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Abstract:

The National Digital Library of India (NDLI) is a National Mission Project initiated by the Ministry of Human Resource Development (MHRD) on education to engage, facilitate and inspire all learners across the country regardless of the age, demographics and ability. The National Digital Library of India is a melting pot of knowledge and information that holds an extensive variety of lectures, courses, archives in various media forms curated, collected and created by the best institutions of the country. It is a platform designed to make digital educational resources accessible to all citizens of the country to inspire, empower and encourage learning. The present study is an attempt to provide an overview of the National Digital Library of India (NDL India) to understand its advantages, features and collection in the global digital space.

The study also explores the learning resources contributed by multiple sources and the content available in various file formats. In order to carry out the present work, the requisite data were collected from the official website of the NDL India. The data was later analyzed to achieve the set objectives. The NDL India is expected to bring a paradigm shift in education movement by solving many of the long-standing obstacles in achieving the goal "education for all" thereby enabling every person with the knowledge resources they need to empower themselves. The study can also act as a beacon light for the professional community to serve global users in general and Indian in particular.

Keywords: National Digital Library of India, NDL India, Digital Library, National Library, E-learning

Introduction

The concept of a library is in transition due to the emergence of digital technologies and services. There have been many digital library initiatives in almost every corner of the world including India. However, the learners are not able to entirely recognize the potential of digital libraries and portals yet. Learners still visit the individual websites to access e-resources and they have to learn search and retrieval techniques separately that is a painstaking and time consuming task. In the process, learners often miss out the most desired e-resources regardless of their availability. Therefore, electronic resources available for the advancement of education and research have only been utilized partially and not completely **(Das et al., 2016).** In this background, Ministry of Human Resource Development (MHRD) under the aegis of the National Mission on Education through Information and Communication Technology (NMEICT) initiated a pilot project that makes quality learning resources available to all learners with a single-window search facility called "National Digital Library of India" (NDL, India). The NDL India comprises contents in several languages and provides learning and research interface support for the leading Indian languages **(National Digital Library of India, 2019).** It collects and collates metadata from leading learning institutions in India and abroad as well as other pertinent

sources **(Government launches National Digital Library of India, 2018)**. Filtered and federated searching is used to facilitate focused searching so that the information seekers may discover the right resource with the slightest effort in the least amount of time. It is developed to provide support for all academic levels including researchers and life-long learners, all disciplines, all popular form of access devices and differently-abled learners. It is being designed to aid students to prepare for the competitive examination, to assist researchers to perform inter-linked research from multiple sources and to enable individuals to learn and prepare from best practices from all around the world. This project is being developed at the Indian Institute of Technology Kharagpur (IIT Kharagpur) **(National digital library of India, 2019)**.

The NDL India has collaborated with libraries in Indian educational institutions, public libraries as well as big international libraries to get access to books on a wide range of subjects. The NDL India is a digital library that boasts of 2 crore resource materials, out of which 40 lakh are books and has a collection of 1.26 crore articles **(Falak, 2018)**. The NDL India is presently one of the biggest treasure troves in the global cyberspace.

Service Architecture of NDL India

Figure1 depicts the 3-tier model of NDL India where services have been structured in three layers. The Digital Repository or DR layer provides a basic Authoring and Acquisition Services. Authoring services deal with content creation whereas acquisition services deal with content borrowing. Digital Library or DL layer is the middle layer that caters to the two important Dissemination Services:

- One is of content search which is a huge component towards the learning part.
- The other one is of content access.
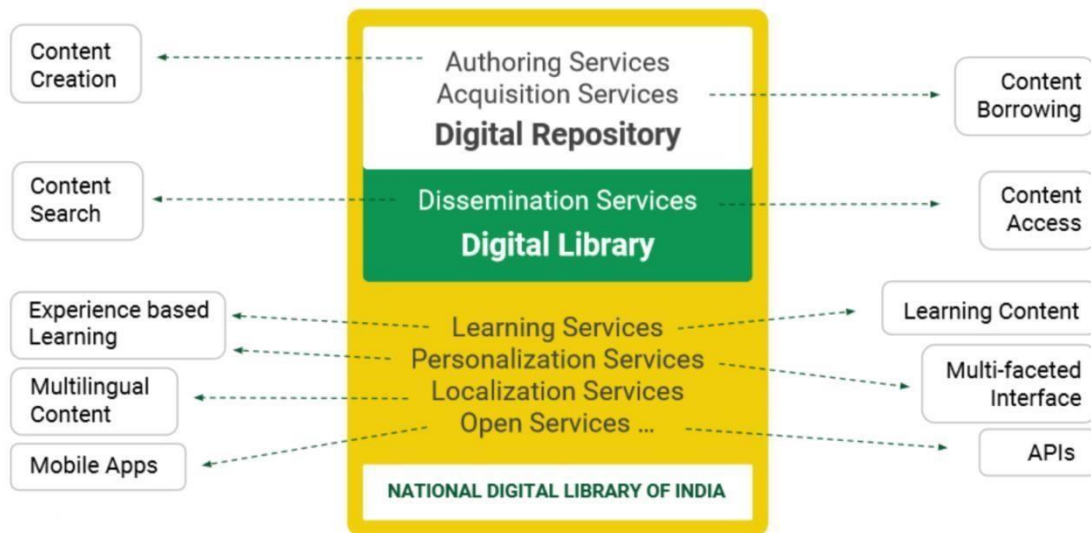
SERVICE ARCHITECTURE

Figure 1: 3-tier model

The outer layer is the National Digital Library of India or NDL India that supports the services like Multi-faceted Interface, Multi-lingual Search and Personalized Learning. For example, a 9th class student looking for "magnetism" as content and in physics a post-graduate student is also looking for "magnetism" as content, both the students will get different sets of contents suitable to the particular levels of education. NDL India tier also supports the Open Services via which others will be able to develop new extensions to it in future (a Mobile App for NDL India being an immediate possibility) **(Das et al., 2016).**

Use Cases

As illustrated in fig 2, the repository has two major components: Content repository and course repository. Contents may be ingested in the Content repository through harvesting or through manual entry. In course repositories, courses are created and submitted by the course developers as part of the learning management system. Consumers such as general users and students

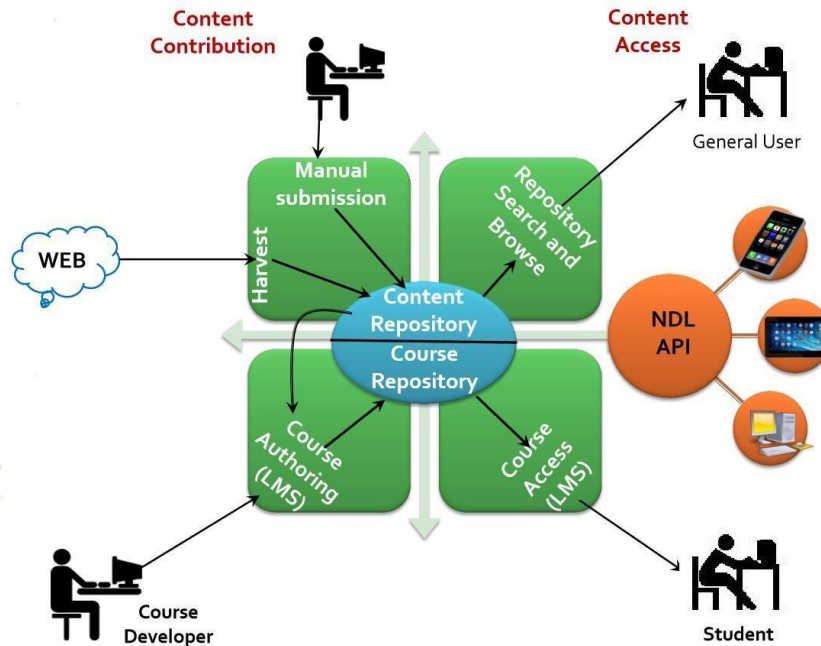are the users who access these repositories **(NDL Team, 2016).**

Figure 2: Use Cases of NDL India

Learning Resource Type

The NDL India provides access to the following content types from multiple sources like books, articles, theses, manuscripts, web courses, etc.

S. No	Items	Source	S. No	Items	Source
1	Book	79	10	Dataset	6
2	Articles	102	11	Annual report	24
3	Theses	70	12	Report	39
4	Manuscripts	6	13	Technical report	23
5	Audio lectures	5	14	Monograph	13
6	Video lectures	17	15	Manual	7

7	Question papers	42	**16**	Technical manual	6
8	Solution	22	**17**	Album	5
9	Web courses	2	**18**	Law judgment	6

File formats

Learning resources are available in multiple formats. Some of them are tabulated as follows:

S. No	Category	File type
1	Text	PDF, HTM/HTML, DOC, PPT, XLS, TXT, ZIP, XLXS, DOCX, SGML, XML, etc.
2	Image	JPEG/JPG, PNG, TIF/TIFF, GIF, etc.
3	Audio	MP3, FLAC, MP4/MPG4, etc.
4	VIDEO	MP4/MPG4, FLV, F4V, MPEG, AVI, etc.

Salient features

- The NDL India portal has been developed to benefit different kinds of users like students (from primary to post-graduate levels), researchers, library users, teachers, librarians, professionals, differently-abled users and all other lifelong learners. Learning materials are available for students ranging from primary to post-graduate levels. The major advantage of this portal is that the interface is interactive and participative. For example, if a ninth standard student is looking for help in physical science studies, it provides only that section of content which is suitable for that level, whereas the same repository if queried by an undergraduate or postgraduate student, he/she will get a different set of contents because

knowledge requirements are different. This kind of personalized interaction is now technologically possible. Facilities of this sort do exist in the NDL India. Further, users don't need to attend the library and search a book from the shelf to shelf thereby saves the time

of users. This is thus like a customized service offered in a 24x7 integrated environment where users can find out the right resource with the slightest effort and in minimum time.

- The NDL India harvest metadata and contents from all the Institutional Digital Repositories (IDR) of Universities and Institutions, all other digital library initiatives and NMEICT projects and index in the NDL India server so that all the e-contents can be searched and accessed by users through a single window. The NDL India provides different ways to browse content like browse by content type, browse by source, browse by subject, browse by learning resource type, etc.

- The NDL India provides access to a number of learning resources like books, articles, theses, manuscripts, video lectures, web courses, etc. in multiple formats like PDF, HTML, DOC, PPT, JPG, GIF, MP3, MP4, FLV, AVI, etc. These contents are either born-digital object or digital surrogate of a physical object or digital metadata of the physical object.

- The National Digital Library of India covers information sources on variety of subjects like natural sciences, life sciences, physical sciences, earth sciences computer science, health & medicine, agriculture, engineering, mathematics, information science, social sciences, legal studies, military science, religion, philosophy, psychology, education, history, geography languages, literature and arts. The resources are offered in more than 70 languages.

- The NDL India does not store contents, NDL only ingests metadata for search & browse and Content (Full-text) is delivered from source. The Library combines contents from different Indian digital repositories.

○ The stakeholders of the NDL India include the content contributors such as authors, publishers, cataloguing service providers, contributing institutions (those who maintain DRs and allow the integration of their contents in NDL India). Consumers are another set of stakeholders that can access the repository and cover students, teachers and general users, consumer institutions (those who use NDL). And then obviously there are ministry and Government who sponsor the initiative **(Das et al., 2016)**.

Issues of the NDL India

1. Responsibility for Contents

The NDL India is cumulating contents that are freely available or institutionally donated/contributed. Almost all these contents are hosted and accessed from the pertinent sources. The accountability for validity, relevance, inclusiveness, reliability and suitability of these contents rests with the respective organization from where the contents are sourced. The NDL India takes no responsibility for hosting these contents.

2. Technical Problems

While it is easy to find a book by means of the search window on the NDL India, it might not always be available for immediate consumption as the NDL India takes no responsibility the portal being unavailable due to technical issues or otherwise **(National Digital Library of India, 2019)**.

3. Copyright Challenges

The NDL India in its quest to provide full-text of books, articles, manuscripts, theses, etc available to learners, copyright challenges have not made it entirely possible. While many sources have made available their books free of cost, some sources like IISER, Bhopal, provide only part of the text, while the full text require authorization. There are other sources for example Springer that allow access to the full-text only upon subscription. Another source like IIT Jodhpur has also contributed content from its library; however, it requires authorization through a separate login. Moreover, there is content where the full-text is available as

long as it is accessed from a member account on the NDL India portal **(Falak, 2018)**.

4. Digitization Problems

The NDL India isn't responsible for the digitization problems like quality, accuracy, visibility and readability as it is the responsibility of the contributing sources to digitize the documents. Many sources have been digitized using low-quality equipments resulting in bad quality documents. The bad quality and visibility make screen reading more harmful to physical health as it causes eyestrain, back and neck problems. These problems also act as barriers for longer intervals of screen reading.

5. Hardware and Software Standards

The NDL India is a hub of many sources from simple text to multimedia documents available in many formats like pdf, doc, html, jpg, mp3, flv, etc. and different software are required to read them. There is not any standardization in formats and reading software. Multiple formats create enormous problems for service providers and confuse end users. This is considered as one of the major disadvantages of the NDL India.

6. Technological Obsolescence

"Technological Obsolescence" is the inevitable progress due to the rapid advancements in technology. The sources available in today's technology can't be used with tomorrow's technology. Therefore, we have to convert the sources from one format to another and from one software to another but it is not a simple process and in some cases, it is technically impossible.

Conclusion

The NDL India is presently one of the biggest treasure troves in the global cyberspace containing information on any branch of knowledge for any user at anytime from anywhere in many languages and formats. Information can be personalized based on the education level, choice of language, difficulty level, media of content and such other factors. It is therefore like a customized service that is provided 24X7 as a result of which learners can find out the right resource

with least effort in the minimum time. Due to the large multilinguistic population and geographic spread, India has many challenges in achieving the goal "Education for all" and the NDL India will help to overcome the challenges. The NDL India is expected to bring a paradigm shift in education movement- enabling every citizen with the knowledge resources they need to empower themselves, solve many of the long-standing obstacles in education, and open several opportunities for new-age techniques in learning. With right focus, encouragement and support, the NDL India is destined to become a national asset thereby bringing a significant change in the domain of online content search for both academics and general readership.

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