



Digital library environment in the changing scenario

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Abstract

This paper aims to summarize the concept of digital library and to emphasize the user's evaluation about the concept of digital library and technology used in digitization and formation of digital libraries. In the present age of science and technology, and with the advance of Information Communication technology (ICT), in the present era world has changed in to global village. It has progressed towards global information and digital networking era. The modern libraries are transforming their information services in different modes. Rapid advances in information technologies have revolutionized the role of libraries. As a result, libraries face new challenges, competitors, demands, and expectations. Digital Libraries are being created today for diverse communities and in different fields e.g. education, science, culture, development, health, governance and so on. Digital libraries have so many advantages over printed documents. For this skilled manpower and equipped infrastructure is needed. The aim of this paper is to discuss significance of digital libraries in the modern information era. It depicts basic concepts, new activities, purpose, need, different stages, requirements, advantages, various types of digital resources in digital environment.

Keywords: digital library, information technology, library environment, electronic resources

Introduction

The developments in ICT, especially the WWW and Internet, have led to the creation large number of digital library projects worldwide. Although the term digital library has gained popularity in recent years, they have evolved along the technological ladder for the past thirty years. In the early 1970s, digital libraries were built around mini and main-frame computers providing remote access and online search and retrieval services to online databases using computer and communication technology available at that time. Digital Libraries are being created today for diverse communities and in different fields e.g. education, science, culture, development, health, governance and so on. With the availability of several free digital Library software packages at the recent time, the creation and sharing of information through the digital library collections has become an attractive and feasible proposition for library and information professionals around the world. Library automation has helped to provide easy access to collections through the use of computerized library catalogue such as On-line Public Access Catalogue (OPAC). Digital libraries differ significantly from the traditional libraries because they allow users to gain an on-line access to and work with the electronic versions of full text documents and their associated images. Many digital libraries also provide an access to other multi-media content like audio and video.

What are Digital Libraries?

A digital library is a collection of digital documents. This definition is the dominant perception of many people of today. Nevertheless, (Singh S., 2018) Though the focus of this definition is on the document collection, it stresses the fact that the digital libraries are much more than a random assembly of digital objects. They retain the several qualities of traditional libraries such as a defined community of users, focused collections, long-term availability, the possibility of selecting, organizing, preserving and sharing resources. The digital libraries are sometimes perceived as institutions, though this is not as dominant as the previous definition.

Definition

A digital library is a library in which a significant proportion of the resources are available in machine-readable format, accessible by means of computers. The digital content may be locally held or accessed remotely via computer networks. It comprises digital collections, services and infrastructure to support lifelong learning, research, scholarly communication and preservation. It is an environment which supports full life cycle of creation, storage, preservation, dissemination and use of data, and information. It is a process of democratization of information." According to Lesk (1997) "Digital libraries are organized collections of digital information. They combine the structuring and gathering of information, which libraries and archives have always done, with the digital representation that computers have made possible.

1. The Digital Library Federation in the USA defines "The digital library as Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to,

interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities.

2. Association of Research Libraries (ARL) define digital libraries as "not a single entity, requires technology to link the resources of many, linkages transparent to the user, permit universal access, not limited to document surrogates but extend to digital artifact."

Characteristics

A digital library is an organized collection of digitized material or its holding in the digital form which can be accessible by a computer on the network by using TCP/IP or other protocol. The main characteristics of digital libraries are as follows:

1. The function of acquisition, storage, preservation, retrieval is carried out through the use of digital technology.
2. Organized collection of information objects may be a digital text or any other.
3. Resources are available in computer readable form.
4. Access to the entire collection is globally available directly or indirectly across network.
5. Support users in dealing with information objects.

Purpose of Digital Library

1. Expedite the systematic development of procedures to collect, store, and organize, information in digital form.
2. Promote efficient delivery of information economically to all users.
3. Encourage co-operative efforts in research resource, computing, and communication networks.
4. Strengthen communication and collaboration between and among educational institutions.
5. Take leadership role in the generation and dissemination of knowledge

Need for a Digital Library

Digital libraries are needed to provide quality based service at the user desktop.

Dr. A.P.J. Abdul Kalam described the role as digital library is where the past meets the present and creates a future. A digital library provides equitable access to knowledge to all the people, irrespective of place, caste, colour or economic status. Digital library unites rather than divide. Therefore there is a need of time to develop digital libraries.

- a. Easy to Understand:** The visual or graphical information system of digital libraries is more popular as compared to text based information system.
- b. Shifting of the Environment:** The new generation user becomes only happy when they will be able to read from the computer screen. The new generation whose demand for information is never met demands that traditional libraries should be developed as a well-equipped and interconnected DL.
- c. Multiple Function of Same Information:** In case of digital libraries by using hypertext it is possible to structure and organize the same digital information in a variety of ways which serve multiple functions.
- d. Information Explosion:** Digital library is expected to be able to handle the problem of information explosion somehow. It will be able to handle and manage large amount of digital content by simply providing link, without actually procuring the document.
- e. Searching Problem in Traditional Libraries:** By using digital library one will be able to retrieve information specifically for e.g. a particular image, photo, a definition, etc.
- f. Distance Learning:** Time is a major factor for each modern user of the library which is otherwise spent in coming and going to the library, but digitization will facilitate learning from home, office or other places which are convenient to users.
- g. To Provide Access to Online Publication:** As more and more information are published over internet, digital library needs to procure and provide link to the online publication and other important sources of information.
- h. Limited Buying Power of Libraries:** The collection of every library is limited to only a fraction of the total. Introduction of digital library will help to enhance the collection considerably.
- i. Storage Problem in Traditional Libraries:** Libraries are spending much of its budget by way of maintaining the collection in a usable form that also demands a huge physical space. Digitization hopes to overcome this. Digital Medias comes with a huge storage capacity.
- j. Low Cost of Technology:** The cost of technologies is much more less than that of traditional libraries.
- k. Environmental Factor:** The use of digital libraries is one of the cleanest technologies to fulfill the slogan "Burn a CD-ROM save a tree."

Functional Components of Digital Library

Most digital libraries share common functional components. These include:

1. **Selection and acquisition:** The typical processes covered in this component include the selection of documents to be added, the subscription of database and the digitization or conversion of documents to an appropriate digital form.

2. **Organization:** The key process involved in this component is the assignment of the metadata (bibliographic information) to each document being added to the collection.
3. **Indexing and storage:** This component carries out the indexing and storage of documents and metadata for efficient search and retrieval.
4. **Search and retrieval:** This is the digital library interface used by the end users to browse, search, retrieve and view the contents of the digital library. It is typically presented to the users as Hyper-Text Mark-up Language (HTML) page. These mentioned components are the important characteristic of digital library, which differ it from others collections of online information.

Different Stages in Digitizing Documents

Cornell University Library/Research Departments (2000), provides six stages in digitizing documents for a digital library: Registering, Scanning, Optical Character Recognition, Proofreading and formatting and producing the Final Version.

1. **Registering:** Before scanning large number of documents, there is the need to first register them and use a filing system to keep their track. If not, you risk misplacing hardcopies, losing files, skipping steps in the process or duplicating work, perhaps without realizing it. There is also the risk of losing electronic versions of files because they have been misnamed or saved in the wrong subdirectory. Moreover, a good filing system is vital, so everyone in the digitizing team knows what he is supposed to do, and he can fill in for another person in case of absence.
2. **Scanning documents:** It is necessary to clean and dust off the documents to be scanned; make sure that all the pages are present and in the right order. If the document is in poor condition, try to find a fresh copy. If it is a sheet fed scanner, cut the document open to get individual sheets to feed through the scanner. If necessary, you can rebind the documents later. If you do not want to damage the documents, you can photocopy each page and feed in the photocopy through the scanner, though this uses a lot of paper and reduces the quality of the scan. To scan a document on a flatbed scanner, place it face down on the scanner platen or put the pages into the sheet feeder. Then, in the software, choose a setting, resolution and colour and scan each page of the document at the settings you have chosen.
3. **Optical Character Recognition (OCR):** Optical Character Recognition (OCR) software converts a scanned image into a text file that a word processor can read. To do this, it must first recognize where the text is on the page. The software breaks the text blocks down into lines or into an individual character. It tries to match the image of each letter against patterns it recognizes as an “a”, “b” (<https://old.diglib.org/>), etc. There is a problem to encounter with languages that use Latin scripts with accented characters. As a solution, you should use the OCR software that is specific for language.
4. **Proofreading:** This is the act of making corrections to the document text and layout. This is done in two ways:
 - a. Comparing the scanned text on the screen with the hardcopy and entering the corrections directly into the computer. The word processors spellchecker will help in spelling errors quickly.
 - b. Printing out the scanned text and comparing it with the original copy. Mark any corrections on the printout, and then enter them into the computer. This is a slower method, but may be the best option if there are no enough computers for each proofreader.
5. **Reformatting:** The Optical Character Recognition (OCR) software may produce a document that consists of straight text, no columns, no headers and footers. There is the need to reinsert these by hand or correct where they appear on the page. There may be also need to change the typeface, heading styles and so on, to make the document more attractive and readable. Alternatively, you may be able to adjust the settings of your OCR program to preserve the layout of the page.
6. **Final Version:** For many documents, there is a need to add some information to the text so that readers can identify it easily. As for a book you must make sure that the book title, the author or the editor, the publisher and the publication date are all included. As for chapter in a book, you should include the title and the author of that chapter and the original page numbers in the printed version of the book. As for the journal articles you should include the journal title, the date, the volume and the issue number, the article title and the authors and the page numbers in the original printed journal. In other words there is the need to add Metadata to describe each document.

Requirement for Digital Libraries

The internet and World Wide Web provide the impetus and technological environment for the development and operation of a digital library. The internet provides the TCP/IP and or its associated protocol for accessing the information and web provides tools and technique for publishing the information over internet. Still, for introducing any digital libraries, the following infrastructure will be needed:-

- a. **Computer Hardware:** Server, P.C. with multimedia, U.P.S. Etc
- b. **Software:** Any suitable software from GSDL, DSpace, etc which is interconnected and suitable for LAN and WAN connection.
- c. **Network:** LAN, MAN, WAN, etc.
- d. **Printer:** Laser printer, Dot matrix, Barcode printer, Digital graphic printer, etc.

- e. **Scanner:** H.P. Scan jet, flatbed, Sheet feeder, Drum scanner, Slide scanner, Microfilming scanner, Digital camera, Barcode scanner etc
- f. **Storage Devices:** Optical storage device, CD-ROM, juke box, etc. As in the digital environment it is reasonable to say that a central back up or archive should be created at the national level which will store information output of the region as well as information from outside the country.
- g. **Other Audio Visual Aid:** Color T.V., V.C.R., D.V.D., Sound box, Telephone, etc.
- h. **Humanware:** Well-trained manpower for online help. The use of search engines, Optical Character Recognition and metadata will allow digital library to operate.

Recourses of a Digital Library

The resources of a digital library are those, which the computer can store, organize, transmit and display without any intervening conversion process. The resources of a digital library mainly consist of e-book, v-book, electronic tax, map, image, sound, and video. The digital material may be of multimedia types or any other i.e. only digital audio, video, full text information, photograph, drawing, digitized sound, 3D representation, etc. The collection may include structured /unstructured text, scanned images, graphic audios, video recording, etc. In the digital environment anyone who has access to the internet can be a publisher by merely posting messages to an online discussion group or other, so digital library's collection should also be enhanced with links to such resources.

- a. **On line Resources:** Local database of traditional books in machine-readable form, E-book, v-book, electronic tax, map, image, sound, video, and multimedia, E-journal, etc.
- b. **Off line Resources:** C.D-ROM, Juke Box, etc.

Advantages of the Digital Library

A digital library is not confined to a particular location or so called building, it is virtually distributed all over the world. The user can get his/ her information on his own computer screen by using the internet. Actually it is a network of multimedia system which provides finger tip access. The spoken words or the graphical display of a digital library is again having a different impact from the words that are printed. In the new environment owning a document will not be problem for the library because the user will pay for its uses.

- a. **No Physical Boundary:** The user of a digital library need not go to the library physically; people from all over the world could gain access to the same information, as long as an Internet connection is available.
- b. **Round the Clock Availability:** Digital libraries can be accessed at any time, 24 hours a day and 365 days of the year.
- c. **Multiple Accesses:** The same resources can be used at the same time by a number of users.
- d. **Wider access:** A digital library can meet simultaneous access requests for a document by easily creating multiple instances or copies of the requested document. It can also meet the requirements of a larger population of users easily.
- e. **Improved access:** Digital libraries are typically accessed through the Internet and Compact Disc-Read Only Memory (CD-ROM). They can be accessed virtually from anywhere and at anytime. They are not tied to the physical location and operating hours of traditional library.
- f. **Structured Approach:** Digital library provides access to much richer content in a more structured manner i.e. we can easily move from the catalogue to the particular book then to a particular chapter and so on.
- g. **Information Retrieval:** The user is able to use any search term bellowing to the word or phrase of the entire collection. Digital library will provide very user friendly interfaces, giving clickable access to its resources.
- h. **Preservation and Conservation:** An exact copy of the original can be made any number of times without any degradation in quality. Since the electronic documents are not prone to physical wear and tear, their exact copies can easily be made, the digital libraries facilitate preservation of special and rare documents and artefacts by providing access to digital versions of these entities.
- i. **Space:** Whereas traditional libraries are limited by storage space, digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain them. When the library had no space for extension digitization is the only solution.
- j. **Networking:** A particular digital library can provide the link to any other resources of other digital library very easily.
- k. **Improved information sharing.** Through the appropriate metadata and information exchange protocols, the digital libraries can easily share information with other similar digital libraries and provide enhanced access to users.
- l. **Cost:** The cost of maintaining a digital library is much lower than that of a traditional library. A traditional library must spend large sums of money paying for staff, book maintenance, rent, and additional books. Digital libraries do away with these fees.

Disadvantages of the Digital Library

The computer viruses, lack of standardization for digitized information, quick degrading properties of digitized material, different display standard of digital product and its associated problem, health hazard nature of the radiation from monitor, etc. makes digital libraries at times a handicap.

- a. **Copyright:** Digitization violates the copy right law as the thought content of one author can be freely transferred by others without his acknowledgement. One difficulty to overcome for digital libraries is the way to distribute information. How does a digital library distribute information at will while protecting the copyright of the author?
- b. **Speed of Access:** As more and more computer is connected to the internet its speed of access is reasonably decreasing. If new technology will not evolve to solve the problem then in near future internet will be full of error messages.
- c. **Initial Cost is high:** The infrastructure cost of digital library i.e. the cost of hardware, software, leasing communication circuit is generally very high.
- d. **Band width:** Digital library will need high bandwidth for transfer of multimedia resources but the band with is decreasing day by day.
- e. **Efficiency:** With the much larger volume of digital information, finding the right material for a specific task becomes increasingly difficult.
- f. **Environment:** Digital libraries cannot reproduce the environment of a traditional library. Many people also find reading printed material to be easier than reading material on a computer screen.
- g. **Preservation:** Due to technological developments, a digital library can rapidly become out-of-date and its data may become inaccessible.

Role of Librarian in Digital Environment:

Though the digital environment is built as a system which can be used by its ultimate end user directly from their desk top PC but the role of librarian cannot be overlooked. In digital environment also the librarian and information scientist will be needed for packaging and repackaging of information, for electronic publishing, for reference purpose, to advice the user about the strategy to identify relevant electronic sources, etc. Thus the librarian will be more or less a hypertext engineer. In the new environment it will be very difficult for the librarian to decide what should be organized; how to give citation; how to organize the collection; etc because the new environment will be really challenging one for the librarian to decide who the authors are, who the publishers are and who the users are?

Conclusion

Digital libraries are in fact probably too young to define in any permanent way, but how we think about them will have a great deal to do with how future generations of librarians conceptualize their mission in the digital world. Digital libraries facilitate users to access electronic versions of full-text documents and their associated images. They bring significant benefits to the users. Digital libraries are not going to replace the physical existence of document completely but no doubt to meet the present demand, to satisfy the non local user digitization must be introduced so that at least libraries becomes of hybrid nature. The initial cost of digitization is high but experiment shows that once digitization is introduced then the cost to manage this collection will be cheaper than that of any traditional library. Day by day the cost of digitization is also decreasing, the online publication is increasing, the need of users are shifting towards a different environment so it is needless to say that after one or two years all library will shift over to digital mode, if not fully at least to some extent. So it is the pick time to all library and informational science professional to gear them in building digital library and taking it as a challenge. Large scale digitization projects are underway at Google, the Million Book Project, MSN, and Yahoo!. With continued improvements in book handling and presentation technologies such as optical character recognition and e-books, digital libraries are rapidly growing in popularity.

References

1. Adamou S. The Impact of Digital Technologies on Academic Libraries. Linnaeus University, 2017.
2. Amudvalli A. Dynamics in Digital Information Systems. Delhi: Ess Esss, 2008.
3. Anuradha P. The impact of digital technologies on academic libraries: challenges and opportunities. IP Indian Journal of Library Science and Information Technology,2017:2(2):46-50.
4. Arms CR. Historical Collections for the National Digital Library. D-Lib Magazine, 1996, 77-89.
5. Arora J. Building Digital Libraries: An Overview. DESIDOC Journal of Library & Information Technology,2001:21(6):25-31.
6. Bamgbade BJ, Akintola BA, Agbenu DO, CO Fagbami OO. Comparative analysis and benefits of digital library over traditional library. World Scientific News,2015:24:7(2):1-7.
7. Bera SK. Digital Library and its Services in the Modern IT Era. International Journal of Library and Information Studies,2016:6(4):44-51.
8. Chowdhury GG, Chowdhury S. Introduction to digital libraries. London: Facet Pub, 2003.
9. Cleveland G. Digital Libraries: Definitions, Issues and Challenges. International Federation of Library Associations and Institutions, 1998, 1-8.
10. Kalpalatha N. Digital Libraries - Digital Librarians and Future Roles. International Journal of Library and Information Science,2015:5(3):135-139.
11. Kumar BS. Digital Library and its Services in the Modern IT Era. International Journal of Library and Information Studies,2016:6(4):43-51.

12. Kumar MS. Digital Library, Features, Strategies, Infrastructure and their Benefits for Users in Digital Era. *Journal of Emerging Technologies and Innovative Research*,2020:7(9):964-975.
13. Mishra RK. Digital Libraries: Definitions, Issues, and Challenges. *Innovare Journal of Education*,2016:4(3):1-3.
14. NK. Digital Libraries - Digital Librarians and Future Roles. *International Journal of Library and Information Studies*,2015:5(3):135-139.
15. Nahak B, Patra PS. Planning, Designing and Developing of DigitalLibraries and Digital Preservation. *Planner. Inlibnet*, 2014, 25-27.
16. SV S, SK, NB. Digital Library at B G S Institute of Technology Library and Information Center: A Case Study. *International Journal of Library and Information Studies*, 2016, 6 (2).
17. Saffady, W. (1995). Digital library concepts and technologies for the management of library collections: an analysis of methods and costs. *Library Technology Reports*,1995:3(3):221-236.
18. Sarasvathy P, GM GP, BM J. Digital Library Environment in the Changing Scenario: User's Survey of Mysore University, Mysore. *International Journal of Library and Information Studies*,2016:6(2):90-91.
19. Seadle M, Greifeneder E. Defining a digital library. *Library Hi Tech*,2017:25(2):169-173.
20. Singh G. *Digital Libraries and Digitization*. Delhi: Ess Ess Publications, 2011.
21. Singh, R. *ModrenTrend in Libraries: For Beginners*. GJMS Intellectual Integrity, 2016.
22. Singh S. Digitization of library resources and the formation of digital libraries: Special reference in green stone digital library software. *Original Research Article*, 2018, 44-48.
23. Somvir, Kaushik S. Digital Library: Today's Need. "Knowledge Dissemination through Libraries and Information Centres: Sharing Vision for the Future MANLIBNET, 2010, 22-24.
24. Sonker SK, Mahawar K. Digital Library: Processes, Services, Challenges and Opportunities. *Core*,20112:6(2):23-29.
25. Srinivasan P. Digital Library Projects in the United States. *DESIDOC Bulletin of Information Technology*,1997:17(6):15-21.
26. Trivedi M. Digital Libraries: Functionality, Usability, and Accessibility. *Library Philosophy and Practice*, 2010, 1-6.
27. Trivedi M. Digital Libraries: Functionality, Usability, and Accessibility. *Library Philosophy and Practice*,2010:27(5):1-5.
28. Witten IH, DB DM. *How to Build a Digital Library*. Morgan Kaufmann Publishers Inc, 2009.