INTRODUCTION

The emergence of digital libraries in 1990’s and their overwhelming growth in the recent years has opened up new horizons across a broad array of issues related to design, implementation, development and evaluation of digital libraries. The various definitions of digital libraries coined by researchers and institutions over time, attest to the growing importance and scope of the digital libraries and the reorganization and emphasis of the role of people, knowledge and technology as key to deliver successful digital libraries.

DEVELOPING DIGITAL LIBRARY

Information technology has changed the modern day libraries. Library professional alone cannot develop digital library, as very few library professionals will have all the skill required to set up a digital library. The effort group’s cooperation and coordination can lead to fruitful results in developing digital libraries. Before initiating the project of setting up a digital library, the important point that should be born in mind i.e. information is selected on the basis of quality, should be accessible to every one and there is no restriction for definite user groups and storage of information can be changed when needed. The five laws of library science coined by Dr. S. R. Ranganathan should be implemented in design of digital library.

DIGITAL LIBRARY: ITS ORIGIN

Although the term digital library has gained very popularity in recent years, but it has a long history, back to over 80 (Eighty) years. Invention of printing in the 2nd half of 18th century started a revolution in spreading thoughts and Scholarships. Later on microfilm (1839), recording Disc (1877), audio tapes (1899), video tapes, T.V. (1908) microcomputer (1980), CD-Rom & optical storage device (1985), DVD Rom (1998) etc. are impact on publishing. In 1928, IBM produced a punched card that became the predominate means of inputting information into computer for several decades.

The concept of “hypertext” which is the basic for today’s Internet can be traced back to Vennipher Bush’s prophetic article “as we may think” written in 1945 for the Atlantic monthly. The idea of processing information in a machine readable format had become very important. Eugene power of university microfilms Inc. began using microfilm technology in the 1930’s. Bush imagined a “Memex” machine capable of organizing, storing and displaying paper books and other information that would be made available at each person’s desktop via microfilm. At the same time Ted Nelson invented and named hypertext and hyperspace in 1974 but was never able to build an operational system. Later, other terms such as “Electronic Library,” “Virtual Library”, Library without Wall etc. has come into existence. The first remotely accessible database came online in the late 1960’s which mainly dealt with legal scientific and government information. In 1972 the first commercial online service named DIALOG appeared which was restricted to the text based documents only. F. W. Lancaster in 1978 in his futuristic book “Towards paperless information system” envisaged the revolution in electronic would pave the way for paperless society.

DIGITAL LIBRARY INFRASTRUCTURE AND ARCHITECTURE

For establishing digital libraries, some basic infrastructure in terms of hardware, software, electronic resources, internet connectivity, specialized equipments like digital camera, scanner, sheet feeders, barcode printers etc are required. There are various tools through which digital can be operationalised in a network environment. The tools are e-mails, mailing lists, newsgroups bulletin board, web form polling, instant messaging, chat, conferencing, internet telephony, video conferencing and virtual worlds. For establishing DL, various hardware and software are needed to be integrated for the development and deployment of digital libraries to access huge collection of digital information in network environment. The basic components for establishing DL system are as follows:

HARDWARE

Hardware comprises of the following:

- Digital computer powered by Pentium-IV with high capacity hard disk for server and clients in the LAN, Web servers and FTP server etc.
- Desktop workstation PC’s.
- Capture devices such as scanners, cameras etc.
- Cartridge Tapes or disk for backup.
- High power Ups (10 to 20 K V).
- Printers.
- Secondary storage or output devices comprising of CD-Rom Disk, DVD, CD-Tower, Flatbed Scanners.
and optical character recognizer (OCR), Data compression Device etc.
  ○ High speed Local Area Network (LAN, WAN), internet connectivity or V-SAT, or through lease line or Radio Modem etc.

SOFTWARE

Software, which comprises of the following:
  ○ Software comprises of operating system.
  ○ Optical Character Recognition (OCR) software.
  ○ Scanning software.
  ○ Adobe Acrobat Reader.
  ○ CD-Read / Write software.
  ○ Digital Library software i.e. D-space, Greenstone, Fedora, E-print etc.
  ○ Window-NT Networking software, SQL server software, Database Management software.
  ○ Web designing software like Java, Front Page, and XML etc.
  ○ RDMBS (Relational Database, supporting the Variety of digital database like ORACLE, Postre SQL, MY SQL etc.).
  ○ Full text search engine to index and provide access to digital resources.

DIGITAL LIBRARY SOFTWARE

For establishing DL operational software is required. For this purpose a number of digital library software is available which aim to offer computer digital library solution and emphasis is being given to open source software package. Following are some DL software which can be used in developing DL:

- **D-space** - D-space is a DL software available at [http://www.dspace.org](http://www.dspace.org)

- **Green Stone Digital Library software** - It is available from [http://greenstone.org](http://greenstone.org) under the term of the GNO General Public License.

- **GNUE-Print** - Archiving software (Version 2.2.2) is available [http://www.eprints.org](http://www.eprints.org)


- **Libraonix Digital Library System** - TheLibronix DLS is available from the site http://www.logos.com/products.

DIGITAL RESOURCES ORGANIZATION

The library should develop an information resource collection and development policy consistent with the objectives of its institutions or community. These information resources should satisfy through content, currency format organization and quality i.e., OPAC, e-text and journals, e-books, internet wave, e-mail bulletin board, database etc. The digital services personnel should, beyond in-house collections and in-house expertise, draw on the resources of other organizations, collect and provide information, by consulting individual experts and tapping external information sources. The digital library should provide access to the most current reference source available in order to assure the accuracy of information. This is based on many types of resources organization such as standards, protocols, access control etc.

LIFE CYCLE OF DIGITAL LIBRARY PROJECT

The life cycle of a typical digital library project consists of the following parts
PROVISION OF LIS SERVICES IN DL

In a digital library, information services can be provided to the users irrespective of their location either campus network environment or from other places over internet provided login and password with the end users. As per the services available in traditional libraries, improved services can be provided which are as follows:

- Access of CD-Rom based information retrieval services in a network environment.
- Access to online public access catalogue (OPAC) within the campus or over the internet.
- Provision of online circulation services like reservation and queries.
- Online subscription to journal.
- E-mail internet access.
- Access to online database for providing indexing and abstracting services.
- CAS and SDI services through e-mail alert or group messaging.
- Online access to in house database through campus LAN over internet.
- Access to shared or Union catalogue available at remote locations.
- Documentation delivery at digital content on demand and many services as per the requirement of the users.

FUTURE OF DIGITAL LIBRARY

Today, the requirements imposed on DLs are very different from that early time. A novel notion of DLs also referred to as “Knowledge Commons” (Ioannidis 2005) has emerged whose fulfillment requires new technologies and new organizational models. According to the most recent understanding, the DLs of the future will be composed of several multi-type and multimedia components aggregated in an unlimited numbers of formats. These for example can mix text, talks of scientific data and images obtained by processing earth observation data or they can mix text tables of scientific data and images, annotations and videos. These new information objects will offer innovative and more powerful means to researchers for sharing and discussing the results of their work. In the new DLs user are not only consumers but also producers of information. By elaborating information gathered through the DL they can create new information objects that are published in the DL thus enriching its content. The new DL are thus required to offer services that support the authoring of these new objects and the workflows that lead to their publication. In parallel with the above evolution of the role of DL systems, it is now observed a large expansion in the demand for DLs. The users’ demands are less expensive and more dynamic DL development models. They want to be able to set up new DLs that serve their needs for the duration of their collaborations in acceptable time frame and with an acceptable cost.

There is also an initiative sponsored by the Government of India to provide a common framework for all the digital libraries in India to coexist. In tune with the exponentially growing storage and band widths, it is proposed by Prof. Raj Reddy to digitize, video and other sports entertainment and religious discourses both live and achieved. This will enhance the utility of the DL and also expand the definition of library to become truly a powerhouse of information. This will also help also in documenting many context traditions and localized information that in the Indian of a “Consortium for Compensating for Creating Contents”- the Four Cs. This scheme addresses the possibility of creating a 21st century equivalent of public libraries, the PBS and the All India Radio to create contents for the Web.

CONCLUSION

To sum up, the emergence of digital libraries and their overwhelming growth in recent years have given new dimension to design, implementation development and evaluation of digital libraries. The association of Research Libraries has published a discussion draft that suggests the action in the context of using digitization as a reformatting strategy, “Libraries cannot wait for long term solution to be completely settled before the water”.

REFERENCES


