# National Digital Library of India

## Uniting the Digitally Diverse India

### https://ndl.iitkgp.ac.in

National Digital Library (NDL) is a virtual teaching-learning-evaluation-knowledge discovery and innovation platform which helps collaborative, personalized, self-paced, new-age multi-media education at all levels. It is a single window access to learners for e-contents working as an umbrella over existing digital repositories.
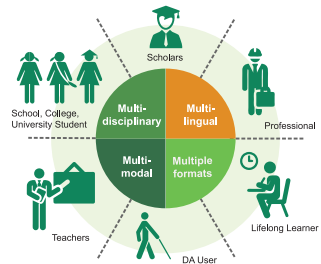


## Background

With Information and Communication Technology (ICT) tools and services facilitating easy discovery and location-independent access of library resources, much of which is available in electronic format today, the concept of the library itself is undergoing a paradigm shift.
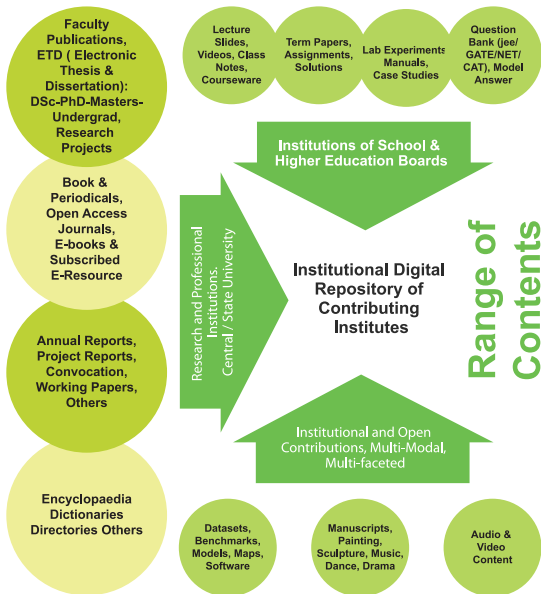
The Ministry of Human Resource Development (MHRD) initiated the NDL pilot project under NMEICT in April 2015 to bridge the wide gap between literacy and advanced knowledge discovery and development.

IIT Kharagpur has designed the National Digital Library system platform and architecture and has developed an Alpha version. The Alpha version is being scaled up with respect to content volume, diversity and value-added apps to become a full-blown National Digital Library of India.
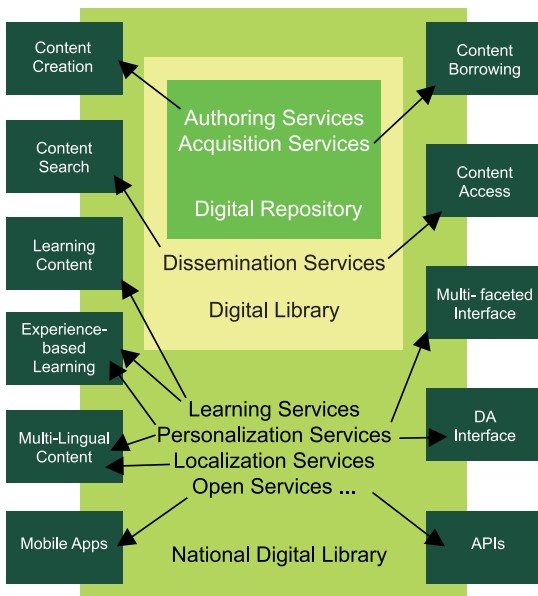
## Why NDL?

- It will be an enabler of learning by making learning resources accessible to all.
- It will  help students to prepare for entrance and competitive examinations.
- It will enable people to learn from and adopt best practices from all over the world.
- It will help researchers to perform inter-linked exploration from multiple sources and carry out new analytics of text, audio, image and video data to create new knowledge.
- It will support the continual evolution of a new pedagogy of learning and new opportunities to leverage ICT in education.

## NDL Content



Faculty Publications, ETD ( Electronic Thesis & Dissertation): DSc-PhD-Masters-Undergrad, Research Projects

Book & Periodicals, Open Access Journals, E-books & Subscribed E-Resource

Annual Reports, Project Reports, Convocation, Working Papers, Others

Encyclopaedia Dictionaries Directories Others

Lecture Slides, Videos, Class Notes, Courseware

Term Papers, Assignments, Solutions

Lab Experiments Manuals, Case Studies

Question Bank (jee/GATE/NET/CAT), Model Answer

Institutions of School & Higher Education Boards

Research and Professional Institutions. Central / State University

Institutional Digital Repository of Contributing Institutes

Range of Contents

Institutional and Open Contributions, Multi-Modal, Multi-faceted

Datasets, Benchmarks, Models, Maps, Software

Manuscripts, Painting, Sculpture, Music, Dance, Drama

Audio & Video Content

- NDL does not store contents; it stores metadata of the contents.

- The owners/providers of contents carry these in their respective Digital Repositories.

- Digital Repositories provide the metadata of every content to NDL through sevearl means for Indexing and search

- For accessing the full-text of any content, the user will be redirected to the URL of the content. Access will then happen from the respective repository.

- The terms and procedure for full-text access will depend on the content,the owner/provider of the content, the user and their mutual relationship. NDL will not mediate in or influence copyright issues.

## NDL Model



Content Creation

Content Borrowing

Content Search

Content Access

Learning Content

Multi- faceted Interface

Experience-based Learning

Multi-Lingual Content

DA Interface

Mobile Apps

APIs

Authoring Services
Acquisition Services

Digital Repository

Dissemination Services

Digital Library

Learning Services
Personalization Services
Localization Services
Open Services ...

National Digital Library

- The bottom-tier (Digital Repository or DR) caters basic Authoring and Acquisition Services through content creation and borrowing.

- The middle-tier (DigitalLibrary) provides Dissemination Services through content search and access.

- The top-tier (National Digital Library or NDL) will support a number of value added services. The NDL tier will also support Open services through which others will be able to build new extensions to it in future, such as a MobileApp or interfaces for specific verticals.

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# NDL Metadata Standard

| Dublin Core | LRMI | Shodhganga |
|---|---|---|
| Type | Board | Researcher |
| Title | Difficulty level | Keyword |
| Subject | Typical LT | Advisor |
| Language | Prerequisite topic | Place |
| Description | Type of LM | Department |
| Date | Pedagogic Objective | Institution |
| Author | Education level | Awarded |
| | | Degree |

Metadata is at the heart of any digital library as it enables access of content To cater to the variety of contents, NDL has adopted an Open Virtual Standard for Metadata by borrowing elements from a few national and international standards, like Dublin Core, IEEE-LOM and Shodhganga. NDL seeks to harvest content repositories, equip them with proper metadata schema and make these accessible.

# NDL Functional Architecture
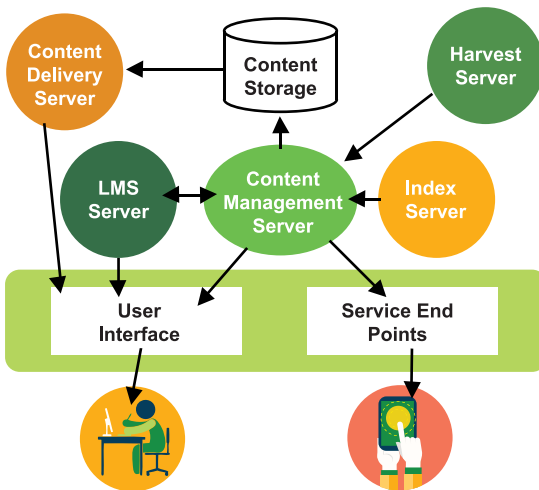


- Harvesting Server for harvesting content
- Content Storage to store content
- Index Server for indexing content
- Content delivery to users through Content Delivery Server and LMS Server
- Overall control by Content Management Server Possible provision of service end points for a host of user devices like mobile, tablet and value-added service providers through Application programming nterfaces(API)

# NDL Verticals
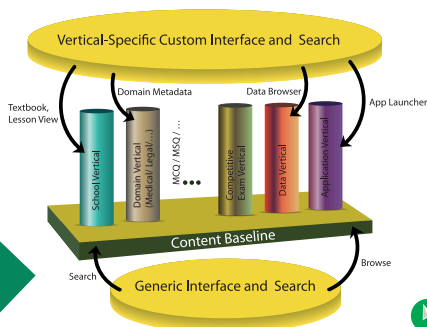


- Content baseline accessed through generic Search and Browse features.
- Vertical oriented custom interface and search for domains like School, Competitive Exam, Medical, Legal, Data, Applications, etc.

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## Automation and Technology in NDL

- Use of open source software and state-of-the-art technology to ensure a user-friendly, responsive, efficient, ever-expanding, and maintainable digital library.

- Machine Learning, Natural Language Processing And Image Processing algorithms are used to automatically extract information from content.

- Adoption of state-of-the-art technology in crawling, multilingual support, searching.

## The NDL is Inclusive

Inclusive of
- All disciplines
- All languages
- All domains
- All sources
- All learning e-contents
- All forms of e-contents

## The NDL is Open

The infrastructure and metadata of NDL will be open for all kinds of research, development and extension except for copyright restrictions on full-text wherever applicable.

## Alpha version of NDL

- Over 50 lakh content items
- Over 100 content sources
- Search and browse content
- Multiple facets
- Enabled for English, Hindi and Bengali

## NDL Moto: Inclusive & Open

**Inclusive & Open**

## NDL Big Picture

National Digital Library of India

MOOCs LMS

Virtual University/ Certification

https://ndl.iitkgp.ac.in

https://web.facebook.com/NDLIndia/

https://www.youtube.com/watch?v=LEwAyHGKeLw