violation and what are the consequences of such violations etc.

New technologies have created both new potential forms of IPRs and unforceable old rights. Hence, needs for new IPRs have been felt and there also is a need to differentiate between fundamental advances in knowledge and logical extension of existing knowledge. These make enforcement of IPR in this digital environment much tougher. With the availability of new equipment software piracy has become easy. The violation of patents and copyright are implant with the tacit approval of the governments. In Thailand, up to 97% of the software in use has been illegally copied and in the US it was 40%. However, no system of IPR can work unless most of the governments of the world agree to enforce it. With the development of information technology (IT), information appears in various forms and formats. These digital information resources can be accessed form networks, particularly over the Internet from anywhere in the world. Storing of work in digital medium and digital transmission of copyright material should be protected. Digitized documents, especially the multimedia products are very prone to right violation. The paper discusses issues related to protection of digital resources, their security in network environment, copyright acts for electronic publications, databases and web document, domain name and trademark issues and patents.

2. IPR ISSUES FOR LIBRARIANS AND LIBRARIES

The content creating agencies and the I P right holders attribute Internet as one of the biggest copying machine and demand the measurement of each drop of knowledge being put in the 'cyberspace'. The issues are of extreme concern to all the libraries specially the professional Information Centers. They are mainly because:

- ✓ Digital data is easy to capture, store, process download.
- ✓ It is just impossible to keep a track of the copyright infringement in the digital environment, because of the facilities like structuring, restructuring, mixing and remixing of information with the sound waves etc.

In the present Internet environment where, more and more universities and colleges are computerizing their operations and services, it is time to ponder over questions as:

- ✓ Is the website copyrightable in terms of content, the source code, layout etc?
- ✓ Is linking and downloading from websites legal/illegal?
- ✓ Viability of new invention, ID and password etc.

Librarians and information professionals have their responsibility the serving of the information placed in their custody as true to its original intellectual content as they can. Such protection must extend not only to intellectual rights over the property, but to the property itself; how we can protect information content from unauthorized, intentional or accidental change. Authors and publishers have an interest in seeing that their works are preserved, protected and provided with uncorrupted form, but neither has taken the responsibility for doing so. But librarians have the responsibility to see that author's works are preserved and organized for use, not only by our generation but also by succeeding generations of scholars and students. On behalf of the future readers, librarians have the general responsibility for preserving against unauthorized change. Librarians have been trying to find out the solutions to protect the intellectual property rights (IPRs) and the solution is to fix a text or documents in some way so that user can be sure of the original text when it is needed. This solution is called "authentication" which is used in verifying the resources. There are various important techniques proposed for authentication, like digital signature, digital certificates, digital water marking etc.

The Indian Copyrights Act protects the authors of their intellectual property rights. At present reprographic service has become a common reader's service in most of our libraries and Information Centers (LICs).

Especially in Academic, Special and Research libraries to meet the demands of the user community chapter/s form books, reports, reference books and form many other sources of information and sometimes the entire document from cover to cover is photocopied and made available to the user community.

This is a clear violation of the Indian Copyright Act. As per the provisions of the Act license has to be obtained from the concerned authority of making photocopies available to the user community in case the concerned document is not available for sale. This provision applies only to rare and out of print documents and the period of copyright has not expired or lapsed. There are instances where some of the Publishing/Bookselling Agencies without proper permission/authority sold photocopied editions of Universal Decimal Classification (UDC) and Dewey Decimal Classification (DDC) schedules at throw away prices. The same fate struck Colon Classification (CC) also. Many of the Library Schools have resorted to the same unethical methods to augment the schedules of classification for teaching practical to a large number of students.

These unauthorized practices is a clear violation of Indian Copyright Act and liable for punishment under the relevant sections of the act. It is the sacred duty of the library profession to protect and safeguard the intellectual property rights of authors, composers, artists and designers, information, intellectual property and the librarian. According to Shera, "no knowledge can rightly be regarded as irrelevant to 'librarianship, for access to all knowledge is the basic objective and function of it. However, the interdisciplinary of librarianship, if more deeply examined in the light of a profound discussion held at an OECD seminar on the subject in 1972 at Paris, appears to e indiscriminate. Indiscriminate interdisciplinary results form the borrowing of concepts, techniques and tools from a multitude of disciplines. Librarianship is considered an encyclopedic endeavour and as such must of necessity practice indiscriminate interdisciplinary, the most recent examples of this being the inclusion of TQM and SWOT analysis in its curricula.

The rights that are affecting the traditional library services, directly or indirectly are:

- The rights to copy a work
- To Issue copies to the public
- To rent or lend the work

Other rights viz. to perform show or play the work, to broadcast the work and to adapt the work are not directly related to library service,

except in special case the right to perform, show or play may be related to the extension activities of library.

Protection against ending the books does affect the library service, as lending of books is a core function of the library. As far as the lending in the parental libraries is concerned the protection is not affecting the lending service because in such libraries, school college, universities and the libraries attached to parent organization–the lending is restricted to the members and not public at large. As long as selling the books to libraries is not restricted the right of the library to lend the books to the members–does not affect the protection. In theoretical terms, the moral right of the authors does get protected.

The authorship is recognized and the purpose for which the work is created serves more forcefully. In the case of public libraries, however to some extent the protection does get affected as the public libraries, however to some extent the protection does get affected as the public libraries have to loan to the public at large. The Public Lending Rights is the answer to this problem. Of course, the implementation depends upon the efficient management of public library service. In an unorganized state, such as in our country, realization of gains of Public Lending Rights is a difficult proposition. Anyway when they get property organized the PLR may prove to be an effective solution.

Major concern in al types of library service is relating to copying of the work. The provisions relating to copying are:

- ✓ Substantive part of the work cannot be copied.
- ✓ Only one article (content page is considered as one article) form a periodical issue can be copied,
- ✓ Ownership of copyright of the books, which is out of print needs to be traced when copying from, is needed.

3. CONCLUSION

We can say that the developments in communication technology have triggered unprecedented changes in corporate activities. The purpose of 'Internet' is to make its content economically viable for the benefit of the newly emerging information society. This would largely depend on how successfully one is able to resolve the issues related to IPR.

At the outset IPR in digital age is acquiring an inseparable status and there is an urgent need to study the laws related to printing and other media at different levels. If one has to make best use of all the media available, one has to surely learn, monitor and incorporate new developments, participate in consortiums related to digital media,

continually update and validate digital content by coordinating with legal representatives and adopt appropriate strategies to limit risk factors.

This new technology has created complex barrier situations before the existing IPR systems. Libraries are increasingly using IT producers for storage and retrieval of information, and other in hour's jobs. By leasing the use of information, libraries are at the rest of infringing the copyright. Therefore, libraries should be allowed limited copying by appropriate changes in the copyright act. Also strict implementation of Copyright Act is needed for checking the piracy of computer software and other IT products.

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Libraries and Copyright

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ABSTRACT

This paper provides an overview of Intellectual Property Laws enacted in India; in particular, it focuses on Copyright, which is likely to have significant effect on libraries in the years to come. Copyright is one of the important Intellectual Property Laws. It is a unique kind of IPR and this concept is growing day by day. The paper argues that libraries and information professionals needs to be more aware of the act. Paper also throws light on International level mechanisms of IPRs in the form of world intellect property organization (WIPO) and trade related intellectual property right agreement (TRIPS)

Whether copyright and other Intellectual Property Rights are a barrier in transformation of information service is also discussed. It further tries to create awareness among the information professionals, with regard to the potential use of Intellectual Property Rights (IPR) especially the Copyright act. In this paper importance of copyright as a tool for the protection of original literary work of the author is also discussed. As main aim of these Intellectual Property Laws are to protect the originality of work, but mere enacting the laws will not fulfill the aim, at the end of paper roles and duties of information professionals to protect and safeguard the intellectual property rights of the author is also briefed.

1. INTRODUCTION

As the world is coming closer and closer in era of Globalization and Liberation of economy, interaction between different countries of the world is increasing. Different strategies in the form of treaties and agreement are being made to explore the wide business market available in developing countries. Developed countries are always in search of exploiting the business market opened for them after the signing of WTO Convention and passing of Copyright act in India.

In today's knowledge based society where knowledge and information are treated as commodities, intellectual properties and assets are the most important way of acquiring economic prosperity for any country. Therefore developed nations are investing billions of dollars in Research and Development (R&D) for enrichment of their intellectual properties. With the invention of printing press, which made copying of literary work possible, a need had been always felt for protecting the legitimate works of the author. With the formation of World Intellect Property Organization (WIPO) and Trade Related Intellectual Property Rights Agreement (TRIPS), different treaties and agreements are being signed by different countries to protect the intangible assets.

These intangible assets may be in any form viz. a document, an article, a poem, a research paper, a invention in science and technology, a film or any dramatic or musical work etc. In order to protect intangible assets in our country certain laws have been enacted. These are

a) Trade Mark Act, (1958)
b) Patent Act, (1970)
c) The Copyright Act, (1957)
d) Geographical Indication of Goods (Registration and Protection) Act, (1999)
e) The Design Act, (2000)
f) Plant Variety and Farmers Right Protection Act, (2001)

2. COPYRIGHT

Copyright is the exclusive right provided for a fixed period to the creator for his original literary or artistic work. Copyright holder gets an exclusive privilege of selling, modifying or any other change in the work which he deems fit. Copyright provide a protection against republication and reproduction of his work without his permission. Copyright is granted for: original literary, dramatics, musical and artistic works; cinematograph films; and records.

In our country concept of copyright has not get much maturity and level of awareness regarding IPRs and Copyright which forms a part of IPRs is very poor, whereas in developed countries awareness level regarding IPRs is very high. In these countries origin of concept of copyright can be traced back to 15th century. In 1717 AD first law regarding copyright was passed in England.

Journey of Copyright in India may be traced back in the year 1847, when first Copyright Act was enacted. A modified version of the same was enacted in 1914. In this law there was a provision of penalty for the infringement of the copyright. After independence a need was felt to further modify the existing copyright law resulting in another refined

version in the form of the copyright Act 1957. Several new features were introduced in this Acts like copyright office under the control of Registrar of Copyright. Copyright Act 1957 has further been amended four times in the years 1983, 1984, 1994 and 1999. With these amendments offence of infringement of copyright has been declared as an economic offence.

3. LIBRARIES AND COPYRIGHT

Storage and dissemination of information is the ultimate goal of any information center, with the aim of providing right information to the right person at right time, sometimes librarians find it difficult to provide desired document or information due to insufficient number of desired documents available in their library. In other cases there may be a situation where a user's need may be satisfied by few pages of a document containing hundreds of pages. In this case practice in existence is to provide photocopies of the desired pages to the users, because it seems most convenient both for users and library. Technically this practice is appreciated and still in practice in most of the libraries but if we talk about morally is it not infringement of copyright. Though there is a provision of "Fair-dealing" or "fair use" which permits for copying of a protected work for purpose of research and private study, but in no way providing full document in photocopy may be justified. This unauthorized practice is a clear violation if Indian Copyright Act and it is the moral duty of librarians to ensure that photocopying service provided in their libraries is not misused and this service is used only for study and research purpose by individual user.

So far in our country IPR or copyright is not a issue of concern but with different countries passing IPRs and copyrights Acts within the framework international conventions, it is necessary for the librarians to become familiar with these acts and laws because in the years to come traditional library service will also have some impact of different provisions of IPRs or Copyright laws.

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Managing Principles of Intellectual Property Rights in the Digital Environment

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ABSTRACT

In this paper managing principles of intellectual property rights in the digital environment have been discussed. Principles play the key role in any changing environment. Because of changing digital environment all over the world, the owners of the copyright of the intellectual works are confronted and exploited by a variety of technological innovations.

1. INTRODUCTION

In ancient days creative persons like artists, musicians and writers made, composed or wrote for fame and recognition rather than to earn a living, thus the question of intellectual property never arose. The importance of intellectual property Rights was recognized only after the invention of the printing press which made possible the reproduction of book in large quantities.

In the digital environment that has simply revolutionized the way workers work, institutional concepts, and also perhaps how thinkers think digital media enables us to store information easily on computers as "data" understands information complexity regularizes the information access and improves information environment our main concern is to have access to information in the easiest and most cost effective way. Information is an umbrella term for both data and knowledge and is the link between the raw data the knowledge eventually attained here knowledge becomes an intellectual property.

The information tide that is sweeping the rest of the world is rapidly approaching India Internet connectivity is available in a variety of different forms ranging from low cost dial up network to large Internet service providers. Consumer service is one of the major driving forces in various information centers university and college libraries specially, professional libraries are on the fore front IPR in the digital environment is acquiring an inseparable status and there is an urgent need to study the laws relating to these.

2. WHAT IS INTELLECTUAL PROPERTY?

Intellectual property refers to rights in creations of the human mind which arise under the laws of patents, copyrights, trademarks, trade secrets, unfair competition and related laws. Article 2 of the Convention Establishing the World Intellectual Property Organization (WIPO) defines intellectual property as follows:

"Intellectual property" shall include the rights relating to:

- Literary, artistic and scientific works;
- Performances of performing artists, phonograms, and broadcasts;
- inventions in all fields of human endeavor;
- scientific discoveries;
- Industrial designs;
- Trademarks, service marks, and commercial names and designations;
- Protection against unfair competition; and
- All other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields.

Intellectual property rights (IPRs) are the legal rights given to creators of intellectual property. IPRs usually give the creator of intellectual property the right to exclude others from exploiting the creation for a defined period of time. Intellectual property laws provide the incentives that foster innovation and creativity, and strive to ensure that the competitive struggle is fought within certain bounds of fairness. The protection of IPRs contributes significantly to technological progress, competitiveness of businesses and our country's well-being.

Intellectual Property Rights can be defined "IPR as the creation of human mind. Human beings potential efforts lead to intellectual outcomes, which in turn have considerable value in economy. Rights associated with Intellectual property which gives legal protection are referred to as intellectual property rights".

According to Padma Upadhyaya, The IPRs are mainly for the benefit of creators of work, invention and design. These rights are granted for

limited period except for trade mark where the protection period could be extended by renewals. The idea of intellectual property is easy enough to grasp it is difficult to have a precise definition since intellectual property by its very nature refers to property that is intangible intellectual property rights. We mean right of the person who by virtue of idea, design, etc. has created property which may be intangible and prevents other people from copying.

Features

- It is a form of property, albeit intangible
- It is separate to and has an existence distinct from the physical articles or goods which contain the rights.
- In some cases the rights are capable of existence and enforcement with no tangible form what so ever.

3. WHY IPR AND DIGITAL RIGHTS?

This issue of, Intellectual property trademark and copyright protection has become hornet's nest since the commercialization of www. Here the issue of privacy in the digital environment is an important subject where unauthorized data sharing, data integration, unethical data utilization, and unauthorized public disclosure are the major areas of concern. The issue is more of concern because:

- Since it is easy to capture, store, process and redistribute digital information.
- It is impossible to observe or keep a track of trademarks and copyright infractions in the digital environment.
- It is simple to download any information value to the original creator if one has a multimedia computer and Internet account.
- Internet is a public information superhighway.

4. IPR IN THE DIGITAL ENVIRONMENT

In the sweeping digital environment all over the world the owners of the copyright of the intellectual works are confronted and exploited by a variety of technological innovations.computer programmes and data bases are also considered literary works and hence are protected by copyright even in India. The emergence of information super high way in the recent years has wider implications on the protection and dissemination of Intellectual works. The main issues concern today are, security of data, fair use, appropriate long term preservation measures availability of digital publication.

The digital revolution has made the problems more acute and hence, consideration of IPR has become more crucial and timely. Internet has posed many questions and hence it has become mandatory to protect

commercial interests of creators work. As the information available on Internet is in public domain it is extremely important to make the digital resources as reliable as possible. Several efforts are being made to improve the authenticity of digital data, to make the global digital environment more reliable.

5. PRINCIPLES

The National Humanities Alliance (NHA) first released basic principles for managing intellectual property in the digital environment in 1997. The principles were developed by the NHA Committee on Libraries and Intellectual Property in an effort to build consensus within the educational community on the uses of copyrighted works in the rapidly evolving digital and legal environments.

The specific context for the 1997 principles was the contentious debate over revising the 1976 Copyright Act to account for digital technologies. In 1998, the Digital Millennium Copyright Act became law. From the perspective of the humanities community, this law failed to achieve balance between users and creators of intellectual property, and threatens the future of fair use in the digital environment.

a. Copyright law provisions for digital works should maintain a balance between the interests of creators and copyright owners and the public that is equivalent to that embodied in the 1976 Copyright Act. That legal balance was consonant with the educational ethic of responsible use of intellectual properties, promoted the free exchange of ideas, and protected the economic interests of copyright holders.
b. Copyright law should foster the maintenance of a viable economic framework of relations between owners and users of copyrighted works.
c. Copyright laws should encourage enhanced ease of compliance rather than increasingly punitive enforcement measures.
d. Copyright law should promote the maintenance of a robust public domain for intellectual properties as a necessary condition for maintaining our intellectual and cultural heritage.
e. Facts should be treated as belonging to the public domain.
f. Copyright law should assure that respect for personal privacy is incorporated into access and rights management systems.
g. Copyright law should uphold the principle that liability for infringing activity rests with the infringing party rather than with third parties. Institutions should accept responsibility for acts undertaken at their behest by individuals but should not be held liable for the acts of individuals–whether or not associated with the institution–acting

independently. This principle is an essential underpinning for academic freedom.

h. Educational institutions should foster a climate of institutional respect for intellectual property rights by providing appropriate information to all members of the community and assuring that appropriate resources are available for clearing rights attached to materials to be used by the institution.

i. New rights and protections should be created cautiously and only so far as experience proves necessary to meet the Constitutional provision for a limited monopoly to promote the "Progress of Science and useful Arts."

j. Copyright enforcement provisions should not hinder research simply because the products of a line of inquiry might be used in support of infringing activity.

IFLA is an international organization which exists to undertake, support and co-ordinate research and studies, and disseminate information about all aspect of library and information work world wide and to organize meeting and training in this field. A library's ability to provide access to its users will be severely restricted in order to maintain a balance between the interests of rights holders and users, IFLA has developed the following principle:

a. In national copyright legislation, exception to copyright and related rights, allowed in the Berne convention and endorsed by the WIPO treaties should be revised if necessary to ensure that permitted uses apply equally to information in electronic form and information in print.

b. For copying over and above these provisions there should be administratively simple payment schemes.

c. Temporary or technical copies which are incidental to the use of copyright material should be excluded from the scope of the reproduction right.

d. For works in digital format, without incurring a charge or seeking permission all users of a library should be able to:

   i. Browse publicly available copyright material

   ii. Read, listen to, or view publicly marketed copyright material privately, on site or remotely.

   iii. Copy, or have copied for them by library and information staff, a reasonable portion of a digital work in copyright for personal, educational or research use.

e. Providing access to a digital format of a protected work to a user for legitimate purpose such as research or study should be permitted under copyright law.

f. The lending of published physical format digital materials (CD ROMs) by libraries should not be restricted by legislation.

g. Legislation should also cover the legal deposit of electronic media.

h. National copyright laws should aim for a balance between the rights of copyright owners to protect their interests through technical means and the rights of users to circumvent such measures for legitimate, non-infringing purpose.

6. CONCLUSION

Intellectual Property Rights are essential to human creativity, by giving creators incentives in the form of recognition and fair economic rewards. Under this system of rights, creators are assured that their works can be disseminated without fear of unauthorized copying or piracy. Intellectual Property Rights in digital environment is acquiring an inseparable status and there is an urgent need to study the laws and managing principal related to printing and other at different levels. This indicates that Intellectual Property Rights in the digital environment are of major concern and we have to emphasize more on the practicality of there to get additional benefit and prosper.

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WIKI Technology for Library and Information Professionals

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ABSTRACT

The technology revolution has brought many changes to the way librarians and library staff manages their day and provide information to the users. A wiki (pronounced as wee-kee) is a web application tool invented by a programmer named Ward Cunningham, which holds greater promise as an on-line authoring environment. He named his effort WikiWikiWeb. The idea first caught on among other techies, who used wikis to collectively work on engineering projects. Wiki make publishing and sharing contents on the web very easily. This article describes how adopting this wiki technology can benefit LIS professionals. The article begins with a description of wikis, then covers wikis features and explores its organizational applications. Finally, a discussion follows on how wikis can be used to support library services with some examples of wikis as collaborative workspaces.

1. INTRODUCTION

Wiki originates from the Hawaiian term means "quick or fast," a wiki is a type of website that allows people to collaboratively develop a Web site with no web programming knowledge. Any member of the community can add to or edit the work of others. So, essentially, a wiki is a perpetual work in progress, where anyone can add his or her nascent ideas/ views or information. Wiki was developed to allow for easy and fast collaborative development of a website. Wikis usually start as a blank slate and are developed by the community of users who choose to participate. The collaborators may know each other or they may be strangers with common interests who are working towards a common goal. They are completely democratic in that anyone in the community can add to or edit anyone else's writing.

The first such software to be called a wiki was created by programmer 'Ward Cunningham' Honolulu International Airport counter employee during 1995 when he wanted a quick way to publish information collaboratively on the Web. The word wiki is a shorter form

of wiki wiki (weekie, weekie). The word is sometimes interpreted as "what I know is", which describes the knowledge contribution, storage and exchange function.

Cunningham called the wiki "the simplest online database that could possibly work". Wikis were increasingly recognized as a promising way to develop private and public knowledge bases. The original WikiWikiWeb site (http://c2.com/cgi/wiki) created by Cunningham still exists and is actively maintained by users.

1.1 Wiki Definitions

Wiki (n.) A collaborative Web site comprises the perpetual collective work of many authors. Similar to a blog in structure and logic, a wiki allows anyone to edit, delete or modify content that has been placed on the Web site using a browser interface, including the work of previous authors. In contrast, a blog, typically authored by an individual, does not allow visitors to change the original posted material; only add comments to the original content. (Source: www.webopedia.com)

A collection of websites of hypertext, each of them can be visited and edited by anyone. (Source:www.parliament.vic.gov.au/sarc/E-Democracy/Final_Report/Glossary.htm)

A wiki is a web application that allows users to add content, as on an Internet forum, but also allows anyone to edit the content. Wiki also refers to the collaborative software used to create such a website (Source: en.wikipedia.org/wiki/WIKI)

1.2 Wiki Features

Wikis are a hypertext medium, with non-linear navigational structures. Each page typically contains a large number of links to other pages. Hierarchical navigation pages often exist in larger wikis, often a consequence of the original page creation process, but they do not have to be used. Links are created using a specific syntax, the so-called "link pattern". Most wikis offer at least a title search, and sometimes a full-text search. The scalability of the search depends on whether the wiki engine uses a database; indexed database access is necessary for high speed searches on large wikis.

Wikis are generally designed with the philosophy of making it easy to correct mistakes, rather than making it difficult to make them. A wiki system may also include various tools, designed to provide users with an easy way to monitor the constantly changing state of the wiki as well as a place to discuss and resolve the many issues, namely, the inherent disagreement over wiki content.

In the early 2000s, wikis were increasingly adopted in the enterprise as collaborative software. Common uses included project communication, intranets and documentation, initially for technical users. Open source wiki software was widely available, downloaded and installed throughout these years. Today some companies use wikis as their only collaborative software and as a replacement for static intranets. Most wikis are open to the general public without the need to register any user account. The source format, sometimes known as "wikitext", is augmented with a simplified markup language to indicate various structural and visual conventions.

A wiki can be used in multiple ways as a conversational management system to support the goals of many organizations, including libraries. Wikis are being used virtually in any type of library for a wide variety of purposes. Right now, libraries are primarily using them internally, but they are also used as subject guides, community guides, and as their actual library Web site. As wikis become more main stream, they will likely to see greater use in providing services to patrons.

Wikis are an ideal tool for libraries that need to share information better internally or that need to develop some sort of a knowledgebase. They can be used by specific groups within libraries–policy development groups, reference staff, committees, etc., or groups with members in various libraries–research teams, people writing an article together, etc., who need to share information and collaborate online. Wikis are good for projects where quick Web development is essential and not all of the players know HTML. They are also useful for projects where the library wants to collect knowledge from library patrons (research guides, community guides, etc.). Although wiki software can vary, generally most wikis include these simple basic features:

(a) Wikis are open to all users, or certain authorized users, and can be freely written or edited by those users;

(b) New pages can be added to a wiki by typing a WikiWord, a word containing two or more capital letters, or by other conventions, such as double brackets;

(c) Wikis use a simplified markup system, not HTML (Hyper Text Markup Language), although some wikis now have WYSIWYG editing.

1.3 Wiki Types

There are three wiki types: Teacher, Groups, and Student. In addition, like any activity, the wiki has the additional group modes also like Separate group or Invisible group etc.

In a Teacher type wiki only the teacher can edit. Students are only view the contents. Where as in a Groups wiki type the teacher and all students can view and edit this wiki. There is one wiki per group. Students are allowed to view and edit the wiki of their own group only. They can view the Wikis for all groups. For the Students wiki every student has their own wiki, which only they and their teacher can view and edit. Students can view the Wikis of all other students in the course. Unless the group mode has been forced by the course settings, it can be set with the group's icons on the course home page after the wiki has been created. A teacher can always edit every wiki in the course

1.4 Creating and Editing Content for wiki

1.4.1 Wiki Engines

In many ways, Wikis are the world's simplest Web sites. The software that runs a wiki is frequently called a wiki engine. Wiki engines are usually installed on a server, so running a engine requires more advanced computer skills than those of basic computer users. Most wiki engines are open source and are written in a variety of programming languages. Some of the wikis are intended for the public, like Wikipedia (www.wikipedia.org). Some recent wiki engines use a different method they allow "WYSIWYG" (What You See Is What You Get) editing, usually by means of Java script control that translates graphically entered formatting instructions, such as "bold" and "italics", into the corresponding HTML tags, this technology is now being adopted by academies and organizations as a collaborative tool for managing knowledge among their employees. More recently, wiki engines are generating wiki syntax instead of HTML. This way, users who are comfortable editing in wiki syntax can carry on. Some popular wiki engines include MediaWiki (www.mediawiki.org), PmWiki (www.pmwiki.org), MoinMoinWiki (http://moinmoin.wikiwikiweb.de), and TWiki (http://twiki.org).

1.4.2 Wiki Farms

People interested in using a wiki who do not have the skills or desire to set up their own server can choose from a variety of hosted wikis, or wiki farms. Wiki farms run a wiki engine on their own servers as a service. This option works well for people interested in testing out the wiki concept or for people who don't want to manage a wiki on their own server. Some wiki farms include Seedwiki (www.seedwiki.com), PBWiki (www.pbwiki.com), XWiki (www.xwiki.com), JotSpot (www.jot.com), and Socialtext (www.socialtext.com). Before implementing a wiki in the work environment, potential users must first consider the workplace culture and environment, and the potential users and their requirements.

The standard menu structure found on most Web sites won't be available in a wiki. By typing a wikiname, the user automatically creates a link to a new page. For example, to add a new page about the wiki, the user could type "AboutThisSite." This wikiname syntax automatically creates a link to the new page on the current page being edited and when the user clicks on this link, the user is automatically sent to the editor for the new AboutThisSite page. Some wikis use square brackets around a word to create a new page (e.g., [Library] to create a new "Library" page). Links to new pages will appear differently than links to existing pages. Some wiki programs use a "?" mark next to the new page link, others use a dotted line beneath the link to denote that it is a new page with no content. Users can also easily link to external Web sites since Wikis recognize URLs and will automatically create hyperlinks when a complete Web address is typed on a wiki page. Adding new images to a wiki page is equally simple. The user typically encloses the URL to the picture in square brackets.

Some wikis have roadmap pages where people "find, collect, and link to useful wiki pages on a particular topic" In addition; Wikis have a Recent changes page that automatically updates each time a page in the wiki is modified. This page helps users track any changes or discussion-taking place in the wiki. Some wikis also have a backlink feature that allows the user to see all of the wiki pages that link to the current page. Finally, users can navigate wikis by doing keyword searches to find information. Since wikis are a centralized resource on the Web, they support a decentralized group of users that need access to a single knowledge repository. Also, a wiki's content on a Web page can be broken apart or combined with other pages to create the best possible content page. Finally, hyperlinks can create context within the wiki.

1.5 Wikis Technology for LIS Professionals

Early attempts to capture the universe of knowledge reference librarians used handwritten or typed ready reference files and index cards that contained frequently asked questions, typically arranged alphabetically or by subject. Eventually these early systems were computerized to add keyword access to their contents. These automated systems then migrated online, sometimes as static Web pages and other times as more interactive online databases. Again, the advantage to recording the answers to difficult or frequently asked questions is that reference librarians are recording their explicit knowledge about particular sources.

Now the librarians can utilize Wikis as a knowledge base within the library. Since Wikis can be installed as password protected, they can be set up as an internal, private tool. All of the librarians who teach library

instruction classes could contribute to a library instruction wiki specifically tailored for their community of users. This type of wiki could include handouts and tutorials used, teaching techniques and tips, class specific information, and anything else librarians might find useful.

Wiki could be used as a ready reference database for frequently asked questions. Since a wiki is a Web-based tool, it is also readily accessible. Another use for a wiki as a knowledge repository would be as a peer resource guide. The reference librarians at Butler University have created a wiki called "WikiRef" (www.seedwiki.com/wiki/butler_wikiref) that is intended to be a collaborative review of reference resources available through Butler University Libraries. An advantage to having an open and public resource like this would be to facilitate a discussion about resources and encourage user participation in the library, in addition to having a resource that features the collective knowledge of its users. Wikis can also be used as subject-specific public resource guides. Most libraries publish their subject guides as static Web pages. Providing that information in a wiki open to the public can add more functionality to that type of resource. The "Biz Wiki" (http://www.library.ohiou.edu/subjects/bizwiki) at Ohio University Libraries is an example of a wiki being used in this way.

Wikis can be used as collaborative workspaces to help manage knowledge for specific projects or teams in library reference services .The wiki could be set up as a private wiki accessible only by a group of team members or it could be set up as publicly readable but editable only by members of the group. Librarians could also use a wiki to work on a jointly authored document or to write policies as a group. Although other online tools exist those perform this collaborative writing function are Writely (www.writely.com) or Writeboard (www.writeboard.com/). Overall, Wikis work well as a collaborative workspace and are even more effective when used with distributed work teams.

1.6 Examples of Wiki Technology

- ALA Chicago 2005, Unofficial Wiki http://meredith.wolfwater.com/wiki/index.php?title=Main_Page
- @Wiki is a free Wiki rental service. With this wiki any user can create a new Wiki web page quickly and easily. (http://atwiki.com/)
- Chat Reference Libraries A list of libraries providing "virtual" reference services (http://www.liswiki.com/wiki/Chat_reference_libraries)
- H2g2, BBC's encyclopaedic guide to Life, the Universe and Everything http://www.bbc.co.uk/dna/h2g2/

- JotSpot Application wiki service (http://www.jot.com/)
- LISWiki was established to give the library community a chance to explore the usefulness of Wikis.(http://www.liswiki.com)
- Library Instruction Wiki http://instructionwiki.org/Main_Page
- Library Success: A Best Practices Wiki http://www.libsuccess. org/
- My Library Wiki the purpose of this Wiki is to discuss and record issues surrounding the creation and maintenance of library-related portal applications (http://dewey.library.nd.edu/mylibrary/wiki/)
- OCLC WorldCat Wiki http://www.oclc.org/productworks/wcwiki.htm
- Ohio University Libraries Biz Wiki http://www.library.ohiou.edu/subjects/bizwiki/index.php/Main_Page
- Seedwiki is a wiki service hosted on the web. Anyone can create a seedwiki account. Up to three free wikis with 50 wiki pages each can be created by one person. Your account gives you 50 megabytes of space for files and images.
- SwitchWiki A wiki that attempts to catalog wiki's on the world wide web. (http://www.worldwidewiki.net/wiki/Switchwiki)
- The Confluence enterprise wiki. an example of a wiki which has been designed specifically for organizational teams. (http://www.atlassian.com/software/confluence/)
- University of Connecticut Libraries' Staff Wiki http://wiki.lib.uconn.edu/wiki/Main_Page
- WikiD A wiki that attempts to catalog wiki's on the world wide web. (http://www.oclc.org/research/projects/wikid/)
- WikiHow, a collaborative project to build the world's largest "how-to" manual http://wiki.ehow.com
- Wikiquote, quotations from notable people and creative works-a companion to Wikipedia http://en.wikiquote.org/wiki/Main_Page
- Wiktionary, a collaborative, free, multilingual dictionary-a companion to Wikipedia http://en.wiktionary.org/wiki/
- Writing Wiki, University of South Florida (includes online tutorials) http://www.writingwiki.org/
- Wiki, Welcome Visitors http://c2.com/cgi/wiki?WelcomeVisitors

- ZopeWiki.org. This site "proposes a simple, comprehensive, collaboratively-maintained guide to all of it (http://zopewiki.org/ZopeWiki)

2. CONCLUSION

Wiki is server software that allows users to freely create and edit web page content using any web browser. Wiki supports hyperlinks and has simple text syntax for creating new pages and cross-links between internal pages on the fly. Like many simple concepts, "open editing" has some profound and subtle effects on Wiki usage. Allowing everyday users to create and edit any page in a Web site is exciting in that it encourages democratic use of the Web and promotes content composition by no technical users. There are many ways wikis can be used by the LIS professionals, but this paper has focused on their general use in managing knowledge. As a conversational technology, wikis encourage incremental knowledge creation and knowledge sharing, in addition to supporting a decentralized group of users. When wikis are coupled with complementary technologies, they become even more powerful as a knowledge management tool. All in all, wikis have tremendous value as knowledge management tools in many types of organizations and environments, including library services.

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E-Learning and Information Literacy

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ABSTRACT

Presently we are living in the era of information technology where information is power and important for every human being either they get it directly or indirectly. Today we get information through various electronic medium such as Internet, www, e-mail, e-books, e-journals, chat, video conferencing, Audio tapes, mobile phone, multimedia etc. These medium play important role for learning and communicating with various aspects of information and also important that how we become information literate through these e-learning medium. This paper discuss about concept, need, purpose, benefits of e-learning and impact of e-learning in information literacy.

1. INTRODUCTION

Today the impact of information technology has changed our daily life. We used various electronic medium to know the information. These mediums are internet, intranet, www, CDROM, multimedia, audio-video tapes, etc. These mediums play an important role for e-learning and communicating with various aspects of information. E-learning is one such type of technology which provide the on line learning programs or learning resources are provided through electronically and the learning material are available in computer in the various forms.

E-learning is an effective way to acquire knowledge rapidly to complete in the knowledge based economy. E-learning offers great potential for delivering and effective training that gives learners what they need, when and where they need it with reduced financial and human resources requirements.

Webopedia.com. an online dictionary and search engine for computer and internet technologies defines e-learning as a type of education in which students learn by executing special training programmed on a computer. According to research conducted, e-learning has a number of unique features that sets at a part from traditional training methods. The Bank of American Securities defines "e-learning is the convergence of learning and Internet. According to Elliot Mosie e-learning is the use of network technology to design, deliver, select, administrator and extended learning.

1.1 Need of E-Learning

Every type of needs is mostly related to the changing technology. E-learning is also technology based learning, where the users learn about various mediums via- internet and others electronic medium. E-learning provides various types of facilities to the learners some of them are following.

- It is cost savings and time savings.
- Learning everywhere and every time.
- It provides 24 hours between teacher and learner.
- The learning is self directed according to their need and interests.
- It provides learning through various types of users, either they are student, teacher engineer or industrialist etc.
- On demand access means learning can happen precisely when needed.
- Reduced travel time and associated costs (packing, fuel, vehicle, maintenance etc.)

1.2 Kinds of E-learning

1.2.1 Online Learning

It is web based learning through internet technology. The learners can get information according to their need and interests. The information is provided more up to date. It is effective reaching out the large no. of peoples all over the world.

1.2.2 Blended Learning

It is combination of online and face-to-face learning such as self-study CD-ROMs and audio-video tapes.

1.2.3 Synchronous

It is online learning in which participants log on at the same time and communicates with each other through chat, video conferencing and tele-conferencing.

1.2.4 Asynchronous

It is interaction between instructor and learner which takes sometime and delay for learning such as e-mail, web pages and discussion forums.

- Self study with subject experts
- Instructor-led group
- Web-based
- Computer-based (CD-ROM)
- Video/audio tape

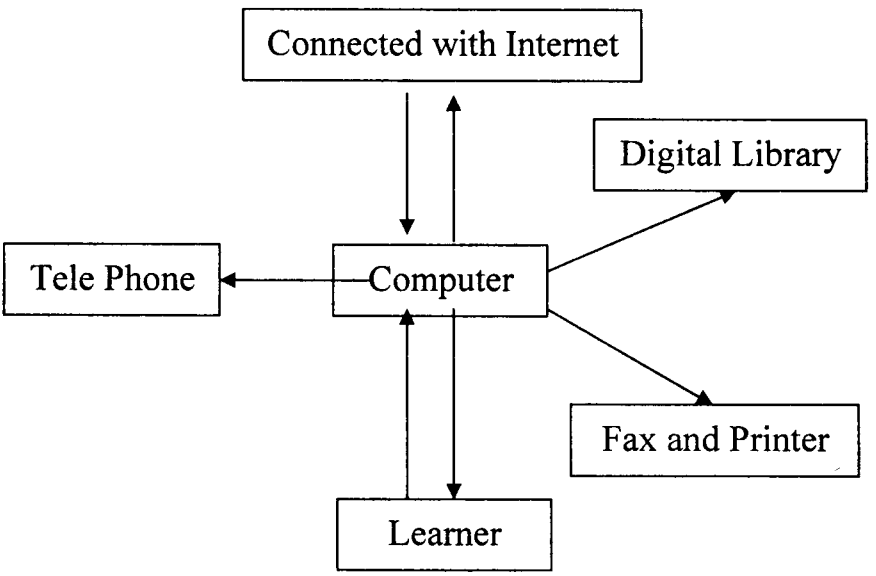


Fig. 1 OnLine learning

1.3 Benefits of E-learning

There are many significant benefits of e-learning for the students who learn online. Some of them are as follows.

- 24-hour accessibility for the learners.
- It is less costly for the learners.
- Online learning for every time.
- Flexibility: Learners can choose instructor led or self study cursers or online learning according to their need and interests.
- Cost effective for learners.
- All types of learners have benefited.
- Education reach at all levels.

- The geographical barriers eliminated, the course material is available online.
- Updation of courses regularly done.
- Better retention

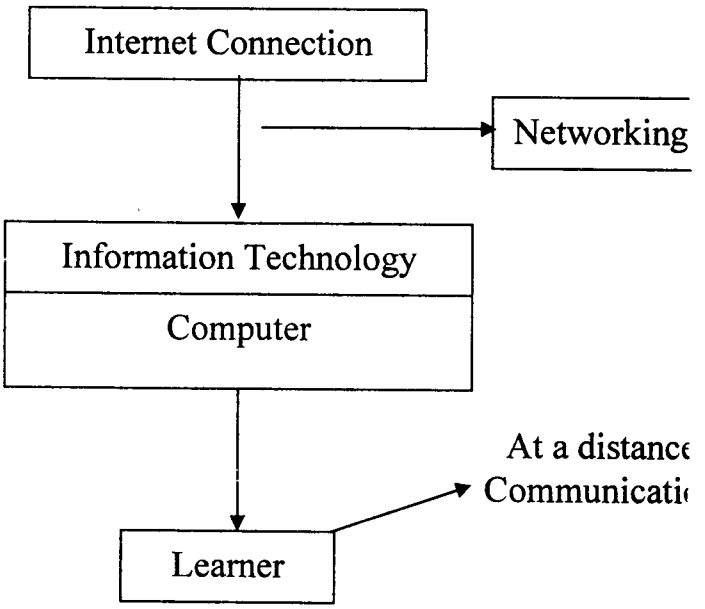


Fig. 2 E-Education-based technology

1.4 The Impact of E-learning in Information Literacy

Information literacy is ability to understand, identify, locate, evaluate and efficiency to use the needed information. An information literate person, is one who is able to-

- Recognize, needed information
- Understand the information.
- Access, the needed information
- Determine the extent of information need and
- Evaluate the information.

An information literate person is able to analyze and interpret information according to their need and interests. We used various types of electronic information tools to acquire knowledge and get information. Libraries and information centres used information technology and encourage computer literacy, media literacy, digital literacy, library

literacy, information technology literacy, network literacy, audio/video literacy etc. All these types of information library is used by large number of peoples. The online information literacy is demanded every time by the users. Many academic libraries have started to give information literacy through internet.

The impact of information literacy on society is due to advanced information technology and information technology or E-learning mediums play an important role for learning education an literacy.

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Information Literacy and E-Learning: A Tool for Organisational Development

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ABSTRACT

Information and its effective communication is a fundamental and vital activity within all areas of industry, commerce, government, education and social life. The Knowledge Organisation Management (KOM) is essential for proper information access facilities in Library and Information Centres (LICs) in digital mode for organisational development. The paper presents the concept and importance of information literacy. Discusses the information literacy and e-learning.

Keywords: Information Literacy, E-Learning, Knowledge Organisation Management.

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Digital Information Literacy: Role of Library

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ABSTRACT

The paper is the outcome of a descriptive research on digital information literacy. The basic concept and essential components of digital information literacy has been systematically described in the paper. Further, the paper promotes the role of libraries, especially digital information literacy among the academic community.

Keywords: Digital Information Literacy, Digital resources, Alphabetic Literacy, Functional Literacy, Social Literacy, Subject Gateway, Multimedia, E-Book, E-Papers, E-Reference Sources, E-Databases, E-Content Pages

1. INTRODUCTION

In the contemporary world, information is the backbone of society; it helps in development of each and every field of human life starting from education to business and health. Students need information basically according to their course curriculum. Digital Information Literacy is aimed to promote the skills of students to locate, collect and evaluate the information which are in electronic form for their academic and scholarly use. Due to rising cost of print materials, availability of most of the information in non-book form, and changing course curricula, force the students to develop their computer skills.

Information Literacy is the set of skills needed to find, retrieve, analyse and use information.

The spectrum of literacy

Alphabetic Literacy	:	Writing Name
Functional Literacy	:	Reading and Writing
Social Literacy	:	Communication in a Cultural Context

Information Literacy	:	Critical location, evaluation and use of information
Digital Information Literacy	:	Application of Information Literacy in Digital Environment

2. INFORMATION LITERACY: DEFINITION

Information Literacy can be defined as, "the ability to access, evaluate, organize and use information for learning, problem-solving, decision making in formal and informal learning contexts such as at work, at home and in education" (Rajgoli)

Information Literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate and use effectively the result out information (Gopal).

Information Literacy is the art of knowing when and why one needs information, where to find it and how to evaluate, use and communicate in an ethical manner.

Information Literacy is the ability to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information.

3. DIGITAL INFORMATION LITERACY

It is commonly held that having an ability to read and write impacts considerably on a person's potential to communicate and learn. But how and in what ways does a person's ability to read and write digitally, impact on that potential? Being able to access the Internet, find, manage and edit digital information, join in communications and otherwise engage with an online information and communication network, are arguably aspects of what could be called digital literacy.

4. DEFINITION

Digital information literacy describes a person's ability to understand, evaluate, and create information in multiple formats via computer and the Internet.

The ability to use digital technology, communication tools or network to locate, evaluate, use and create information is:

According to Doyle's, "Digital Information Literacy is the ability to access, evaluate and use information from a variety of source in meaningful ways."

5. DIGITAL INFORMATION LITERACY: NEED

The current age is most suitable to bid farewell to paper based resources and concentrate upon electronic ones as:

- ❖ Information is available through multiple media;
- ❖ Digital resources provides faster interaction and stimulates understanding and recall of information;
- ❖ Digital resources facilitates self paced learning or lifelong learning;
- ❖ Digital resources are convenient for access any time any where than paper resources;
- ❖ Digital resources reduces travel time and cost;
- ❖ Browsing information through hyperlinks and www possible only by digital resources;
- ❖ Students can select learning materials for themselves;
- ❖ On-demand availability of digital resources enables students to complete training at leisure or from home.

(http://www.ala.org/ala/acril/acrilissues/acrilinfolitoverview/inrotoinfolit/inftroinfolit.htm)

6. COMPONENTS OF DIGITAL INFORMATION LITERACY

Digital Information literacy is available in multiple types such as:

6.1 E-journals

Electronic Journals may defined as any journal, magazine, newsletter or serial publication available over internet in electronic format and can be accessed using technologies such as world wide web., e-mail, mailing list, CD-ROM, databases etc. Due to spiraling costs of them print counterparts and multiple availability e-journals turnout to fast replace the paper journals.

Chief advantages of E-journal can be counted as:

- ➢ Faster Delivery
- ➢ Easy and effective search
- ➢ Multidimensional interaction
- ➢ Dynamic hyperlink
- ➢ Cost Effective
- ➢ Flexible
- ➢ Can be easily manipulated
- ➢ Minimal or free operation cost.

6.2 e-Books

An electronic book is the context of book made available to the reader in electronic form. It may be defined as "An E-book is a term analogous to a book that is in digital form to be displayed on Computer Screen" (ELIS). Thus E-books are books in computer file format, can be read on all types of computers and can be delivered by download, e-mail attachment, on 3.5" disk and CD-ROM.

Hence, e-book comes as a handy tool to improve library services. Major advantages of e-book:

- E-book are cheaper than print ones;
- Available in multimedia format
- Can be resized according to the reader's own convenience
- Never goes out of print
- Portable and instantly available
- Easily searchable
- Immediate world wide distribution (on-line)

7. OTHER DIGITAL RESOURCES

e-Papers: e-Papers open a new paradigm for paperless society, through e-papers, it is possible to broadcast the documents to large numbers of recipients through on-line communication systems.

e-Reference Sources: E-reference sources like Maps, Atlases, Encyclopedia, Directories, Dictionaries, Citation Guides, Bibliographical Sources, Translation Services mostly are 3-D objects so that a complex topic becomes comprehensive even to common and unsophisticated readers.

e-Databases: E-databases are collection of logically related electronic data in the form of both bibliographic and full-text and can be viewed from standalone, networked or internet systems.

e-Content Pages Provide desktop access to the digitalized content pages of books, conference proceedings, journals etc.

Multimedia Digital Resources: Multimedia digital resources are resources in combination of two or more media such as text, images, animation, audio and video.

8. SUBJECT GATEWAY

Subject Gateways are Internet Services which supports systematic resource discovery. They provide links to resources (documents, objects, sites or services) predominantly accessible via the Internet or simply subject gateways are Internet Based Services designed to help users locate high quality information that is available on the Internet. They are typically databases of detailed metadata (or Catalogue) records, which describe Internet Resources and offer a hyperlink to the resources.

- Moffat defines Subject Gateway as, "a process of identification, filtering, description, classification and indexing before they are added to databases which is freely available via www."
- An Internet site set up to provide an easy link to other information servers giving useful subject based information in a particular discipline. (www.Library.nuigalway.ie/help/jargon/jargonm.html).

9. BASIC SKILLS FOR ACCESSING DIGITAL INFORMATION

Niwikangas (2005:p.23) describes for accessing digital information one should require the following basic skills:

- The skill of using of computer hardware, software, peripherals and the ability to navigate and find information on the world wide web and to communicate through e-mail.
- A digitally literate individual must have the ability to
  - Determine the extent of information needed;
  - Access the needed information effectively and efficiently;
  - Evaluate information and its sources critically;
  - Incorporate selected information into one's knowledge base;
  - Use information effectively to accomplish a specific purpose;
  - Understand the economic, legal and social issues surrounding the use of information;
  - Use information ethically and legally.

Prof Christine Bruce has given following set of skills for Digital information literacy:

- Understanding the nature of information society;
- Acquiring values that promote information access and use;

- Being able to implement the processes of identifying information need;
- Locating, retrieving, evaluating and synthesizing the information required;
- Developing a high level of communication skills, including the ability to communicate with colleagues and professionals;
- Developing a sound knowledge of information sources, network sources and strategies for using them;
- Developing the ability to manage the information retrieved through appropriate softwares;
- Developing familiarity with hardware of information technology, books, newspapers, video, compact disks, computers and all accompanying materials/apparatus.

10. ROLE OF LIBRARIANS/LIBRARY IN PROMOTING DIGITAL INFORMATION

According to Campbell and Coffta and Sschoen the LIS professionals/ organizations have to play a significant role to promote digital information literacy in the society. They are given below:

1. They should be trained and skilled to provide better services to users;
2. They should be educated on the concept of lifelong learning and bridge the gap between the staff and the user;
3. They should be empowered and motivated on the use and availabilities of digital resources and services on the web;
4. They should encourage students to question their findings in every step of the research process;
5. They should build new paradigms and finance in digital information literacy programmes;
6. They should provide guidance for proper access and use of digital information;
7. Library personnel must cooperate with students and faculties everywhere;
8. They should come forward to organize proper courses inability students and faculties to find, access, evaluate and use digital information;

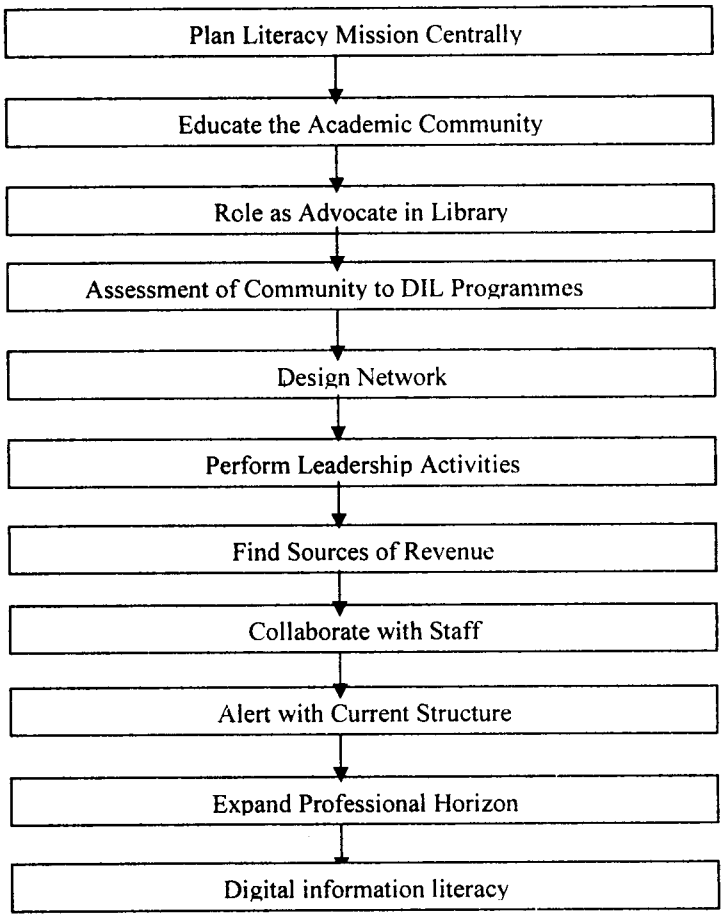
9. They should come forward to develop necessary technological and communicational skills among students and faculties to reap immediate benefits of DIL;
10. They should maintain perfect interaction and cooperation will all concerned and must promote all possible types of means to develop DIL

11. TECHNIQUES OF PROMOTING DIL

There are several techniques for promoting DIL such as orientation programmes, lectures, seminars, conferences etc., but there is a need of systematic policy for librarians to promote DIL. This policy is described here is known as 'Ten Commandments':

1. Make DIL in all forms central to your library's mission;
2. Educate others about the changing information environment and its impact on members of community, school or campus;
3. Advocate support for library's role with the institute, the media, the legislators and all levels of government;
4. Learn more about DIL programmes in your community. Find important gaps in such programme even if your community has running the same;
5. Network with DIL provides and supporters and translate their support to your library / institution.
6. Be active in your local library coalition. If there is none, start one;
7. Find Financial Support Investigate existing sources to determine whether additional funds are available to expand DIL services as well as provide technical resources and training;
8. Collaborate with public officials students, faculty, administration, trustees, and other key groups to develop 21st Century literacy initiatives that addresses a wide range of literacy and learning needs;
9. Keep track on current issues related to the use of information and IT for learning;
10. Expand professional horizons join professional associations volunteer to work with committees and forums who support and fund such activities.

These techniques are given diagrammatically as follows:



12. ADVANTAGES OF DIGITAL INFORMATION LITERACY

DIL provides better access to a wide range of Information;

1. Consortia Services provide better value for money (by entering purchasing agreements for e-resources and e-services).
2. Staff time can be conveniently managed;
3. Less time spent on housekeeping operations;
4. Provides 24X7 access to resources and services without depending upon intermediary/staff;
5. Total stock access without any risk of losing physical documents, i.e. issue of journals;
6. Equal access to stock. e.g. everyone able to see the current issue of a journal;
7. Potentially reduces multiple purchases.

13. DISADVANTAGES

1. Costs: Investment in newer technologies always cost higher
2. If paper subscriptions have to be run in parallel than the savings can not be substantial;
3. Lack of proper negotiating skills may mop up higher cost;
4. Additional skills or training is required for the personnel which may cost higher and mop up more time;
5. If the users don't have the pertinent skills they can't reap the benefits available from electronic resources;
6. Use of technology always requires reliable and robust systems in operation.

14. CONCLUSION

The present situation in Digital Information Literacy can be compared with these famous lines of Robert Frost,

"These forests are sweet, lovely and deep
But I have miles to go before I sleep".

But literacy is the only institution, which can offer real help to promote such life long learning endeavors, and is doing so with great zeal.

In fact, education doesn't stop with attaining an educational degree, but it is a life long process. Therefore, the librarians have to play greater roles to proliferate life long learning in this war-torn environment.

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Reaching the Unreached Through Information Literacy Programmes: An Overview

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ABSTRACT

The article gives a brief overview of the Information Literacy Programmes for the handicapped / disabled. It defines the exceptional children, and their categories. It stresses on the role of rehabilitation in providing a normal quality life to the disabled. It gives a survey of the literacy activities of the disabled, by providing vital statistics of the current scenario. The article emphasizes the role of libraries vis-à-vis Information Centres in enhancing the life of the unreached disabled. It further highlights the Information Literacy activities, and gives an insight to the various Information Technology assisted Information Literacy programmes for the disabled, the IT companies involved in providing necessary software to meet the special needs of the disabled etc.

It gives a bird's eye view to the key handicap Institutions at various levels with a summary of the activities conducted by the institutions at local level. It put forth certain observations, suggestions and recommendations to strengthen the Information Literacy activities for the disabled.

Keywords: Disabled, Handicapped, Institutions Handicap, Information Literacy Programmes, Technology assisted Information Literacy programmes,

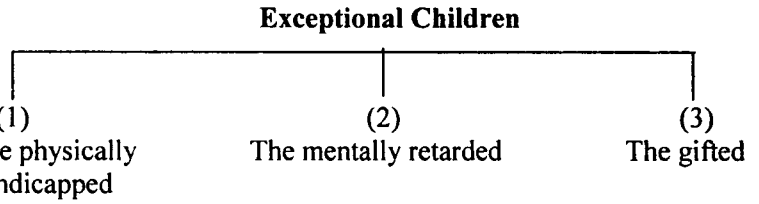
1. INTRODUCTION

Major advances in information and communication technologies combined with the rapid growth of global networks have transformed business and markets, revolutionaries learning and knowledge sharing, generated global information flows, empowered citizens and communities. The twenty first century will be the 'century of knowledge'. A society with knowledge power will dominate, and sustain in a dynamic world. The societal transformation will be based on action plans on rural development, with national and international experiences, focused on education health-care, agriculture and governance. Such transformation is also expected to lead to higher empowerment of the backward and depressed classes, the disabled, the women, creating a transparent society based on equity and justice.

The information centres today, are busy finding a 'Cyberspace' for the masses. In this context, the Health Science Information Centres have additional responsibilities since their main task is to deliver effective health care services, and improve Health Standards of people (Kuffalikar, C. R. IASLIC, 2000)

2. UNDERSTANDING DISABILITY AND EXCEPTIONAL CHILDREN

According to Barbe, "exceptional" refers to those children who differ from the average to an extent, that their differences warrant some type of special school adjustment, either within the regular classroom, or in special classes. According to 'Crow and Crow,' the following classification my be made defining the "exceptional children"



The physically handicapped, can be sub grouped under the category of the crippled, the blind, the near blind, the deaf, and those having defective speech and delicate health.

2.1 Mentally Retarded Children

According to 'American Association of Mental Deficiency' (AAMD) "Mental retardation refers to significantly sub-average general intellectual functioning existing concurrently with defects in adaptive behaviour, and manifested during developmental period."

2.2 Disadvantaged Children

This group is referred to by researchers and voluntary organizations as deprived children, vulnerable children, children in difficult situations, children at risk, and such other categories. These can be further categorized as Street and working children, Migrant children, Delinquent Children, Children of Prisoners, Children of Prostitutes, Bar dancers etc (Govinda, R. IER, 2002)

3. REHABILITATION OF DISABLED

Rehabilitation basically involves the treatment and training of a patient in an effort that he may attain his maximal potential for normal living. Rehabilitation involves the co-operative efforts of various specialists, medical and social, and their associates to improve the physical, mental, social and vocational aptitudes of persons who are handicapped, with the objective of preserving their ability.

3.1 The population in India as at 0.00 hours on 1st March 2001 stood at 1,027,015,247 persons. The disabled in India constitute a sizeable section at 21,906,769 persons. As per 2001 census their 74.80% population was based in rural areas 25.19% in urban. 7.16% disabled population lives in Maharashtra State. 21,906,769 persons are disabled in India, out of which categorized as (10,634,881 are) in sight, 1.640.868 in speech, 1,261,722 in hearing,6,105,477 in movement, and 2,263,821 mentally retarded persons in India.

Table 1. Distribution of the disabled by sex and residence 2001

Sr. No.	India / State	Sex	Total	Rural	Rural (%)	Urban	Urban (%)
1.	India	Persons	21,906,769	16,388,382	74.80	5,518,387	25.19
		Males	12,605,635	9,410,185	74.65	3,195,450	25.34
		Females	9,301,134	6,978,197	75.02	2,322,937	24.97
2.	Mahar ashtra	Persons	1,569,582	1,020,371	65.00	549,211	34.99
		Males	933,867	600,603	64.31	333,264	21.23
		Females	635,715	419,768	66.03	215,947	33.96

(Source: http://www.censusindia.net/disability. Census of India, 2001)

3.2 Rehabilitation Through Institutions

The term "Institution for persons with disabilities" is indicative of an institution, that receives, cares, protects, educates, trains, rehabilitates or provides any other service, for persons who are disabled."

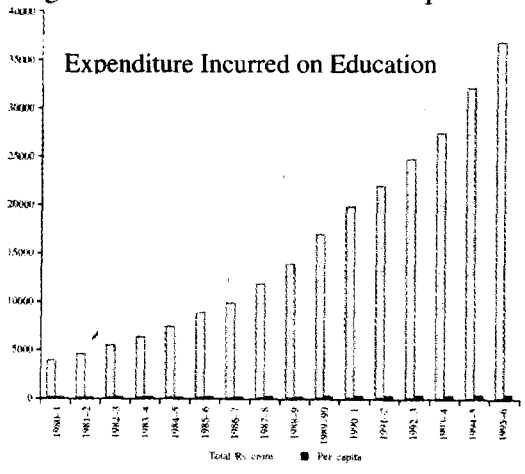
3.3 Utilisation of Books

It is a well-known fact that the utilisation of books and other materials serve as adjunct to therapy. The importance of an institutional

library and the awareness of its conspicuous place in the overall program of institutions have been underscored by the many articles that have appeared in print on the subject.

4. LITERACY FOR DISABLED

The 1989 UN convention on the Rights of the Child "states that disabled children have the right to 'achieve participation in the community and their education should lead to the fullest possible social integration and educational development'. The World Conference on 'Education for All: Meeting Basic Learning Needs' (World Conference on EFA 1990) states that the learning needs of the disabled demand special attention.



The year 1981 was a benchmark year as being the International Year for Disabled Persons (IYDP), but 1990 was the year, when disabled children and persons were assured of rights and services at par with all other children and persons.

As per the information brought out by Central Statistical Organisation per capita expenditure on education has doubled since 1989-90 and similar trend is observed for health and welfare services. But in the absence of data for the significant age groups, and disabled children and persons, one really cannot comment with confidence, that the assurances given are being fulfilled. This issue merits attention in view of the fact that magnitude of children requiring special education facilities is also an issue by itself.

5. LIBRARIES VIS-À-VIS INFORMATION CENTRES

Their role in the literacy of the handicapped individuals with disability has varying degrees of need. Their information needs are just like those who are not disabled, and often strive hard for a high quality of life as other normal individuals. A disabled who is in the prime of his youth, demands an equal opportunity and must therefore be offered a range of assistance such as examination support, specialized equipments, library assistance, note taking in class, reader sign interpreters and parking provisions etc. Only when they have a strong support such as the ones mentioned above they can hope to lead normal lives.

6. INFORMATION LITERACY

Information literacy is an intellectual framework, for recognising the need, for understanding, finding, evaluating, and using information. These are activities which may be supported in part by fluency with information technology, in part by sound investigative methods, but most importantly through critical discernment and reasoning. Information literacy initiates, sustains, and extends lifelong learning through abilities that may use technologies, but are ultimately independent of them. (ANZIIL, 2004).

6.1 Braille Bug : An Assistive Technology for the Disabled

The Braille Bug www.afb.org/braillebug, sponsored by the American Foundation for the Blind, is an interactive web site created to teach sighted children about Braille, and to encourage literacy among all children, disabled, and nondisabled alike. The Braille Bug combines full accessibility with sophisticated functionality, and a playful environment that features colorful animated graphics, including the Braille Bug itself, a ladybug with the six dots of a Braille cell on its back, that helps kids understand the "secret code" of Braille, and invites them to participate in a variety of fun, and educational online games, and activities.

6.1.1 Knitters' Internet group shares information

VIP-SHEEP-TALK is an Internet group for blind and visually impaired individuals who enjoy yarn-related crafts, typically--but not limited to-knitting and crocheting. The group uses the list to share, and learn patterns, exchange information on yarns and supplies, find help with difficult patterns or stitches, and make new friends. Emerging technologies are helping the disabled people gain not only physical independence but also the requisite skills to become an important part of the society and economy.

6.2 Assistive Technology for Mild Disabilities

Lahm and Morrissette (1994) outlined seven areas of instruction where assistive technology could assist students with mild disabilities. These areas include (i) organisation, (ii) note-taking, (iii) writing assistance, (iv) productivity, (v) access to reference materials, (vi) cognitive assistance and (vii) materials modification.

6.3 Advances in Assistive Technology

Global IT giants including Microsoft, Sun, IBM and Apple are committed to advances in assistive technology. They are striving to make better IT products and software for the disabled. The Redmond Giant released the latest version of Active Accessibility–the technology software that developers use to make programmes more accessible to people with special needs and use accessibility aids like screen readers.

IBM is not far behind in its efforts. It recently launched a Homepage reader for spoken web access for the blind and visually impaired. The new talking browser orally communicates all the content and information presented on the computer screen including graphics descriptions, tables and columns.

6.3.1 Assistive technology

Assistive technology is gaining ground in India too. NIIT Ltd., a leading IT training and software company, has developed an interactive software called I-learn. The DOS-based software, developed under the leadership of Prof Isasc, is targeted at the children who cannot use computer key boards. Spastic students can access the computer either by touching a disk shaped pad or interrupting light through a slight hand movement or by making a sound. Similarly, Delhi's Blind Relief Association is running a computer centre for the disabled to make them IT savvy and increase their market value in the 'must be computer literate' corporate jungle. The association uses a simple text to Braille which can be printed on a Braille printer. India charities and help organizations have setup their own sites like www.cry.com or www.silence India.com and www.IndiaworldCo.in home/sahayata to reach out to disabled people.

7. ASSISTIVE TECHNOLOGY ONLINE

This World Wide Web database on Assistive Technology (AT) is presented by the Applied Science and Engineering Laboratories through their programs Rehabilitation Engineering Research Center (RERC), Delaware Assistive Technology Initiative (DATI), and Science, Engineering and Math Project (SEM).

7.1 EASI (Equal Access to Software and Information)

Internet: http://www.isc.rit.edu/~easi/ : An affiliate of the American Association for Higher Education (AAHE), EASI's mission is to make information technology accessible to person with disabilities with the use of adaptive technology. EASI provides informative publications, on-site seminars and a series of e-mail delivered workshops to assist colleges, schools and businesses in making their information technology resources more accessible.

7.2 WebABLE

Internet: http://www.adobe.com/Acrobat/Access.html: WebABLE describes itself as an "information repository for people with disabilities and accessibility solution providers". It's dedicated to promoting the interests of adaptive, assistive, and access technology researchers, users, and manufacturers.

7.3 Globe All Program

Globe All Program, Hadley School for the Blind, 700 Elm Street, Winnetka, IL 60093-2254, USA: The (International Council for Education of People with visual Impairment) ICEVI-Hadley "Globe All" (Growth and Learning Opportunities in Blindness Education) was launched in March, 2003 there has been much interest expressed by educators throughout the world. The program is open to any individual associated with ICEVI. The Hadley Catalog will provide you with descriptions of the four programes that serve specific audiences. There are more than 90 courses to choose from in such diverse areas such as "communication skills", "technology", "early childhood", "parenting", "Braille instruction", "low vision" and many more. Courses can be taken by e-mail, or surface mail. All courses are available to you free of cost. Persons who successfully complete courses through the ICEVI-Hadley "Globe All" program receive a certificate signed by the president of ICEVI and President of the Hadley School for the Blind. For details visit www.hadley-school.org or mail to <infor@hadley-school.org>

7.4 Indian Initiatives

7.4.1 ABILITY Foundation

Ability Foundation is a strong advocate of inclusive education at all levels and acts as a catalyst in promoting inclusive education. Offering disabled people choices in higher education, access to change and mainstream employment has been an important part of their work. This, is a crucial step towards bringing to the fore their latent talents, and changing the stereotypic images generally associated with them.

National Centre for Information and Communication Technology (NCICT) seeks to impart state-of-the-art computer education and life skills that prepare graduates with disability to strike out on their own in today's demanding corporate workplace. NCICT–initially set up as a pilot project in the country in association with UNESCO. Today, NCICT offers holistic and comprehensive job-oriented education to graduates with hearing/visual/orthopedic impairments.

Ability Foundation also has a placement wing and arrange radio programme: ThiramaiyinThisayilT heir facilities include a cyber café where all visually impaired persons in and around Chennai can browse the web loaded with JAWS for Windows (the speech enabled software that converts every cursor or mouse movement into clear speech), which is another step towards independence, empowering visually impaired persons with the power of the Internet. Talking Book Library: Talking book Library is a storehouse of valuable books for any disabled person who prefers to listen to books rather than to read. More than 500 titles

are available in audio-cassette and CD form – textbooks, fiction, non-fiction, literature, etc.

7.4.2 *Ali Yavar Jung National Institute for the Hearing Handicapped* (AYJNIHH) was established on 9th August 1983. It is an autonomous organization under the Ministry of Social Justice and Empowerment, Government of India, New Delhi. The Institute is located at Bandra (West), Mumbai-400050. The Objectives of the Institute are Manpower Development, Research, Educational Programmes, Service Facilities, Material Development, Community Programme, Information and Documentation. Among the other notable institutes providing Information literacy programmes for the disabled are.

⇒ Blind Men's Association

⇒ The Federation for the Welfare of the Mentally Retarded (India) FWMR

⇒ Rehabilitation Center of the Bhagwan Mahaveer Viklang Sahayata Samiti (Jaipur)

⇒ National Federation of The Blind

8. RENOWNED REHABILITATION CENTRES OF VIDARBHA: A GLIMPSE

8.1 Anandwan–The Forest of Joy

Anandwan (The forest of Joy) has grown over the last 50 years to become what is perhaps the largest community of leprosy afflicted and physically challenged people in the world. Anandwan is the home of those who had been rejected by society. They were the lonely, vulnerable, wounded and abandoned; they were the lost, the last, the least. At Anandwan, every one of them is welcomed with open arms, to stay as long as they wish. Anandwan is the realization of the dream of one man-Muralidhar Devidas Baba Amte and the enduring efforts of the institution set up by him as a vehicle for this endeavour, the Maharogi Sewa Samiti. What has given them sustenance, what has nourished them and kept them going against all odds, are certain fundamental values that they have consistently upheld as an uncompromising charter through these years.

The story of the last 50 years of Anandwan has also been a story of exponential growth. Started initially with a total of seven rupees, the annual budget of the Maharogi Sewa Samiti has today grown to a phemomenal Rs 70 million, much of which is generated through the efforts of the members of the Anandwan community themselves. It is creditable to note, that quite a few foundations from abroad, have donated in cash and kind for promoting Information literacy activities for the disabled in Anandwan. Quite a few foreigners are staying in

Anandwan to help the disabled to master the computer skills. This has helped generate employment, and build up self confidence among the disabled. Information Literacy programmes, have without doubt, provided a ray of hope for the disabled to sustain in the fast changing environment influenced by Information Technology.

8.2 NARCAOOD: 'A Mission With a Vision' : NARCAOOD

Brief Perspective: The "Nagpur Association for the Rehabilitation of children and Adults with Orthopaedic and other disabilities (NARCAOOD), Nagpur was founded in the year 1958 (in November as NARCOD). 'Rotary club of Nagpur', "Indian Medical Association" (IMA) actively supported in the establishment of NARCAOOD. Registered under the Registration of Societies Act, Bombay"(Mumbai) vide Reg. No. B-56 (1959) on the 18th of July.

Recent Past: The small cerebral palsy' school of (1959) shifted to Shankar Nagar in its own building in 1970, Late Mrs. Kamala V. Nimbkar, started these facilities for the first time in Bombay (Mumbai) and Nagpur. The horizon of activities of the centre restricted to infants and children were widened to accommodate adults, and hence NARCOD became NARCAOOD (Nagpur Association for the Rehabilitation of children and Adults with Orthopaedic and other disabilities). 1980's onwards.

Present: NARCAOOD has a carpet area with a clinical therapy hall (4000 Sq. ft.) a separate wing for the office, Library and waiting hall; open space (1200 sq. ft.) etc. In 1995, the foundation of the new NARCAOOD building was laid. NARCAOOD moved to its new building in June 1998. The work of the first floor was completed in 2004, and separate units for CP and Administrative block with its Learning Resources Centre / Information Centre, conference Hall, staff area etc. were added.

NARCAOOD is also a very well recognized 'Research Institute' affiliated to Nagpur University and CIIMS, Nagpur which offers M.Ph.T. degree by 'Theses' only of its kind in Central India, since 1990. NARCAOOD has computerized all its in-house activities for the past two years, now.

NARCAOOD: Objectives of the Association vis-à-vis Information Centre are :

⇒ To aid children and adults with orthopaedic and other disabilities to overcome their handicaps and to become useful and self supporting members of the Community.

⇒ To provide facilities for vocational assessment and training to suitable candidates and make them fit for gainful employment within the limits imposed by their disability.

⇒ To assist the disabled to find suitable employment on permanent basis.

⇒ To encourage the disabled themselves to get together and help each other.

⇒ To provide computer and Information Literacy training to the disabled for gainful employment.

Information Centre: The NARCAOOD Library and Information Centre plays a key role in almost all the activities of the Association. It is an inseparable link and hub of all academic activities. It is the only institute of its kind, to have an independent library building and 'Reading Room' facilities for the users. The Information Centre has internet facilities which are used optimally by the staff and research scholars of NARCAOOD. It plays a leading role in providing Information Literacy training.

Information Services: Providing Information Services to its users forms the key function of the centre. Even the facilities/services being user (customer) oriented best customer care is the motto of the association as well as the Information Centre. Xerox facilities (paid) is provided to the needy from the institute as well as other institutions (coming from different parts of India).

Expert vocational guidance is available through the centre which also acts as a job placement centre. Young needy disabled are given concessions in all the professional courses of their choice (especially Medicine oriented and other allied fields). Close network with the other institutes like, Govt. Medical College (IGMC), Lata Mangeshkar Medical College, National Medical Support Staff Training Institute and placement Bureau, Vell's College Chennai and a number of other institutes ease the work of the association. A number of Short term courses are conducted regularly and opportunities are provided to recruit the disabled.

Research material of high quality is made available through the centre, outside and, through 'Internet' for their research scholars at confessional rates,. 'National Information Centre' (NIC) (Nagpur) has rendered a helping hand in these ventures. Bonafide students taking advanced training in physiotherapy and occupational therapy from different parts of India make use of the Information Services rendered, which also include the CAS/SDI etc.

Users: the Information Centre/Library does not have any existence without its users. The users of the Centre form a diverse group which includes the Staff of the Association (Doctors/Executive Body Members coming from different disciplines etc.) Students of B.Ph.T./M.Ph.T. (of the institute/Outside the institute within the city/outstation students) Internees/part time Research Scholars.

The Information Centre is constantly in touch with other R&D libraries (specially Medical) to keep themselves updated, Being a 'charitable Institute' the centre does not charge any library fees, and emphasis is only on qualitative services rather than the quantity, and run purely on no profit no loss basis. The core group being mainly the staff and students, the Information Services, are centred only around these, and mostly counseling services are provided to the patients along with general reading.

All for the cause of visually handicapped: M.D. Shivankar, Deputy Secretary, Regional Office, Nagpur, Maharashtra State Board of Technical Education and Makarand Pandharipande, who runs a computer centre at Blind Relief Association, here, were felicitated at a function organized by Maharashtra Knowledge Corporation Limited (MKCL) recently at Mumbai for their contribution. They both have created history by endeavouring to give a chance to visually impaired students to appear for the MS-CIT examination.

The JAWS software was installed which was having audio output. The students appearing for examination get the result and the certificate immediately. The printout of certificates was drawn from Braille printer which is available at computer centre of Blind Relief Association. This year 5th batch of visually impaired students passed out. Now other handicapped from NARCAOOD and other institutions are also coming forward to appear for the exam.

9. OBSERVATION

The disabled have the same human right as other citizens of a country. The disabled are entitled to a comprehensive education which provides continuity of service from early detection and intervention through schooling, vocational preparation, independent living in the community, and lifelong education, which will support their life and also stabilize their learning.

Despite the introduction of legislation like the Persons with Disabilities Act, disabled people are amongst the most disempowered groups in India. The number of disabled people would be around 55 million. They are constantly faced with discrimination and are subjected

to neglect, prejudice, revulsion, rejection and pity. The insurmountable barriers that exist in society (economic, educational, architectural, legal, health) prevent people with disabilities from leading a fulfilling life and achieving their full potential.

In the Indian context, there is no awareness of the term Information Literacy and its applications in higher education and lifelong learning. There are no specific standards, reports and policy guidelines for Information Literacy brought out either by Government. However, going through similar political, economic and social changes over the last couple of decades, most of these countries, regardless their development level, have certain common points of relevance regarding the information literacy issues, (Pejova, 2002)

10. RECOMMENDATIONS

⇒ Provision for a separate library building, collection development, and equipment facilities, should be considered without delay.

⇒ Braille books are not easily available; hence they should be published simultaneously whenever a printed version comes out.

⇒ Specially skilled Librarian should be made available in the Rehabilitation institutes and their libraries.

⇒ Integration of the disabled into the education system cannot be regarded as an issue separate from the policies for society as a whole.

⇒ Scientific investigations are needed to identify the problems of parents and management strategies to deal their children with disabilities.

Considering the explosive spread of Internet, we need to ensure not only the development of electronic communication devices but also the web accessibility. W3C (World Wide Web Consortium)'s WAI (Web Accessibility Initiative) developed a guideline in 1999. The United States has the Rehabilitation Act and preparing a new regulation regarding the federal government's web information. Fundamental Law for the disabled people (1970 law No.84) stipulates "Our state and local public institutions must take necessary measures to provide the environment and facility for the disabled people where they can use information, electronic communication, and broadcasting smoothly." (The first clause of Article 22)

11. CONCLUSION

Presently various organizations are involved in the activities related to the welfare of elderly and disabled people. It is important to exchange information about new technology and management plans, especially the

training for the support activities among organizations. It is necessary to develop a nationwide association to improve the support level.

The parents, the handicapped should have more knowledge of the society in general, this could be provided by lectures, educational campaigns associations, with the media (written, oral and in television) so that it promotes greater conscience awareness of the rights of people who are disabled and those whose needs special.

"As we are going to celebrate 21st century as technology century, we must pay attention to physically handicapped. We should concentrate on how their intelligence can be used. Only then, we can achieve the motive of technology century."

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Semantic Approach towards e-learning

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ABSTRACT

The major academic and research institutions and business communities have started to think seriously about use and applications of semantic web technology in which information in machine-processable form can coexist and complement the current web with better enabling computers and people to work in co-operation. The Semantic Web technology has the potentiality to be applied in different domains. e-learning is one of the domains which may benefit from this new web technology. This paper focuses on potential uses of Semantic web technology in e-learning and advantages of using ontology to describe learning materials. Also a conceptual architecture of Semantic Web based e-learning portal is presented.

1. INTRODUCTION

The current technology enhanced learning landscape is characterized by a high and growing number of heterogeneous educational service providers. For a user with a particular educational need, a typical scenario involves the user visiting one or several online educational centers, browsing their offers, collecting information about the courses (study programs, requirements, needed tools, prices, etc.), selecting the most appropriate course for his/her needs and preferences and, finally, registering it. This manual browsing is too time consuming and, typically, a user will visit just a very few online centers before making a decision.

Therefore, learning processes need to be fast and just-in-time. Speed requires not only a suitable content of the learning material (highly specified, not too general), but also a powerful mechanism for organizing such material. Also, learning must be a customized on-line service, initiated by user profiles and business demands. In addition, it must be integrated into day-to-day work patterns and needs to represent a clear competitive edge for the business. Learning needs to be relevant to the (semantic) context of the business (1).

The new generation of the web, the so-called Semantic Web, appears as a promising technology for implementing e-learning. The Semantic Web constitutes an environment in which human and machine agents will communicate on a semantic basis(2). One of its primary characteristics, viz., shared understanding based on the ontology backbone. Ontology enables the organization of learning materials around small pieces of semantically annotated (enriched) learning objects(3).

This paper highlights the effective use of semantic web technology for realizing sophisticated learning scenarios. Here I have explored the characteristics of e-learning and the potential uses of Semantic Web technology in e-learning and given an overview of the layered structured of Semantic Web technology. It also discusses the advantages of using ontology to describe the learning materials. And finally a conceptual architecture of semantic web-based e-learning portal has been presented.

2. CHARACTERISTICS OF e-LEARNING

Our traditional learning process could be characterized as centralized authority (content is selected by educator), strong push delivery (teacher push knowledge to students), lack of personalization (content must fulfill the needs of many) and the static/ linear learning process (unchanged content). But learning process should be-fast, just-in-time (cheap) and relevant (problem-dependent), which is possible with the distributed, student-oriented, personalised, non-linear/dynamic learning process– what is possible in e-learning. The longer-term aim of educational change is to (a) increase the effectiveness of education, (b) to increase the flexibility and accessibility of education, (c) increase the attractiveness of education and (d) to decrease the workload for staff or more in general to decrease the institutional costs).

Important characteristics of e-learning are(4):

- Pull–student determines agenda
- Interactive–responds to problem at hand
- Non-linear–allow direct access to knowledge in whatever sequence make sense to the situation at hand
- Systematic–learning occurs as in integrated activity
- Continuous–learning runs in the parallel loops and never stops
- Distributed–content comes from the interaction of the participants and the educators
- Personalised–content is determined by the individual user's needs and aims to satisfy the needs of every user
- Dynamic–content changes constantly through user input, experiences, new practices, business rules and heuristics

The origin of e-learning is computer-based-training (CBT), which was an attempt to automate education, replace a paid instructor and develop self-paced learning. The objective of e-learning is not only recorded education (as in CBT), but also education without barriers of time and distance, and customized to users' and business needs.

3. SEMANTIC PORTALS

The heterogeneity, distributed nature of web led to the need for web portals, web sites providing access to collections of interesting URLs and "dumb" (keyword-based) search for information. Similarly, a semantic portal can be seen as an entry point to knowledge resources that may be distributed across several locations. However, differently from "dumb" web portals, semantic portals are "smarter" and carry out intelligent reasoning behind the scenes. They offer semantic services including semantics-based browsing, semantic search and smart question answering. Semantic browsing locates metadata and assembles point-and-click interfaces from a combination of relevant information (5). Semantic search enhances current search engines with semantics; it goes beyond superficial keyword matching by adding semantic information, thus allowing easy removal of non-relevant information from the result set. Smart question answering is the technique of providing precise answers to a specific question. For instance, given a question such as "Which country had the highest inflation rate in 2006?" The system would directly reply to the question with the name of the country, as opposed to the approach of current search engines (such as Google). All these services would be built on top of functionality such as machine access to semantic information.

We can think of a scenario where educational services can be mediated on student behalf. The advantage of having a semantic portal is that students need not look for courses distributed across many locations (unlike current solutions). Moreover, semantic services perform inferences in the background (taking into account student preferences) as opposed to having users manually searching the traditional way.

From a pedagogical perspective, semantic portals are an "enabling technology" allowing students to determine the learning agenda and be in control of their own learning. In particular, they allow students to perform semantic querying for learning materials (linked to shared ontologies) and construct their own courses, based on their own preferences, needs and prior knowledge. By allowing direct access to knowledge in whatever sequence students require them, just-in-time learning (4) occurs. At the other end of the spectrum, tutors are freed from the (now student-run) task of organising the delivery of learning materials but must produce materials that stand on their own. This

knowledge in whatever sequence students require them, just-in-time learning (4) occurs. At the other end of the spectrum, tutors are freed from the (now student-run) task of organising the delivery of learning materials but must produce materials that stand on their own. This includes properly describing content and contexts in which each learning material can be successfully deployed. One possibility is metadata, i.e. tags about data that allow describing, indexing and searching for data (6). Semantic portals technology is built in a layered manner, i.e. it is processed in steps, each step built on top of another. The pragmatic justification of it is that it is easier to achieve consensus on small steps, whereas it is much harder to get everyone on board if too much is attempted.

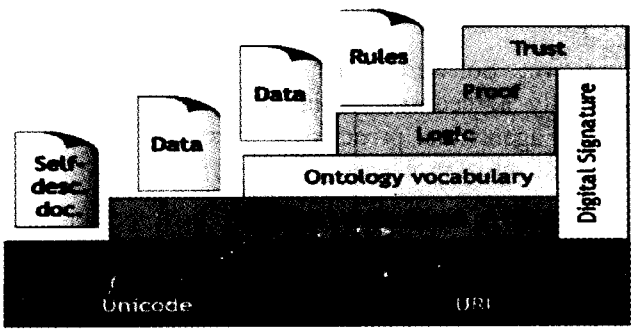


Fig.1 Layered Approach to Semantic Web (7)

XML (8) allows users to add arbitrary structure to their document by creating tags to annotate a web page or text section. Although the meaning of XML tags is intuitively clear, tag names by themselves do not provide semantics. XML is not appropriate for propagating semantics through the semantic web, but is used as a "transport mechanism". It is particularly suitable for sending documents across the web. RDF (Resource Description Framework) (9) and RDFS (10) provide a basic framework for expressing metadata on the web, while current developments in web-based knowledge representation, such as DAML+OIL (11) and OWL (12), build on RDF to provide more sophisticated knowledge representation support. Logic layer which enables intelligent reasoning with meaningful data.

4. SEMANTIC WEB AND e-LEARNING

E-learning is an area which can benefit from Semantic Web technologies. The Semantic Web technology has enabled by a set of suitable agents, which seems to be powerful enough to satisfy the e-learning requirements–fast, just-in-time and relevant learning. The expectation about the Semantic Web is that it will be help of in two

tasks and course management and administration tasks (setting-up new instances of courses).

- Persons in different roles (learners, tutors, content providers) can be helped to perform tasks more effectively and efficiently in large, distributed, problem-based, multi-actor, multi-resource learning spaces that are set-up to establish, learner-centred, non-linear, self-directed lifelong learning opportunities.

The possible uses of Semantic Web technology for e-learning are (4):

- Pull: Knowledge items (learning materials) are distributed on the web, but they are linked to commonly agreed ontologie(s). This enables construction of a user-specific course, by semantic querying for topics of interest.
- Interactive: Software agents on the Semantic Web may use commonly agreed service language, which enables co-ordination between agents and proactive delivery of learning materials in the context of actual problems.

  The vision is that each user has own personalised agent that communicates with other agents.
- Non-linear: User can describe situation at hand (goal of learning, previous knowledge,) and perform semantic querying for the suitable learning material. The user profile is also accounted for. Access to knowledge can be expanded by semantically defined navigation.
- Symmetric: The Semantic Web (semantic intranet) offers the potential to become an integration platform for all business processes in an organisation, including learning activities.
- Continuous: Active delivery of information (based on personalised agents) creates a dynamic learning environment.
- Distributed: The Semantic Web will be as decentralised as possible. This enables an effective co-operative content management.
- Personalized: A user (using personalised agent) searches for learning material customised for her/his needs. The ontology is the link between user needs and characteristics of the learning material.
- Dynamic: The Semantic Web enables the use of knowledge provided in various forms, by semantical annotation of content.

Distributed nature of the semantic web enables continuous improvement of learning materials.

5. ONTOLOGIES FOR e-LEARNING

In an e-learning environment the situation can easily arise that different authors use different terminologies, in which case the combination of learning materials becomes difficult. The retrieval problem is additionally compounded by the fact that typically instructors and learners have very different backgrounds and levels of knowledge. Therefore, some mechanism for establishing a shared-understanding is needed. Ontologies are a powerful mechanism for achieving this task.

The role of ontology is to formally describe shared meaning of used vocabulary (set of symbols). Ontology contains the set of possible mapping between symbols and their meanings. But shared-understanding problem in e-learning occurs on several ontological levels, which describe several aspects of document usage. When a student searches for learning materials, the most important things are (7),

a) What the learning material is about (content);

b) In which form this topic is presented (context); and

c) While learning material does not appear in isolation, another dimension (i.e. structure) is needed to encompass a set of learning materials in a learning course.

Therefore, there are three ontology levels: content, context (pedagogy), and structure.

A content ontology describes the basic concepts of the domain in which learning takes place (e.g., history or computer science). It includes also the relations between these concepts, and some basic properties. For example, the study of Classical Athens is part of the history of Ancient Greece, which in turn is part of Ancient History. The ontology should include the relation "is part of" and the fact that it is a transitive property of an element. In this way, an automated learning support agent can infer that knowledge on Classical Athens can be found under Ancient History. The content ontology can also use relations to capture synonyms ('creator' and 'writer'), abbreviations 'world wide web' and 'www'), and so on.

Contextual (pedagogical) issues can be addressed in pedagogy ontology. Learning material can be presented in the various learning contexts, like, as lecture, tutorial, example, figure, walk-through, exercise, solution, and so on. It helps in context-relevant searching for learning material as per user needs. For example, if you are searching for

detailed explanation of a topic, obviously you would like have material which has given more examples.

Finally, structure ontology is used to define the logical structure of the learning materials. e-learning is often self-paced environment, so training needs to be broken down into small bits of information, which can be tailored to meet individual needs and skill gaps. But these chunks of knowledge should be well connected to create the whole course. So, greater attention should be given to design the structure of e-learning materials. Typical knowledge of this kind includes hierarchical and navigational relations like previous, next, hasPart, isPartOf, requires, and is BasedOn. Relationships between these relations can also be defined; for example, hasPart and isPartOf are inverse relations. It is natural to develop e-learning systems on the web; thus a web ontology language should be used.

6. GUIDELINES FOR BUILDING-UP ONTOLOGY

As users are the main part of our ontology based e-learning system, the first stage of the development process involves the capture and documentation of the most basic functional requirements from readers' viewpoint. The steps involved are (13):

- Acquire domain knowledge
- Organize the ontology
- Flesh out the ontology
- Check your work
- Commit the ontology

In this way, the development of the ontology is an iterative process, centered on the architecture and driven by use cases; where each stage refines the previous one. As the use cases mature and are refined and specified in more detail, more of the ontology terms are discovered. This, in turn, can lead to new use cases. Therefore, both the ontology and the use cases mature together.

7. SEMANTIC BASED CONCEPTUAL E-LEARNING PORTAL ARCHITECTURE

Figure 2 shows a conceptual Semantic e-learning brokerage portal architecture which provides high-level services to people looking for appropriate online courses.

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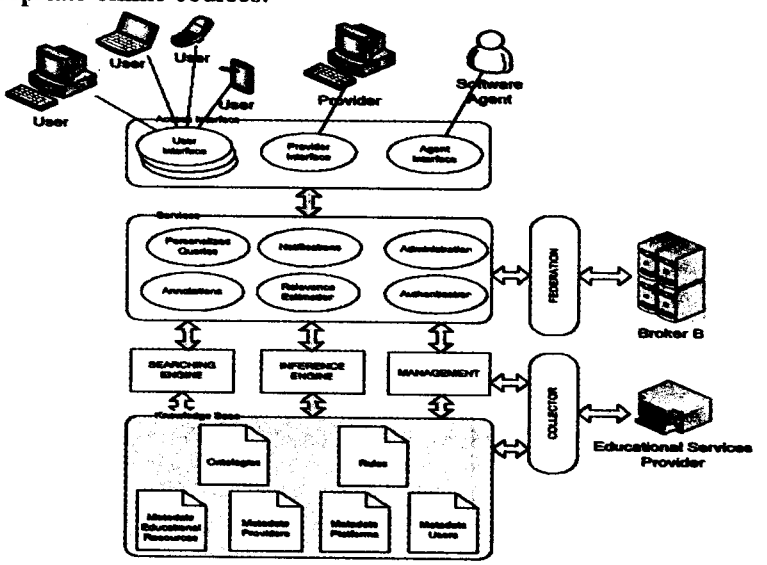


Fig. 2 Conceptual e-learning Portal Architecture (13)

Knowledge Base: This is the basic and core element of the architecture. It is a repository where ontologies, metadata, inference rules, educational resources and course descriptions, user profiles are stored. The metadata may be placed within the document itself or in some external metadata repository (e.g. an RDF repository) (14). Here the metadata are stored externally in the knowledge base. The advantages of external storage are: (i) it is easier to scan a separate meta-description stored in a database and it takes less space to store it, and (ii) the point of view may vary according to different authors who reuse the same learning material. It means that it is possible to have different descriptions of the learning material according to the different contexts (13).

Search Engine: It provides an API with methods for querying the knowledge base. RDQL (RDF Data Query Language) can be used as an ontology query language.

Inference Engine: It answers queries and is responsible for inferring new facts by an intelligent combination of facts already have in the knowledge base.

Access Interface: It provides an integrated interface through which readers as well as authors/ administrators of academic institutions can access, upload or modify the data with particular authority. The software agent interface consists of a set of Web Services that conforms to a standardized access model.

8. CONCLUSION

The Semantic Web is the emerging technology aiming at web-based information and services that would be understandable and reusable by both humans and machines. One of its primary component is ontology, generally defined as a representation of a shared conceptualization of a particular domain. It is anticipated that semantic web technologies will influence the next generation of e-learning systems and applications.

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Towards Information Literacy

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"The illiterate of the year 2000 will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."

--Alvin Toffler

1. INTRODUCTION

In the current Information Age, the speed at which we work makes us increasingly dependent on high-quality, accurate information. However, information is becoming more voluminous, fragmented into different formats and media, and duplicated in multiple physical locations. In order to access and use these myriad sources effectively, people must be information literate. For many years educators have heard about a variety of literacy–print, visual, computational, cultural, computer, scientific–and their importance in every child's education. Each of the literacies prescribes a process by which the learner can more easily negotiate the content unique to a particular area of study. Each of the literacies operates in isolation of the others, and each has its own vocabulary and conventions for study. Information literacy, on the other hand, is a potential tool of empowerment for all learners, reached through a "resource-based" learning approach.

Briefly defined, information literacy is an individual's ability to:

- recognize a need for information;
- identify and locate appropriate information sources;
- know how to gain access to the information contained in those sources;
- evaluate the quality of information obtained;
- organize the information; and
- use the information effectively. (Doyle, 1992)

As our society has shifted from an industrial age, based on the production of goods and the exploitation of resources, to an "information

age," more frequently termed a "knowledge-based economy" or "knowledge society," our economy is also more based on service and the exchange or use of information. Implications for educators are clear; students can no longer be expected to learn a finite body of knowledge.

With the so-called "information explosion," there is more data available than ever before. Knowing how to ask the right questions has become the essence of the learning process. The principal task for educators is to teach young minds how to deal with ideas (not just data or worse, opinions) ... and how to evaluate and analyze, then apply, and synthesize these new ideas into knowledge. Supporting the construction of knowledge then, is critical for the public education system in Prince Edward Island, and reflected in the development of this document, Building Information Literacy.

In today's rapidly changing society, students must have the opportunity to develop the ability to retrieve, assess, and apply information. As we equip students with these skills we will help ensure that learning does not end with the completion of formal education, but continues throughout life. These goals can best be achieved through resource-based teaching/learning, that is, a library program fully integrated with the school's instructional program with teacher-librarians and teachers using a cooperative program planning approach

Equity of access to information instruction and technologies in schools will help to overcome economic barriers to achievement. It will also help educators reduce barriers that prevent some students from both imagining and realizing their potentials. Information technologies can:

- Provide new learning opportunities to geographically isolated communities and individuals
- Enhance instruction in French and other languages. Information technologies will make it possible, through the sharing of resources, for Francophone students, native students and those students for whom English is a second language to have greater access to information, learning materials, instruction and support.
- Expand racial and ethno-cultural perspectives. By bringing new worlds of information to schools, information technologies and information skills training will give students of all races and ethnic backgrounds improved access to information and knowledge about their cultures and the opportunity to develop greater confidence in their cultural and racial identities.
- Enable students to work and express ideas in an environment relatively free of gender stereotyping and other biases. In comparison

with other forms of communication, electronic networks have the greater potential for allowing students to interact without regard for gender. They also allow students with any impediments to social interaction with others in ways that build confidence.

- Provide new opportunities for students with special needs and abilities. Information technologies are easily modified to meet the needs of students with visual, motor and learning needs

Information technologies have the potential to provide physical access to a broad range of information, but it is the equity of access to (information skills instruction) that will produce information literate students prepared to live and work in the 21st century

2. INFORMATION LITERACY: DEFINED

According to tne American Library Association, information literacy is the ability to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information"). Information literacy is important due to the amount of information that is available in contemporary society. Simply being exposed to a great deal of information will not lead to informed citizens; they need to learn how to use this information effectively

CILIP have defined information literacy as "Information literacy knows when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner." They have also created more in depth guidance on the skills required to be information literate.

The Joint Information Services Committee (JISC defined as: "the ability to identify, assess, retrieve, evaluate, adapt, organise and communicate information within an iterative context of review and reflection.

Information Literacy is the ability to access, evaluate, and use information from a variety of sources. As students prepare for the 21st century, traditional instruction in reading, writing, and mathematics needs to be coupled with practice in communication, critical thinking, and problem solving skills

An information literate person is one who:

- recognizes that accurate and complete information is the basis for intelligent decision making
- recognizes the need for information
- formulates questions based on information needs

- identifies potential sources of information
- develops successful search strategies
- accesses sources of information including computer-based and other technologies
- evaluates information
- organizes information for practical application
- integrates new information into an existing body of knowledge
- uses information in critical thinking and problem solving

3. COMPTETENCIES OF INFORMATION LITERACY

"The ability to find, evaluate, use, and communicate information in all of its various formats"

–Work Group on Information Competence

A list of information literacy competencies, based on a breakdown by Godwin (2001) and representing both the "lower order" and the "higher order" information skills, was offered to the respondents with the request that they tick all that are taught in their institutions. The competencies were:

- to recognize a need for information;
- to define a topic as a preliminary step in the search for information;
- to select the main concepts in a topic;
- to identify keywords to search for information on a topic;
- to understand that a range of information sources is needed to research a topic;
- to know that general reference sources may be used to gain a broad understanding of a topic;
- to know that different kinds of information will be found in different kinds of sources;
- to be able to choose the most appropriate resources; both print and electronic;
- to be able to distinguish among catalogs, indexes, online databases, and web resources;
- to be able to locate and access information from different resources;
- to know how to formulate search strategies;
- to be able to construct search statements;
- to use Boolean logic;
- to know how search engines work;
- to be able to compare and evaluate information from different resources;

- to know about issues such as currency, bias, and authority;
- to be able to organize, use, and communicate information;
- to quote and cite others' work correctly;
- to know about issues such as copyright and plagiarism;
- to produce and present an organized piece of work;
- to synthesize and build new knowledge based upon existing information.

4. TYPES OF LITERACY

- **Media literacy**
  "The ability to decode, analyzes, evaluate, and produce communication in a variety of forms"

  - Trent Think Tank on Media Literacy (Ontario, Canada). 1989.

- **Computer literacy**
  "The ability to use a computer and its software to accomplish practical tasks"

  - *Webster's II New College Dictionary*

- **Visual literacy**
  "The ability, through knowledge of the basic visual elements, to understand the meaning and components of the image"

- **Tool literacy**, or the ability to understand and use the practical and conceptual tools of current information technology relevant to education and the areas of work and professional life that the individual expects to inhabit.

- **Resource literacy** or the ability to understand the form, format, location and access methods of information resources, especially daily expanding networked information resources.

- **Social-structural literacy**, or knowing that and how information is socially situated and produced.

- **Research literacy** or the ability to understand and use the IT-based tools relevant to the work of today's researcher and scholar.

- **Publishing literacy**, or the ability to format and publish research and ideas electronically, in textual and multimedia forms (including via World Wide Web, electronic mail and distribution lists, and CD-ROMs).

- **Emerging technology literacy**, or the ability to ongoingly adapt to, understand, evaluate and make use of the continually emerging innovations in information technology so as not to be a prisoner of

prior tools and resources, and to make intelligent decisions about the adoption of new ones.

- **Critical literacy** or the ability to evaluate critically the intellectual, human and social strengths and weaknesses, potentials and limits, benefits and costs of information technologies.

5. EVOLUTION OF INFORAMTION LITERACY

The seminal event in the development of the concept of information literacy was the establishment of the ALA Presidential Committee on Information Literacy whose final report outlined the importance of the concept. The ALA Presidential Committee precipitated the formation of the National Forum on Information Literacy, a coalition of more than 65 national organizations that seeks to disseminate the concept. The development of information literacy in K-12 education began with the publication of A Nation at Risk in 1983. This was soon followed by Educating Students to Think: The Role of the School Library Media Program (1986), a concept paper outlining the role of the library and the role of information resources in K-12 education. Kulthau's Information Skills for an Information Society: A Review of Research (1987) included library skills and computer skills in the definition of information literacy. The American Association of School Librarians' (AASL) 1988 publication, Information Power: Guidelines for School Library Media Programs, and its 1998 publication Information Power: Building Partnerships for Learning emphasize the notion that the mission of the school library media program is "to ensure that students and staff are effective users of ideas and information."

6. BENEFITS OF INFORMATION LITERACY

For Students:

Information literacy–and the resource-based learning programs that foster it–counteracts the information dependency created by traditional schooling, where students must rely on the teacher to dispense information. Information literate students are more effective consumers of information resources. They learn to recognize that information is packaged in a variety of ways, that it is packaged using a variety of techniques, that it serves a variety of interests, and that it contains a variety of value messages. Information literate students are more critical when they make decisions about the resources they use.

For Citizens:

Lengthening life spans and increasing leisure time have altered the formula for what constitutes a productive, healthy, and satisfying life. To respond effectively to an ever-changing environment, people need more than just a knowledge base. They need techniques for exploring, making connections, and making practical use of information.

Information-literate citizens know how to use information to their best advantage at work and in everyday life. They identify the most useful information when making decisions such as where to locate a business, how to vote, or whether to have a child. They are able to evaluate newscasts, advertisements, and political campaign speeches, recognizing when statistics are being used to support only one aspect of a complex issue.

For Workers:

The workplace of the present and future demands a new kind of worker. Reading and arithmetic ability simply are not enough. In a global marketplace, data is dispatched in picoseconds and gigabits. The deluge of information must be sorted, evaluated, and applied, and workers must be able to gather, synthesize, interpret, and evaluate. Lack of these skills currently costs business billions of dollars annually in low productivity, accidents, absenteeism, and poor product quality. Workers must be information literate.

7. TECHNOLOGY AND INFORMATION LITERACY

Information Technology is the great enabler. It provides, for those who have access to it, an extension of their powers of perception, comprehension, analysis, thought, concentration, and articulation through a range of activities that include: writing, visual images, mathematics, music, physical movement, sensing the environment, simulation, and communication.

Technology, in all of its various forms, offers users the tools to access, manipulate, transform, evaluate, use, and present information.

Technology in schools includes computers, televisions, video cameras, video editing equipment, and TV studios.

Two approaches to technology in K-12 schools are technology as the object of instruction approach, and technology as the tool of instruction approach.

Schools are starting to incorporate technology skills instruction in the context of information literacy skills.

Technology is changing ,the way higher education institutions are offering instruction. The use of the Internet is being taught the contexts of subject area curricula and the overall information literacy process.

There is some empirical indication that students who use technology as a tool may become better at managing information, communicating, and presenting ideas.

8. INFORMATON LITERACY: MODELS

- **The 8Ws:** This model was developed by Annette Lamb in the early 1990s to bring together perspectives from library media, technology, and traditional content areas.
- **Pathways to Knowledge:** This Follett sponsored information skills model was developed by Marjorie Pappas and Ann Tepe. Go to their thematic units page for examples on the topics of fossils, endangered species, microbes, and Shakespeare.
- **The Big 6:** This Information Problem-Solving Approach by Michael B. Eisenberg and Robert E. Berkowitz is probably the most popular model for information skills. It includes the steps of task definition, information seeking strategies, location and access, use of information, synthesis, and evaluation. You can also see examples of each element. Explore and evaluate a series of lesson examples and lots of links to K-12 school projects.
- **Research Cycle 2000:** This information model by Jamie McKenzie also provides links to the other models.
- **Stripling and Pitts Research Process Model:** This was one of the earlier models developed.
- **InfoZone:** This was one of the first web-based information process website. It includes the phases of wondering, seeking, choosing, connecting, producing, judging.
- **The Building Blocks of Research:** Engaging, defining, initiating, locating, examining, selecting, comprehending, assessing, recording, sorting, organizing, interpreting, synthesizing, communicating, and evaluating are parts of this model. For each of these areas, they describe the student skills, outcome, and teaching strategies. They also give a sample project for each area.

9. INDIAN SCENERIO

Despite the fact that India has highly competent human resources and a firm base in information and communication technologies (ICT), India has less literacy today when compared to other nations. In India a number of training programmes are conducted by the different agencies, who are also architects of modern information systems, to the end-users. For example, INFLIBNET conducts workshops on information resources in Infonet e-journal consortium.

10. CONCLUSION

Many questions have been raised to develop Information Literacy as a University-wide module concern embedding the Information Literacy curriculum in specific disciplines and subjects. After considering the facts, it is recommended that colleges and individual academic departments work together with the Libraries and the Information Literacy Initiative (ILI) on an approach that works best for their curriculum.

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Bringing Internet into School Libraries: Implications

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ABSTRACT

The paper provides a brief overview of the Internet as a tool to add value to the programmes of the school. Identifies and describes few important web resources, and services of importance and discusses the implications and the impact on school library and highlights the role of librarians in providing Internet based services.

1. INTRODUCTION

The Internet gave birth to the concept of the library without walls. The Internet has great potential for libraries. It is often difficult to use, and at this juncture serves higher education and other sectors. The Internet is now being promoted, as the answer to education's information needs. School libraries play a major role in helping the students to activate and sharpen their knowledge about the Internet and on-line resources. School libraries in India, have not developed to the extent required. Educational development in India during the past few years has been marked by the advent of information technology. All schools are now taking interest to impart computer culture among the students. If school librarians are to survive and develop equality with their colleagues in school, then they must be proactive in information and communications technology.

2. INTERNET BENEFITS FOR LIBRARIES

Hundreds of research, academic, public and corporate libraries all over the world has made their catalogues available online. The Internet offers a communication link to a multitude of library systems that have online public access catalogues (OPACs). Generally available free of cost, these are useful for finding books not available locally, to identify and select books for local acquisition, bibliographic data verification and to search holdings of periodicals and monographs. Many OPACs also have full text databases. The libraries can use these databases to respond to queries from their patrons.

For academic libraries, the Internet is the most indispensable means of amplifying their resources. The library world has tried several measures for optimum resource sharing, but all of these have proved ineffective in document delivery. The Internet can bring about real democratization of intellectual resources by providing access to the world information.

With Internet connectivity, the boundaries of the library are expanded worldwide. The valuable information present in the library can be fed to home page and made available to users anywhere. The library can be a depository of local information/resources to the worldwide community and at the same time provide its local users access to internet resources.

3. RESOURCES AVAILABLE ON THE INTERNET OF LIBRARIAN'S INTERNET

Following resources are the selective resources available for providing various type of information: E-journals, magazines. old books, databases, dictionaries, encyclopedias, directories, audio, video, OPACs, bibliographical tools, newspapers, films, institutions, association, organizations etc.

4. INDIAN WEBSITES

The fastest growing information source happens to be websites, which are developing by leaps and bounds. There are one million Internet users in India. There are believed to be 2300 India-centric websites in existence. One of the websites boasts of accessing more than one lakh sites relating to India-specific information. All the important newspapers and periodicals published in India have established their own websites. Television and radio media are also not to be left behind. There are also several India-Oriented websites receiving more hits on daily basis than the totality of the readers visiting all the libraries of India put together. Rediff-on-the-Net is India's first portal. It should develop fast with the Intel taking stake in it. *Indiaword.*com has ten special interest sites including on news, history, finance and sports. It has more than four lakhs page views a day. Recently it was taken over by Satyam Online and it is thus headed for great times. Satyam Online and librarians should be talking to each other.

While these are India-based and India-specific websites the world has opened up for net users in India. For instance, Encyclopedia Britannica (32 volumes) is now online for Indian readership free of cost. The Britannica proposes to launch a six-volume students' edition and an entire edition focused on South Asia. 10000 new Internet connections are added every month on worldwide basis. Thus the net is a jungle with

mushrooming growth in infinite abundance waiting to be exploited systematically.

All these developments should have been a matter of concern to the profession. Earlier the retrieval of the content was the sole prerogative of librarians who were trained to organize and retrieve information by the rules of the game. Knowledge organization (the special province of librarians) has taken a backseat. The librarians are thus required to change their mindsets in the fast-changing environment. Are they ready to take over from hereafter?

Sass [1] observes Web sources are a valuable supplement to print materials for the school library. For example the Virtual Reference Desk; Britannia Internet Guide; Where the Wild Things Are: Librarian's Guide to the Best Information on the Net; the Quaboag Library; My Virtual Reference Desk; and Ready Reference using the Internet. The Internet Library for Librarians (extensive directory of web sites for all types of libraries), The Librarian's Index to the Internet (A searchable directory of internet sites from Digital Library SunSite), Librarian's Toolkit (Lists of books, articles, and web sites compiled by the State Library of Ohio. This site is directed at public librarians but school librarians may also find information of interest), The Library Spot (Feature articles on libraries and links to library and reference web sites), Online Resources for School Librarians (Directory of web site for school librarians), Teacher-Librarian Links (A good collection of school library web sites by Ravinder Toor, a Canadian Teacher-Librarian), UNESCO Libraries Portal (An international directory of library web sites)and The Young Adult Librarian's Help/Homepage (Many links to sites of interest to librarians working with teenagers) are some other important resources available on the net.

5. IMPLICATIONS

Technical Services: The Internet greatly enhances both circulation and inter-library loan primarily through increased access to online catalogues which allow a patron greater convenience in completing an online search; additionally the patron can check holdings records at the office or at home. Thus providing Internet access to the library catalogue places it on the patron desktop and can actually increase the use of the library collection.

Libraries as Internet Publishers: The technologies and tools used for making information available on the Internet are relatively inexpensive and easy to implement, also with extensive knowledge of the nature of information, of patron needs, and of specific subject domains, libraries

possess a unique blend of skill that can go a long way in improving the internet's publishing process.,

Reference Services: Of all the academic librarians, reference librarians can probably benefit the most from using the Internet. The wealth of information found in FTP archives, Gopher sites and WWW servers extends the scope of information available to the reference librarian. Many reference librarians find that one they have identified quality Internet resources, they are often more valuable than print and commercial counterparts.

Sources of Information: There are vast sources of information available on the Net. The libraries can avail this great opportunity of using these sources in providing information. Internet is a dominant medium for information transmission. Everything that is needed for teaching and learning, viz, text books, newspapers, magazines. Encyclopedias, catalogues, journals, photos, and all made available on Internet. Internet has been viewed as a valuable source of information that can assist students in the pursuance of knowledge, learning, research, and increasing their capacity for social interaction internet is seen to promote inquiry and creativity through interaction of various forms of knowledge such as text, multimedia, music, video, graphics, photos, sound, animation etc.

Internet access in schools should be provided via the school library media center. In maximizing the use of the Internet the schools should have: at least one trained Internet contact person at each school; required hardware for connecting to the Internet is accessible; provide necessary Internet software in a convenient form; and provide some print resources to help staff members gain skills and find Internet addresses of interest.

School library media specialists have sets of skills [2] that allow the connection to the Internet to be made and utilized to its full potential. These skills include: technical expertise in establishing and maintaining networks; experience in promoting and integrating new technologies in the educational process; and the ability to identify and evaluate information resources. Additionally, school library media specialists have knowledge and training in dealing with the issues of censorship and equity of access that accompany use of the Internet by school children. In this regard the International Association of School Librarianship (IASL) [3] provides an international forum for people interested in promoting effective school library media programs as viable instruments in the educational process. A website http://www.rhi.hi.is/~anne/iasl.html is devoted to Links to School Library Resources on the Internet.

Increasingly widespread access to the Internet and World Wide Web in schools provides school librarians with both opportunities and potential problems. Focusing on opportunities, the librarian should look at the wider range of resources now available to pupils and teachers; and work more closely with teachers in giving advice on resources; find out the scope for integration of Web resources into information skills teaching; create new information resources for the school.

Truett [4] feels that librarians need to develop a multifaceted plan for ensuring that students' rights and freedom of information are respected and protected while both legal and technical safeguards provide some assurance to educators and parents that school Internet use is responsible and educationally sound (i.e. curriculum related). For fair use of Internet acceptable use policies, Internet blocking software and plain `responsible use' of the Internet in both school media centers and classrooms are all practices that should be followed when using the Internet in educational settings.

The library has to design a Web site that can serve as its gateway to the Internet and the site has to assist novices as well as support more experienced users.

Finding information on the Internet that is of reliable quality and at an appropriate level can be difficult and time consuming. Teachers and LIS professionals need to be trained in Internet instruction including searching techniques and ethical Internet use.

School libraries need access to the widest possible information range. The State government has to explore the possibility of provision of a comprehensive electronic network (Internet access), which involves special activities in technical work, organization and application to teaching.

Clyde [5] has shown the major applications of the Internet in libraries are for professional communication, for answering reference questions and providing information services, for locating reviews of possible acquisitions or for interlibrary loan purposes, for providing access for library users, and as a means by which libraries can make information available externally.

Many librarians feel strongly that access to information should be unrestricted and that Internet resources provide valuable information to students. Yet schools work within certain restraints and must be sensitive to parental pressures. It is up to librarians to balance, as best they can, the

often-conflicting interests of students, parents and the community and uphold the principle of open access to all information.

Security: Internet has security issues for librarians to consider. Very little security is possible with computers using older operating systems. Even the popular Windows 95 has limited protection from intruders who want to mess up its hard drive. Yet, in truth, complete security is impossible regardless of what barriers are put into place. The biggest hole in any security system is people, which is probably not a surprise to anybody. That people must use passwords is people to maintain computer systems, means that they will eventually be breached. The best that ever is done is to reduce the chances of security breaks. Library inventories held on Windows NT computers would be the best one can get outside of building "firewalls" between the user and the valuable data you have stored.

Controlling the way browsers are used also has limits. Both Netscape and Microsoft browsers can be set so as to limit access to inappropriate sites and topics. However, whether you are limiting access to sites or to words that can be searched, the fact remains that once on a site, there will be jumps to other sites that are out of control. As with all student activity, adult supervision is still the best bet.

The Internet is not solely a service enhancement opportunity. The Internet is also a social phenomenon, which should be examined for the multiplicity of ways, some all, but invisible, it impacts on teacher-librarians, libraries in schools and the way both operate. Two of the categories into which these impacts fall are those which may affect the form and survival of the school library, and those which directly impact teacher-librarians.

Libraries can recommend particular Internet resources, but cannot control the net quality of the total collection by ensuring non-availability of inappropriate or mediocre works, and lack the cost or space considerations, which supported the necessity to make choices on quality and utility.

Many Internet resources change virtually daily, a situation acknowledged by the National Library's decision to assign ISBNs to home pages based on the analogy with loose-leaf publications. Monitoring is impractical, and there is a significant element of unpredictability. This is not to suggest teacher-librarians should be cautious about connecting. On the contrary, a reaction of undue caution by both teacher-librarians and decision-makers has been an unplanned output of the Internet, and a hindrance to library connectivity. Teacher-

librarians need to develop an "unplanned" set of new skills, which takes time, confidence and capacity, and to face head on the implications of the myths which surround the school use of the Internet.

6. CENSORSHIP

Schools which are actively using the Internet acknowledge that there is material on the Internet which is considered inappropriate for school students. Reaction to the hype about pornography on the Internet has presented with two alternatives - challenges to access to materials in electronic form before they can be considered for 'acquisition', resulting in the removal of decisions about selection from teacher-librarians to others, and imposition of community standards of communities other than their own. Censorship of the Internet is both being legislated by governments and being offered as a service by corporations opposed to the essentially techno-anarchic nature of the Internet.

Robotic filters sift the good and the bad indiscriminately. At least some of the firms providing net filtering services deny to customers' information about what is being censored. Increasingly, society is being encouraged to regard the absence of censorship as a system failure and to remove the technology (or person) responsible for this failure.

Censorship is technically difficult. The only real protection we can provide children is to give them moral grounding and some common sense. The school library has a central role in this. A task for librarians is to accept the reality of the Internet, and apply commonsense and service principles to integrating these two conflicting environments.

Documents and databases on the Internet have much in common with the books on the shelves. The disturbing ideas may well be those that come through the e-mail and newsgroups. The Internet opens teacher-librarians to the ideas and discourse of the rest of the profession on an unprecedented level.

Development of Internet skills requires a considerable time-commitment and resource-discovery is time consuming in the absence of selection aids. In a sense, teacher-librarians must not only choose resources because of their relevance but decide which to purchase and which to access on the Internet, gambling on that access continuing for as long as the resources are relevant.

School libraries make a difference to student achievement; that school libraries have a positive impact on students and on learning. A well-stocked library staffed by a certified library media specialist has a positive impact on student achievement, regardless of the socio-

economic or educational levels of the community. Although socioeconomic factors continue to be the strongest predictor of academic success, school library characteristics may account for variance in reading-related test scores. Effective librarians perform a variety of tasks, including student instruction and teacher professional development. Inequity in the quality and availability of library resources continues to exist between both high- and low-poverty schools as well as high- and low-performing schools.

6.1 Library Web Sites Copyright

A major unsettled issue in the emerging networked digital library environment is that of copyright. Copyright law grants exclusive rights to authors for copying for educational purposes and also copying privileges to librarians and archivists but these rights are applicable within the purview of work in digital form. Displaying, downloading, copying, transmitting or printing of copyright works in electronic form has to be performed under contract license. Thus a crucial role has to be played by information professionals for both controlling and facilitating access to the growing number of local and remote electronic information resources. Therefore a need is felt for statutory right to use copyright protected material in all formats. Users can't locate the information or the site that they want on the Internet unless they are searching with a specific address, and even addresses change. The role that search engines play in providing access to Internet resources will evolve over the next few years. Search engines will be viewed as increasingly central in determining which sites users visit; as consumer guides they have potential to be very powerful. In addition, a greater number of search engines will be necessary to meet the needs of different client groups. An important element in the professional development of information managers will be the scope and features of the search engines.

7. ROLE OF INFORMATION PROFESSIONALS

Information is in brief content+net+knowledge organization. New technology is looking for expertise in knowledge architecture. Librarians are the rightful priests of the future Saraswati temple. This only requires redefining of their roles. Being a worldwide network of information resources, librarians have much to gain from Internet that offers unimaginable potentials for information services. Internet has helped to diminish all geographical distances between the user and his resources. With so vast potentials, school libraries cannot afford to be silent spectators or observers of this phenomenal source of information, which is an unimaginable tool in their hands to serve their clientele more efficiently and effectively. Librarianship is indeed passing through a challenging phase, greater challenges are still awaited in this age of ubiquitous (Internet explosion) electronic publishing, network and

communication technologies. According to the US Council of Competitiveness, by 21st century, Internet, the global information infrastructure, will enable people to access information and communicate with each other easily, reliably, securely and cost-effectively in any medium voice, data, image or video anytime, anywhere. To cope with the time and technology, the LIS professionals must be receptive to these new developments by adopting an inquisitive aptitude to know and learn more on this developing front. We can become experts in searching the Internet for information that our user need only if, we have positive attitude towards our role under the changing scenario. There has been tremendous change in the attitude and demands of the end-users as well. Therefore, it has become essential for information professionals to learn the skill of surfing the Internet for locating and exploiting the information resources to provide better information service to its users.

Over these years fast technological developments are taking place in India also. Access to Internet is becoming easier and affordable, most of the libraries and librarians have recognized the potentialities of Internet and its versatility providing immense utilities like searching data, images, scholarly publications such as journals, reports already accessible on the Internet from users desktop computer. Internet technology has ushered a new era of data management adding much faster speed, accuracy and timeliness in their provision. Internet as a treasure house of unlimited information has acquired immense importance in this networked environment for the information professionals. Invasion of Internet has changed the existing scenario of librarianship when there are no boundaries for seeking and searching the information.

8. CONCLUSION

Librarians are more capable of dealing with the challenges presented by the Internet and realizing its benefits in the education environment. The first step is to ensure that all parts of the school community have a realistic understanding of what the Internet can actually deliver, the role it can play in partnership with the actual library, and a commitment to ensuring that the teacher-librarian has a primary role in implementing access to the Internet and use of Internet resources in the school.

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Internet: Emergence Role of Internet-Based Library and Information Services in Libraries and Information Centers in Modern Era

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ABSTRACT

Information is regarded as a vital resource and an invaluable commodity in modern times. Information plays a significant role in the socioeconomic, scientific and technological development of a country. The development of computers and communication technology has brought radical changes in the modes and methods of information, storage retrieval and transmission. Computer technology, Laser Technology, Micrographic Technology, Reprographic Technology, Audio-Visual Media, Telecommunication Technology and Information Technology are the effective technologies for library and information services. The advent of Internet and its world wide web has created a greater impact on the Library and Information centers to have access to various information sources and disseminate it to users. The services available in Internet can be utilized by the Library and Information centers for acquisition, collection development and various services CAS, SDI, ILL, Reference service etc. through the various types of resources that are available on internet. This paper discusses the importance of the Internet and web technology and its impact on library and information services. The authors have focused on Information Retrieval system on Internet and Internet based library & information services.

Keywords: Internet, WWW, Information Retrieval-Search Engines, Internet based library and Information Services.

1. INTRODUCTION

Information is regarded as a vital resource and an invaluable commodity in modern times. The right information available to the right person at the right time in the aim of any modern library. Developments

in computer, communication and information access technologies are bringing revolutionary changes in the modes and methods of information storage, retrieval and transmission. In olden days the function of the libraries were merely the collection and preservation of the documents, but in the 21st Century the books are not our means of preservation but also for dissemination of the information contained in them. Now-a-days most of the functions carried out by the libraries have been modernized with new technology. The national policy on education has also emphasized the need for a better library services in the time to come. In this connection libraries play an important role for the promotion of education and research. With the advent of Internet and advancement of information technology it became possible to have the access to various information sources and databases available in different parts of the world.

In the beginning of Internet, the main users were researchers and scientists who were utilizing to fulfill their information needs. In the later stage the Internet has emerged as an important source for different types of information users. Internet has become more popular for dissemination of information for its different features like WWW. E-mail, Telnet, Ftp etc. some of the outstanding and valuable resources are also freely available on Internet. It has opportunity to share the resources by the individuals and organizations. The People are using Internet for commerce, education, information, entertainment and for many other purposes. Internet has a huge collection of information sources, which covers many fields. There are about one billion i.e., 1000 million unique URL's or 'web pages' which are accessible through the Internet. The Internet has be come an indispensable tool for the dissemination of information.

2. TECHNOLOGIES FOR LIBRARY AND INFORMATION CENTERS

The library oriented latest technology developments are

2.1 Computer Technology

Computers can be used for library operations like acquisition cataloguing, database creation and maintenance, circulation control, serials control information storage retrieval, communication and networking and management works.

2.2 Laser Technology

Computer links facilitate speedy random retrieval of information. In the long run, the use of the disc may substitute for the use of actual items like books, which deteriorate quickly due to handling.

  - Caltech general reference page
  - (http://library.caltech.edu/reference/default.htm)
  - The Internet public General reference collection.
  - (http://www.ipl.org/ref/RR)
- Dictionaries
  - Dictionary.com
- Encyclopedias
  - Free internet Encyclopedias (http://clever.net/cam/encyclopaedia.html)
  - The www virtual library:General reference encyclopedia (http://hom.istar.ca/~obyme/ency.html)
- Geographical resources
- Biographical resources
  - Biographical Dictionary (http://www.s9.com/biography)
  - Cambridge biographical Encyclopedia (http://www.biography.com)
- Directories, Bibliographies, E-Journals, Magazines, Old books,
- Data base, Share wares, Newspapers
- Patents, Standards, preprints, Technical reports
- Organization Websites, gateways
- Full text document, Educational resources, mailing lists and library catalogues.

4.1 Information Retrieval: Search Engines

Retrieval of information over Internet is a major problem; because of vast amount of information resources are available on it. To locate a particular information on the Internet requires skill on the part of researcher. There is no central agency that makes search easy. Instead, there are some tools and techniques that makes resources discovery much easier. There are two main techniques, used in the search of information. They are:

- Searching; and
- Browsing

4.1.1 Searching

Searching involves choosing some 'words' or 'phrases' that indicate the information required by the researcher. This is entered in the search box and the computer retrieves the items that contain word/s or phrase/s. Searching is appropriate when-

- One is sure that something is available on the Internet and just wants to pinpoint it.
- There is need for specific information and have clear search terms to describe it.

4.1.2 Browsing

Browsing involves hyperlinks to move from page to page with aim of getting the information by chance. Any page on the web can be browsed at random. But some sites permit easy browsing via structured trial of links organized under subject headings. Browsing is preferred to other means:

- To get an idea of what is available on the Internet in a subject area; or
- When one fails to identify a suitable search term/terms or are getting in a appropriate search results from a search on giving a chosen search terms.

4.2 Tools and Techniques for Resource Searching

The tools for resource searching are:

- Subject gate ways
- Web. Directories
- Search Engines

4.2.1 Subject Gateways

These are highly specialized tools, designed, specifically to find high quality Internet site and resources. They offer a catalogue of selected Internet sites to search and a series of subject headings to browse. They are specially designed to support the information requirements of academic and research communities. Some gateways specialize in particular subjects while others cover all subjects. e.g., RDN (Resources Discovery Network) <http://www.rdn.ac.uk>. Gateways are very useful, especially when high quality, trustworthy information that support learning and research is required. Also it is very useful to have information on what is available in a subject area.

4.2.2 Web Directories

Web directories provide large collection of Internet sites and focus on browsing. All these sites are classified under subject headings e.g., http://uk.yahoo.com. Web directories are useful for browsing the Internet to see what is available in a particular area/subject.

4.2.3 Search Engines

Search engine is a comprehensive search tool that enables to Crawl vast quantities of Internet resources by keyword searching. They are designed to cover all types of resources. Some subject specific and country-specific search engines are now emerging. They are characterized by the fact that they are built by machines, sometimes called robots, web crawlers or spiders. Spiders are computer programs that go out on the Internet and locate hyperlinks that are available to the public, such as WWW and Gopher documents. These spiders or robots

as they are commonly called load these resources in a database, which one can then search by using a search engine. These spider orbit programs were created because the number of Internet documents increases so rapidly that people can't keep up with indexing them manually. Each of the major search engines attempts to do the same thing namely-index as much of the entire web as possible, so they handle a huge amount of data. Following are the major search engines used frequently for searching the information:

- Google http://www.google.com.
- Altavista http://www.altavista.digital.com.
- Lycos http://www.lycos.com.
- Yahoo http://www.yahoo.com.
- Excite http://www.excite.com.
- Galaxy http://www.galaxy.com.
- HotBot http://www.hotbot.com.
- Infoseek http://www.infoseek.com.
- Northern-Light http://www.northernlight.com.
- WebCrawler http://www.vebcrawler.com.

Search engines are useful when some information is required, specific and fast also when large quantity of information is required. Search engines help to use narrow search terms and advanced search options to make search very specific. It is also helpful to make careful judgments of the quality of information retrieved.

4.2.4 Search Tips

Quick search tips: The following tips work most search engines in their quick search options:

- Use plus (+) sign in front of the words to force their inclusion and minus(-) sign to force exclusion in the searches.
- Use double quotation marks ("") around phrases to ensure that these are search as phrase and not a individual keywords;
- Put the most important keywords first in the search statements; and
- Use wildcards (i.e.*) to look for variations in spellings and word form. Example: colo*r – returns colour (American spelling) and colour (British spelling).

Quick tips for Boolean search: Always enclose OR statement in parentheses and always use CAPS when typing Boolean operator in the search statement.

Boolean logic redux: Boolean logic is not always simple or easy. Different searching engines handle Boolean operators differently. For example some accept NOT, while others. Accept AND NOT as one

word, and still others will treat AND NOT as separate words. Some requires the operators to be typed in capital letters while others do not.

Field searching: Electronic records, like print records, are organised into separate fields. A typical web page is composed with of the following major field title, domain, host or site, URL and link. When information is entered into a record's field, some search engines allow retrieving it by using the correct field label in combination with search terms(s). Where available, field searching on to web is a very powerful tool. It allows one to specify exactly where one wants the search engine to look in the web document.

Domain searching: If one is seeking information from a particular kind of site, one may choose to limit the field searching to one of the current top-level domains.

Host or site searching: If one is seeking information that resides on a specific computer or server, he/she can narrow his/her search with the host or site query. Example: host.www.sc.edu.

5. INTERNET-BASED LIBRARY AND INFORMATION SERVICES (IBLIS)

Internet is a boon for information professionals whose main aim is to provide information to their clientele. It is the most useful tool to obtain latest as well as retrospective information. Access to Internet has changed the scenario of Librarianship. Internet and associated technologies in particular the web, offer exciting possibilities for the librarians, to deliver information to the user's desktop and integrate library services using web as the common user interface. Internet based library and information services is the existence of an organization wide intranet, connected to the Internet. In the absence of this a library LAN can be easily converted into a private intranet to offer Internet-based library and information services with in the library. Internet created profound impact on library & information services by offering new modes of information delivery & a vast information source. The services are include web access to catalogues, e-mail delivery of current Awareness and SDI bulletins, local web access to purchased databases, CD-ROM databases, remote information services etc.

Information services are to provide required information to the user on demand or in anticipation and keep the user well informed and up-to-date in their field of specialization and in the related fields. Web offers significant advantages by integrating different library & information services. Some of the information services provided through Internet are discussed as follows:

5.1 Collection Development

The Internet brings together all the libraries spread over in the world providing the opportunity of accessing the collection of various libraries. Thus one can make the library a global resource.

Further various types of material can be downloaded.

- Articles, documents, files, software etc.
- The library collection can be build up with these material.

5.2 Acquisition

The libraries can make use of Internet sources for acquiring various types of reading material in the libraries. The various publishers have their own websites by displaying their publications in the Internet. One can select the document from their catalogues and one can place orders for acquisition of document. Several publishers will also display their journals in the Internet for free availability or for subscription. One can acquire free journals available on Internet and can subscribe the required journals by using the Internet sources. Thus the libraries can place order and browse the e-journals, books, videos, CD-ROMs ect.

5.3 Inter Library Loan

Number of libraries will be making available their collection over internet one can have the access to these documents and can borrow them on ILL or can get download the documents available in internet. We can also request them to send a hard copy of the document.

5.4 OPAC

OPACS is an important service available in the net. Using this service many of the library catalogues can be searched online. About 500 online public access catalogues are available on the Internet. Examples:

NCSI Library Catalogue (http://144.16.72.156/ncsilib/bkcri6.htm)

University of Hyderabad (http://202.41.85.234/library/html)

IIT, Madras, Central Library (http://www/iitm.ac.in/research/depts/ventlib/html)

5.5 Current Awareness Services (CAS)

The CAS is meant for alerting the users with the latest information. By using the Internet resources one can provide CAS in the Libraries by creating various types CAS Bulletins or making online access to the readers with various databases. The CAS delivers regular updates on newly available information according to interest profiles specified by the user, either through electronically or through the internet have added to the important of current awareness, the meaning of the concept of

CAS and the purposes served by CAS. It can be classified based on the type of database selected as follows:

(a) Books
- Amazon books (www.Amazon.com)
- Books list ALA (http://www.ala.org/booklist)
- Book Browser (http://www.bookbrowser.com)
- Forthcoming Books-National Library of Canada (http://www.nlc-bnc/.ca/forthbks/efbintro.htm)
- New York Books (http://www.nybook.com)

(b) Journal Tables of Contents
- Current Contents (http://www.isinet.com)
- Elsevier Science (http://www.elsevier.no/homepage/alert.htt)
- American Chemical Society (http://www.acs.org)
- Electronic Newsstand (http://www.enews.com)
- IDEAL-Academic Press (http://www.idealibrary.com)
- IEEE computer Society Publications (http://www.computer.org/pun.htm)
- COPSAT-NCSI information service (http://www.nesi.iisc.ernet.in)

(c) Recent Additions
- UNESCO (http://www.unesco.org)
- Book List-ALA (http://www.ala.org/booklist)

(d) Alerting Service
- SciGate-The IISc Science Information Portal (http://144.16.72.156/ncsilib/bkcir6.htm)
- IDEAL (http://www.idealibrary /.com/news/ideal-alert.jsp)

(e) Conferences
- World Wide Wed Virtual Library on conferences (http://conferences.rpd.net/)
- Backwell's Book Services (www.unf.edu/library/concernces)

(f) News papers and Magazines
- World Wide News (http://www.worldwidenews.com)
- The Hindu (http://www.indiaserver.com/news/theindu/the hinu.html)
- Accounting Education. Come (http://www.accountingeducation.com)

(g) CAS Bulletin
- Current content list of research journal
- List of research in progress in various fields

- List of latest publications
- List of forth coming conferences/Seminars/Symposia/ Workshop etc.

5.6 Selective Dissemination of Information (SDI)

The main aim of this SDI service is to provide latest information to the selective users. The Internet possesses the number of document databases which can be used as document profile for providing SDI services in the libraries. Periodically the user profile of the library can be matched with the document profile to get required document for their clientele. The matched documents can be notified to their users to provide SDI services. Thus the latest information can be communicated through SDI notifications at regular intervals to their users.

SDI is a method of producing personal current awareness information to individuals and groups. It can be provided through Internet.

- From library collection (library catalogues-OPACs)
- Databases (UNESCO- http://www.unesco.org)
- OCLC- - http://www.oclc.org:NLM- http:www.nlm.nih.gov)
- Internet Sources (Encyclopedia Britannica Online http://www.eb.com; Oxford English dictionary– http://oed.com)
- National information Centre, SNDT University (http://www.sndt.edu/nicindex.htm)
- Informatics India (http://www.information.co.in)

5.7 Document Delivery Services

The document supply/delivery service will library to request another library for copy of a document, to be transmitted via E-mail or fax. The role of INFLIBNET here in mainly to act as a catalyst in promoting this service to the academic and research community in India.

- INFLIBNET (http://www.inflibent.ac.in)
- SciGate-IISc Science information portal (http://144.16.72.156/incsilib/bkcir6.htm)
- British library document Supply Centre (http://www.blds.ac.uk)
- Chemical Abstract Service (http://www.cas.org/support/dds.html)

5.8 Reference Services

Reference service can also be provided through Internet. Web based Reference Services where users need to search or browse.

- Britannica. Com (http://www/Britannica.com/)
- Ask a librarian (http://www.loc.gov/rr/asla;on/)

- All Experts. Com (http://www.allexperts.com/_
- Question point (http://www.questionpoint.org/)
- Ask ERIC (http://ericir.syr.edu/qa/userform.shtml)

5.9 Indexing Services

An indexing system facilitates the literature searching activity and informs about the existence or non-existence of documents in response to the requests of the users. It acts as an effective communication link between the source of information and the user of information.

- COMPENDEX-engineering index (http://www.CPXWeb.ei.org)
- INDEX MEDICUS-NLM (http://NIM.nih.gov)
- Earth Science Journals (An Index of Journal) (http://www.gwrp.cciw.ca/Internet/journals.html)

5.10 Abstracting Services

An abstracting service presents the summary of a publication or an articles accompanied by an adequate bibliographical description to enable the publication or article to be traced.

- INFLIBNET (http://www.inflibnet.ac.in)
- OCLC (world cat) (http://www.OCLC.org)
- LC (http://www.loc.gow)
- UNESCO (http://www.unesco.org)
- Dialog (http://www.dialog.com)

There are database vendors who in addition to their own databases, also provide to other databases on request.

- UMI (http://www/umi.com)
- Silver Platter (http://www.silverplater.com)
- OVID (http://www.ovid.com)

5.11 Translation Services

There are some translator databases and tools are available on Internet.

- NCTA (Northern California Translators Associations) Searchable. Translator Database. It is a chapter of the American translators Association, (http://www.lai.com/ncta/trdb.htm)
- UNESCO-Index Translationum-An international bibliography of translations (http://www.unesco.org)
- WWW.translation Page provides translation of HTML documents

(http://www.systransoft.com/translate.html)

- Altavistra is a offering a free online translation service since 1999 (http://babelfish.altavista.digital.com/cgi-bin/translate)
- Virtual Information Centre-ICICI Knowledge Park, Hyderabad (http://www.vic-ikp.info)

5.12 Referral Service

Requests for provision of information which cannot be satisfied by a library can be referred to another source where from the information can be had.

- LC-National referral Centre (http://www.loc.gov)
- DARE-UNESCO Referral Database (http://www.unesco.org)
- INFLIBNET (http://www.inflibnet.ac.in)
- NCS! (for all Science Subjects) (http://www.ncsi.iisc.ernet.in)
- DELNET (http://www.delnet.nic.in)

6. CONCLUSION

With the increasing impact of information technology on higher education, internet has emerged as a formidable social and cultural institution of Global proportions felicitating access to a wealthy information on the web for the academic society to support their academic and research activities. Every Library and Information center in our country should be attached with internet and should create a home page. Innovative use of internet technologies enables library and information professionals to reach both local and distant users much more easily and effectively. Technologies such as e-mail and web provide tremendous opportunities for library and information scientists to delivery information to the desktops of our users. For library of information science professionals Internet is a challenging tool for providing better services thus improving the image of library among the user community. Access to resources on the net cannot be achieved un less until short term courses or workshop and training programmes are conducted. This will help users to know various developments and searching techniques for accessing the desired information. With the emergence of World Wide Web, Internet has become an inseparable part of the modern library and librarian can only exist in the coming century if he becomes a net librarian or a web librarian.

Government should make attempts to provide the necessary infrastructure facilities such as high speed networks connections to

access the e-resources and to conduct some training programmes for the library professionals and information literacy programmes for students to better services and also to conduct seminars and conferences on latest trends in library and information science.

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OpenURL for Accessing Referenced Resources

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ABSTRACT

OpenURL is a mechanism for transporting metadata and identifiers describing a publication, for the purpose of context sensitive linking. OpenURL standard is designed to support mediated linking from information resources (sources) to library services (targets). It works with 'Link Resolver System' to facilitate seamless access to the referenced resource. In this paper the concept of OpenURL, and its significance is discussed. The paper also focuses to develop 'Link Resolver System' and OpenURL through open source tools.

1. INTRODUCTION

OpenURL is a type of URL that contains resource metadata for use, primarily in libraries and consortia. The OpenURL is a mechanism for transporting metadata and identifiers describing a publication, for the purpose of context sensitive linking. The OpenURL is indeed, a way of organizing meta-data in a URL and pointing it to a destination. It describes the cited object. It helps in accessing appropriate copy of reference resources.

In other words OpenURL is a standard for encoding generic search terms such as author, title, ISBN, etc into a URL. This enables systems that support OpenURL to format search requests and supply results. OpenURL defines the request standard, and then the appropriate copy is returned to the user, usually in the form of a web page

2. OPENURL STANDARD

National Information Standards Organization (NISO) has developed and proposed OpenURL and its data container (the Context - Object) as international ANSI standard Z39.88. On 22 June 2006, OCLC was named the maintenance agency for this standard. The OpenURL standard is designed to support mediated linking from information resources (sources) to library services (targets). A "link resolver", or "link-server", parses the elements of an OpenURL and provides links to appropriate services as identified by a library. A source is generally a bibliographic

citation or bibliographic record, used to generate an OpenURL. A *target* is a resource or service that helps satisfy user's information needs.

Examples: Full-text repositories; abstracting, indexing, and citation databases; online library catalogs; and other Web resources and services.

3. HISTORY

OpenURL was initially developed to support Resolver technology (Resolvers are software servers that guide the user to the most appropriate source of information), a way of passing requests to a Resolver that uses encoded terms–combined with a knowledge base of available informationto create links to resources in a format accepted by the publisher. OpenURL is mainly used for this function, although any application wishing to receive bibliographic-style search requests via URLs can utilize it. OpenURL Version 0.1, released in 2000, is the most generally used, although this has since been superseded by Version 1.0, defined in the NISO Standard Z39.88 to provide more complex encoding to satisfy the needs of electronic journal publishing.

4. HOW OPEN URL WORKS

OpenURL is indeed a way of organizing data in a URL. It describes the cited object. There is a link resolver pointer in the OpenURL, which process the OpenURL. For example each library has one link resolver to which all their OpenURL's point.

4.1 Open URL Works as Part of a Broader Linking System in the Following Steps

Step I: The OpenURL from the reference resources carries sets of metadata of the desired citation object to the specified link resolver.

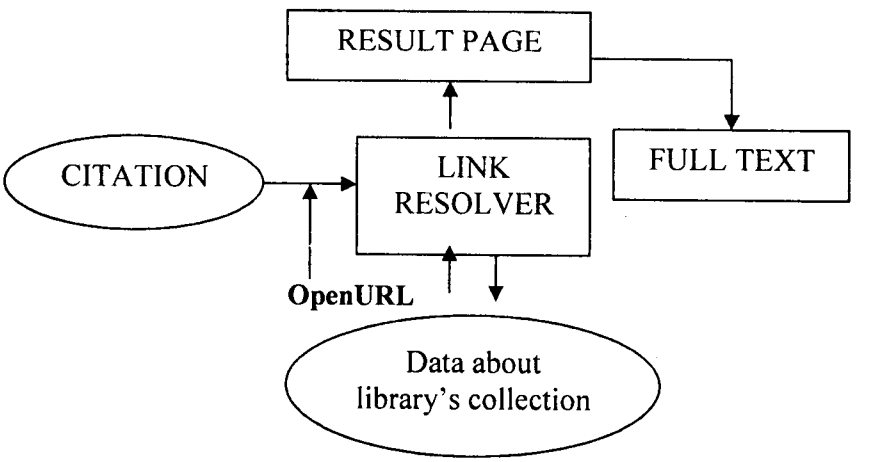


Fig. How OpenURL works

Step II: The link resolver compares the data about the item described in the OpenURL with data about what is held in our library's collection. At this stage it also checks the access rights.

Step III: Based on the results of step II, the link resolver displays the options that are available to the patron.

Step IV: Patron selects the best option. Ideally, this is a link directly to the full-text of the article. If that is not available, He may be linked to the journal, or a link to search for the item via interlibrary loan or a document delivery service.

4.2 What Does OpenURL Consist?

An OpenURL consists of a base URL, which addresses the user's institutional link-server, and a query-string, which contains the bibliographic data, typically in the form of key-value pairs. For example:

http://resolver.example.edu/cgi?genre=book&isbn=0836218310&titl e=The+Far+Side+Gallery+3

is a version 0.1 OpenURL describing a Gary Larson book whose title is "The Far Side Gallery" http://resolver.example.edu/cgi is the base URL of an example link-server. In version 1.0, this same link becomes somewhat longer:

http://resolver.example.edu/cgi?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:book&rft.isbn=0836218310&rft.btitle=The+Far+Side+Gallery+3

4.3 Significance of Using OpenURL

- It helps the information providers to equip their products for optimal integration with library linking systems.

- Enables library-controlled links to a multiplicity of resources related to a citation and is designed for localized linking.

- Enhanced by interaction with the DOI system, it transports metadata and identifiers describing a publication, for the purpose of context-sensitive linking.

Helps link resolve system for linking within an institutional context and interpret the incoming HTTP request in the form of OpenURLs, takes the local holdings and access privileges of that institution (usually a library) into account, and display links to appropriate resources in the form of a WebPages.

- ➢ Allows the library to provide a range of library-configured links and services, including links to the full-text, a local catalogue to

check print holdings, document delivery or ILL services, databases, search engines, etc.

4.4 Developing OpenURL Link resolver system using software suites: CUFTS GODOT and dBwiz

4.4.1 CUFTS Open Source Serial Management

CUFTS is online knowledgebase of full-text journal collections. It provides libraries to develop their sites of searchable serials database, MARC records for their catalogue, direct to article OpenURL link resolving, and electronic resource management (ERM) tools.

4.4.2 CUFTS Installation Requirements

- Perl
- Apache/mod_perl
- Various Perl modules
- Postgresql database

4.4.3 CUFTS Global Resources and Local Resource

CUFTS serves as Knowledge Base and contains a variety of resource types including Journal collections and databases called as "Global Resource" from these Global Resources libraries can select and activate the local resources for their site which they subscribes or have access.

Resources can be activated by editing resource details screens such as:

i. General settings
ii. Resource details - database URL
iii. Supported services etc

4.4.4 Activating Unique Local Collections

In CUFTS we can create our own Local Resources when one is not available in the Global Resource list. For creating new resource we must provide a Name and the Provider (often a publisher or an association) and no of other settings.

Module is an important component of any new resource. For typical fulltext collection we can enter 'GenericJournal' but if new resource uses DOI's then we should use 'GenericJournalDOI'. Finally we need to add title list for new resource, which is required to provide link resolving, and CJDB listings.

The title list should at minimum include the journal titles, ISSNs, fulltext start date, and a URL. This can be created and uploaded to the CUFTS.

Exporting Title Lists: CUFTS also have the feature to export the title list.

Activating CrossRef: CUFTS works with CrossRef to provide DOI linking for some DOI-enabled resources. Activating CrossRef in CUFTS will provide more article-level linking.

Electronic Resource Management: Various ERM features of CUFTS resource such as Basic ERM – name vendor publisher subscription notes, Dates/Costs, Statistics, Admin Info, Terms, Contacts, Misc can be set by editing any Local Resource.

4.4.5 CJDB (CUFTS Journal Database)

CUFTS provides the library users with web-based database of all serials, including print, microform, and electronic. It provides a very good user interface to search the journal articles subscribed by the library. It is highly customizable, provides both alphabetical and subject browsing, and is searchable by keyword, title, subject, publisher or association, and ISSN:

CJDB users can create their own accounts, and can organize their own collections of journals, under My TAGS.

5. CUFTS STATISTICS

CUFTS provides the Statistics link on the main Administration page. Selecting the Report Type and the Time Period can generate CUFTS statistics by pressing run report.

5.1 CUFTS Site Settings

It includes General settings, Templates, ERM Settings, CJDB Display, CJDB Data and GoogleScholar

5.2 GODOT Link Resolver

GODOT is link resolver software. Provides direct Full-text Links from CUFTS knowledge base, Interlibrary Holdings Locator and Requesting. It also reveals holdings in the catalogue or in other location.

5.2.1 Installation Requirements

- Perl and various perl modules
- Apache/mod_perl
- PostgreSQL
- YAZ
- CUFTS

5.3 Features of GODOT

Full text links–GODOT uses the CUFTS knowledge base to link the full text from the specified libraries. For this purpose GODOT uses the cufts_resolver_server_url i.e http://yourhost/CUFTS/Resolver/site

Library catalogues holdings–GODOT does Z3950 search to retrieve the print holdings available from the library catalogues.

Search other libraries/request this item – This link is configured to check the availability in other similar group of libraries and to put a ILL request.

Check the web for the item–We can configure a link to Google or any other search engine search to check the availability on the web.

5.4 dbWiz–Federated Search interface

dbWiz is an Open source federated search engine allows to search multiple databases, web sites, catalogues, and other online resources from a single interface, and presents the results in an integrated list.

5.4.1 Installation Requirements

- Apache
- Perl and various perl modules
- Mysql
- GODOT and CUFTS

5.4.2 Searching dbWiz

dbWiz search interface provides both Basic Search and Advanced Search features.

Basic Search: Provides users a minimal interface and requires few decisions to retrieve the results. Here one can only select the profile or category to search.

Advanced Searching: This provides users with search fields to construct more complex search statements, and also allows users to select their own resource for searching.

Search Results: The search results are displayed in an internet search engine format. All available citation details are provided, along with a link to either the native interface or a GODOT link resolver.

5.4.3 dbWiz Administration

dbWiz administration login page URL is something like this: http://yourhost/DBWIZ_config/config.cgi

After login we can configure dbWiz search settings. Create the search profiles and categories; select the databases and resources to search. And edit the templates to change the interface look.

6. CONCLUSION

The OpenURL is a method for sending metadata, most commonly in the form of a URL. It contains a base URL, which is the address (on the web) to which the OpenURL is being sent. It also contains metadata (which includes resource identifiers). No doubt OpenURL is the need of the time. It provides seamless access to reference resources by sending metadata to link resolvers , as here in '*GODOT link resolver*', which then build links to full-text articles (if the metadata describes a journal article) and extended services.

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E-Print Archive of University of Delhi: A Step towards Open Access

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ABSTRACT

The present article gives an introduction to the concept of 'open access". It further explains an "e-print". It focuses on the e-print archive of University of Delhi and tries to evaluate it. It concludes with suggestions for individual colleges under University of Delhi.

1. INTRODUCTION

The escalating cost of scholarly publications has given rise to open access publications. "Open access to scholarly information is a hot-button issue that quickly triggers heated discussion–especially if the topic arises in a mixed group of librarians and publishers.

Open access has become an increasingly important and potentially divisive issue in recent years as journal inflation rates have increased. For many librarians and scholars, journal price inflation is itself the central problem and open access is the solution. According to this view, the fact that libraries have to pay for access to some scholarly information is acceptable, but prices are too high and are increasing at an insupportable rate; the establishment of competitive open-access journals will force commercial publishers to moderate their profit-seeking behavior."[1]

The implication of the term "open" in "open-access" does not necessarily mean free-for-all, any time anywhere. "The term "open" has a different meaning in the Open Archives Initiative, as is declared by

their promoters: "Our intention is 'open' from the architectural perspective- defining and promoting-machine interfaces that facilitate the availability of content from a variety of providers. Openness does not mean 'free' or 'unlimited' access to the information repositories that conform to the OAI-PMH [Open Archives Initiative Protocol for Metadata Harvesting]". The Open Archives Initiative has provided the metadata tagging standards that enable the content of distributed archives to be interoperable.

In this sense the Self-Archiving Initiative is devoted to opening access to the refereed research literature online, providing free software for institutions to create OAI-compliant archives, interoperable with all other open archives through the OAI-Protocol for Metadata Harvesting."[2]

Open-access includes both open-access journals and e-prints. "Although the term "open is somewhat fluid, included under its banner are the so-called "two roads to open access": open-access journals and "e-print" (i.e., preprints or postprints) repositories, both of which make the full text of scholarly articles freely available to everyone on the open Internet. Although debate swirls around questions of copyright, peer review, and publishing individual authors are taking action in this arena by posting their articles to personal or institutional Web pages and to disciplinary repositories."[3]

Open-access deprives the creator, of the scholarly publication, monetary benefits. However, open-access makes the publication available to a large number of users. "The attainability of open access depends on the key distinction between literature that authors consent to distribute without payment and literature on which authors hope to make money. All authors, artists, and creators have a right to make money from their work, and we do not criticize anyone for trying. But when authors choose to give their work away, then readers should get the full benefit of their generosity. Opening access to readers would also repay authors by giving them the enlarged audience and impact for which they sacrificed revenue."[4]

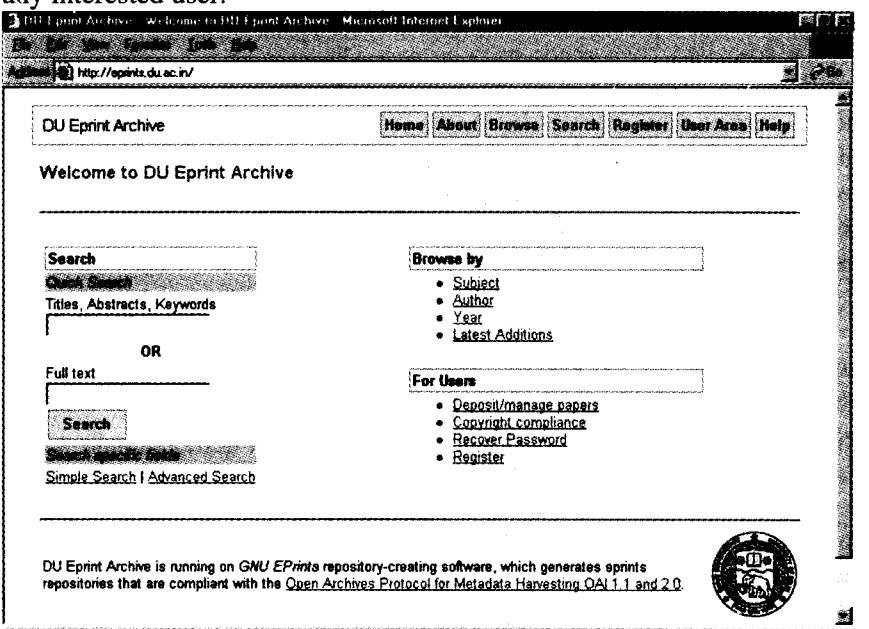
Open-access does not mean that the publication is free of any copyright. Such publications are available under open-access along with usual copyright implications. "The intellectual property rights that are vested in specific scholarly works do, in fact, need to be actively managed, first by the authors of and institutions that support that

scholarship, and ideally in partnership with the value-adding second or third parties–the publishers."[5]

The publication of scholarly information involves certain cost. "For information to be made freely and permanently available to the public, the costs of creation, publication, and distribution must be absorbed by someone other than those who wish to use it. The Internet eliminates most distribution costs, but not all of them, and does not affect creative costs or publication costs to any appreciable degree."[6]

2. E-PRINT ARCHIVE OF UNIVERSITY OF DELHI

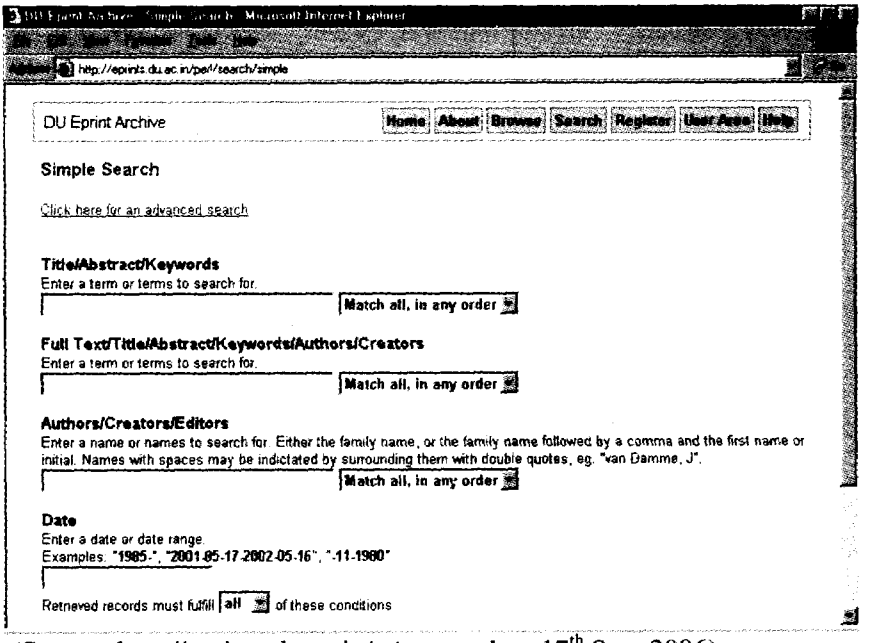
The e-print archive of University of Delhi (DU) is running on GNU E-Prints open repository software, which is freely available repository system. The objective for establishing e-print archive was to make available the research work being carried out at DU freely available to any interested user.



(Source: http://eprints.du.ac.in/. Accessed on 17th Sep. 2006)

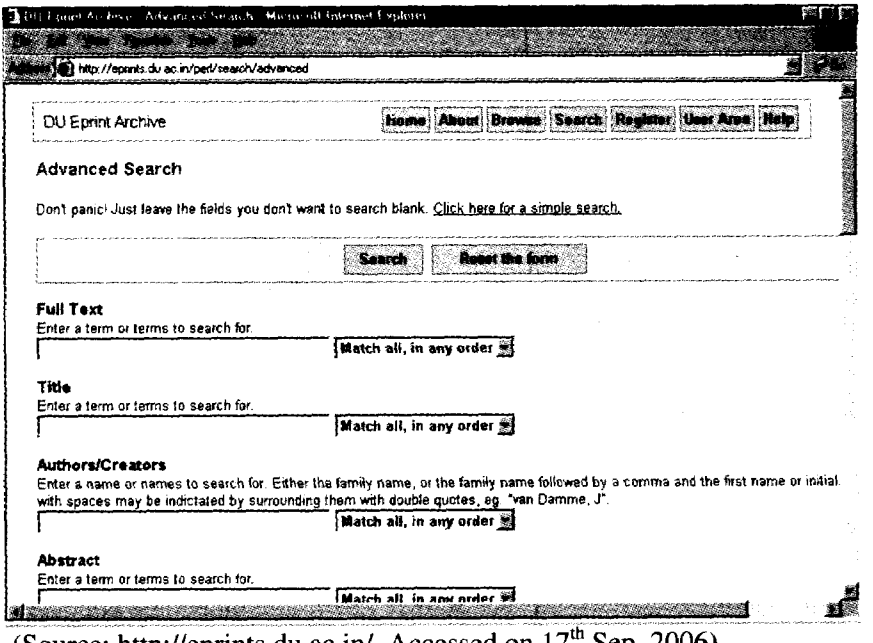
Fig.1. Screen shot of DU e-print archive

Search has been provided at two levels- simple and advanced. A user can browse by subject, author, and year and by latest additions.



(Source: http://eprints.du.ac.in/. Accessed on 17th Sep. 2006)

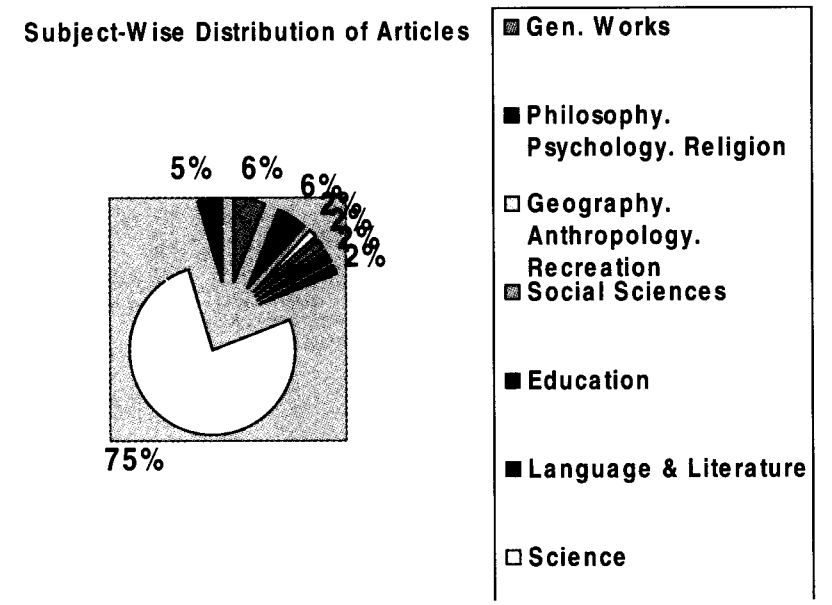
Fig.2 Screen shot of DU e-print archive's: Simple search

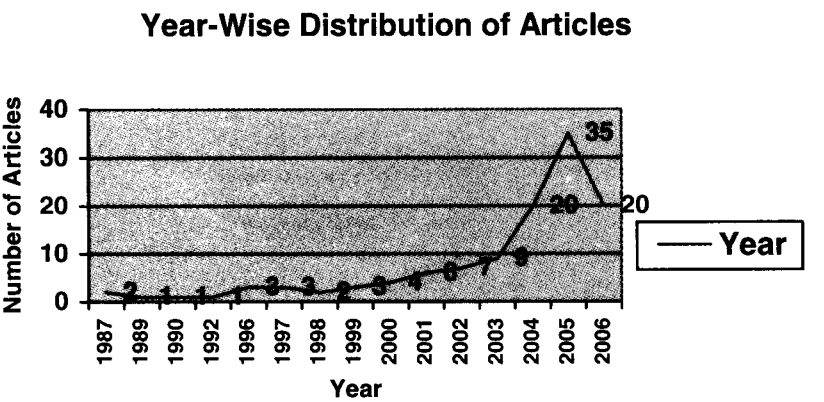


(Source: http://eprints.du.ac.in/. Accessed on 17th Sep. 2006)

Fig.3 Screen shot of DU e-print archive's: Advanced search

The archive divides the universe of knowledge in 21 subject areas. It contains a total of 117 articles written by 143 authors.





A comprehensive usual manual has been incorporated to guide the user regarding deposition of articles and for searching the repository.

The e-print archive of DU has shown way to the individual colleges under University of Delhi. The faculty members of such colleges also contribute scholarly literature in the form of journal articles and books. Each college of the university can develop e-print archive on the line of

e-print archive of DU. The lecture notes of the faculty members can also be made available for the benefit of students.

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Organising Web-based Information Services in Academic Library with Special Reference to Library of University of Delhi

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ABSTRACT

In this digital age, academic libraries have the advantage of technology infrastructure to efficiently organize and speedily disseminate the valuable information available on the world wide web (www). There are many types of web-resources in various subjects that can be utilized by the user community of an academic institution. Present articles deals with the various types of web-resources that can be organized to provide the valuable information service to the users of an academic library. Electronic resources of the library of the University of Delhi comprehensively deal with the information requirements of the faculties, research scholars and students.

1. INTRODUCTION

Information technology has facilitated to share the information at global, regional and local levels. In the recent years World Wide Web is the greatest factor in changing the society and emerged as the core foundation of the information infrastructure. Internet is the host of a lot of scholarly information and provides a global networked environment for publishing and access to information. There are various factors that need to be considered while making the provision of accessing these e-resources. The developments in the web technology have paved the way to display the contents on the desktop. The searching and retrieval of the e-resources also have taken the state of the art of the techniques available.

The key features of networked information are:

- Access and Publication:
- Information delivery at users desktop
- Multimedia integration
- Hypertext navigation

2. SCHOLARLY INFORMATION RESOURCES ON THE WEB

Internet provides access to various types of scholarly information resources available on World Wide Web. These may come under the following categories:

Primary Sources: Including conferences; courseware/tutorials/guides/ manuals/; projects; science/ research news; software; standards; theses and dissertations.

Databases, Datasets and Collections

Including bibliographic databases; citation databases; digital collections (images, audio and video); equipment/product catalogues; scientific datasets (numeric, property and structural databases); library catalogues (including union catalogues); museums and archives; virtual libraries.

Electronic Books: Including electronic books, online bookselling and print-on-demand.

Reference Sources: Including dictionaries; encyclopedias; biographies; abbreviations; thesauri; subject headings; handbooks; maps.

Organisation and Peoples: Including employment/career sources; funding/grants sources; libraries/information centers; organizations/ research institutes/companies/societies; people/experts/scientist directories.

The important e-resources, necessary for the modern academic community, can be described as:

- Bibliographic and full text databases
- Table of content of Primary Journals
- Electronic and Online journals
- Books and Newsletters
- OPACs
- Commercial products
- Directories
- Campus wide information systems (CWIS)

3. ELECTRONIC JOURNALS

This is also known as e-journals. The major publishers of S&T journals like IEE, IEEE, Elsevier, Academic Press, Blackwell Scientific, John Wiley etc have announced their commitment to provide web-access to their journals.

The benefits that can be achieved through these e-journals to the academic community are immense. Some benefits are:

- User gain quick access to current and archival issues
- User can download the desired articles
- Keyword based search enhance quicker and easier identification of articles
- Production of journals is quicker and perhaps more economical
- E-journals need not to be bound by physical size or no. of articles
- Paper may be published as they are accepted

3.1 Table of Contents

Major Publishers deliver content pages of their journals free of cost. The 'Content Direct' service of Elsevier Publisher delivers content page of more than 800 journals by e-mail over the Internet. Publishers also provide content page data much earlier to full text.

3.2 Preprints

Scholars used preprints as a means to enhance speed and efficiency of scientific communication. Preprints are the earliest form that is being delivered on Internet electronically first by e-mail later on over www. Internet based preprint services has been highly successful in some areas like high energy physics and mathematics.

3.3 Technical Reports

Technical Reports contains results of research or investigations commissioned by agencies and as much only a limited number of copies are produced for use. It is a valuable tool for science communication. Large no. of Technical Reports are available on Internet. One of the examples is very well developed system called NCSTRL (Networked Computer science Technical Reports Library).

3.4 Library Catalogues

Many Library Catalogues can be accessed online on the Internet, mostly available free of cost. These catalogues are useful for identification and selection of books for acquisition, bibliographic data verification, and search holdings of periodicals.

Online Catalogue of Library of Congress used heavily by Librarians and users.

3.5 Discussion Forums/Mailing Lists

Discussion forums, mailing lists, and listserves are major web resources that servers the purpose of web awareness.

3.5.1 Campus Wide Information Systems (CWIS)

CWIS provides online information service of the university. It provides web-based access to a variety of information. CWIS provide access to faculty and students, course details and research projects etc.

4. ACCESS TO THE RESOURCES: OPTIONS

There are various provisions through that the web resources can be accessed and fully utilized. These options are:

- Electronic subscription is linked to the print subscription
- Electronic subscription with campus Licenses
- Electronic subscriptions are bundled
- Pay-per-look
- Electronic only
- Consortium Licensing
- National Licensing

5. WEB-BASED RESOURCES & SERVICES OF LIBRARY OF UNIVERSITY OF DELHI *(http://crl.du.ac.in)*

Web-based e-resources of Library of University of Delhi have the provision of being served through Internet from three locations namely: Delhi University Library System (DULS), Central Science Library and Ratan Tata Library

5.1 Delhi University Library System *(http://crl.du.ac.in)*

There are various tools and electronic databases that can be used to search and access the required information on the Internet. It facilitates user to use the maximum capabilities of web. There are provisions of links to connect them from DULS site. These e-resources includes:

1	Judgment Information System	9	World Bank Documents and Reports
2	Global Journal literature Through Open J-gate	10	OAIster Project of University of Michigan Dig. Library Prod. Service
3	E-reference sources	11	Major Indian Search Engines
4	Finding Aids and Gateways	12	Open Source Initiative
5	Internet Search Tools	13	Scholarly Societies in All Disciplines
6	E-resources on Public Domain	14	Sources of International Statistics
7	E-books from University of Adelaide	15	Electronic Resources in Classic literature
8	Australian University E-thesis Program		

Following types of E-resources are available at the URL ***http://crl.du.ac.in*** of DULS:

5.1.1 Electronic Databases and Journals Accessible Through Delhi University Campus Network

The list of databases accessible through campus network of DU includes:

1	Xreferplus	23	TOC Premier
2	ABI-INFORM COMPLETE	24	Encyclopedia Britannica
3	Academic Search Premier	25	Euclid
4	ACM Portal	26	Ingenta Gateway
5	American Chemical Society Publications	27	JSTOR
6	American Institute Of Physics	28	Kluwer Online Journals
7	American Physical Society	29	Mathsci Net
8	Blackwell Synergy	30	Nature
9	Business source Premier	31	Oxford University Press Online Journals
10	Cambridge University Press Journal	32	Paper Invited Database
11	Cell Press	33	Project Muse
12	Current Abstracts	34	Portland Press
13	Elsevier Science Direct	35	Royal Chemistry of Society
14	Emerald Journals	36	Science Magazine
15	EBSCO databases	37	SpringerLink
17	Humanities International Complete	38	Taylor & Francis Online Journals
18	Lexis-Nexis Academic Universe	39	UN and Other Agencies Publications
19	Library, Information Science, Technology Abstracts		
20	Regional Business News		
21	Scopus		
22	SocIndex		

5.1.2 UGC-Infonet Resources

The UGC-Infonet: e-journals consortium is a milestone in the history of higher education in India. In this consortium such a large number of scholarly journals are being made available to academicians, research scholars and students. This is the country's largest consortium successfully executed, implemented and monitored in academic circles and has helped a great deal in teaching, learning and research work.

5.2 Central Science Library: ***(http://csl.du.ac.in)***

A comprehensive coverage of e-resources in the area of science and allied subjects are being taken care of while making provision of web access at the URL: ***http://csl.du.ac.in*** The resources includes:

- Online journals and databases: This link provides access to about 52 best core databases and Journals in the world in different disciplines of knowledge
- List of CSL Serials Holdings
- E-journals subscription 2006
- UGC-Infonet (Subject Wise of E-Journals)
- Digital library link provide access to journals in public domain: including directory of open access journals (DOAJ), electronic journals library (8000+journals), free medical journals and Unesco social and human sciences online periodicals (700)

Online Books: This is a link, which provide access to a site known as Digital Book Index (http://www.digitalbookindex.org/) includes 126,000 online books from various commercial and non-commercial publishers.

E-reference Sources: This link includes various online reference tools like encyclopedias, dictionaries, thesauri, yearbooks, and almanacs, Handbooks; Sources of biographical, geographical, statistical, educational and current information; A&I services, Standards and Patents Indian, Reference sources, India- Specific Search Engines, Important Reference Sites and Some useful Software.

Thesis and Dissertations: It contains the link to ProQuest digital dissertations, Educational Resources Information Center (ERIC), databases, Networked Digital Library of Thesis & Dissertations, *Vidyanidhi*: Indian Thesis Database

Conferences: Links to the information about the conferences are provided through following sites:

- Conference Alerts
- Directory of Conferences
- Conferences and Events
- Google Directory of Conferences
- Conference Database
- UN Conferences and Events

UN and Other Agencies Publications: Here the Links to the websites of various international agencies like ADB (Asian Development Bank), IMF (International Monetry Fund), Demographic and Health Surveys, Human Development Resource Center, International Organizations of

the World, United Nations, UNESCO, UNDP, WHO Statistical Information System, and World Trade Organization etc.

Subject Gateways: Links to the following Subject Gateways are provided to search the information pin pointedly:

- Physical Sciences Information Gateway (PSIgate)
- EEVL: Engineering, Mathematics & Computing
- BIOME: Health and Life Sciences
- Eric Weinstein's World of Science
- Bio-Web
- Human Genome Project
- NCBI Human Genome Resources
- Social Science Information Gateway (SOSIG)
- BUBL LINK / 5:15: Social Sciences
- Google Directory of Social Sciences
- Artifact
- HUMBUL Humanities Hub
- Voice of the Shuttle
- Humanities and Social Sciences Online
- Google Directory of Arts and Humanities

5.3 Ratan Tata Library: *(http://crl.du.ac.in)*

From this library, access to a large number of E-resources is being provided from the URL: *http://crl.du.ac.in* , The resources are:

Electronic Resources: It includes access to:

- Journals in Public Domain
- Online Books
- E-reference Sources
- Thesis and Dissertations
- Conferences
- UN and Other Agencies Publications

E-journals Subscription 2006: Here links to websites of about 126 journals currently subscribed by the library, are provided.

List of Serials Holdings: The list contains title, publisher, subject, frequency and format (print/electronic) of all 456 journals subscribed by the library.

List of Thesis and Dissertations: This is a bibliographical list of Thesis and Dissertation submitted to the University of Delhi.

Online Databases and Journals: 27 Online Databases and Journals are provides with links to access.

UGC-InfoNet: The UGC-Infonet: e-journals consortium provides access to the more than 4000 journal subscribed by consortium. Here the consortium Journals are categorized by subject and links are provided

6. CONCLUSIONS

The academic library users have very specific need of quality e-resources in their subject areas. The development of valuable contents on Internet necessitated the academic libraries to identify these contents and make provision of access to their clientele. A regular updating of the web-based services on continuous basis is also needed.

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