

**CURRENT TRENDS IN LIBRARIES IN THE  
DIGITAL ERA  
(Book of Papers)**

**EDITOR**  
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Ahmedabad Library Network (ADINET)  
Information and Library Network Centre (INFLIBNET)  
Ahmedabad Management Association (AMA)

**on**  
**9<sup>th</sup> August, 2008**

**at**  
Ahmedabad Management Association,  
Ahmedabad



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## PREFACE

Each year ADINET celebrates the birth anniversary of Dr. S.R. Ranganathan. Besides being the Father of Library & Information Science, he was an educator, mathematician and a philosopher. As part of the celebration, a seminar is held on an important current topic. The seminar helps the Library & IT Professionals to know about the latest Information and Communication Technology used in libraries, to interact with each other and to discuss important current developments.

The theme of this year's Seminar is "Current Trends in Libraries in the Digital Era". This Book of Papers contains the full text of the following six papers both in English & Gujarati:

1. Library 2.0- Innovative Technology for Building Libraries of Tomorrow.
2. The Deep Web
3. E-learning: Trends and Opportunities for LIS Community.
4. Bibliographic Control in Electronic Media
5. Impact of ICT on changing scenario of Library and Information Centres
6. Scholarly Search Engines

All the authors of the papers have spent much time and effort not only to cover the topic, but to identify the demands of library users in this changing digital environment.

Digitisation has had a profound impact on the way Librarians access, store, retrieve and disseminate information. New developments in Information and Communication Technologies used in Libraries are taking place very rapidly. Web 2.0 which is the second generation World Wide Web is being applied in many fields. Library 2.0 is one such application which enables Libraries to give more specialized services like 24×7 Virtual Reference Service to their clientele. Librarians are also using a few of the following :

Instant Messaging (IM), RSS Feeds (Real Simple Syndication), HTML Feeds, Streaming Multimedia (delivery of multimedia content), Podcasting (used to distribute audio digital media files), Vodcasting (to deliver video content), Blogs (Web log), Wikis (collection of web pages), Social Networks, Tagging, Social Bookmarking Services, Mashups, Library Tools Bars, etc.

It is indeed a challenge for most Libraries to use even some of these technologies owing mostly to lack of know-how and resources. Therefore ADINET'S mandate for sharing all the resources in a Library ie, money, material, manpower and machines become not only more meaningful, but very critical and crucial.

Effective Resource Sharing becomes possible only when the three vital ingredients, Cooperation, Coordination and Collaboration are actually implemented. Each Library requires active institutional involvement and strong management support. This will enable the Library community to seamlessly connect and provide universal electronic access to the complete collection of Libraries as well as web-based material.

We are indeed grateful to all the authors and the translators, who have at a very short notice translated the papers in Gujarati. We thank all the advertisers, publishers and book

sellers for their patronage and help. We are deeply beholden to Ahmedabad Management Association, INFLIBNET Centre, Directorate of Libraries Gujarati State, M/s Allied Publishers Pvt. Ltd. and M/s Elsevier Science Publishers.

Our heart-felt thanks are also due to all the Librarian friends who have helped ADINET for the success of this Seminar.

Rhoda Bharucha

## **Ahmedabad Library Network (ADINET)**

**ADINET is a Network of Libraries and Information Centers in and around Ahmedabad.** The process of covering of whole of Gujarat has been started. It was established in 1994 with an initial grant for a few years from National Information System for Science and Technology (NISSAT), Department of Science and Industrial Research, Government of India. **It caters to all types of Libraries:** school, college, universities, institutional libraries and even public libraries. Hence, **access is provided to hundreds of libraries**, librarians and organizations through the ADINET Network

The main **vision of ADINET** is to join Libraries, to enable them to achieve what cannot be done by one library alone. This will help them to harness their limited resources and collective strengths so that Libraries can continue to play their historic role as society's portal to information. ADINET therefore promotes sharing of resources and disseminates information among Libraries by networking them.

### **Objectives:-**

- To **integrate the economic, scientific and technical information systems** into an effective network
- To **co-ordinate with** other regional, national & international Networks, Libraries & Information Centers by providing links especially to OPAC's of Libraries. This will provide seamless connection & universal electronic access to the collective collection of Libraries, together with web-based material.
- To provide **Library Consultancy Services** like creation of Website, Institutional Repositories, etc. This will be of great help to small libraries.
- To develop **Databases of AV materials & Institutions.**
- To prepare **products & services** for the Library profession.
- To help Library & Information Center users & also individuals who practice different professions in **getting specialized information** of their interest.

### **Services & Activities:-**

- a ADINET is maintaining a **Database of over 5500 Current Periodicals** received by over 140 libraries in & around Ahmedabad.
- b **Document Delivery & Inter-library Loan:-** ADINET enables users to locate periodicals/books/reports, so that these can be borrowed on inter-library loan.
- c **Content Pages** of Library & Information Science journals are regularly supplied to all members. Full texts of selected articles from content pages are supplied.
- d **Supply of Photocopies** from journals published by more than .
- e **Manpower development programs.**

- f **Completion of backlog** of any work of library & information centers.
- g **Digitization work.**
- h An **Electronic Discussion List** has been started with the help of INFLIBNET. This List helps to **build online relationships** & share information.
- i **Internet Tool box** gives latest tools, trends & resources for searching precise information on the Internet.
- j It is proposed to start an **ADINET Student Group** to provide support & leadership opportunities for M.L.I.S. Students.
- k **ADINET Monthly Lecture Series** is held on last Friday of every month L.I.S. Professionals give interesting & informative talks on important current topics.
- l **Ranganathan's Day celebration:-**  
Each year ADINET celebrates the birth anniversary of Dr.S.R.Ranganathan as Librarians' Day, by conducting a Seminar on an Important current topic.
  
- m **ADINET Website has been redesigned with vital links to important databases:-**  
The following useful information is available on the website:-
  - 1 Directory of Libraries & Information Centers
  - 2 Union List of 5540 Journal Titles
  - 3 Directory of Librarians
  - 4 Open Access Resources
  - 5 CUCOLIS
  - 6 JOLI Database (contains details of fresh LIS Professionals)
  - 7 Database of Databases (under preparation)
  - 8 ADINET Newsletters
  - 9 Power Point Presentations of Monthly Lecture Series

#### **Publications of ADINET:-**

- a **ADINET Newsletter** is published quarterly.
- b **'Directory of Institutions and Colleges, Trade & Commerce Associations in Ahmedabad and Gandhinagar and Universities in Gujarat'**, July 2008.
- c **Union List of 5540 Current Journals.**
- d **CUrrent COntents for Library and Information Science (CUCOLIS)**
- e **Book of Papers of Seminars** held each year.
- f **Course Materials** of Workshops & Training Programmes

#### **Membership of ADINET:-**

All Institutions, Libraries and Information Centers, LIS professionals and students are invited to become members of ADINET and avail professional services. Membership fees are:-

- |  |                     |
|--|---------------------|
| 1. Institutional Member:                             | <b>Rs. 10,000/-</b> |
| 2. Associate Institutional Member:                   | <b>Rs. 5,000/-</b>  |
| 3. Associate Academic Member: (Colleges and Schools) | <b>Rs. 2,000/-</b>  |
| 4. Individual Member: <b>Life Membership</b>         | <b>Rs. 1,200/-</b>  |

5.	Corporate Membership:	(One-Time Payment)
	-Multinational Companies (MNC):	Rs. 40,000/-
	-Companies having several branches in India:	Rs. 25,000/-
	-Booksellers:	Rs. 10,000/-

#### **Administration of ADINET:-**

The apex body of ADINET is the Governing Council which is headed by a Chairman. The day to day administration of ADINET is looked after by an Executive Committee, which consists of Chairman, Director and Secretary.

#### **For more information please contact:**

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Visit ADINET Website : <http://www.alibnet.org>

for latest news & activities of ADINET

# **Information and Library Network Centre**

## **1. Introduction**

The INFLIBNET Centre is an IUC of the UGC located at the Gujarat University Campus, Ahmedabad. Major activities and services of the Centre are set towards modernization of academic libraries and information centres, to promote information transfer and access, to support scholarship, learning and academic pursuits. The Centre acts as a nodal agency for networking of libraries and information centres in universities, institutions of higher learning and R & D institutions in India. The Centre was established as an independent IUC of UGC in May 1996.

## **2. Mission and Vision**

- To usher the country in the era of Information Technology allowing the academic and research community to derive its benefits. To create a wave of awareness through out the country about IT;
- To improve capability in information transfer and access, that provides support to scholarship, learning, research and academic pursuits;
- To carry out modernization of libraries and information Centres in the country, with application of computer and communication technologies; and
- To promote and steer a cooperative endeavor in resource development, sharing and its utilization at national level using the IT enabled services.

## **3. Aims and Objectives**

The major objectives of the Centre as per MoA are as follows:

- a) To promote and establish communication facilitates to improve capability in information transfer and access that provide support to scholarship, learning, research and academic pursuits through cooperation and involvement of concerned agencies;
- b) To establish information and library network - a computer communication network for linking libraries and information centers in universities, deemed to be universities, colleges, UGC information centers, institutions of national importance and R&D institutions, etc. avoiding duplication of efforts.

## **4. Physical Infrastructure**

The INFLIBNET Centre is located at Gujarat University Campus since 1992. The Govt. of Gujarat has allotted a piece of land measuring 10,000 sq. mtrs free-of-cost to the UGC for constructing permanent building of the Centre at Infocity, Gandhinagar during 2006.

## **5. Scientific and Technical Activities**

### **5.1 Database Management**

The Centre is involved in database management activities and developed union catalogues of library resources available in Indian universities. The databases are accessible free-of-cost through in-house developed search interfaces at <http://www.inflibnet.ac.in>. The major union databases are books (79,98,450 records),

theses (2,20,206 records), current serials (13,881 records), serials - unique (14,500 records), serials – holdings (50,164 records), subject experts – university (15,800 records), subject experts – NISSAT (24,000 records) and research projects (10,000 records).

## **5.2 Software Development**

Software R&D and Database R&D Groups of the Centre are involved in the software development. Database R&D Group is involved in software applications for union catalogues activities. The Software R&D Group has developed SOUL integrated library management software for automating the academic libraries. The Unicode based new version of the SOUL software will be released very soon which supports MARC21 and RFID. The software has more than 1538 installations across the country.

## **5.3. Bibliographic Standards, Formats and Protocols**

Bibliographic standards and protocols are backbone of any bibliographic databases and related software. Utmost efforts from the Centre are being made to implement all recognized international standards such as Unicode, MARC21, AACR2, ISO2709, RFID etc. in to the products of the Centre. In this regards, the Centre participates in the activities of NISO, ISO and BIS as its member.

## **5.4. UGC-Infonet Internet Connectivity Programme**

149 universities have been provided Internet bandwidth ranging from 256 Kbps to 2 Mbps using Broadband LL / SCPC / DAMA / FTDMA / RF Open Network Architecture. The UGC-Infonet is based on open IP platform, employing state-of-the-art technologies like IP Multicast, TCP spoofing and other Internet tools that provide interactive education on PC or TV, enabling on-line response to queries. Open systems architecture ensures support for current and future applications.

## **5.5. UGC-Infonet Digital Library Consortium**

The UGC-Infonet Digital Library Consortium provides current and archival access to more than 5000 core and peer-reviewed journals and nine bibliographic databases from 23 publishers and aggregators in different disciplines. At present 120 universities funded by UGC have been provided access of subscribed e-resources on all disciplines. Under the consortium, the Centre has also initiated ILL through JCCC service provided by 22 identified university libraries. The JCCC provides article-level access to all the journals subscribed by the UGC-Infonet Digital Library Consortium and journals subscribed by 22 university libraries.

## **5.6 Human Resource Development and Consultancy**

Several training programmes, workshops and seminars focusing on the managing automation and networking have been conducted so far. Training programmes in the name of IRTPLA, User Awareness Programme on E-Resources, etc. have been conducted across the country in collaboration with the universities. National and International Conventions called PLANNER and CALIBER are also part of the human resource development activities of the Centre. The Centre has also conducted 70 Training Programmes on SOUL installation and operations for libraries.

## **6. Publications of the Centre**

The Centre brings out the following publications regularly:

- INFLIBNET Newsletter (Quarterly)
- Guidelines for Data Capturing: A Manual
- Proceedings of the CALIBER and PLANNER (Annual)
- Information Brochures on INFLIBNET
- Course Materials on Various Workshops and Training Programmes
- Annual Reports
- INFLIBNET Diary with Directory of Indian Universities
- NUCSSAL: National Union Catalogue of Serials in Academic Libraries

#### **7. IR @ INFLIBNET (<http://dspace.inflibnet.ac.in>)**

The Centre has institutional repositories called IR@INFLIBNET available at <http://dspace.inflibnet.ac.in>. The papers published in CALIBER and PLANNER proceedings are uploaded in the repository. It also includes Course Materials, Newspaper Clippings, etc.

#### **8. Special Drive for North-East and Jammu & Kashmir**

Under the special drive for automation of college libraries in the NE region, the Centre has distributed SOUL software to 49 college libraries under this programme.

#### **9. Associate Members**

On receiving the request from the non-consortium members for e-journal access, the Centre has opened the Associate Membership Programme.

For more Information, please visit the website at <http://www.inflibnet.ac.in> or contact Dr. Jagdish Arora, Director, INFLIBNET Centre at [director@inflibnet.ac.in](mailto:director@inflibnet.ac.in)

### **Ahmedabad Management Association (AMA)**

A pioneer in the management movement in the country, Ahmedabad Management Association (AMA) has been contributing to management profession and the society through its various educational, training and research activities. Established under the inspiring leadership of late Dr. Vikram A. Sarabhai and other professionals, AMA is an independent, non-profit, registered Charitable institution and a Society. For its over 370 institutional and 2500 professional manager members and other entrepreneurs and businessmen, AMA has been providing a regular forum to interact and enrich knowledge and experiences in management through its various educational and professional activities.

AMA is one of the promoters and founder member of All India Management Association, the apex body for management profession in India, and has been collaborating and participating in all its educational and professional activities offered throughout the country. AMA has received 14 times (1990 to 2008) the Best Local Management Association Award Category-I by the All India Management Association for its Outstanding Contributions in professional management. AMA is also an ISO 9001 certified organization and an approved institute for Management Training by Government of Gujarat. 

# KEYNOTE ADDRESS

## LIBRARY 2.0 INNOVATIVE TECHNOLOGIES FOR BUILDING LIBRARIES OF TOMORROW Jagdish Arora<sup>1</sup>

### 1. Introduction

The Internet and web technology has changed the way people communicate, interact, acquire, share knowledge, search, investigate and participate in the creation and re-use of content. However, when the Web was created originally, it did not have features and facilities for users to interact. In other words, Web 1.0 began as a platform for businesses and organizations to broadcast information to the people. With evolution in Internet and communication technology, Web 2.0 evolved into a dynamic, interactive and collaborative platform that facilitates exchange of information and knowledge amongst users. These features facilitate integration of people and the Web, and thus is the backbone of the Web 2.0. In Web 1.0 environment, users read what others wrote. However, now Web 2.0 facilitates users to express their views and publish them online through services like blogs and wikis. In other words, migration from Web 1.0 to Web 2.0 is essentially characterized by movement from “read-only” web to “read-and-write” web.

The phrase “Web 2.0” has become very popular. It has found its applications in several spheres of activities, which, in turn, led to evolution of concepts like Business 2.0, Travel 2.0, Library 2.0, Librarian 2.0, etc. As such, the concept of Library 2.0 is borrowed from that of Web 2.0 and follows some of the same underlying philosophies.

### 2. Web 2.0: Definition

Web 2.0 is the label attached to new capabilities and services offered by the second generation World Wide Web (WWW) that facilitate online collaboration and sharing among users. These capabilities include social networking, wikis, instant messaging and social tagging.

Tim O'Reilly and Dale Dougherty O'Reilly (2005), responsible for coining the term Web 2.0 define it as “applications that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better as more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects

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<sup>1</sup> Dr.Jagdish Arora, Director, INFLIBNET Centre, Ahmedabad, Gujarat  
E-mail: jarora2@hotmail.com.

through an “architecture of participation”, and going beyond the page metaphor of Web 1.0 to deliver rich user experiences”.

### **3. Library 2.0: Definition**

Although one concise definition will never fit Library 2.0, it can loosely be defined “as a model for a modernized form of library service that reflects a transition within the library world in the way services are delivered to users”. Library services, in Library 2.0, are constantly updated and re-evaluated to best serve library users. Library 2.0 also attempts to harness the library user in the design and implementation of library services by encouraging feedback and participation. Proponents of this concept expect that ultimately the Library 2.0 model for service will replace traditional, one-directional service offerings that have characterized libraries for centuries (Wikipedia, 2008).

The term Library 2.0, first coined by Michael Casey in 2006 on his blog LibraryCrunch, refers to a number of social and technological changes that are having increasing impact upon libraries, its staff and their clientele, and how they could interact. The application of concepts and technologies of Web 2.0 applied to the library services and collections is named as “Library 2.0”. It is a concept that defies new genera of library services geared towards the needs and expectations of today’s library users.

### **4. Tools and Techniques**

Conceptually speaking, Library 2.0 is independent of technology given the fact that every library activity designed or built with active participation and feedback of its user community qualifies to the concept of Library 2.0. However, Web 2.0 technologies can help libraries to create collaborative and participative environment that is necessary to deliver user-centric library services and to create new resources and build-upon existing ones using collective intelligence of users. Availability of technologies gives libraries the ability to offer improved, customer-driven services to their users. Tools and techniques used for evolving Library 2.0 environment can broadly be grouped into five categories as described below:

#### **4.1. Synchronous Communication**

##### **4.1.1. Instant Messaging (IM)**

Instant messaging or IM is a form of real-time, virtually instantaneous communication between two or more people using textual format. Libraries are already deploying IM for providing “real-time reference” services, where patrons can synchronously communicate with librarians much as they would in a face-to-face reference context. Software used in libraries for “live reference services” are usually much more robust than the simplistic IM applications. This software often allows co-browsing, file-sharing, screen-capturing, and data sharing and mining of previous transcripts. Libraries are already offering live reference service using

IMs 24x7x365 in a collaborative fashion. Libraries can benefit greatly by adopting this technology as it evolves since it facilitates reference services in an online mode quite similar to traditional reference services of the physical library.

## **4.2. Content Delivery**

### **4.2.1. RSS Feeds**

RSS stands for Real Simple Syndication or Rich Site Summary. The technology, on one hand allows a web site (or e-publisher) to list the newest published updates (like table of contents of journals, new articles) through a technology called XML; on the other hand, it facilitates a web user to keep track of new updates on chosen website (s). Like a personal search assistant, RSS feed readers visit pre-defined web sites, look for updated information and fetch it automatically on to the user's desktop. It provides users a way to syndicate and republish content on the Web. Users republish content from other sites or blogs on their sites or blogs, aggregate content on other sites in a single place, and ostensibly distil the Web for their personal use. Such syndication of content is another Web 2.0 application that is already having an impact on libraries, and could continue to do so in remarkable ways. Libraries are already creating RSS feeds for users to subscribe to, including updates on new items in a collection, new services, and new content in subscription databases. They are also republishing content on their sites.

### **4.2.2. HTML Feeds**

HTML feeds are basically RSS feeds converted into HTML codes so as to facilitate peer-to-peer interaction amongst researchers and sharing of RSS search results. The HTML codes can be placed onto the web sites and the resulting HTML feed can be customised to compliment the page. HTML feeds allows quicker access information to visiting users. The Elsevier Science has implemented HTML feeds for Scopus, the citation database from Elsevier.

### **4.2.3. Streaming Media**

Streaming multimedia is sequential delivery of multimedia content over a computer network that is displayed (or played back) to the end-user as it is being delivered by the provider. The streaming of video and audio media is an important application that existed before Web 1.0 and finds its application in Web 2.0 too.

With availability of computer and network infrastructure to support multimedia streaming, library instruction delivered online began incorporating more interactive, media-rich facets. The static, text-based tutorials are being transformed to multimedia-based interactive tutorials. Several tutorials use Flash programming, screen-cast software, or streaming audio or video, and couple the media presentation with interactive quizzing; users respond to questions and the

system responds in kind. Tutorials were the first library applications to migrate into more socially rich Web 2.0.

Besides its applications in computer-generated instructions, streaming media would also be available increasingly in its collections. As media is created, libraries will be responsible for archiving and providing access to them. Libraries are already beginning to explore providing such through digital repository applications and digital asset management technologies.

#### **4.2.4. Podcasting**

The word “pod casting” is derived from two words, namely “broadcasting” and “iPod” (popular MP3 player from Apple Computer). Pod casting is defined as “process of capturing audio digital-media files that can be distributed over the Internet using RSS feeds for playing-back on portable media players as well as computers. Users can subscribe to such feeds and automatically download these files directly into an audio management program on their PCs. When a user synchronizes their portable audio device with their personal computer the podcasts are automatically transferred to that device to be listened to at the time and location most convenient for the user (Wikipedia, 2008).

A podcast is distinguished from other digital media formats by its ability to be syndicated, subscribed to, and downloaded automatically when new content is added, using an aggregator or feed reader capable of reading feed formats such as RSS or Atom. Several libraries use podcasts to support library orientations programmes. Taking advantage of podcasting and other consumer technologies (e.g., PDAs, iPods and other MP3 players) as a deliver media of Library’s content and services is a great leap forward for library profession.

#### **4.2.5. Vodcasting**

The “VOD” in Vodcasting stands for “video-on-demand”. It is identical to podcasting. While podcasting is used for delivering audio files, vodcasting is used for delivering video content. Like podcast content, vodcasts content can be played either on a laptop or on personal media assistant(PMA).

#### **4.2.6. SMS Enquiry Service**

Short Message Service (SMS) is a mechanism of delivery of short messages over the mobile networks. The SMS enquiry services in a library allow patrons to use their mobile phones to SMS their inquiries to the library. The reference staff deployed to attend to such queries can respond immediately with answers or with links to more in-depth answers.

### **4.3. Collaborative Publishing Tools**

### **4.3.1. Blogs**

A blog (an abridged form of term web log) is a website, usually maintained by an individual, with regular entries of commentary, descriptions of events, or other material such as graphics or video. Entries are commonly displayed in reverse chronological order (Wikipedia, 2008). Blogs are considered as lightweight publishing tools. Blogs provide control to an individual or group of individuals for publishing contents or making commentary on it. Technologically, blogs are easier to use, platform-independent, and accessible online over the Internet. Broadly, blogs can be said to be online dairies, however, thousands of blogs are maintained by experts in different subject areas who are willing to share their knowledge, understanding and opinions with other people. Michael Casey, who coined the term “Library 2.0”, for example maintains a blog called Library Crunch on Library 2.0.

The most obvious application of blogs for libraries is to use it as a tool for promotion, publicity and for outreach services. Libraries can disseminate information to their users; make announcements for its new resources and events through its blogs. Blogs can be used to initiate debates and interaction amongst users and staff. Moreover, library staff and user can be encouraged to use Library blogs to get to know each other and interact at personal level.

### **4.3.2. Wikis**

A wiki is a collection of web pages designed to enable anyone who accesses it to contribute or modify content, using a simplified mark up language. Wikis are often used to create collaborative websites and to power community websites (Wikipedia, 2008). For example, the collaborative encyclopaedia, Wikipedia is one of the best-known wikis, that has broken down one of the golden rules of librarianship, i.e. content validation and authenticity of information. Wikis are also used in businesses to provide affordable and effective Intranets and for knowledge management. Ward Cunningham, developer of the first wiki software, WikiWikiWeb, originally described it as “the simplest online database that could possibly work” (Wikipedia, 2008). Wikis can essentially be equated to open web-pages, where anyone registered with it can publish on to it, add to it, amend it and change it. As in case of blogs, Wikis do not have reliability as traditional resources. In spite of this, their value as information resource cannot be undermined.

Libraries can use wiki as a communication tool to enable social interaction among librarians and patrons. Users can share information, ask and answer questions, and librarians can do the same within a wiki. Moreover, a record of these transactions can be archived for perpetuity. Transcripts of such question-answer sessions would serve as a resource for the library to provide as reference. Furthermore, wikis (as well as blogs) will ultimately evolve into a multimedia environment, where both synchronous and asynchronous audio and video collaborations will take place.

## **4.4. Collaborative Service Platforms**

### **4.4.1. Social Networks**

A social network service is web-based software that facilitates creation of virtual social networks for communities of people who share interests and activities or who are interested in exploring the interests and activities of others (Wikipedia, 2008). Most social network services are web-based interfaces that facilitate community of users to interact with each other deploying tools such as chat, messaging, email, video, voice chat, file sharing, blogging, discussion groups, etc.

MySpace, FaceBook, Del.icio.us, Frappr, and Flickr are some of the social networking services that are very popular. While MySpace and FaceBook enable users to share themselves with one another (detailed profiles of users' lives and personalities), Del.icio.us enables users to share Web resources and Flickr enables sharing of pictures. Frappr is a blended network that facilitates use of maps, chat rooms, and pictures to connect individuals.

Social networking services could enable librarians and patrons not only to interact, but to share and exchange resources dynamically in electronic environment. Users can create accounts with the library network service; see what other users have in common to their information needs, recommend resources to one another. Besides, libraries can also recommend resources to users through their network, based on similar profiles, demographics, previously-accessed resources, and a host of data that users provide.

### **4.4.2. Tagging**

A tag is a keyword or term or subject heading assigned to a piece of information (a picture, a geographic map, a blog entry, a video clip etc.), thus describing the item and enabling keyword-based classification and search of information. Tags are usually chosen informally and personally by author / creator or by its consumer/viewers/community. Tags are typically used for resources such as computer files, web pages, digital images, and Internet bookmarks (Wikipedia, 2008).

While cataloguing is a fundamental skill of librarians, but the art of tagging is essentially a prerogative of user which enables them to assign keywords to a piece of information or object. The user can define and categorize information based on his or her own perception of given piece of information. In Library 2.0, users could tag the library's collection and thereby participate in the cataloguing process. The best thing about tagging is that everyone is allowed to categorize the information the way they want.

The catalogues of Library 2.0 would enable users to follow both standardized and user-tagged subjects, whichever is more convenient or makes better sense to a user. In turn, they can add tags to resources. The user

responds to the system, the system to the user. This tagged catalogue would be an open catalogue, a customized, user-centred catalogue. The University of Huddersfield, West Yorkshire, UK, for example, has introduced Web 2.0 features into their library catalogue and options for rating the books as well as dynamic floor plans showing locations of subject areas with an aim to make the catalogue more interactive tool.

#### **4.4.3. Social Bookmarking Services**

Social bookmarking is a method of storing, organizing, searching and managing bookmarks of web sites using descriptive metadata. In a social bookmarking system, users can save links to web pages that they want to remember and /or share with other users. These bookmarks can be made public, or saved privately or shared only with specified people or groups of people. The authorized people can usually view these bookmarks chronologically, by category or tags, or via a search engine (Wikipedia, 2008).

Most social bookmark services encourage users to organize their bookmarks with informal tags instead of traditional browser-based system of folders, although some services feature categories / folders or a combination of folders and tags. These services also enable viewing of bookmarks associated with a chosen tag, and include information about the number of users who have bookmarked them. Some social bookmarking services also draw inferences from the relationship of tags to create clusters of tags or bookmarks.

itList, Blinklist, Clip2, ClickMarks, HotLinks, del.icio.us, Furl, Simpy, Citeulike and Connotea, Stumbleupon, Ma.gnolia, Blue Dot, Diigo, etc. are some of the popular bookmarking services.

Libraries can make use of social bookmarking sites using RSS feeds for subject disciplines or in areas of specialization relevant to them.

#### **4.5. Hybrid Applications, Programs and Programming Tools**

Mashups, Ajax, API and Library toolbar are applications that can be deployed effectively to implement Library 2.0 features into a traditional library.

##### **4.5.1. Mashups**

A mashup is a web application that combines data from more than one source into a single integrated tool. Mashup originally referred to the practice in pop music (notably hip-hop) of producing a new song by mixing two or more existing pieces. Content used in mashups is typically sourced from a third party via a public interface or API (web services). Other methods of sourcing content for mashups include Web feeds (e.g. RSS or Atom), and screen scraping. Many people are experimenting with mashups using Amazon, eBay, Flickr, Google, Microsoft, Yahoo, YouTube and APIs, which has led to the creation of the mashup editor (Wikipedia, 2008).

Mashup is a hybrid of blogs, wikis, streaming media, content aggregators, instant messaging, and social networks. Mashups are applications, where two or more technologies or services are merged into a completely new, novel service. Retrivr, for example, merges the functioning of Flickr's image database and an experimental information architecture algorithm to enable users to search images not by metadata, but by the data itself. Users search for images by sketching images. Another example is WikiBios, a site where users create online biographies of one another, essentially blending blogs with social networks.

Mashup in Library 2.0 environment remembers a user when they log in. It allows the user to edit OPAC data and metadata, saves the user's tags, IM conversations with librarians, wiki entries with other users (and catalogues all of these for others to use), and the user is able to make all or part of their profile public; users can see what other users have similar items checked-out, borrow and lend tags, and a giant user-driven catalogue is created and mashed with the traditional catalogue.

There are a number of mashup platforms that can be used to create mashups, e.g. Intel Mash Maker, Google Mashup Editor, LiquidApps, Microsoft Popfly, Serena Mashup Editor, Yahoo pipes, etc.

#### **4.5.2. Ajax (Asynchronous JavaScript and XML)**

Ajax (Asynchronous JavaScript and XML), or AJAX, is a group of inter-related web development techniques used for creating interactive web applications. The technology facilitates web pages to interact with users by exchanging small amounts of data with the server "behind the scene" so that entire web pages do not have to be reloaded each time there is a need to fetch data from the server. This is intended to increase the web page's interactivity, speed, functionality and usability (Wikipedia, 2008).

Ajax is a cross-platform technique usable on many different operating systems, computer architectures, and web browsers as it is based on open standards such as JavaScript and the Document Object Model (DOM). There are free and open source implementations of suitable frameworks and libraries.

#### **4.5.3. Application Programming Interface (API)**

An application programming interface (API) is a source code interface provided by an operating system, library or service to support requests made by computer programs. Language-dependent APIs are available only in a particular programming language. They utilize the syntax and elements of the programming language to make the API convenient to use in this particular context. Language-independent APIs are written in a way that they can be called from several programming languages. This is a desired feature for a service style API which is not bound to a particular process or system and is available as a remote

procedure call. Examples of API are Windows API, Scopus API that enables a user to select Scopus data elements to your own mashups.

#### **4.5.4. Library Tool Bars**

A toolbar is a graphical user interface consisting of a panel of buttons, icons, menus or commands that are used more often in an application. Toolbars are used in common applications such as Microsoft Word, and as add-ons for web browsers such as Internet Explorer and Mozilla Firefox. The INFLIBNET Centre has recently developed its tool bar to show-off its e-resources, databases, products and services.

### **5. Transformation from Library 1.0 to Library 2.0**

Traditional libraries maintain their resources, authorities, information on the shelves or behind a login that are known and managed by librarians. Collection (print or electronic) in libraries is catalogued and classified and made accessible through Library OPAC to users to explore. Users are given open access to these resources within libraries, they are also allowed to borrow these resources to be returned for someone else to use. In Library 2.0, however, the content and information can come from the patrons also. Although, traditional libraries maintain manuscripts and unpublished works by local authors and researchers, but it did not have a way to provide a platform to their users to publish their own ideas, thoughts, and experiences. With availability of technological solutions, libraries are now adopting tools and techniques to collaborate with its community with an aim to preserve its collective knowledge and experience.

The librarians, being the earliest inhabitants on the web, following their professional instincts and immediately began to create subject gateways for all sorts of subjects. However, most of what libraries adopted during the early days of Web was static. The Library web sites consisted of a number of static web pages with provision of e-mail-based "feedback". Although, the online public access catalogues (OPACs) facilitate users to search for information, they do not have more dynamic features like Amazon.com offers. Similarly, the first generation of online library instruction was provided via text-based tutorials that are static and do not respond to users' needs nor allow users to interact with one another. These tutorials are now evolving into more interactive, media-rich tutorials, using animation programming and more sophisticated database quizzes. The librarians and libraries should recognize the fact that Internet and search engines are now the main source of information for users. Instead of trying to change the behaviour of users, the libraries should change its approach and deliver their services through Internet using tools users enjoy the most. Besides, Library 2.0 also recognizes that human beings do not seek and utilize information as individuals, but as communities.

The best conception of Library 2.0 would be a social network interface that a user designs him / her-self. It is a personalized OPAC that includes access to IM, RSS feeds, blogs, wikis, tags, public and private profiles within the library's

network. It is virtual reality of the library, a place where one can not only search for books and journals, but interact with a community, a librarian, and share knowledge and understanding with them. Library 1.0 moved collections and services into the online environment, and Library 2.0 will move the full suite of library services into this electronic medium. The library has had a web-presence for many years, and with Library 2.0, its patrons will be joining it.

Some examples of the move from Library 1.0 to Library 2.0 include:

<b>Library 1.0 Services and Applications</b>	<b>Library 2.0 Services and Applications</b>
Digital reference service (email-based)	Real-time reference service using Instant messaging
Selective Dissemination of Information (SDI)	Personalization (RSS Feeds, HTML Feeds, Atom)
Text-based tutorials	Multimedia tutorials (Streaming media)
Mailing Lists, Listservs	Blogs and Wikis
Catalogue of reliable subscribed print or electronic collections	Catalogue of reliable subscribed print or electronic collections as well as web pages, blogs, wikis, etc.
OPAC	Personalized social network infrastructure
Taxonomies (classification)	Folksonomy (Tagging)
Controlled classification schemes	Tagging
Encyclopaedia	Wikipedia
Content Management System	Wikis, Wikipedia
Information as commodity	Information as conversations
Integrated Library System as core operation	User service as core operation
Address books, Contact lists	Online social networks
Authenticated and validated print and e-resources	Resources created by people through their collective intelligence on blogs and wikis
Delivery mechanism: Library (physical) + Internet	Delivery through Internet using wikis, blogs, podcasting, etc.

## 6. Conclusion

The concept of Library 2.0 is borrowed from that of Web 2.0 and Business 2.0 and follows some of the same underlying philosophies. Library 2.0 encompasses a range of new and not-so-new technologies tools and techniques used for evolving Library 2.0 environment. These tools and techniques are useful for many libraries in providing new services and making existing services available in new and interesting ways. Library 2.0 also encompasses a set of concepts

about library services, several of them are not exactly new. Implementation of some of these tools and techniques are likely to improve reputation and standing of libraries in the community. Some of them may successfully attract new patrons to the library, others may help to retain existing members or make libraries even more important as centres of the culture and history of their cities and academic institutions. These new services and ongoing changes are likely to make libraries more interesting, more relevant, and better acceptable place. However, methodologies, applications and concepts will continue to change within libraries.

Library 2.0 proposes to bring revolutionary changes in libraries that are bound to bring about conceptual, cultural and physical changes in libraries to keep pace with the changes in communities and their information seeking behaviour. Applications of Web 2.0 technologies in libraries will result in a meaningful and substantive change in libraries, its collection, services and methods of delivery of services. The library's collection will change, becoming more interactive and fully accessible. The library's services will change, focusing more on the facilitation of information transfer and information literacy rather than providing controlled access to it. The implications of these revolutionary technologies are enormous. Librarians are only beginning to acknowledge and adopt some of these technologies into their libraries.

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# THE DEEP WEB

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## Abstract

*Web has been growing at an exponential rate since 1990s. Traditional search engines search only the surface web which can be traversed by its crawlers and thus indexable. The Deep Web also called the invisible web is that portion of the Web which is hidden from the Web users because traditional search engines cannot access them. This hidden portion of the web is 550 times bigger than the surface Web. Ninety five percent of this Deep Web is free. The present paper defines the Deep Web and explores the importance of the Deep Web for the librarians. The paper presents 30 tools to search this Deep Web which can be effectively used by the librarians to improve their information services.*

**Keywords:** Deep Web, Invisible Web, Search Engines.

## Introduction

World Wide Web is often thought of as a synonym to Internet by most people. Basically through the HTTP protocol, created by Tim Berners-Lee, it links one document to the other and can be accessed on the Internet. Berners-Lee created it in 1989 at CERN in Geneva, Switzerland so that researchers at CERN could share their documents from different computer systems. So with the creation of Hyper Text Markup Language and the launch of World Wide Web in 1992, navigating the Internet became much easier. Ever since then, the Web has been growing at an exponential rate.

## What is the deep web?

That portion of the Web which is hidden from the web users because traditional search engines cannot access them is called the deep web. The deep web is also called as 'the invisible web' or 'the hidden web'. The term 'invisible web' was first coined by Jill Ellsworth in 1994 to refer to those sites which are not visible because they did not register themselves with any of the search engines.<sup>i</sup> According to Wikipedia "The deep Web (also called Deepnet, the invisible Web, or the hidden Web) refers to World Wide Web content that is not part of the surface Web, which is indexed by search engines."<sup>ii</sup> Here the surface Web means that part of the web which is indexed and thus searchable by traditional search engines. Some call this as the visible web.

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Michael K. Bergman in his famous white paper captured the significance of the deep web when he said that, "Searching on the Internet today can be compared to dragging a net across the surface of the ocean. While a great deal may be caught in the net, there is still a wealth of information that is deep, and therefore, missed."<sup>iii</sup> He further explains that many sites are dynamically generated and thus traditional search engines can never find them.

Conventional search engines use programmes called crawlers that traverse the web continuously and prepare a search index. These crawlers reach the pages through the hypertext links. Therefore those web pages that require authorization or are not linked through any hypertext are not reachable by the traditional search engines. Even Google which has today become a synonym for searching is all about links. Larry Page who created it along with Sergey Brin in 1996, "reasoned that the entire Web was loosely based on the premise of citation and annotation- after all, what was a link but a citation, and what was the text describing that link but annotation?"<sup>iv</sup> Thus he devised a crawler that could count and qualify each backlink on the Web. Google which has transformed into a remarkable organization which is visited by millions of people everyday perhaps indexes "no more than sixteen per cent of the surface Web."<sup>v</sup> This was a figure given in 2001 and now in 2008 it most certainly would have gone up yet it is so less. Also this excludes the deep web. So it remains to be seen how big is the Deep Web?

### **Why is it important for librarians to know about the deep web?**

Libraries and librarians have all along been collecting and disseminating documents and information in whichever form and media human beings recorded them. Thus keeping with the philosophy of librarianship, librarians have accepted and absorbed the electronic resources in the libraries. Especially from 1990s when search engines like Alta Vista, Excite, Northern Light and Google made searching the Web easy, librarians and reference librarians in particular are extensively using the Internet resources to disseminate information to their users. Hence the Deep Web is of special concern to the librarians. The discussion to follow explains why understanding the Deep Web is important for librarians.

- The content on the Deep Web is immense and appears to be beyond measure. Yet attempts have been made to measure it. Bergman writes that BrightPlanet made an attempt to quantify the size of the Deep Web in March 2000 and they found that it is 400 to 550 times larger than the surface Web. The deep Web contains 7,500 terabytes of information and 550 billion individual documents. Whereas the surface Web which most search engines search have only 19 terabytes of information and only one billion individual documents<sup>vi</sup>. So no librarian can ignore that portion of the Web content which is nearly 550 times larger than the surface Web. According to yet another study the deep Web contained 900 billion pages of information in January 2006 and in contrast Google had indexed just 25 billion pages by then<sup>vii</sup>. So librarians cannot ignore the 875 billion pages of information that constitutes the Deep Web.
- Not only the quantum but the constitution of the Deep Web is of equal concern to the librarians. The content of the deep Web includes the databases of private organizations, academic institutions like colleges and universities, government agencies etc which were not created for public access. Many commercial databases like the databases of the electronic publishers are available only to

subscribers. Similarly the databases of libraries, movie databases and music databases are not searchable through conventional search engines. Also websites that generate dynamic pages through Common Gateway Interface (CGI) or Active Server Pages (ASP) are not indexed by the conventional search engines. The information contained in these databases is searchable only by use of keywords in the query engines located on these websites.

- Yet another reason why the Deep Web is important for the librarians is that the quality of information content on the Deep Web is far superior to the surface Web. This is because the Deep Web consists of major authoritative websites. Bergman writes, "Total quality content of the Deep Web is much greater than that of the surface Web. Deep Web content is highly relevant to every information need, market and domain. More than half of the Deep Web content resides in topic specific databases."<sup>viii</sup>
- Besides the quantity, constitution and quality, the Deep Web is also growing at a faster rate than the surface Web. Faster growth leads to greater information content and hence should be of greater importance to the librarians. Bergman's study also states that "The deep Web is the largest growing category of new information on the Internet<sup>x</sup>." It means it is the Deep Web that would continue to dominate Internet in future.
- Librarians indeed are subscribing to e-journals and other electronic databases which constitute the part of the Deep Web. However what is important to know is that 95% of the Deep Web is free and publicly accessible and one does not have to pay for it.<sup>x</sup>

### **Tools through Which the Deep Web can be accessed by Librarians**

It is clear from the above discussion that the Deep Web is more useful for serious researches. So, the value of the Deep Web content is immense to librarians to serve their users effectively. Hence, it becomes extremely crucial for librarians to know how to access this mass of information that resides in the Deep Web. Many companies like the Bright Planet are extending solutions to this problem. Many researchers are also presenting solutions; Raghavan and Garcia-Molina<sup>xi</sup> have introduced a hidden web crawler, Ntoulas<sup>2</sup> have also worked on building an effective hidden web crawler. Many meta search engines have been built for this purpose. A list

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<sup>2</sup> Ntoulas, Alexandros, Zerkos, Petros and Cho, Junghoo. (2005). Downloading textual hidden Web content through keyword queries. *JCDL* June 7-11, 2005.

of thirty tools to search the Deep Web is listed below arranged in an alphabetical order with some annotations.

### ***BEAUCOUP***

It is a collection of over 2,500 searchable databases and search engines. It contains free information sources in the areas of computer, software, employment, society, geography, health, business & money, media, people, reference & education, sciences, family, pets, hobbies etc.

### ***BLOOMSBURY RESEARCH CENTRE***

This meta site covers dictionaries, quotations and literary reference works. It also links to gateways, awards and festivals and book trade information. It is useful to all those who are interested in writing and literature. It is provided by Bloomsbury Publishers, London.

### ***BUSINESS.COM***

It contains Web pages on 64,000 plus public, private and international companies. It is extremely useful for business information. It is useful especially for information related to marketing, human resource, business travel and consumer services.

### ***COMPLETEPLANET***

Highly topical information like energy or agriculture or food or medicine from rich content sites can be found from Complete Planet which is developed by Bright Planet. It is a public service to the Internet users. The databases it searches are extremely valuable.

### ***DIRECT SEARCH***

This is compiled by Gary Price. It provides links to the search interfaces of resources that contain data not entirely searchable by traditional search engines. It is updated daily. It also provides search access to streaming media: news & public affairs resources.

### ***DIRECTORY OF OPEN ACCESS JOURNALS***

This directory covers free and full text scientific and scholarly journals that are peer reviewed or editorial quality controlled. As of now 3414 journals are there in the directory out of which 1161 journals are searchable at article level. It also accepts free user registration online.

### ***DISINFORMATION***

This extremely interesting website launched in 1996 collects and indexes the most "hidden" and subversive material on the Web. It is a popular alternative news culture on the Web.

### ***DMOZ.ORG***

This Open Directory Project is a comprehensive human-edited directory of the Web created and maintained by librarians especially a community of volunteers. It is

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becoming a definitive catalogue of the Web. This free directory provides reviewed, quality websites and databases by subject area.

### ***ERIC***

ERIC is sponsored by the U.S. Department of Education and provides free access to more than 1.2 million bibliographic records of journal articles to education literature. It also provides links to full text of the articles wherever available.

### ***FLIPPER***

Fipper is for news and e-commerce. The popular categories in it are [finance](#), lifestyle travel, home, business and entertainment .

### ***GENIUSFIND***

It is a directory of search engines, databases and archives. It is organized into categories and subcategories for ease in searching.

### ***HEALTHFINDER.GOV***

This website was developed in 1997 by the U.S. Department of Health and Human Services together with other Federal agencies. This site is developed for consumers to find the key government and nonprofit health and human services information on the Internet. It covers over 1,500 health-related organizations. It does not accept paid advertisement or links. It is supported by the U.S. government funds.

### ***INCYWINCY***

This Web Search Engine covers over 100,000 databases. Hundreds of thousands of search engines are indexed and searchable through Incywincy. It presents search engines as 'related searches' on search result and directory pages.

### ***INFOMINE***

INFOMINE is built by librarians and maintained by University of California. It is a virtual library of Internet resources useful for research. It contains databases, electronic journals, electronic books, bulletin boards, mailing lists, online library card catalogues, articles, directories of researchers etc.

### ***INTERNET.COM***

It is an extremely useful gateway covering all operating systems, markup languages, wireless, downloads, developers, IT security, networking and much more. It is very comprehensive and up-to-date.

### ***INTERNET PUBLIC LIBRARY***

This is a public service organization founded at the University of Michigan, School of Information. It is now developed and maintained by a consortium of colleges and universities with programmes in information science. It is an excellent source for public library needs. It is also good for exhibits, news and youth collections.

### ***INTUTE***

Intute is a free online service that provides resources for education and research which are evaluated by experts. The service is created by a network of UK universities and other partners. Subject-specific and cross-subject resources can be accessed through

it. It has four subject groups viz., Arts & Humanities, Health & Life Sciences, Science Engineering & Technology and Social Sciences.

### ***LIBRARIANS INTERNET INDEX***

It is a publicly-funded website which started from California and now it serves the whole world. It has over 20,000 entries carefully selected and organized by librarians into 14 main topics and nearly 300 related topics. Users can also subscribe to its free newsletter. It is very reliable and gives access to high-quality websites.

### ***MARTINDALE'S REFERENCE DESK***

It is maintained by James Martindale. It is a gateway to excellent sources in a wide range of reference topics. It is strong in sciences and health sciences. It also has a health Science Guide 2008.

### ***NEWPAGES***

It is an important website for students, writers, readers, and editors. It has information on independent bookstores, independent publishers, literary periodicals and newswEEKlies. It is rated high by its users.

### ***RUTGERS UNIVERSITY RESEARCH GUIDES: SOCIAL SCIENCE AND LAW***

This site is a very good source for Environmental Studies, Women's Studies, Latin American Studies, Library & Information Science and Alcohol Studies. It also covers medicine, science & technology, humanities and social science disciplines.

### ***SCIENCE.GOV***

It is a gateway to over 50 million pages of authoritative selected science information. It contains the science information provided by U.S. government agencies, including research and development results. Agriculture, applied science & technology, astronomy & space, biology & nature, computers & communication, earth & ocean sciences, energy & energy conservation, environment & environment quality, health & medicine, math, physics & chemistry, natural sciences & conservation and science education are the subject areas covered by science.gov.

### ***SCIRUS***

This gateway covers scientific, technical and medical sources. It is developed by Elsevier Science. It indexes over 450 million scientific items. It contains both fee based as well as Elsevier Science Collection. It also allows searches into scientists' homepages, pre-print server material, patents and institutional repositories.

### ***SHAKESEARCH***

This site provides a full-text search of all works by Shakespeare. All his Comedies, Tragedies and Poetry are covered. Even the words coined by him and his most popular lines can be searched. It also links to related sources.

### ***SOCIOSITE***

This gateway is exclusively for the subject of sociology to help sociologists. It is global in scope and contains high quality resources. This is maintained by University of Amsterdam. The access is free to promote scholarly communication.

### ***STATISTICAL RESOURCES ON THE WEB***

This site is national and international in scope. It has links to University of Michigan's rich Foreign Governments document collection. It covers areas like agriculture, business and industry, demographics, economics, education, energy, environment, health, housing, labour, politics, science, sociology etc.

### ***THE SEARCHSYSTEMS.NET PUBLIC RECORDS DIRECTORY***

According to this site it is a reliable directory of public records and best resource for background checks and criminal records on the Internet. It was established in 1990 in Newbury Park, California. It provides access to over 36,000 useful databases containing billions of public records.

### ***VIRTUAL GUMSHOE***

It is a free public record resources among investigators created in 1996 by a law enforcement officer collecting links that proved useful for investigative work. It contains over 4000 links to public information databases.

### ***VIRTUAL LIBRARY***

This is the oldest catalogue of the Web. It was started by Tim Berners-Lee, the creator of World Wide Web in 1991. It is maintained by volunteers, who compile pages of key links in areas of their expertise. It is rated as one of the highest-quality guides on the Web.

### ***VOICE OF THE SHUTTLE***

This site started in 1994, is extremely good for humanities resources. It includes anthropology, area studies and minority studies in addition to other humanities disciplines. It is maintained by Alan Liu of University of California, Santa Barbara.

The above tools are just a few out of a host of tools available on the Internet to search the Deep Web. Even Google's Google Scholar a late 2004 beta release searches the Deep Web. It is freely-accessible and indexes the full text of scholarly literature from academic publishers, professional societies and institutional repositories. Google's digital library project is yet another attempt to create a virtual library that is searchable. Now there are many search engines that offer a desktop search tool. The desktop search tool installed on a Personal Computer searches the hard disk and dishes out the results as it would do it on the Web. Thus, today with the desktop search tools even the information content on our hard disk is no more invisible.

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BEAUCOUP

<http://www.beaucoup.com/>

<http://www.business.com/>

BLOOMSBURY RESEARCH CENTRE

<http://www.bloomsburymagazine.com/>

COMPLETEPLANET

<http://aip.completeplanet.com/>

BUSINESS.COM

DIRECT SEARCH

<http://www.freepint.com/gary/direct.htm>

DISINFORMATION  
<http://www.disinfo.com/>

DMOZ.ORG  
<http://dmoz.org/>

ERIC  
<http://www.eric.ed.gov/>

FLIPPER  
<http://flipper.com/>

GENIUSFIND  
<http://www.geniusfind.com/>

HEALTHFINDER.GOV  
<http://www.healthfinder.gov/>

INCYWINCY  
<http://www.incywincy.com/>

SCIENCE.GOV  
<http://www.science.gov/>

SCIRUS  
<http://www.scirus.com/>

SHAKESEARCH  
<http://www.rhymezone.com/shakespeare/>

INFOMINE  
<http://infomine.ucr.edu/>

INTERNET PUBLIC LIBRARY  
<http://www.ipl.org/>

INTERNET.COM  
<http://internet.com/>

INTUTE  
<http://www.intute.ac.uk/>

LIBRARIANS INTERNET INDEX  
<http://www.lii.org>

MARTINDALE'S REFERENCE  
DESK  
<http://www.martindalecenter.com>

NEWPAGES  
<http://www.newpages.com/>

SOCIOSITE

<http://www.sociosite.net/about.php>

STATISTICAL RESOURCES ON THE WEB

<http://www.lib.umich.edu/govdocs/stats.html>

THE SEARCHSYSTEMS.NET PUBLIC RECORDS DIRECTORY

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RUTGERS UNIVERSITY RESEARCH GUIDES: SOCIAL SCIENCE AND LAW.

<http://www.libraries.rutgers.edu/>

VITRUAL GUMSHOE

<http://vitalgumshoe.com>

VIRTUAL LIBRARY

<http://vlib.org/>

VOICE OF THE SHUTTLE

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# E-LEARNING: TRENDS AND OPPORTUNITIES FOR LIS COMMUNITY

Shweta Shroff<sup>3</sup>

## 0. Abstract

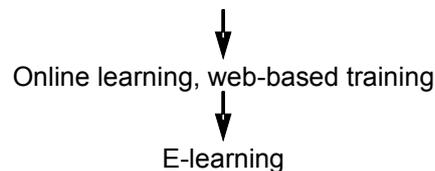
*Careers, today, have become more demanding than ever before. What is cutting edge today may become obsolete tomorrow. One has to be up-to-date in terms of knowledge and skills to meet the changing demands successfully. ICT, including internet and all its interactive elements, has extremely positive impact to the learning potential of an individual. Web-based learning, computer-based learning, virtual classrooms, and digital collaboration are not unfamiliar today. Any learning that utilizes electronic technology and network for delivery, interaction or facilitation is e-learning. This paper aims at making LIS professionals aware about e-learning, reasons behind its increasing importance, recent trends in e-learning and how LIS professionals can take advantage of this not only to update their knowledge and skills, formally and informally, but also to serve their clientele and organization in an improved manner. It is also a need of the hour to supplement LIS Education with e-learning opportunities. The paper also suggests some useful tips for this.*

1. **Keywords:** E-learning, Electronic Learning, Virtual Learning, Virtual Classrooms, Blended Learning, Web-based Learning, Online Learning

## 2. Introduction

Technology is changing very fast. The growth of the network technologies especially Internet, has offered more opportunities than ever before for people to communicate and access information. It has certainly opened up new possibilities that influenced all sectors of public life and particularly the learning process. In the recent years, there is an increasingly heightened awareness of the potential benefits of e-learning. Not many people have heard of the term “e-learning” a few years ago, but, a lot of people did hear about distance education or distance learning. In recent years, terminology has changed and it we now have terms such as

Technology-supported learning, distance learning, distance education



E-Learning represents the whole category of technology-based learning, while online learning is synonymous with web-based learning. E-learning covers a wide set of applications and processes, including computer based learning, web-based learning, virtual classrooms, and digital collaboration, whereas online learning constitutes just one part of technology-based learning and describes learning via Internet, intranet, and extranet. <sup>1</sup>

## 3. Definitions

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One can find many definitions of e-learning on Internet and in works published by various authors and organisations. A few important ones are mentioned below:

The Open and Distance Learning Quality Council, UK, defines e-learning as *the effective learning process created by combining digitally delivered content with (learning) support and services.*<sup>2</sup> Another definition of e-learning by the Network for Capacity Building and Knowledge Exchange (NetTel@Africa) is - *the effective teaching and learning process created by combining e-digital content with local community and tutor support along with global community engagement.*<sup>2</sup> According to Elliott Masie of the Masie Center, *e-learning is the use of network technology to design, deliver, select, administer, and extend LEARNING.*<sup>3</sup>

In general, e-learning is an instructional content (education and training) or learning experiences supported, delivered or enabled by electronic technology, or we can say, any learning that utilizes electronic technology and network (LAN, WAN or Internet) for delivery, interaction or facilitation is e-learning.

#### 4. E-learning technologies

For e-learning to take place, all that is required is essentially a computer with an internet connection and browser for accessing web courseware. However, e-learning may involve the use of some, or all, of the following technologies.

- Computers – desktop, laptop etc.
- Networks – internet, intranet, extranet
- Interactive whiteboards
- Digital cameras and videos
- Audio-video tape
- Interactive TV and satellite broadcasts
- CDs, DVDs etc.
- Electronic communication tools, including email, discussion forums, chat facilities, virtual classroom, video conferencing etc.
- Virtual Learning Environments (VLEs)
- Managed Learning Environments (MLEs)
- Wireless and mobile technology including mobile phones and PDAs

#### 5. Relative advantages of e-learning over traditional method of teaching-learning

E-learning has many advantages that make it suitable for the information-age education system. The main advantage is that it puts the learner in the centre of the equation instead of the teacher, trainer or instructor. Others are:

- It is **easy to use** and can work from any location. It provides great flexibility to e-learners as they can go through training sessions from anywhere in the world at any time. Thus, it is **geographic and time independent** and saves travel expenses of number of learners and instructors which otherwise they would have made.
- **Physical classroom settings are not required.** On the contrary, the classroom comes to the learner when s/he needs it, for just as long as s/he needs it.
- It operates in **real time.** This just-in-time or any-time benefit can make learning possible for people who never would have been able to work it otherwise. Immediate interaction, feedback etc. sustain interest of the learner and facilitates learning process.
- It is **individualized, self directed, self-paced and convenient** as most e-learning programmes can be taken when needed and at ones own pace. It allows e-learners to select activities from a menu of learning opportunities most relevant to her/his background, job and career.

- It is **dynamic and interactive** in the sense that it allows real-time communication between the learner and instructor. It allows immediate feedback facilitating monitoring of progress and adjustment of instructions accordingly.
- It **provides consistency** in terms of the quality of information presented to various learners and it eliminates the issues associated with different instructors teaching different material on the same subject.
- It is **quick and moves faster** mainly due to the individualized approach that allows learners to skip material they already know or understand and move onto the components they need training on. The course progresses as fast as the learner can without worry for other learners or an instructor. Moreover, the information in the web-based lesson can be changed any time, without any delays in the distribution of the material.
- It can lead to **increased retention** and a stronger grasp on the subject mainly due to many elements that are combined in e-learning to reinforce the message, such as video, audio, quizzes, presentations etc. This is also possible due to the facility to revisit or replay sections that might not have been clearly understood.
- It is **empowering**. E-learners have control over how fast they can learn, what material they need to cover, where they can learn, and how much they can learn. They are empowered to gain knowledge, skills and abilities in a manner that is best suited for their learning style.
- Most of the e-learning courses are **proven and certified** by the renowned academic institutions or accredited to some universities.
- It is **less expensive** as there is little extra cost involved in serving additional learners, once the initial infrastructure and developmental costs have been met.
- Age is no bar.

While above are the perceived advantages for learners, the advantages to the developers or the administrator of e-courses are:

- It makes **communication easier** with individual learner and groups of learners
- Learners' activities can be tracked down to the finest level. **Pre and post skill assessments** can be used before, mid-way or after the completion of the module or course to measure the progress of the learner which can also be conveyed to the learner immediately.
- The information content of the module or course can be **updated easily and quickly any time** and from any where, and this can be conveyed to the learners without any delays in the distribution of information.
- It is **easily manageable for large groups of learners**.
- It allows **economic reuse** of high quality and expensive resources.

All these mean that e-learners can be taught in very large numbers, but also in very small classes, or even as individuals, anytime, anywhere. As a result, e-learning is a highly cost-effective and adaptable medium for small education and training institutions and small organizations with limited resources. It is also suitable for organizations with workforces that are distributed in small numbers in a large number of locations or for organizations with workforces that move more frequently than conventional course attendance would allow.

It is not always easy to keep pace with the changing demands, expectations and technological advancements, Some of the main constraints identified by various studies that could impede e-learning are, outdated equipment; inadequate provisions for regular updating of hardware compatible with the software; outdated software; inadequate trained support staff for properly maintaining equipments and administering the course; shortage of able and motivated instructors; inadequate computer literacy among learners; inadequate exposure of instructors and learners to requirements of profession in terms of skill development; infrequent revisions in the curriculum; inadequate rapport between academia and industry; absence of R&D culture in academia/industry; financial constraints etc.

## **6. E-learning Categories <sup>4</sup>**

The real focus and unifying theme of e-learning is LEARNING – whether it is through virtual classrooms, online, blended, or embedded. Each category presented below is most effective when properly matched with the appropriate learning environment and desired outcome. None of the categories listed function in isolation. The categories of e-learning are:

### **6.1. Formal learning – e-courses**

Most discussions of e-learning deal with formal learning or courses. It is easy to take existing educational materials, add various media, sequence the material and consider it “transferred” to the online environment. Some designers have begun to employ simulations, story telling, and the unique traits of online media in an effort to transform the material for representation in a digital environment.

### **6.2. Informal learning**

Though least recognized, informal learning is perhaps the most dynamic and versatile aspect of learning. One’s need for information drives the search for it. Search engines (like Google) coupled with information storage tools (like Furl) and personal knowledge management tools like wikis and blogs present a powerful toolset in the knowledge workers portfolio. At work place, one learns how to do her/his job through informal learning - observing others, asking people, calling the help desk, trial-and-error, and simply working with people.

### **6.3. Blended learning**

The best opportunities for learning transition from classroom to e-learning are provided by blended learning. Blended learning involves face-to-face learning and online learning. This method is very effective for adding efficiency to classroom instructions and permitting increased discussion or information review outside the classrooms. For example, abstracting can be taught to LIS students and professionals through a workshop, followed by online resources and discussions for continued learning. Blended learning thus, utilizes the best of classrooms with the best of online learning.

### **6.4. Online communities**

Learning is a social process. Most issues within the organizations are complex and dynamic, and yesterday’s solutions don’t always work today. Problem solving requires different perspectives to create an accurate understanding of potential solutions and environment of implementation. Online communities allow people to stay up to date in their fields through dialogue with other members of the same organization, or the larger global field. Such communities strongly contribute to the flow of tacit knowledge and hence, quite significant in the learning process.

### **6.5. Knowledge management**

Knowledge Management in the organisations involves the process of identifying, indexing, and making available, in various formats, knowledge generated within the daily activities of an organization. Some organisations have found value in managing content, mining emails, and creating communities of practice. For example, organisations develop and maintain Standard Operating Procedures, Operating Manuals and Institutional Repositories etc. so that the knowledge of the organisation gets documented and be useful to future generations.

## **6.6. Learning networks**

Learning networks are the communities typically formed around a particular goal, concept or theme. A learning network is the loose, personal coupling of communities, resources, and people. It is the foundation stone of personal knowledge management. The utilization of personal learning networks allows professionals to remain current in their fields.

## **6.7. Work-based learning**

This involves significant elements of work-based assessment and may involve attending courses too. It is focused on the needs of the employer and employee, and is for people in employment. This style of learning requires heavy emphasis on context, and the employee control in initiating the learning needed. Work-based learning is generally an enterprise-wide initiative and for organizations, work-based learning requires a significant investment in resource creation and usability planning.

## **7. Recent trends and technologies in e-learning**

If we carefully study the patterns of the changing trends in e-learning, we will certainly be able to understand why and how e-learning will continue to be a driving force in education as well as business.

### **7.1. E-learning as a business strategy**

For smart companies, e-learning is a strategic solution that must be deployed to all employees. Organization-wide roll-outs are used to increase sales effectiveness, improve organizational competency, and build rich customer relationships. Companies have realized that without properly trained employees and customers, the investment in major Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) purchases will fail. Consequently, e-learning will continue to be a part of organizational infrastructure to increase staff productivity.<sup>5</sup>

### **7.2. Application-specific e-learning solutions**

Similar to traditional classroom training, e-learning can provide technical and non-technical training to employees, such as application-based training on how to operate software or skills-based training on how to deal with customers over the telephone. It can provide the necessary communication, collaboration, and learning technology to quickly and efficiently keep employees up-to-date on new procedures and offerings without taking them out of the field or off the telephone.<sup>5</sup>

### **7.3. Blended learning**

A current buzz phrase and trend involves blended learning programmes that are designed to integrate e-learning with traditional face-to-face training methods to increase overall effectiveness. Blended learning preserves the necessary consideration of how people learn but offers options for learning, and at the same time can produce measurable savings in learning offerings promised by e-learning.

### **7.4. Online collaborative learning**

Another trend in e-learning is online collaborative learning. It is a process which emphasizes group efforts among the learners, group of learners and instructors/trainers leading to the construction of new knowledge. E-learning, online collaboration and

knowledge management are margining into each other. Collaborative learning is an umbrella term for a variety of educational approaches involving joint intellectual effort by learners, or learners and instructors together.

### **7.5. Use of mobile or wireless technologies**

Learning using mobile technologies such as mobile phones, PDAs, digital pen etc. is a boon especially for two kinds of people, firstly, for those without or with inadequate infrastructure facilities, and secondly, for those whose jobs require them to continuously move.

### **7.6. Use of variety and combination of e-resources i.e. informal e-learning**

Some of the online resources that enhance e-learning and are used frequently by motivated learners are Encyclopedia, Wikis, Directories, Dictionaries, Glossaries, Thesaurus, Audio-Video clips, Journals, Articles, Reports, Blogs, Games, Tutorials, Virtual Learning Centers (VLC), Virtual Communities, Discussion boards, Listservs/Infoservs (eg, India-LIS, NPDG-L, Univers, SLA etc.), Organizations' websites, Online social networks, Current Awareness sites (eg. informed librarian, info librarian etc.), Portals etc.

### **7.7. Digital Game-based learning**

Digital Game-based Learning (DGL) is a term and concept that has been under discussion and debate in recent years. They are increasingly being used for e-learning simply because they are interesting, appealing and attractive to awake and keep the focus of the learner and also because the most technical or boring subjects can also be taught easily if presented as part of compelling fun games. Moreover, in e-games, feedback helps the learner to take decisions about her/his strategy and also encourages the learner's motivation.

### **7.8. Instant Messaging (IM) & chat**

Instant messaging and chat are forms of real-time communication between two or more people based on typed text. These are used widely now-a day. The text is conveyed via computers connected over a network such as the internet. Most exchanges are text-based only, though popular services, such as AOL, MSN Messenger, Yahoo! Messenger and Apple's iChat now allow voice messaging, file sharing and even video chat when both users have cameras.

### **7.9. Live e-learning**

This includes live meetings, live lectures, virtual classrooms etc. It is a computer accessible, on-line learning environment intended to fulfill many of the learning facilitation roles of a physical classroom. Everything in a live e-learning occurs in a non-physical environment; and learners access the classroom by connecting to the internet, rather than travelling to a real, physical classroom.

### **7.10. Peer-to-peer (p2p) e-learning**

Peer-to-peer is a network in which information is stored on many PCs, reducing or eliminating the need for a central repository like a web server. Such networks are useful for many purposes like sharing content files in real-time containing audio, video, data or anything in digital format. P2P allows learners and instructors to transfer files directly, rather than through the use of a website or directory.

### **7.11. RSS and Podcasting**

RSS stands for Really Simple Syndication, Rich Site Summary or RDF (Resource Description Framework) Site Summary. The use of RSS is one of the recent trends in e-learning. It is a syndication format that is quite popular for aggregating updates to blogs and the news sites. The word Podcast is coined using two words, **iPOD** and broadcast. Podcasting is the preparation and distribution of audio files using RSS to the computers of subscribed users.

## **7.12. Development of standards**

The efforts are on for building a Common Reference Model for the foundation of a good e-learning. These standards will help not only in articulating guidelines that can be understood and implemented by developers of learning content, but also in their adaptation, understanding and use by as wide a variety of stakeholders as possible, especially learning content and tool developers and their customers. In order to stimulate wide agreement, some high-level requirements like accessibility, adaptability, affordability, durability, interoperability, reusability etc. would be established for the development of the e-learning environments. Standards generally

- Optimize interoperability between systems
- Facilitate information exchange across domains
- Permit sharing of common services
- Allow scalable solutions
- Provide orderly base for infrastructure developments
- Ensure migration strategies

## **8. E-learning in LIS Curriculum**

It is a fact that LIS students have to compete with students of other professions, and to survive in the information industry, they have to be equipped with a curriculum which can make them function as competent information professionals. There is a strong need for continuing professional education and training in LIS field. The present LIS education system in India suggests that the quality improvement is essential and unavoidable, not only for its survival but also for facing the major changes and challenges of today and tomorrow. E-learning is beneficial to the LIS community in many areas as it offers opportunities

- For new learning to develop knowledge and skills in a wide range of areas
- For growth in employment opportunities
- For taking part in collaborative development
- In developing new roles and responsibilities within the libraries and information centres
- To work from home
- To maintain a healthy life/work balance
- In better information exchange, sharing of ideas and support within the LIS community
- To work together and construct professional knowledge across different countries

There could be three ways in which e-learning can be introduced to LIS curriculum.

### **I. Recommend e-course/s**

It is really a difficult task for anybody to recommend any e-course without thorough evaluation of it as there are number of e-courses available, free and paid, with variety of features. The e-courses can be evaluated using the following criteria.

- **Learner support and resources** of the e-course in terms of course information; online support; content support; and channels for feedback on resources and support.
- **Online information and design** of the e-course in terms of completeness; clear syllabus; aesthetic design; consistency and functionality; accessibilities; and channels for feedback.

- **Instructional design and delivery** of e-course in terms of opportunities for interaction; alignment of course objectives to learning outcomes; clearly defined learning outcomes; variety of learning tasks; critical thinking tasks; and channels for feedback on instructional design.
- **Assessment and evaluation of student learning** in terms of opportunities for self-assessment; alignment between objectives; activities and assessments; comprehensive assessment strategy; opportunities for students to receive feedback and channels for learners' feedback on assessment strategy.

In short, one should select a course with SMILE – Simple, Motivating, Interactive and Learner-centric environment. <sup>6</sup>

## II. Develop e-course/s

Development of an e-course is even more difficult as it requires thorough understanding and expertise in e-learning concepts, strategies and technologies. This task can be outsourced too, however, one needs to first analyze the availability of resources like infrastructure, finance, human and intellectual resources. There are many software available – open source as well as commercial - which help in development of an e-course if one takes appropriate training and builds her/his capacity to use them effectively and efficiently. Some of the open source software are - Atutor, Moodle, Claroline, Dokeos, eFront, ILIAS, KEWL, Lectureshare, LON-CAPA, OLAT etc.

## III. Supplement LIS curriculum with e-resources

To start with e-learning in LIS education initially, it is suggested to supplement the curriculum with variety of e-resources. In the process of selection of the right e-resource, the teacher or instructor as well as the students not only get acquainted with the appropriate search strategies, but also learn to compare, evaluate and utilize them advantageously for improving the knowledge and skills, the learning outcomes, and the performance outcomes. The curriculum topics may be supplemented with any or all of the e-resources mentioned in the **section 7.6** above. Some tips for LIS teachers or trainers to make the supplementary learning for their students more efficient and cost-effective are

- a. Use what is available
- b. Make sure there's something for everyone
- c. Obtain senior management involvement
- d. Solve real problems
- e. Use the full range of e-learning methods
- f. Provide a gateway to learning
- g. Look for receptive learners
- h. Don't sacrifice the long term
- i. Value quality than quantity

## 9. Informative web links for LIS community

1. Institutions Offering Courses on Distance Mode and Open Universities In India by Department of Higher Education, Ministry of Human Resource Development, Government of India - [http://www.education.nic.in/dist\\_inst.asp#Open](http://www.education.nic.in/dist_inst.asp#Open)
2. LIS courses in India - <http://www.webindia123.com/career/correspondence/libra.htm>
3. Resources for librarians - <http://www.tsl.state.tx.us/ld/pubs/dl/opportunities.html>
4. Learning sites for library staff - <http://www.librarysupportstaff.com>
5. Library related e-learning sites - <http://library20.ning.com/profiles/blog/show?id=515108%3ABlogPost%3A30994>
6. Free online library tutorials - <http://home.earthlink.net>

7. OCLC resource sharing tutorials and LIS education programmes - <http://www.oclc.org/americalatina/pt/support/training/firstsearch/tutorial/default.htm>
8. ALA Accredited LIS Programme Directory - <http://www.ala.org/ala/accreditation/lisdirb/lisdirectory.cfm>
9. The Internet Public Library - <http://www.ipl.org/>
10. Virtual Reference Shelf : Selected web resources compiled by the Library of Congress - <http://www.loc.gov/rr/askalib/virtualref.html>
11. Courses in LIS by CILIP - [www.cilip.org.uk](http://www.cilip.org.uk)
12. Online dictionary for LIS - <http://lu.com/odlis/about.cfm>
13. Glossary of library terms - <http://library.boisestate.edu/Reference/BBRIN/jargon.htm>
14. WebJunction course catalogue - <http://www.webjunction.org/do/Navigation?category=442>
15. Free e-mail English courses for learners and teachers - [http://esl.about.com/cs/onlinecourses/a/a\\_ecourses.htm](http://esl.about.com/cs/onlinecourses/a/a_ecourses.htm)
16. Free English language courses - <http://www.english-online.org.uk>
17. Learn Indian languages - <http://www.languageshome.com/>
18. Business English exercises - <http://www.better-english.com/exerciselist.html>
19. Free e-courses in IT - <http://www.e-learningcenter.com>
20. Free computer tutorials - [http://www.homeandlearn.co.uk/](http://www.homeandlearn.co.uk)  
<http://www.educationonlineforcomputers.com/>  
<http://www.teacherclick.com/>  
<http://www.businessbookmall.com/Software%20Tutorials%20Internet%20Library.htm>  
<http://www.3dtree.com/ev/e/sb.htm>
21. Free tutorials on variety of subjects from Arts to Travel - <http://www.mytutorials.com/tutorials/>
22. SLIS - IT knowledge and Skills: diagnostic tool - <http://www.unt.edu/slis/apppacket/ITKS/ITKSassess.htm>
23. Free tests, exams and certificates - <http://www.docnmail.com/resources.htm>
24. Free video sharing website YouTube - <http://www.youtube.com/>
25. Video tutorials - <http://www.video-tutes.com/>

## 10. Conclusion

E-learning can be very effective for learning individuals as well as learning organisations. It can be a disaster also if not managed appropriately. One should understand that it is not a panacea, but, it is a means to an end. E-learning, to be successful, has to have the right fit with the identified learning needs. It does not substitute the traditional way of teaching, neither it is to be used for lessons with the same possibilities but via the electronic technology. It rather complements and enriches the present educational process by helping teachers/trainers by offering more complete and global learning experiences to their students/trainees. Ian Fyfe of Learndirect, Scotland has rightly said that "On the road to e-learning, make sure that Learning is in the driving seat, and Technology is in the passenger seat with the map. Learning decides the destination, Technology helps you get there." <sup>7</sup>

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# BIBLIOGRAPHICAL CONTROL: ELECTRONIC MEDIA

Shailesh R. Yagnik<sup>4</sup>

## Abstract

*Bibliographical control means complete bibliographical details of all the publications/materials in the form of electronic data making it available to users globally. Because nobody knows, where user is sitting and what he wants. Librarians have to work keeping in mind present and future development of technology and retrospective backlog of old not digitized materials. Materials not digitized are not available locally as well as globally. Individual institution has to work seriously for the bibliographical control at local level because it has direct impact at global level because of World Wide Web (WWW).*

**Keywords:** Bibliographical Control, Electronic Media, Digital Market, In-house Digitization, Advantages, Challenges.

## Introduction

The main functions of any library are to procure process, preserve, retrieve and disseminate the information. Traditionally retrieval is an important function. This covers classification, cataloging for macro documents and indexing and abstracting for micro documents. Catalog was considered as the mirror of a library. In 1902, LC began producing catalog cards for purchase so that libraries that purchased the same book could buy those cards, rather than having to catalog the book themselves.<sup>xii</sup> This saves the time and saved time could be used productively by the librarians. According to IFLA *“it is also concerned with the promotion of the importance of the discipline of bibliography to library professionals in all types of library (not just national libraries) to publishers, distributors, and retailers and also to end-users.”*<sup>xiii</sup> During 1980s the use of information technology (IT) became common in many libraries, but there are some libraries which even today could not take the advantage of the IT because of one reason or another. They will fall immediately into digital divide. Instead of using catalogue cabinet now bibliographic data are machine-readable and are shared over networks.

Bibliographical control means revealing the stock of the library properly cataloged. In other words the bibliographic control means broader than cataloging, comprehending all materials accessed through libraries, a diverse community of users, and a multiplicity of venues where information is sought. It is the organization of library materials to facilitate discovery, management, identification, and access. Bibliographical control is required at global, continental, national, regional, city and institute levels. Apart from libraries the publishers, aggregators and open access play a vital role in bibliographic control. Publishers maintain the website of their publications. For ex. Amazon.com is a website which gives details of new books and used books. In India used books are available in a shop but not on the website. This creates another market opportunity to create the bibliographical control of the used books in the country.

Libraries deal with print and electronic media. Ultimate objective of the libraries is to make all the resources available to users at a global level. World Wide Web (WWW) helps to make resource available at a global level. Users demand are not predictable and geographical lactations are different so all the resources should be made available to users.

The biggest advantage is that users will come to know where the information is lying.

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More emphasis in this paper has been given at the institute level. If all the institutes work towards bibliographical control at a local level, one day the global situation will improve because of fast networking due to information and communication technology (ICT). Local bibliographical control has direct impact at global level. This is the biggest merit of electronic media.

## **Electronic Media Market**

Worldwide in 2007 there were 320 million households with broadband access. Digital publishing (e-books, e-papers online research papers etc.) is evolving into a lucrative market. Market size of global digital publishing is \$340 billion publishing industry. Publishers are competing with each other to take the content online. Growth of Indian industry was 15% in the last financial year. Market size for digital publishing in India is Rs. 80 million. Major publishers outsource from India at an advantage of 40% cheaper than advanced countries. Out of total publications 45% are English titles. India is third largest producer after UK and USA.<sup>xiv</sup>

## **Development of Electronic Resource**

Explicit knowledge is available in the print form and digital form. Apart from books, academic and research institutions have their own publications like research publications, journals, newsletters, faculty publications, students research (dissertation and thesis), conference proceedings, workshops, seminars, working papers, case studies etc. These are common resources in all institutions but there may be many more other resources depend on the nature of the institutions like National Institute of Design (NID), National Institute of Fashion Technology (NIFT), and Mudra Institute of Communications, Ahmedabad (MICA). The development of ICT could give us the soft copy in word format and PDF format. The complete bibliographical details as per standards and formats for all publications should be available along with full text without losing the commercial value.

Every institute is involved in image building and reputation management. Institutes use various channels to do the same. Newspaper is one of the media used frequently by the institute to highlight the activities happening on the campus. The media and career counselor write about various institutions and their specializations like fashion, design, communication, mass media, management, rural management, forest management, arts, technology, etc. KEIC (Knowledge Exchange & Information Centre) has complete online information on the newspaper clippings with full text about the MICA Institute from 1990 onwards though the institute was started in 1991.

Internal bibliographical control of all the institute published materials is necessary for future reference work. Institute brings out various leaflets, program brochures, placement brochures, conference/workshop/seminar brochures, advertisements, convocation speeches, invitation cards, students activities literatures, photographs, course outline 1994 -2008 etc. KEIC has created MICA Archive for all the above literatures and full text in PDF format. This helps faculty members, students and staff members to work independently, timely and efficiently. We had to outsource the digitization work but it took more than allotted time limits. KEIC is the inputting member to its parent organization called Reliance Anil Dhirubhai Ambani Group (ADAG) as one of the archival system members. Every month new literature published by the institute is being sent with print and PDF format.

## **Interactive Catalogue**

Library catalog is seen as only the list of procured publications by a library available to the users but product catalogue tells beyond availability and promotes the use of a product. Same way the library catalogue should not tell only about the availability of books and other features like author, title, subject, and classification number. But now librarians have to look beyond the static catalogue and work towards dynamic and interactive catalog.

It should promote the use of the library resources in an optimum manner. There are many users who do not use the catalogue but they try to remember a book by color, hardbound, paperback, size, physical location of a book on the stack area etc. The electronic media made it possible to give the image of a book so users can easily recall it. It is one kind of use of semiotic in an interactive catalogue of the library. A book image is available on the Amazon.com, publisher's website and if it is not available anywhere, an image of a book can be scanned in the library with help of the scanner.

Another way to help the users is to list names of the users who have recommended a book. Maintain the used records of a book on the catalog to help the users to take decision about its usefulness. We see book reviews written by various eminent personalities to promote use of it and it is one kind of free endorsement. Librarians may request borrowers to give the reviews after reading a book, how the book was useful to them and how it will be useful to other users.

Another help could be to link the contents with other books. Online catalogue may provide the navigational facilities to users without changing the page. For e.g. the word brand will appear in the contents of many other books like advertising management, marketing communications, marketing management, account management, corporate communications, reputation management, corporate social responsibility. Same way the title could be linked with other titles. This way it retrieves other books. This should be done also for authors; this helps in case of books with multiple authors.

## **Dissertation Database**

All the features mentioned in the interactive catalogue are possible in the dissertation database. Dissertation is an academic requirement to get the degree. Normally they are kept in the reference section of the library. A user cannot issue it but simultaneously may not be allowed to photocopy it. Knowledge commission says that full text should be available to users and it is the moral responsibility of the users to acknowledge the source. MICA's Knowledge Exchange & Information Centre (KEIC) has put the entire dissertation with full text from 1994 onwards. KEIC started taking the full text dissertation from the year 2000 onwards from students but previous years dissertations were in the print form with the centre. This was another challenge to the Centre to digitize previous dissertations. It was a three months project but it took two years to complete the project. The database has provision for a photograph of the student; this is to establish the customer relationship management (CRM) with them. Current batch students can access any dissertation along with photo of the alumni so they can associate with them immediately when they go to industry. Students make final presentations to the Defense Committee based on the research outcome and last three years power point presentations (PPT) are accessible along with full text database.

## Advantage of Networking Environment

MICA has got an extension centre at Gujarat Law Society called MICA Entrepreneurship Development Centre (MACA-EDC). Mudra Foundation for Communications Research and Education has launched another successful venture called Mudra Institute of Communications

Research (MICORE) near Parimal garden. Both are temporarily located outside the MICA campus but in future having proper infrastructure facilities the extension centre and MICORE will be back on the MICA campus. KEIC has good bibliographical control and provides support to MICA-EDC and MICORE.

KEIC has provided all the support to the MICA-EDC except two databases. MICORE will be provided access to all those resources where the word “future” is mentioned. Table one shows the status of the resources available with KEIC in column one and column second and third show the support extended to them by KEIC.

Table – 1

KEIC-Electronic Information Resources	MICA-EDC	MICORE
MICA Archive (full Text)	√	√
MICA in News (full Text)	√	√
Dissertation (full Text)	√	√
Crafting Creative Communications (CCC) Final Portfolio (Print and TVC)	√	√
Audit Bureau of Circulations (data)	√	√
Broadcast Education. Association (full Text)	√	√
CMIE – EIS	X	X
Communications Studies (Sage) (full Text)	√	Future
Business Source Premier (Ebsco) (full Text)	√	Future
Comm. & Mass Media (Ebsco) (full Text)	√	Future
Euro. Case Clearing House	X	X
Emerald ManagementXtra (full Text)	√	Future
e-brary ( 6100n full Text books)	√	Future
Indiastat.com (data)	√	Future
ISI Emerging market (full Text)	√	Future
Mag India (Online advertising library)	√	Future
Questia (full Text)	√	√
WARC (full Text)	√	√
American Academy of Advertising (bibliographical)	√	√
Books (bibliographical)	√	√
Case Studies (bibliographical)	√	√
Newspaper (full Text)	√	√
Periodicals (Abstracting & Indexing.)	√	√
Print Ads (with image)	√	V
Radio Commercial (with jingle)	√	V
TV Commercial (view 22000 TVC)	√	√

Future: Access will be provided, √: Access provided, X: Access not provided

## Challenges

So far as the use of ICT is concerned Librarians always feel that it's not possible to go with the same speed all the time. Some times a system created in the library will be disturbed by changes brought in by information providers. For e.g. Agency Source Index was providing every month the CD on TV commercials shown on Indian channels and foreign channels. New system they introduced is the IP based online and users can view only limited commercials. This is not viable for any academic library because if it is an assignment then all students will go to the website and see the same commercial. But library is entitled to view 100 commercials so this limit will be over within no time. KEIC has decided to discontinue the subscription and start monitoring on its own. Additionally KEIC has subscribed the Cannes Online to view awarded international TV commercials because Indian channel does not show the foreign advertisements.

Another challenge for old libraries is to create online catalogue. If some one starts from mid way then there will be backlog. KEIC has started monitoring the print ads from digital newspaper from 2008 onwards. This saves the time of scanning. Immediately the question arises as to what has happened to the backlog of the print ads available in the guard book from 1994 onwards. The only solution to these problems is to outsource additional work of the library. Time management is not possible in outsourcing. There are very limited outsource companies in the market who do quality jobs.

## Conclusion

To have bibliographical control, sky is the limit and it needs lot of planning for man, money, materials, ICT, standards, cooperation, and willingness to share. Best examples are INFLIBNET, DELNET, OCLC, and Library of Congress.

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# IMPACT OF INFORMATION & COMMUNICATION TECHNOLOGY ON CHANGING SCENARIO OF LIBRARY & INFORMATION CENTRES

P.Lalitha<sup>5</sup>

## Abstract

*With the advent of Information and Communication Technology (ICT) there has been a significant impact on Library and Information Centres (LICs) that has further paved way in modernizing them in different ways. The objective of the present paper is to emphasize on the changing scenario of LICs in providing information services, information seeking attitudes of users and the challenging role of Information Professionals in managing information and infrastructure in current digital and networked environment*

Keywords: **Library and Information Centre (LICs), Information & Communication Technology (ICT), Web2.0, Library 2.0.**

## Introduction

Information and Communication play a vital role in the development of a nation. The advent of Information and Communication Technology (ICT) further paved the way for tremendous modernization of Library and Information Centres (LICs). With these developments, libraries are not merely the communication links between the producers and the users of information; they are in between institutions, communities and even countries. With this the nature of information delivery and its consumption is constantly changing. The ability to retrieve, organize and store information from printed or electronic sources will no longer be regarded as the only basic concept of library and information services. Modern information technology provides easy and fast access for almost everyone to use the ever-growing amount of stored information in international, national or local databases. In the present scenario, changing societal needs, academic and research requirements, information seeking attitudes of users and impact of technological advancements brought tremendous change in exploring information through different ways. The objective of the present paper is to discuss about the different changes occurring in LICs and their impact in providing different services to users, changing attitudes of users in seeking information and the challenging role of library and information professionals in the current digital environment.

Information is dynamic and unending and when communicated promptly, it has great significance in education, research and development. The human communication has progressed through four phases. The first phase began with the verbal communication with origination of languages, second phase with written communication that enabled recording and storing of the information. The written communication started with cave paintings, followed by clay tablets, ink, papyrus etc. The third phase, the printing era began with Gutenberg and his Bible in 1456. The fourth phase the age of telecommunications began with Morse's telegraph and was perpetuated by Marconi's wireless. Now we are in fifth phase where communication is playing a major role in interactive communication systems (Kanjilal, U., 1993).

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## Emerging Technologies and LICs

The use and impact of ICT is clearly visible in LICs, which is due to the emergence of new technologies and drastic reduction of the cost of hardware and software and their easy availability in the markets with service support from the suppliers or vendors. Due to enormous capacity of data storage, quick processing, access, retrieval and dissemination of information, traditional LICs are quickly transforming into digital libraries (read hybrid libraries). Digital libraries are meant to deal with digital materials, whereas hybrid libraries deal with both printed and digital materials. (Chowdhary, G.G & Chowdhary, S, 2004). The networked infrastructure offered by Internet with wide coverage and geographical distribution along with the omnipresence of WWW has brought drastic technology induced paradigm shift in LICs from traditional libraries to digital libraries, print on paper to digital information, card catalogs to Web OPACs, chains to RFID tags, print journals to online or electronic journals, ownership to access, in library access to remote and desktop access. Information availability from libraries changed from traditional time of 9 – 5 or 7 to 24X7, photocopies to digital copies, the document delivery services are being provided through E-mail instead of post or fax. Gradually the libraries are evolving into information networks than standalone libraries by forming networks and sharing resources and slowly converting from real to virtual communities.

### Impact of Library 2.0

When Tim Berners-Lee created Web in 1989, it is the implementation of the Web 1.0 that is considered as “read only Web”. Currently we are at infancy stage of Web 2.0, which makes use of the latest technologies and concepts in order to make the user experience more interactive, useful and inter connecting. Library 2.0 is the implication of Web 2.0. According to Wikipedia, “with Library 2.0 library services are constantly updated and reevaluated to best serve library users. It also attempts to harness the library user in the design and implementation of library services by encouraging feed back and participation”(en.wikipedia.org/wiki/Library\_2.0). Library 2.0 is the application of interactive, collaborative and multi media web based technologies to web based library services and collection” (Maness, 2006). With the above definitions it is evident that the basic idea of Library 2.0 is to transform library service by making them more personalize, more interactive, collaborative, more web-based, driven by community needs.

Library 2.0 uses varieties of technologies offered by Web 2.0. In recent days, different web resources like wikis, blogs, RSS, and podcasts have become popular in conveying and acquiring information.

**Wiki** (from the Hawaiian *wiki, to hurry, swift*) is a collaborative website whose content can be edited by any one who has access to it. It is a web application that allows users not only to add content, as on an Internet forum, but also refers to the collaborative software used to create such a website.(en.wikipedia.org/wiki/Wikis) Wikipedia – The free Encyclopedia, is significantly transforming the information age with greatly grown popularity.

**Blog** is a related Web information sharing technology. A blog (WEBLOG) is a website that contains dated entries in reverse chronological order (most recent first) about a particular topic (<http://www.answers.com/topic/blog>). One person or groups of contributors can write them. Entries contain commentary and links to other websites, images and some times search facility may also be included. Although most early weblogs were manually updated, tools to automate the maintenance of such sites made them accessible to a much larger population, and the use of some sort of browser-based software is now a typical aspect of ‘blogging’ (en.wikipedia.org/wiki/Blogs)

**RSS**, Really Simple Syndication, is a family of web feed formats used to publish frequently updated content such as blog entries, news headlines and podcasts. An RSS document

(which is called a 'feed' or 'web feed' or 'channel') contains either a summary of content from an associated website or the full text, RSS makes it possible for people to keep up with websites in a special programme or filtered displays.(en.wikipedia.org/wiki/RSS)

**Podcasting**, a portmanteau of Apple's "I Pod" and "broadcasting" is a method of publishing files to the Internet allowing users to subscribe to a feed and receive new files automatically by subscription, usually at no cost. It first became popular in late 2004, used largely for audio files.(en.wikipedia.org/wiki/Podcast)

**Social Networking** service uses software to build online social networks for communities of people who share interest and activities or who are interested in exploring the interests and activities of others. Most services are primarily web-based and provide a collection of various ways for users to interact, such as chat, messaging, e-mail, video, voice chat, file sharing, blogging, discussion groups and so on. The below given Table no.1 shows Web 2.0 tools to Library 2.0 applications along with some case examples.

Web 2.0 Tools	Library 2.0 applications	Cases
RSS (really simple syndication)	<ul style="list-style-type: none"> <li>• Announcing arrival of new books, journal and databases</li> <li>• Promote events organized by library</li> </ul>	<p>New york University Library (<a href="http://library.nyu.edu/feeds">http://library.nyu.edu/feeds</a>) using feed for providing more general to specific information, like Library instruction Classes, library orientation, database search, database management, Library News: about library hour, new event Liblink: providing tips for better use of library</p>
Wikis	<ul style="list-style-type: none"> <li>• Training Tool</li> <li>• Library website</li> <li>• Subject guide</li> <li>• Library suggestion</li> </ul>	<p>Ohio University Library Biz Wiki (<a href="http://www.library.ohiou.edu/subjects/bizwiki/index.php/Main_Page">http://www.library.ohiou.edu/subjects/bizwiki/index.php/Main_Page</a>) is a collection of business information resources of Ohio state university library. Its contain articles, reference books, business websites and other research guides. They have also provided service for online chat through Library Services Electronic Resources Wiki (<a href="http://library.hud.ac.uk/wiki/Main_Page">http://library.hud.ac.uk/wiki/Main_Page</a>).</p>
Blogs and blogging	<ul style="list-style-type: none"> <li>• Support Library instruction</li> <li>• Staff Communication</li> <li>• Subject Resources</li> <li>• Course Materials</li> <li>• Breaking News</li> </ul>	<p>Wellesley College Library (<a href="http://wellesleylibrary.blogspot.com">http://wellesleylibrary.blogspot.com</a>) Blog provided link to valuable information pertaining to student need. Library is also providing information regarding exam schedule, changes in library timing, link to new resources, educational cds and video.</p> <p>Western Carolina University, Library News Blog (<a href="http://hunterlibrarynews.blogspot.com">http://hunterlibrarynews.blogspot.com</a>) Providing latest news about library collection, exhibits, hours, database trail and library happenings.</p>
Flickr (photo sharing)	<ul style="list-style-type: none"> <li>• Event: annual symposium, Library Function, Book Sale</li> <li>• Regular Occurrence:</li> </ul>	

<p>IM Messenger (Chat Reference)</p> <p>Social Networking Software</p>	<p>tour, reference transaction, Computer use, classroom scenes.</p> <ul style="list-style-type: none"> <li>• Library poster</li> <li>• Virtual reference</li> <li>• Research Assistance</li> <li>• As web portal</li> <li>• For Library Promotion</li> <li>• Extension of Library website</li> <li>• Catalogue, Database search</li> </ul>	<p>Arizona State University Library (<a href="http://www.flickr.com/photos/asulibraries/sets/72157601621243043/">http://www.flickr.com/photos/asulibraries/sets/72157601621243043/</a>) has two type of collection ASU Libraries events(event organized by ASU libraries)and about ASU Libraries.</p> <p>American Library Association ( <a href="http://www.flickr.com/photos/ala_members/ala_members/">http://www.flickr.com/photos/ala_members/ala_members/</a>)</p> <p>American University Library (<a href="http://www.library.american.edu/ask/im.html">http://www.library.american.edu/ask/im.html</a>) using virtual reference service for providing online reference for research questions from student and faculty.</p> <p>Syracuse University Library (<a href="http://www.facebook.com/group.php?gid=2380333929">http://www.facebook.com/group.php?gid=2380333929</a>) has a profile in facebook. This was designed to connect student with library in L2 way. Library provided link to library catalogue for books, database search, chat reference and changing library schedules.</p>
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Table No.1. Web 2.0 Tools, its Applications and Cases (Dora, M & Maharana, B., 2008)

### Users' Information Seeking Attitudes

There has been a revolutionary change in the information accessing behaviour of the researchers and scholars due to the technological advancements. On one hand the digital publishing technologies and global networking have enhanced the development of wide variety of digital libraries and online resources of interest to the scholarly community. Different agencies are also involved in creating these resources including commercial and society publishers, universities and research institutes. Now the Open Access Movement has dawned to provide free or minimal-cost access to scholarly literature. On the other hand, the availability of different hardware and software at minimal costs has tremendously changed the information seeking attitudes of the users. With the user-friendly technology providing convenience in accessing information and with the availability of different portable equipments there has been a change in using different equipments for handling or storing information, i.e., from floppy discs to CD-ROMs to Pen drives to Mobiles to Palm Digital Assistants (PDA) is noticed in medical and healthcare fields (Groote, De & Sandra, L., 2004). Due to the availability of range of subjects with good narration at affordable costs, now the users are becoming more information savvy and techno-savvy and accepting the Web as a medium for information dissemination as it is speeding up the communication of research results in an effective manner.

### Role of Librarians'

Now with the changing environments in networked world, it is very important that the librarians should be familiar with different networks and technology. The Library and Information professionals should be well conversant with information and network literacy, and e-learning. Traditionally librarians used to select, search, collect,

organize, maintain and preserve the resources but in current era their role has been as follows:

- **Negotiator** – a person who should be able to identify the needs of users
- **Navigator** - Searching the ocean of information regardless the format
- **Facilitator** – Information and Infra-structure
- **Educator** - being familiar with information in different formats and should be able to train the users whenever required
- **Entrepreneur** - Marketing Library Services
- **Policy advocator** – Should be able to understand and decide certain policies while providing information services
- **Information filter** – Able to provide right information, in right time to the right person from right resource.

## Challenges and Opportunities

The current digital environment offers opportunities to build up the career along with challenges to library and information professionals. They are as follows:

- Resource Management – Providing information from different resources (print, e-resources and online resources), Resource usage, Usage evaluation and measuring the impact of usage of the resources (Research output).
- Providing information about Open Access Resources and educating the users about Open Access.
- Building Institutional Repositories
- Providing seamless integration to different databases, electronic and online resources.
- Knowledge of Intellectual Property Rights
- Knowledge Management
- Social Behaviour and attitudinal changes of users
- Digital Divide
- Providing Information literacy
- Personal counseling and interaction with library users as well as virtual users of library for getting feed-back about the services offered and for proposed improvements.

Major tasks of present day Librarians include management, leadership and website-related tasks. Due to the emphasis on team-based and collaborative projects, current digital librarians consider communication skills and project management skills very important in performing their roles. As the nature of digital libraries is constantly changing, digital librarians must be able to adapt to change and continue to learn. (Choi & Rasmussen., 2006).

## Conclusion

An incredible fast progress in information and communication technologies are transforming the information handling and seeking habits of both librarians and users. The information professionals are adopting technologies like computing, networks, Internet, digital data etc and getting adapted to the changing environment because their main focus is the 'user' and the fulfillment of information needs of the users according to the organizational requirements. In spite of the availability of different online resources, still most of the users are unable to use them, as they are unaware of handling them. Initiatives have to be taken by the different organizations in educating the users and librarians about different information sources and their usage.

One of the foremost requirements is the training of staff in library service marketing strategies. Development of soft skills (better communication and behavioral pattern etc.) to be paid due attention and short term training programmes for the LIS staff should be organized. Training influences perception, attitude and opinion about the information conveyed. Course curriculum for LIS should be revised with emphasis on development of the soft skills as core competencies (Vogt, Hannelore., et al., 2008).

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# SCHOLARLY SEARCH ENGINES

Saroj Das<sup>6</sup>

## Abstract

*Web searching is a common feature in everyday life and people from all sections of our society are using it. There are millions of pages available on the web, but extracting the right information is a very difficult. The paper here discusses some scholarly search engines, which can minimize the efforts of searching scholarly works on the web.*

**Keywords:** Search Engine; Scholarly Information; Scholarly Search Engine

## 1. Introduction

The amount of information available over the web is exceptionally high it has increased to such an extent that it is virtually impossible for any information seeker to locate his/her information pin-pointedly at one go. Searching the web for information is a common feature in everyday life, and with the amount of available information it has become a tedious task to locate the required information, and the same is also applicable to scholarly information as, the amount of scholarly information is also rapidly expanding and residing in different sources, effectively searching such information is very crucial to meet the users complex demands. The paper here discusses some issues relating to efficiently searching the web for scholarly information. Searching the web is both science, and art as it requires analytical thinking, understanding and selecting the right search tool to locate the desired information. The library and information professional play a vital role in searching the right information for the right reader at the right time and in a readily usable format.

## 2. Search Engine

NASA defines the term "Search" as, "A search is the organized pursuit of information. Somewhere in a collection of documents, Web pages, and other sources, there is information that you want to find, but you have no idea where it is". So, a search engine is the means for finding the information that you are looking for.

According to Wikipedia, a search engine in computing terms is, an information retrieval system designed to help find information stored on a computer system. Search engines help to minimize the time required to find information and the amount of information which must be consulted, akin to other techniques for managing information overload. The most common form of search engine is the web search engine, which searches information on the WWW. Web Search engine is a software program that searches for the websites based on the keywords assigned as search terms. Search engine matches the words indexed in their database to retrieve the related results.

Different types of search engines work differently, but they perform the following three basic functions:

**Search:** They search the Internet based on the keyword provided

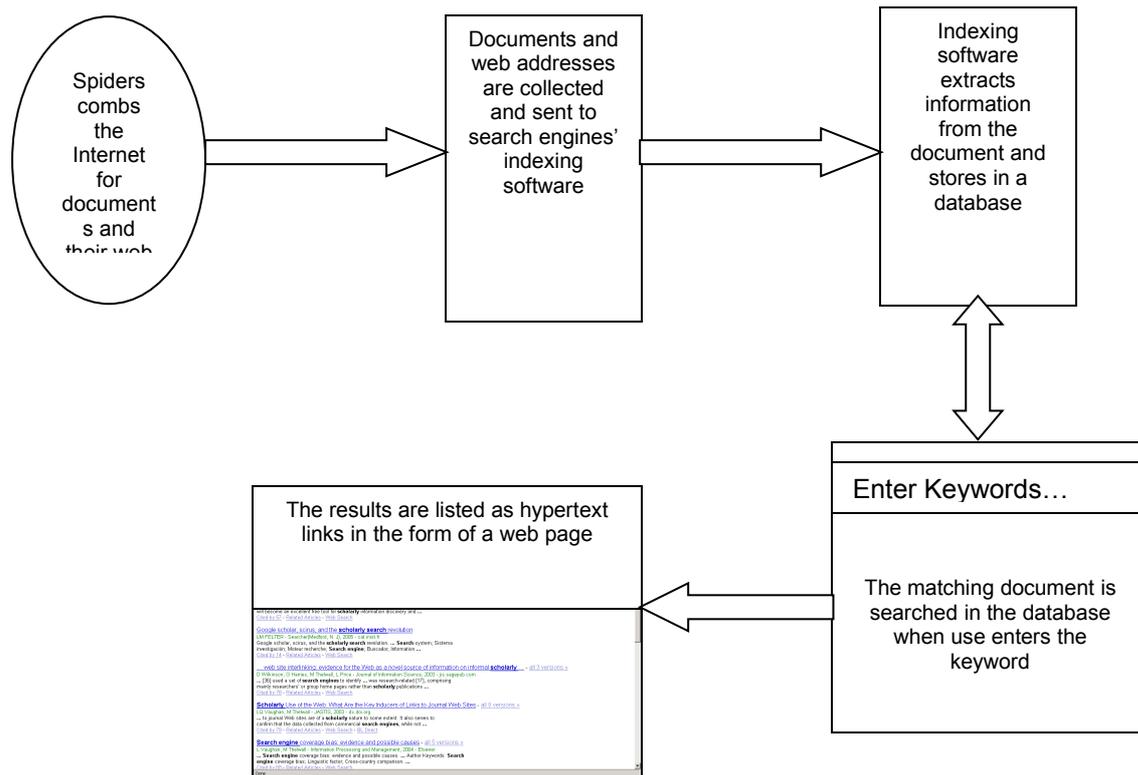
**Index:** They maintain an index of the searched term and location of the term

**Retrieve:** They retrieve the search terms or combination of search terms indexed in the database

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### 3. How Search Engine Works?



1. Search engines uses software called spiders, which search the Internet for documents and their Web addresses
2. The documents and Web addresses are then collected and sent to search engine's indexing software
3. The Indexing software extracts information from the documents and stores in a database. The kind of information indexed depends on the particular search engine. Some index every word in a document; others index the document title only.
4. When a search is performed by entering keywords, the database is searched for documents that matches
5. The search engine lists the results as hypertext links in the form of a web page.

### 4. Scholarly Search Engines

The terms Search engine and Directories are often used interchangeably though they are not the same thing however here we are using the terms interchangeably. There are different categories of search engines depending on the information indexed and the way information is indexed i.e., either automated (using spiders) or human-indexed, and there are also search engines which incorporated both these aspects and they are known as hybrid search engines. We are broadly considering only two types of search engines, viz., General Search engines and Scholarly search engines.

General Search Engines: are those, which search general information and cater to all sections of the society. Example, Google, Yahoo, MSN Search, etc.

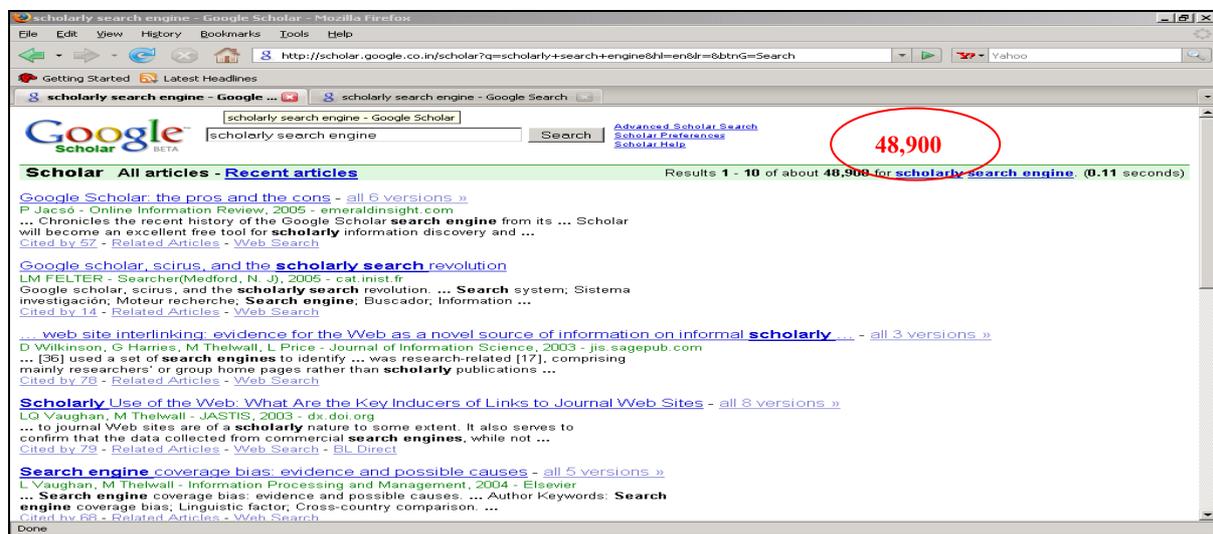
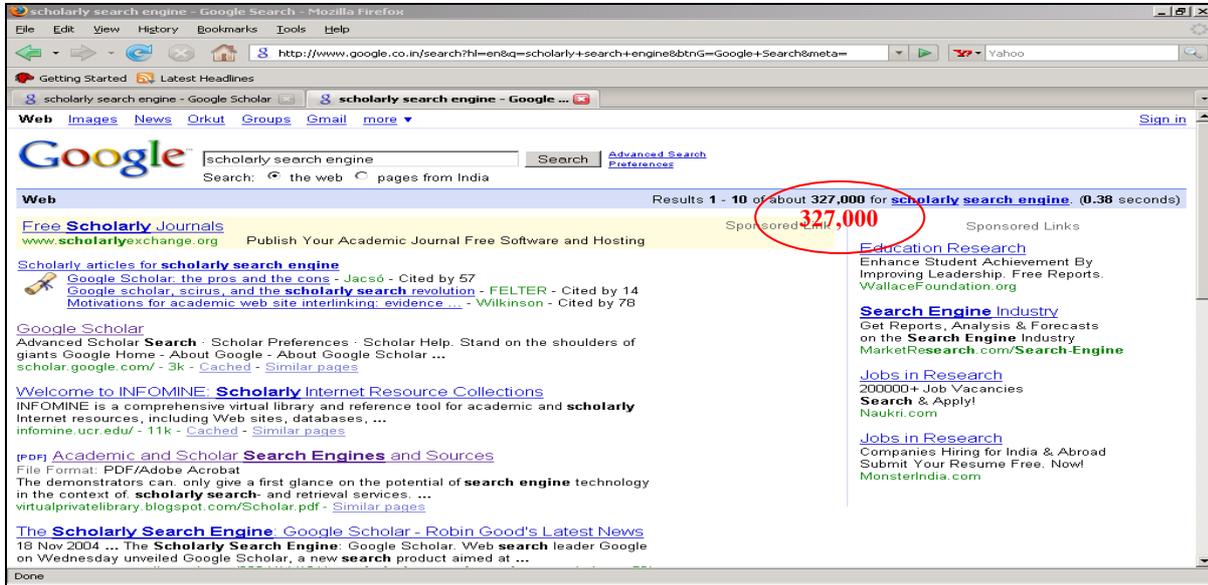
Scholarly Search Engines: are those, which search scholarly information and cater to specific group of people.

Scholarly information is, information by researchers on a particular subject field, aimed at an audience of fellow researchers and peers in the same field, and which usually have bibliographies citing references of sources used.

Scholarly information covers Journal articles, peer-reviewed papers, theses, books, preprints, courseware, subject-specific learning materials, etc.

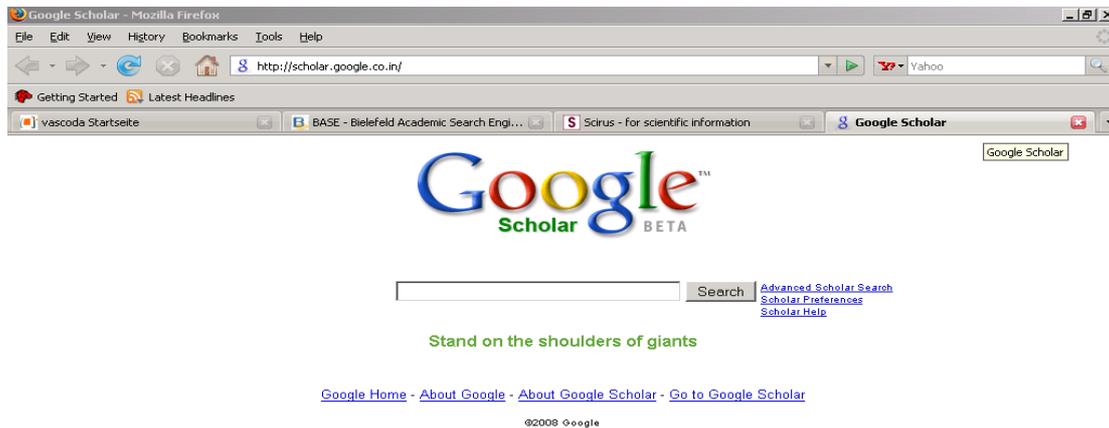
Scholarly search engines search various academic publishers, institutional repositories, academic institutions like universities and scholarly organizations, professional societies, etc. Example: Google Scholar, Scirus, BASE, etc.

## General vs Scholarly Search Engines



hyperlinks of only scholarly articles on the topic.

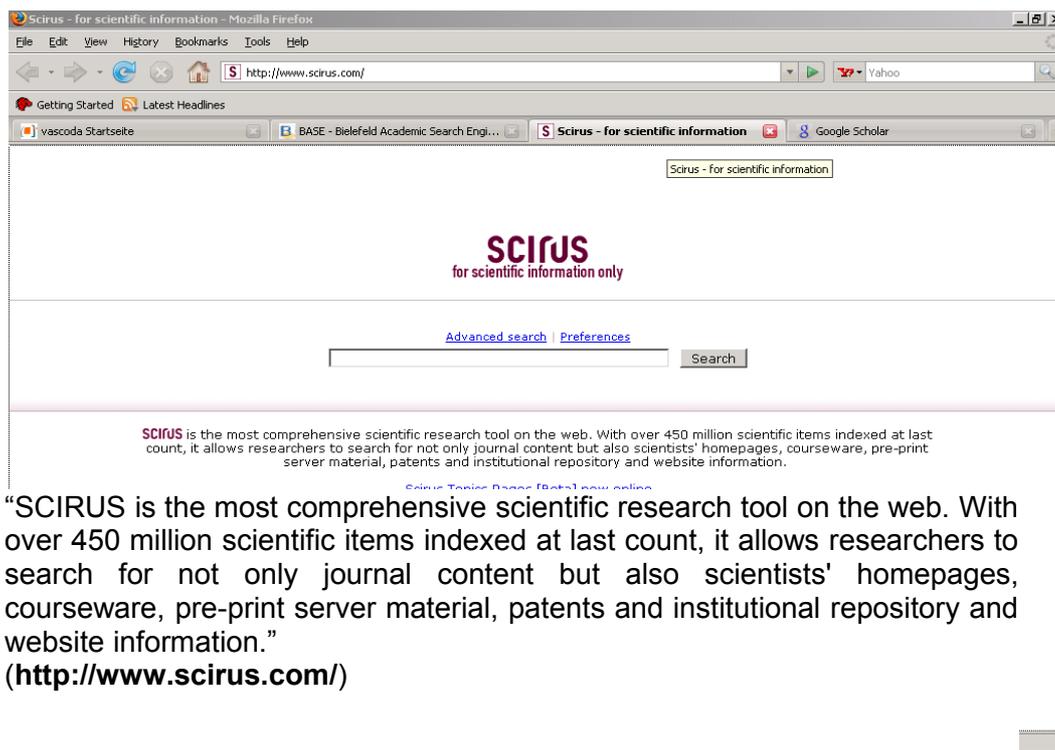
## 5. Examples of Scholarly Search Engines



“Google Scholar provides a simple way to broadly search for scholarly literature. From one place, you can search across many disciplines and sources: peer-reviewed papers, theses, books, abstracts and articles, from academic publishers, professional societies, preprint repositories, universities and other scholarly organizations. Google Scholar helps you identify the most relevant research across the world of scholarly research.”  
 (http://scholar.google.co.in/intl/en/scholar/about.html)

Done

## Google Scholar (http://scholar.google.com)



“SCIRUS is the most comprehensive scientific research tool on the web. With over 450 million scientific items indexed at last count, it allows researchers to search for not only journal content but also scientists' homepages, courseware, pre-print server material, patents and institutional repository and website information.”  
 (http://www.scirus.com/)



## BASE Bielefeld Academic Search Engine

Advanced Search | Help

**Basic Search**

Expand Search Terms [?]

Word Forms  Eurovoc Thesaurus  off  basic terms only  basic terms and used-for-terms

Find additional word forms

“BASE is distinguished for the following features:

- Intellectually selected resources
- Only document servers that comply with the specific requirements of scientific quality and relevance are included
- A data resources inventory provides transparency in the searches
- Searches full text plus meta data (depending on the resource)
- Discloses web resources of the "Deep Web", which are ignored by commercial search engines or get lost in the vast quantity of hits.
- The display of search results includes precise bibliographic data (if provided in the resource)
- Several options for sorting the result list
- "Refine your search result" options (authors, resources, document type, language etc.)”

([http://base.ub.uni-bielefeld.de/index\\_english.html](http://base.ub.uni-bielefeld.de/index_english.html))

## BASE Search Engine (<http://www.base-search.net>)



Search in: (deselect all)

- Engineering and Physical Sciences
- Medicine and Life Sciences
- Law, Economics and Social Sciences
- Humanities
- Regions / Cultural Areas
- Multidisciplinary Data Stocks

“vascoda is a free of charge internet portal for all those looking for scientific and scholarly information. vascoda offers user-friendly access to reliable information and full texts from a wide range of different subject areas.

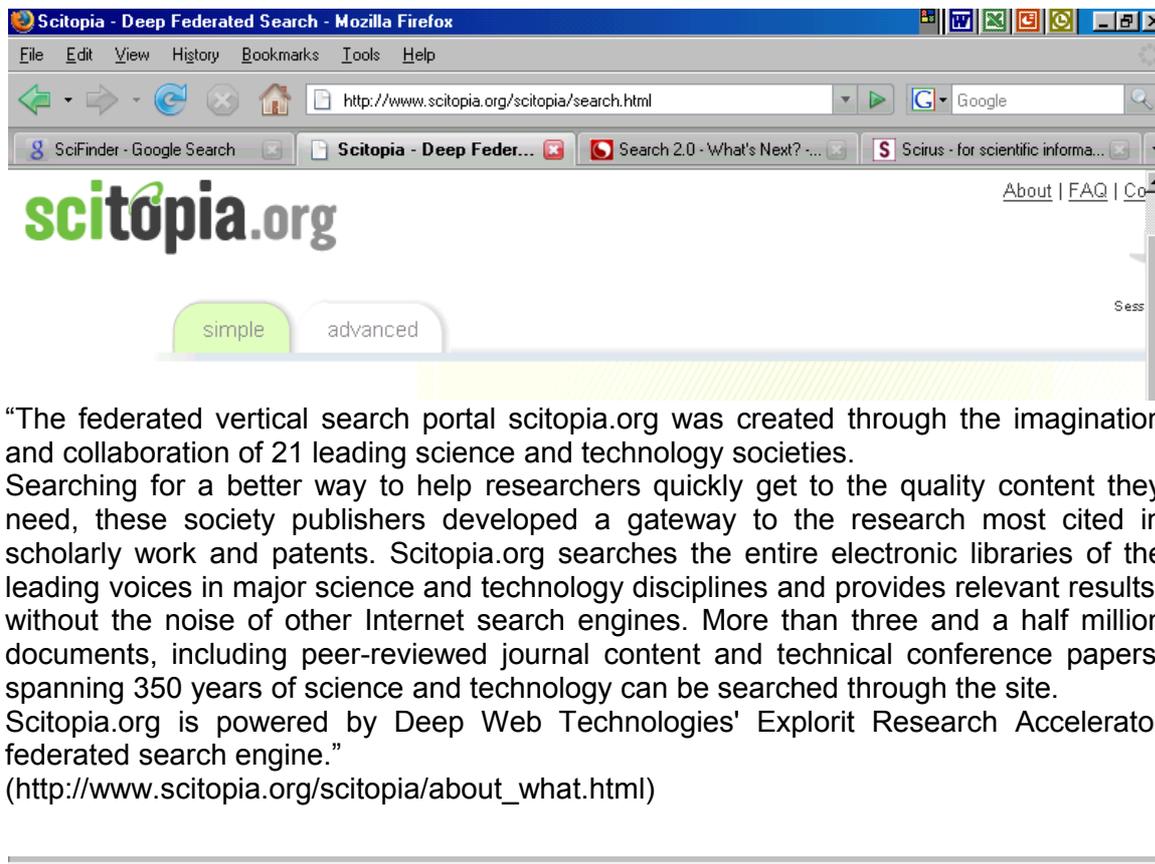
Starting with one standard user interface, one can choose either a subject-specific or an interdisciplinary search. Using modern search engine technology allows a fast and high-structured search across multiple sources, like subject specific databases, bibliographic databases and directories of internet sources.

Detailed Collection Level Descriptions leads to high quality, specialised subject-specific portals of vascoda partners.

vascoda and the integrated subject offerings are developed and maintained by academic libraries and nationally important information providers. vascoda has, therefore, access to resources which are not visible to internet search engines.”

(<http://www.vascoda.com>)

Done



Scitopia (<http://www.scitopia.org>)

## 6. Some other useful Scholarly Search Engines

### **CiteSeer<sup>x</sup>**

CiteSeer<sup>x</sup> is a scientific literature digital library and search engine that focuses primarily on the literature in computer and information science. CiteSeer<sup>x</sup> aims to improve the dissemination of scientific literature and to provide improvements in functionality, usability, availability, cost, comprehensiveness, efficiency, and timeliness in the access of scientific and scholarly knowledge.

<http://citeseerx.ist.psu.edu/>

### **Educational Resource Information Center (ERIC)**

ERIC provides free access to more than 1.2 million bibliographic records of journal articles and other education-related materials and, if available, includes links to full text. ERIC is sponsored by the U.S. Department of Education, Institute of Education Sciences (IES).

<http://www.eric.ed.gov/>

### **RePEc - EconPapers**

EconPapers provides access to Research Papers in Economics ([RePEc](http://econpapers.repec.org/)), the world's largest collection of online Economics working papers, journal articles and software.

<http://econpapers.repec.org/>

### **Social Science Research Network (SSRN)**

Social Science Research Network (SSRN) is devoted to the rapid worldwide dissemination of social science research and is composed of a number of specialized research networks in each of the social sciences.

<http://ssrn.com/>

### **Yovisto**

yovisto is video search engine for academic video content, online lectures and educational stuff. It allows searching within videos.

## 7. Conclusion

There are many more search engines which cater to specific information requirements of specific group of people, what is important is the fact that one should know about the existence of such search engine. Information professionals are the people who need to explore these resources and share with the users. They should not only explore the scholarly search engines but create customized scholarly search engines for their users; Google Custom search tool is readily available to create such search engines.

Technology is advancing very fast and the technocrats are not only working on discovering better indexing techniques, they're exploring new horizons like vertical engines, meaning-based search, intent-driven search, new clustering methods, and much more. The library and information professionals need to keep pace with these changing technologies to serve their users in the best way and also prove the fact that, LIBRARIANS ARE THE ULTIMATE SEARCH ENGINES.

***“Search Smart, Not Hard”***

## 8. References

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7. <http://www.vascoda.com>
8. Marshall, Peg, Herman, Shawn and Rajan, Sri (2006), “In Search of More Meaningful Search”, *SerialsReview*, Volume 32, No. 3, p.172-180
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