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## Library Services in Digital Environment: Challenges and Strategies in Covid-19 Pandemic Situation

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### Abstract

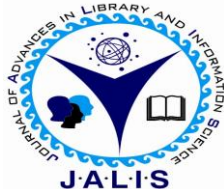
*Due to COVID-19 pandemic lockdown situation and major dramatic technological changes in academic environment throughout the world, library collections are not only limited to print resources but also electronic resources grows rapidly by their use and therefore it is important to develop digital library. Academic libraries on the web have become more competent and confident in terms of digital resource management and digitization. During COVID-19 pandemic situation information societies are seeking information from our academic libraries in digital format. So, academic libraries play vital role in digital resource acquisition, storage, analysis, interpretation and dissemination of digital information among the existing library users. This article has brought out opportunities to learn about various advancements of digital library like planning of digital library, required skills for digital library, digital library initiatives in India, benefits of digital library resources; and challenges and opportunities of COVID-19 pandemic environment in order to maximize the usage of digital resources and digital services in worldwide lockdown and pandemic situations prevailing in our country*

### Keywords

Digital Library; Digital Library Initiatives; Digital Library Services; Digital Resources; Institutional Repository

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## 1. Introduction

At present the whole world is going through a critical phase of COVID-19 pandemic lockdown environment. Coronavirus has threatened and affected almost all spheres of our living and livelihood. Every academic institution including libraries and information centres has been affected with coronavirus. The libraries across the globe are striving hard to cope with the emergent situation. As the locks down phrases are related to bring in normalcy, the libraries are also gearing up for reopening and resumption of activities. In this pandemic situation, all libraries have been the gateways of relevant information and knowledge for conducting research and development on the related subject areas. The academic libraries and information & reference services started to gain importance by providing researchers the opportunity to explore scientific research, while prevention of the disease. The new normal, social distancing, masks, gloves and washing of our hands are here to stay in the world. Even all restrictions are lifted, until corona vaccine is discover and implemented (Tunga, 2021).

The present study attempts to provide a better understanding of the measure to take into account when reopening the libraries and digital library services required for the post-pandemic academic library reopening phase. With a proper understanding of the pandemic, academic librarians can perform well in library re-opening time and similar pandemic conditions in the future and provide a better post-pandemic experience for library users in the digital environment.

## 2. Previous Studies

Lakshmi and Suma (1998) focused on the planning digital library development, especially planning for the IT infrastructure and financial planning. Sadagopan (2000) discussed one of the challenges of digital libraries, includes availability of information at the fingertips but questions, where is knowledge. Digital libraries in the Indian context are discussed and the author highlights the opportunities available to library scientists for creating and accessing content in Indian languages. Srivastava and Saxena (2004) have also evaluated an overview of digital libraries. Bhattacharya (2004) studied on the development of digital libraries in India and

concluded that India's attempt towards digital library development has been sporadic and partial. Krishnamurthy (2004) also gives an overview of digital libraries describing the Digital Library Initiative – Phase I and Digital Library Initiative – Phase II projects. He also touches upon research issues involved in digital libraries such as interoperability, collection development and management, preservation, cataloguing and indexing and reference services. Sharma and Arora (2005) highlighted the need for digital libraries along with the requirements, digitization process and future of digital libraries. Jain and Babbar (2006) have categorized the different Indian digital library initiatives viz., at the government level, at academic institutions and within society-level organizations. Fifteen digital library initiatives that fall under the three categories have been highlighted. The authors also affirm that only sporadic and partial attempt have been made towards digital library initiatives in India. Gupta & Singh (2006) focused on the issues and strategies involved in management of digital libraries include hardware management, software management, collection management, preservation/archiving, financial management and the access system. Yadav (2018) studied on the meaning digital library, needs, its advantage and challenges of digitization of library and the role of librarians in the digital libraries.

### 3. Purpose of the Study

The general purpose of this study is to investigate digital library resources and services for improvement and innovation of access and retrieval for effective teaching-learning activities in academic libraries in India. Specifically, the study intended to:

- Establish the planning of digital library
- Ascertain the required skills for digital library
- Identify the available digital resource links of Books, Journals, Manuscripts and Theses & Dissertations in India
- Identify the available library consortium and Institutional repositories in India
- Determine the challenges and opportunities of COVID-19 pandemic situation

### 4. Research Questions

- What are the steps should follow for planning of digital library in your library?
- What types of skills are required for developing digital library in your library?
- What are the digital library initiatives in India for books, journals, manuscripts and electronic theses and dissertations?
- How many library consortium initiatives by societies and institutions in India?
- How many institutional repository initiatives in India?
- What are the benefits of digital resources in any library?
- What are the challenges and opportunities of COVID-19 pandemic situation?

### 5. Materials and Methods

A detailed review of the literature was conducted regarding the digital learning, digital library and provisions for digital library services during COVID-19 pandemic situation. Literature search was conducted from November to December 2020. Appropriate keywords were used to find the required information and those keywords are: digital learning, e-learning, COVID-19 pandemic, digital library, digital library services to provide library services during and post-pandemic conditions, existing guidelines for reopening libraries, existing strategies for COVID-19 and how to conduct academic libraries during and post-pandemic seasons. These keywords were queried through different advanced searching techniques on the database of Oxford academic journals, JSTOR, SCOPUS, Google Scholar, and websites of World Health Organization (WHO), Ministry of Health and Family Welfare, India, American Library Association, IFLA, in Online magazines, National Geography, The Economic Times Magazine and Research Gate.

### 6. Results and Discussion

#### 6.1. Digital Library

The term "Digital library" divided into two parts. One in "Digital" and another is "Library" Digital means, information in any digitized format and library means, a total mechanism for obtaining access to, storing, organizing and delivering information. So, *digital library* is the library to collect the information with associated services, where the information is stored in digital format like text, video, audio etc. and accessible over a network. *Digital library* is an information services

in which all the information resources are available in *digital formats* and the functions of acquisition, storage, preservation, retrieval, access and display are carried out through the use of *digital technologies*. *Digital library* is a collection of information in digital formats and accessible over a network. In other word digital library is a computer resident networked library, created and managed by some defined software, containing *digital objects* which can be used seamlessly. Items in digital library are digital objects. They are stored in repositories and identified by *handles*. Information stored in a digital object is called *content*.

## 6.2. Planning of Digital Library

For planning for digital library, we have to keep in our mind which type of users have access it and if access are not restricted, following steps should followed to fulfill the need of its users (Lakshmi & Suma, 1998).

- a) **IT infrastructure planning:** Digital library requires well tested and proven information technologies including the multimedia kit, data handling, memory, processing and storage, computer software such as OCR and library application software, etc.
- b) **Digitization of information:** For digitalization of library resources such as book, serials, thesis, dissertation reports, current and back volumes of periodicals, institutional publications, seminar proceedings in digital form equipments like scanners, printers, digital camera have to be procured.
- c) **Information access:** Users are required to be given user ID and password to access the materials in digital form. There should not be limitations for access of digital materials for authorized users.
- d) **Information Needs:** There are three main components of any library, resources, librarian and the most important one is its user. If there are no users there is no need for establishing library.
- e) **Digital Library Committee:** A digital library committee should be formed to plan for its creation and maintenance. The members must be from various library departments and, if necessary, consultants can be hired. There are at least two ways of developing a digital library, firstly by

converting a traditional library into a digital library, and secondly, by direct development of a digital library.

- f) **Digital library services:** A digital library should be planned to provide these services like CD-ROM Databases, Remote Information Services, Search engine services, Internally published newsletters, Reports, Journals, Internet information, Electronic Document Delivery Services, Reference Service, Electronic Publishing, Web-based reference, and information services, Special Collection Services, e-mail, ETD, Electronic Table of Contents
- g) **Security issues:** Security issues for the development of any digital library are must. There are some pre-planned rules of using digital library which are to be clarified concern how users access their desired information. Backup plan, if in case of any mishappening is also required. How to control security threat protection (firewall, antivirus, etc.), has to be determined.
- h) **Financial planning:** To meet the expenditure for the digital library, appropriate funds should be provided by the library authorities. Plan for budget, other aspects related to digital library like, human resources, software, hardware application, etc. Upgrading new technologies, etc. are another important aspect for planning a digital library.

## 6.3. Required Skills for Digital Library

- ICT Skills: Networking, Web Programming, Digitization Methods, Digital Library Systems, Architecture, Digital Library Software, Digital Library Products and services.
- Information Skills: Information Organization, Information Retrievals, User Studies, User Education Skills, Collection Management Skills, Digital Information and Reference Service
- Management Skills: Personal & Financial Management Skills, Marketing Skills, User Care & Realations Skills, Decision Making Skills.
- Research & Project Management Skills: Publication & Reporting Skills, Research Design, Learning New Things & Adopting

## 6.4. Digital Library Initiatives in India

India has several digital library initiatives of the institutional, organizational and national level (Bhattarya, 2004; Jain & Babbar, 2006; Yadav, 2018).

#### 6.4.1. Digital Library of Books

S No.	Name of Digital Library	URL
1	Digital Library of India (DLI)	<a href="http://www.newdli.ernet.in/">www.newdli.ernet.in/</a> / <a href="http://dli.iit.ac.in">http://dli.iit.ac.in</a> <a href="http://www.dli.cdacnoida.in">www.dli.cdacnoida.in</a>
2	Digital E-Library: Dware Dware Gyan Sampadaa-	<a href="http://mobilelibrary.cdacnoida.in">http://mobilelibrary.cdacnoida.in</a>

	Providing books at your Doorsteps	
3	National Digital Library of India (NDLI)	<a href="https://ndli.itkcp.ac.in">https://ndli.itkcp.ac.in</a>
4	NCERT Online Textbooks	<a href="http://ncert.nic.in/textbook/htm">http://ncert.nic.in/textbook/htm</a> <a href="http://www.ncert.nic.in/textbooks/testing/index.htm">www.ncert.nic.in/textbooks/testing/index.htm</a>
5	Vigyan Prasar Digital Library (VPDL)	<a href="http://www.vigyanprasar.gov.in/digilib/">www.vigyanprasar.gov.in/digilib/</a> <a href="http://www.vigyanprasar.gov.in/dream/index.asp/">www.vigyanprasar.gov.in/dream/index.asp/</a>

#### 6.4.2. Digital Library of Journals

Open Access journals initiatives in India by Scientific Society and Publishers as follows:

S No.	Name of Digital Library	URL
1	Indian Academy of Sciences	<a href="http://www.ias.ac.in/pubs/journals/">www.ias.ac.in/pubs/journals/</a>
2	Indian Journals.com	<a href="http://www.indianjournals.com">www.indianjournals.com</a>
3	Indian MEDLAR's Centre	<a href="http://medind.nic.in">http://medind.nic.in</a> IndMed: <a href="http://indmed.nic.in">http://indmed.nic.in</a> OpenMed: <a href="http://openmed.nic.in">http://openmed.nic.in</a>
4	Indian National Science Academy	<a href="http://www.insa.ac.in">www.insa.ac.in</a> or <a href="http://www.insaindia.org">www.insaindia.org</a>
5	Indian Statistical Institute (ISI)	<a href="http://sankhya.isical.ac.in">http://sankhya.isical.ac.in</a>
6	Kamla-Raj Enterprises	<a href="http://www.krepublishers.com/KRE-New-J/index.html">www.krepublishers.com/KRE-New-J/index.html</a>
7	Medknow Publication Pvt. Ltd.	<a href="http://www.medknow.com/journals.asp">www.medknow.com/journals.asp</a>
8	National Centre for Biodiversity Informatics	<a href="http://www.ncbi.org.in">http://www.ncbi.org.in</a>
9	National Collection of Industrial Micro-organism (NCIM)	<a href="http://ncl-india.org/ncim">http://ncl-india.org/ncim</a>
10	NISCAIR Research Journals	<a href="http://nopr.niscair.res.in">http://nopr.niscair.res.in</a>
11	Open Journal Access System@INFLIBNET	<a href="http://www.inflibnet.ac.in/ojs/">http://www.inflibnet.ac.in/ojs/</a>

#### 6.4.3. Digital Library of Manuscripts

S No.	Name of Digital Library	URL
1	Kalasampada: Digital Library-Resources of Indian Cultural Heritage (DL-RICH)	<a href="http://www.ignca.nic.in/dlrich.html">http://www.ignca.nic.in/dlrich.html</a>
2	Muktabodha: Digital Library and Archiving Project	<a href="http://www.muktabodhalib.org/digital_library.htm">http://www.muktabodhalib.org/digital_library.htm</a> <a href="http://www.muktabodhalib.org/SECURE/digital_library_index.htm">http://www.muktabodhalib.org/SECURE/digital_library_index.htm</a>
3	National Databank on Indian Art and Culture (NDBIAC) by Indira Gandhi National Centre for the Arts (IGNCA), New Delhi	<a href="http://ignca.nic.in/ndb_0001.htm">http://ignca.nic.in/ndb_0001.htm</a>
4	National Mission for Manuscripts	<a href="http://www.namami.org/index.htm">http://www.namami.org/index.htm</a>

(NMM)
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#### 6.4.4. Digital Library of Theses and Dissertations/Electronic Theses and Dissertations (ETD)

S No.	Name of Digital Library	URL
1	CSIR Explorations: Open Access Repository of Indian Theses	<a href="http://csir.explorations.com">http://csir.explorations.com</a>
2	Central Marine Fisheries Research Institute (CMFRI)	<a href="http://eprints.cmfri.org.in">http://eprints.cmfri.org.in</a>
3	ETD@IISc	<a href="http://eprints.iisc.emet.in">http://eprints.iisc.emet.in</a>
4	ETD@Bombay	<a href="http://etd.library.iitb.ac.in">http://etd.library.iitb.ac.in</a>
5	ETD@IIT Delhi	<a href="http://eprints.iitd.ac.in/dspace/">http://eprints.iitd.ac.in/dspace/</a>
6	ETD@JNU	<a href="http://etd.lib.jnu.ac.in">http://etd.lib.jnu.ac.in</a>
7	ETD@Cochin University of Science & Technology: DYUTHI	<a href="http://dyuthi.cust.ac.in/xmlui/">http://dyuthi.cust.ac.in/xmlui/</a>
8	ETD@University of Mysore: VIDYANIDHI	<a href="http://www.vidyanidhi.org.in">www.vidyanidhi.org.in</a> <a href="http://210.212.200.226/">http://210.212.200.226/</a> <a href="http://dspace.vidyanidhi.org.in:8080/dspace">http://dspace.vidyanidhi.org.in:8080/dspace</a>
9	KSHIPRABHA: Agricultural Doctoral Dissertations Repository from 45 Universities in India	<a href="http://14.139.232.167:8080/HAU/thesis.html">http://14.139.232.167:8080/HAU/thesis.html</a>
10	SHODHGANGA: Reservoir of Indian Electronic Theses and Dissertations (ETD)	<a href="http://shodhganga.inflibnet.ac.in">http://shodhganga.inflibnet.ac.in</a>

##### 6.4.4.1. Library Consortium in India

S No.	Name of Digital Library	URL
1	CeRA (Consortium for e-Resources in Agriculture)	<a href="http://cera.iari.res.in&amp;:amp;">http://cera.iari.res.in&amp;:amp;</a> <a href="http://cera.jccc.in">http://cera.jccc.in</a>
2	CSIR Consortium	<a href="http://www.niscair.res.in/activitiesandservices/majorprojects/">http://www.niscair.res.in/activitiesandservices/majorprojects/</a>
3	DRDO E-Journal Consortium	<a href="http://www.dsl.drdo.gov.in/ejournals/">www.dsl.drdo.gov.in/ejournals/</a>
4	DeLCON (DBT-Dept. of Biotech. e-Library Consortium)	<a href="http://delcon.gov.in">http://delcon.gov.in</a>
5	ERMED (Electronic Resources in Medicine) Consortium	<a href="http://ermed.jccc.in/">http://ermed.jccc.in/</a>
6	INDEST-AICTE Consortium	<a href="http://indest.iitd.ac.in">http://indest.iitd.ac.in</a> <a href="http://www.panitd.ac.in/indest">http://www.panitd.ac.in/indest</a>
7	MCIT Consortium	<a href="http://www.mcitconsortium.nic.in">http://www.mcitconsortium.nic.in</a>
8	NLIST-INFLIBNET	<a href="http://nlist.inflibnet.ac.in">http://nlist.inflibnet.ac.in</a>
9	National Knowledge Resource Consortium (NKRC)	<a href="http://nkrc.niscair.res.in">http://nkrc.niscair.res.in</a>
10	UGC-INFONET Digital Library Consortium	<a href="http://www.inflibnet.ac.in/econ">http://www.inflibnet.ac.in/econ</a>

##### 6.4.4.2. Institutional Repositories (IR) in India

S No.	Name of Digital Library	URL
1	Digital Archive of NIT Rourkela	<a href="http://dspace.nitrkl.ac.in/dspace/">http://dspace.nitrkl.ac.in/dspace/</a>

2	Digital Repository@IIT Bombay	<a href="http://dspace.library.iitb.ac.in/dspace/">http://dspace.library.iitb.ac.in/dspace/</a>
3	Digital Repository@Management Development Institute Gurgaon	<a href="http://dspace.mdi.ac.in/dspace/">http://dspace.mdi.ac.in/dspace/</a>
4	Digital Repository@ Raman Research Institute (RRI)	<a href="http://dspace.rii.res.in:8080/dspace/">http://dspace.rii.res.in:8080/dspace/</a>
5	Digital Repository Service@ National Institute of Oceanography	<a href="http://dri.nio.org/">http://dri.nio.org/</a>
6	Dspace@IIM Kolkata	<a href="http://dspace.iimk.ac.in/">http://dspace.iimk.ac.in/</a>
7	Dspace@National Centre for Radio Astrophysics (NCRA)	<a href="http://ncralib.ncra.tifr.res.in:8080/dspace/">http://ncralib.ncra.tifr.res.in:8080/dspace/</a>
8	Dspace@National Chemical Laboratory (NCL)	<a href="http://dspace.ncl.res.in/dspace/">http://dspace.ncl.res.in/dspace/</a>
9	Dspace@Thapar University	<a href="http://dspace.tiet.ac.in:8080/dspace/">http://dspace.tiet.ac.in:8080/dspace/</a>
10	ICFAI Business School Ahmedabad Digital Repository	<a href="http://202.131.96.59:8080/dspace/">http://202.131.96.59:8080/dspace/</a>
11	IR@INFLIBNET	<a href="http://dspace.inflibnet.ac.in">http://dspace.inflibnet.ac.in</a> <a href="http://ir.inflibnet.ac.in">http://ir.inflibnet.ac.in</a>
12	IR@National Aerospace Laboratories	<a href="http://nl-ir.nal.res.in">http://nl-ir.nal.res.in</a>
13	Indian Institute of Astrophysics Repository	<a href="http://prints.iiap.res.in">http://prints.iiap.res.in</a>
14	Open Access Repository of IISc Research Publications	<a href="http://eprints.iisc.eamet.in/">http://eprints.iisc.eamet.in/</a>
15	University of Delhi E-Print Archive	<a href="http://eprint.du.ac.in">http://eprint.du.ac.in</a>

#### 6.4.4.3. Other Digital Library Initiatives

S No.	Name of Digital Library	URL
1	Archives of Indian Labour: Integrated Labour History Research Programme	<a href="http://www.indialabourarchives.org/">http://www.indialabourarchives.org/</a>
2	C-DAC Projects	<a href="http://cdac.in/index.aspx?id=mc_hc_digi_lib">http://cdac.in/index.aspx?id=mc_hc_digi_lib</a>
3	Cultural Heritage Digital Library in Hindi (CHDLH)	<a href="http://tdil.mit.gov.in/coilnet/ignca/welcome.html">http://tdil.mit.gov.in/coilnet/ignca/welcome.html</a>
4	in.arXiv: Hosted by Institute of Mathematical Sciences (CIMS), Chennai	<a href="http://in.arxiv.org">http://in.arxiv.org</a> <a href="http://xxx.imsc.res.in">http://xxx.imsc.res.in</a> <a href="http://www.arxiv.org/">http://www.arxiv.org/</a>
5	Indian Education Digital Library (IEDL)	<a href="http://www.edudl.nic.in">http://www.edudl.nic.in</a> <a href="http://www.edudl.gov.in">http://www.edudl.gov.in</a>
6	Traditional Knowledge Digital Library (TKDL), NISCAIR, CSIR & AYUSH	<a href="http://www.tkdil.res.in">www.tkdil.res.in</a>

with following benefits (Ansari, 2003, Gupta & Singh, 2006)

### 7. Benefits of Library Digital Resources

No physical boundary in digital libraries. The user of a digital library need not to go the library physically, users from all over the world could gain multiple accesses to the same information as long as an internet connection is available by using the internet of multimedia system, which provides fingertip access

- Information availability: 24×7 access from anywhere at anytime
- Easy of access and provide various search options
- No need to visit physically and save time of the users
- Everything is one click away
- Easy to store, to read and to carry

- Easy to track the usage
- Huge information reservoirs
- Provide quick and up-to-date information
- Many a times in multimedia format & are interactive
- Provide special services like SDI, Alert etc.

## **8. Challenges and Opportunities of COVID-19 Pandemic**

- Paradigm shift from physical to online environment
- Change of mindset among library staff and library users
- Increase in use of internet and also use of digital library materials
- Improvement in Information & communication Technology (ICT) infrastructure
- Too many online webinars/workshops/quiz/meetings
- Restricted movement –save fuel and no pollution
- Better environment and reduced pollution
- Thermal scanners, hand sanitizer, face shield, masks, gloves, disinfecting spray & wipes etc.

## **9. Recommendations**

The above identified challenges could be solved through the following:

- To create awareness and teach to library users to improve their digital skill development
- Arranging training for library users on accessing and use of available e-resources
- Also arrange training for library staff to increase skill on handling e-resources
- The access to computers is seen as essential task for searching, retrieving, copying, and studying purposes. So for safety purpose, it has been suggested in post COVID 19 pandemic period that the users should use their own laptop and common computers used for students and others should made inaccessible.
- The close physical contact is the major cause of catching the coronal virus, and only way to avoid the virus is 'social distancing' – keeping a safe distance

between two persons in order to reduce the risks of COVID 19 from one person to another. The recommended distance differ from country to country but appears not to be below 1 meter i.e. about 3-4 feet, and more than that may be better.

- Maintaining culture so as to manage the available web 2.0 facilities effectively
- Colleges, Universities and UGC should take an active role in providing ICT facilities to digital libraries
- Proactive training of librarians to acquire 21<sup>st</sup> century skills to adopt to the changing web 2.0 environment
- Educating the library users on the issue of copyright law and violation

## **10. Conclusion**

Information technology has changed the world and has become one important tool for retrieving information new days. Library collections are not only limited to printed documents but also electronic resources increases by their use and therefore it is important to develop digital library. People realized the importance of digital libraries no matter what their feelings towards them were before. Innovative information knowledge collection, storage, process, transfer methodologies made possible by digital libraries will promote scientific research and development, facilitate distant-learning environment, and bring significant influence on the national economy (Sun & Yuan, 2012)

Academic Libraries on the web have become more competent and confident in terms of resource management and digitalization. Information societies are seeking information in digital format, therefore, library services depends upon skilled professionals. Library plays vital role in data acquisition, storage, analysis, interpretation and dissemination of information among the library users. This Article has brought out opportunity to learn recent technological advancements in order to maximize the usage of library resources and services in worldwide lockdown and pandemic situations prevailing in the country. Library staff and all the stakeholders shall have a general understanding of the post pandemic. Academic librarians can lead all the safety protocols, policies, getting touch with the latest updates about the pandemic, disinfection practices in the library.

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