National Digital Library of India: Study of E-Resources Related Engineering Discipline

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Abstract

National Digital Library of India is sponsored by Ministry of Education, Government of India and developed by Indian Institute of Technology, Kharagpur. To free accessible to the learners' community educational resources through a single-window, National Mission on Education through Information Communication Technology (NMEICT) has sponsored the NDLI project and set funding through Ministry of Education. This paper focused on available e-resources related Engineering subjects in National Digital Library of India

Keywords: Digital Library, NDLI, MoE, NMEICT and NDLI Mobile App, IIT-Kharagpur

1 Introduction

The digital library is an electronic/virtual library where information is certain, acquired, processed, systematized, stored and retrieved in digital format. The users of digital libraries are the worldwide users who should have facilitated with free access to all formed and achieved digital sources of information in the form of electronic text, image, map, sound, video and multimedia. Thus, the digital libraries are attributed to electronic databases and accomplished of handling huge data and servicing users effectively in resource sharing environment. Ministry of Education, Government of India under National Mission on Education through Information Communication Technology (NMEICT) initiated the NDLI pilot project in April 2015 to develop the overall framework of a facility that can provide a single-window free access to learners for e-contents, address the issues of collaborative learning and facilitate self-paced personalized learning. Any format of digital content including text, image, audio, video, animations, and simulations are to be supported and all types of educational resources are to be hosted. NDL will facilitate students to prepare for entrance and competitive examinations and enable learners to learn from best practices from all over the world and adopt them., self-paced learning platform which will help researchers to perform inter-linked exploration from multiple sources. Hear focused on available e-resources related Engineering subjects in National Digital Library of India

2 Digital Library

A digital library is a library wherein collections are stored in digital formats and retrieved by computers. The digital items may be stored locally, or retrieved remotely through computer networks. This mode a digital library is an electronic collection of real/virtual resources, which may also be available in a different place. Digital information means information stored using 0 and 1 bit, Information stored and accessed with the help of computer and ICT technology. Digital library means information not only stored and accessed through computer online and offline but it is systematic functions like traditional library. Like cataloguing, collecting, disseminating and long-term archiving of information in digital format. Digital library offers digital contents electronically by online/offline. National Digital Library of India is the best example of digital Library.

2.1 Definitions:

Digital libraries are libraries with the same purposes, functions and goals as traditional libraries. Collection development and management, subject analysis, index creation, provision of access, reference work and preservation (Cleveland Gary, 1998). Digital libraries can be created by three ways i) digitization of print material ii) acquisition of digital work i.e. electronic journals, electronic books and electronic databases iii) access of external materials that may be from other library collection or publishers servers (Cleveland Gary, 1998).[1]

"A digital library, also called an online library, an internet library, a digital repository, or a digital collection is an online database of digital objects that can include text, still images, audio, video, digital documents, or other digital media formats or a library accessible through the internet. Objects can consist of digitized content like print or photographs, as well as originally produced digital content like word processor files or social media posts. In addition to storing content, digital libraries provide means for organizing, searching, and retrieving the content contained in the collection. Digital libraries can vary immensely in size and scope, and can be maintained by individuals or organizations. The digital content may be stored locally, or accessed remotely via computer networks. These information retrieval systems are able to exchange information with each other through interoperability and sustainability". (Wikipedia) [2]

3 Objectives

To study the e-resources associated with engineering available at NDLI.

4 Data Collection Method for the study

The data was retrieved from the National digital library of India' website as during 14/12/2022 dated 21/12/2022. The observation method was obtained for this study.

5 Study of NDLI Resources

The different tabs and information are available on the dashboard of NDLI. The tabs and information are Browse, Search, Video (Hindi), Video (English), Disability Knowledge, NDLI Club, Language, Log–in, Test Preparation, Study at Home, COVID -19 Research Repository, Featured Collections. Also, the information of About, Disclaimer, FAQ, Privacy Policy, Help, Institutional Registration, Bulk Registration, Sponsor, Contact, Feedback, NDLI Video You Tube Link and many more.

Here the finding engineering related e-resources are as follows.

5.1 Browse: Content/ Resources available

NDL India provides a single-window search facility for all digital resources to act as a one-stop shop. Information can be personalized based on the language preferences, education level, media content and difficulty level. And it is open access for 24 X 7. NDL India contents are available in different forms such as text, video, audio, image, simulation and presentation. One can choose the desired format to retrieve particular materials. NDLI contents are classified into five categories based on their accessibility to the user. View of the contents, full text or not, is restrict by the source organization. While many organizations provide full text access to all their content, many would like to restrict it in some way or the other. When you look at an icon with each document indicates its accessibility.

Access Restrictions

Categories	Accessibility
🔓 **Open**	Full-text available to all types of registered users.
🛡 **Limited**	Part of the text is available but full-text requires permission of authorization by source Authority.
🔒 **Subscribed**	Full-text available for such institutions that have subscribed to the source.
🔒 **Authorized**	Full-text access requires permission of authorization by source authority and special login to the source.
👤 **NDLI**	All the contents can be freely accessed in full-text mode through logging into NDLI.

5.1.1 Brows by Types of the E-resources

The NDLI provides digital content of the traditional items as well as various type of other digital content like text, image, video, audio, presentation, application, simulation, animation, dataset etc.

The below table & figure shows the total number of content forms available in the repository, The total number of items are 89148973 and the engineering related resources are 28889486, where the text 96.95 % and text related engineering resources is 33.05 % of total text items. The text item is the chief number of resource type available. On the other hand, in less than 3 %, image, audio, presentation, video, simulation, application and animation forms are available. The content can be downloaded after Log-in.

Table 1: Type of Resources

Types of Resources	No. of Items	(%)	Items Related Engineering	(%)
Text	86434571	96.95520665	28567562	33.0510832
Image	1627975	1.826128721	171767	10.5509605
Video	631606	0.708483765	138366	21.9070116
Audio	261728	0.293584986	7616	2.90989118
Presentation	178128	0.199809369	531	0.29810024
Simulation	11518	0.012919947	3054	26.51502
Application	2509	0.00281439	299	11.9170984
Animation	938	0.001052171	291	31.0234542
Total	**89148973**	**100**	**28889486**	

(Retrieved from https://ndl.iitkgp.ac.in/ on date 20/12/2022)

Figure 1: Type of Resources

Types of Resources
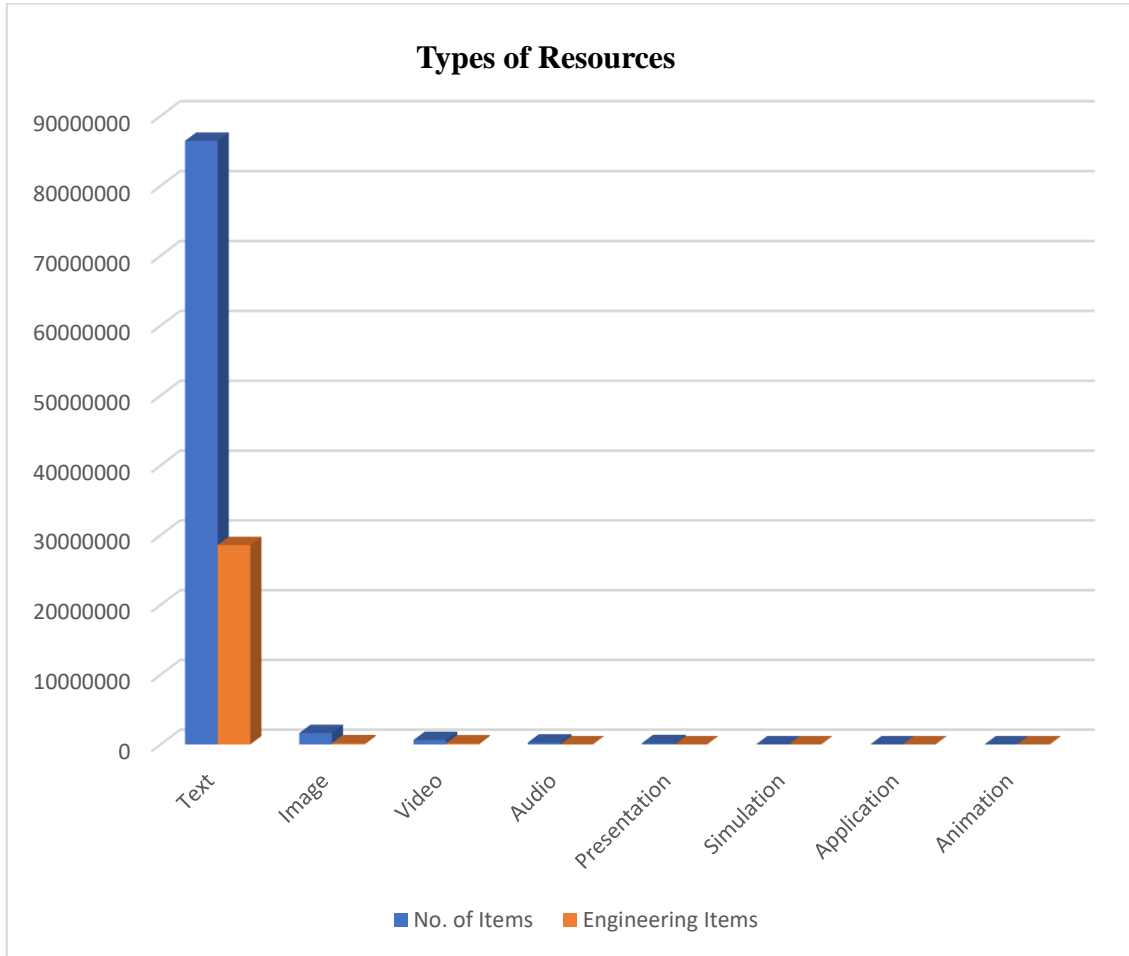
5.1.2   Subject Wise Contents

The following table and figure found that 16632435 contents associated with Computer Science, Information & General works subjects and Technology linked 13103490 contents are available in the NDLI. Where is computer Science contents is 32% and Technology 25%. The contents are more than other subjects. So 57% resources linked to the engineering subjects and 43% resources linked to the other subjects.

Table 2: Subject Wise Contents

Subject	No. of Contents	%
Computer Science, Information and General works	16632435	32.36213
Philosophy and Psychology	626144	1.218304
Religion	250967	0.488313
Social Science	6367709	12.38981
Language	191517	0.372639
Natural Science and Mathematics	10030885	19.51734
Technology	13103490	25.49578
Arts, Fine & Decorative Arts	1983332	3.859017
Literature & Rhetoric	976049	1.899122
History and Geography	1232215	2.397551
Total →	**51394743**	**100**

(Retrieved from https://ndl.iitkgp.ac.in/ on date 21/12/2022)

Figure 2: Subject Wise Contents
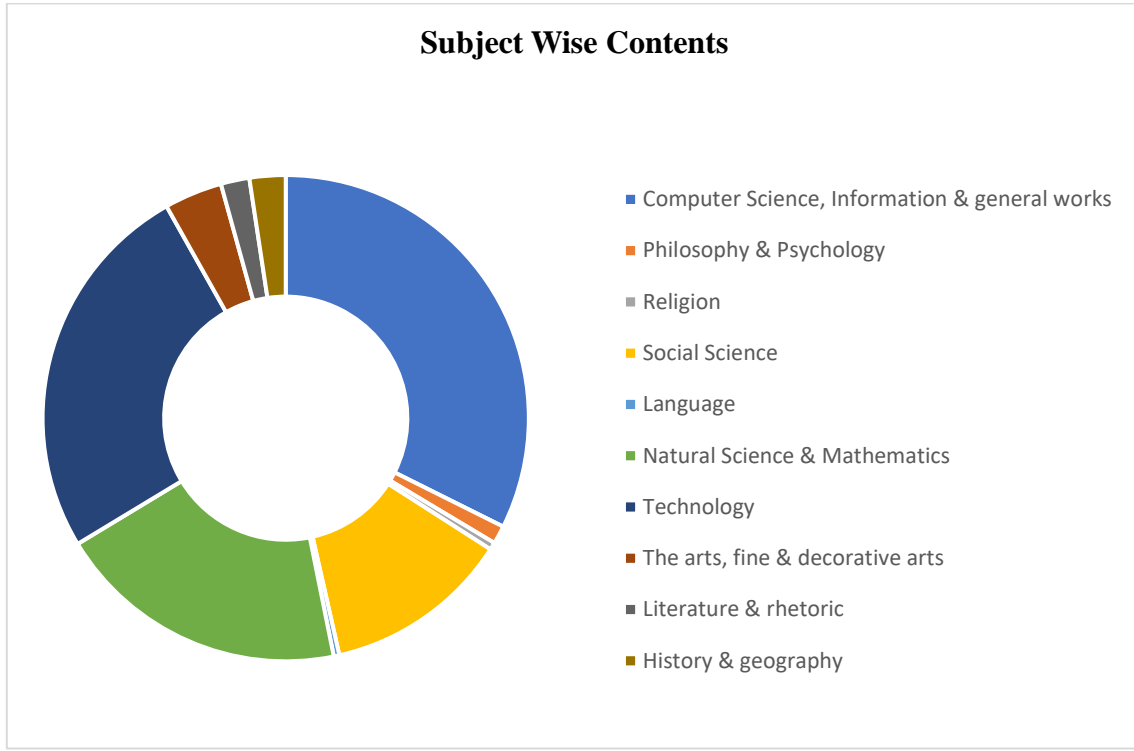
Here is also focus on Engineering & allied operation within Technology and Chemical Engineering, there 9496472 items are available on the subject. The branch wise items are shows in below table and figure. It is found that 6481327 full-text items available to all types of registered users and 2752819 Full-text items available for such institutions that have subscribed to the source. So NDLI is boon for the users of engineering.

Table 3: Branch wise Items with Access Restriction

Branch	No. of Items	Access Restriction				
		Open	Limited	Subscribed	Authorized	NDLI
Applied Physics	1464943	295409	1216	936180	229102	3036
Mining & Related Operations	19048	14971	107	3442	5	523
Military & Nautical Engineering	5440	363	16	4566	5	490
Civil Engineering	33958	27827	439	3253	1853	586
Engineering of Railroads & Roads	8737	684	10	7432	0	611

Hydraulic Engineering	20415	1611	18	18491	0	295
Sanitary & Municipal Engineering	15432	4214	87	10393	120	618
Chemical Engineering	315906	259733	1422	45128	7831	1790
Computer Science	6707543	5413284	539	1286276	7151	293
Other branches of Engineering	905050	463231	169	437658	3414	578
Total →	**9496472**	**6481327**	**4023**	**2752819**	**249481**	**8820**

(Retrieved from https://ndl.iitkgp.ac.in/ on date 21/12/2022)

Figure 3: Branch wise items with Access Retractions

Branch wise items with Access Retrictions
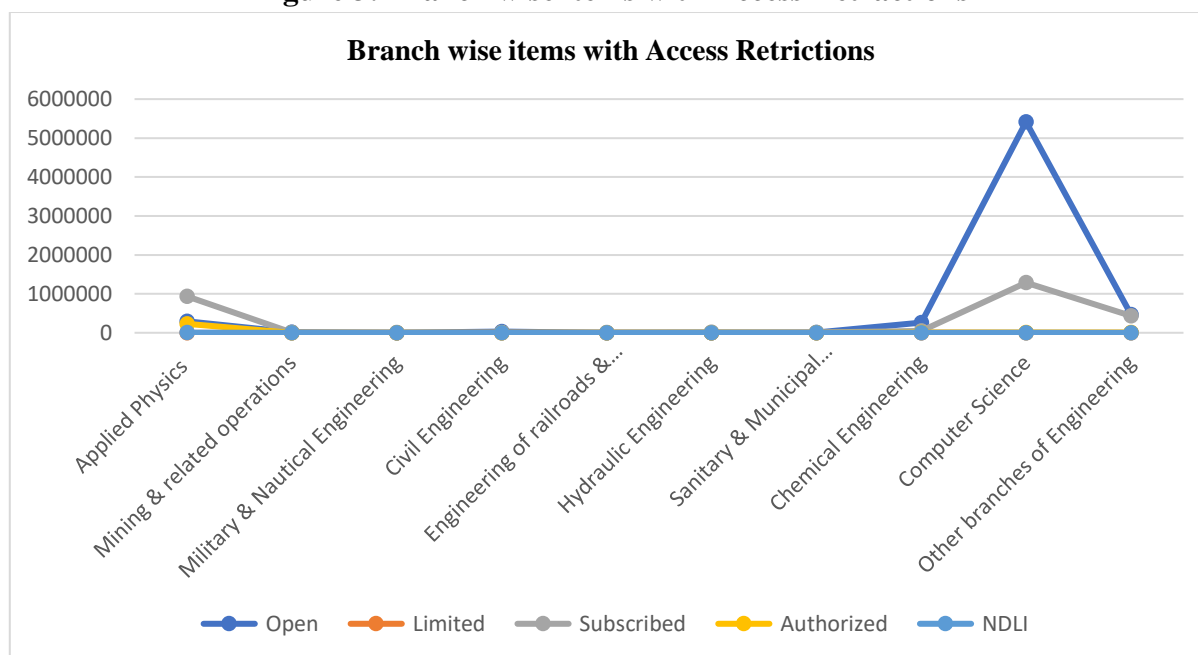
5.1.3 Search By Sources

The some NDLI Sources Items are IIT JEE 37, GATE 283, NPTEL 151279, NCERT 5806, South Asia Archive 29969, OECD Library 102017, Librivox 206672, Krishikosh- Indian National Agricultural Research 138322, INFLIBNET 771, Shodhganga 269702, N-LIST-Oxford Scholarship Online 1930, Satyajit Ray Society 39, World eBook Library 7526585, British council 656861, Maharashtra State Board Secondary and Higher Secondary Education 323 and etc.

5.1.4 Types of Learning Resources in the NDLI

The Learning resources are available in multiple formats. Some of them are tabulated as below table 4:

Table 4: File form of Learning Resources in the NDLI

| Category	File Format
Text	PDF, HTM/HTML, DOC, PPT, XLS, TXT, ZIP, XLXS, DOCX, SGML, XML, etc.
Image	JPEG/JPG, PNG, TIF/TIFF, GIF, etc.
Audio	MP3, FLAC, MP4/MPG4, etc.
Video	MP4/MPG4, FLV, F4V, MPEG, AVI, etc.

The below table 5 & figure 5 found that 55134170 total number of learning resources items are available in the repository, wherein 18042405 items linked with engineering e-resources. where the articles 78.63 % is highest learning resources and article related engineering resources is 34.99% of total articles. The Manuscript associated with engineering resources is 95.55% in comparison total manuscripts. On the other sides, 0% Law Judgement resources linked with engineering resources whereas total Law Judgement 878483 are available in NDLI.

Table 5: Types of Learning Resources wise Items

Learning Resource Type/Item	No. of Items	%	Items with Engineering Resources	%
Books	7544644	13.684153	2002443	26.54125
Thesis	870488	1.5788539	229354	26.34775
Audio Lecture	3826	0.0069394	479	12.5196
Article	43353091	78.631983	15170381	34.99262
Manuscript	171306	0.3107075	163691	95.55474
Video Lecture	477122	0.8653835	125419	26.28657
Question Paper	46309	0.0839933	20187	43.59196
Web Course	17385	0.0315322	11877	68.31752
Annual Report	34375	0.0623479	12566	36.55564
Solution	70088	0.1271226	10724	15.30076
Data Set	242141	0.439185	6225	2.570816
Report	678587	1.2307921	127894	18.8471
Technical Report	716629	1.299791	141104	19.68997
Manual	7721	0.014004	1528	19.79018
Album	96	0.0001741	18	18.75
Monograph	19223	0.0348659	17654	91.8379
Technical Manual	2656	0.0048173	861	32.41717
Law Judgement	878483	1.5933549	0	0
Total→	**55134170**	**100**	**18042405**	

(Retrieved from https://ndl.iitkgp.ac.in/ on dated 14/12/2022)

Figure 5: Types of Learning Resources wise Items

Types of Learning Resources wise Items
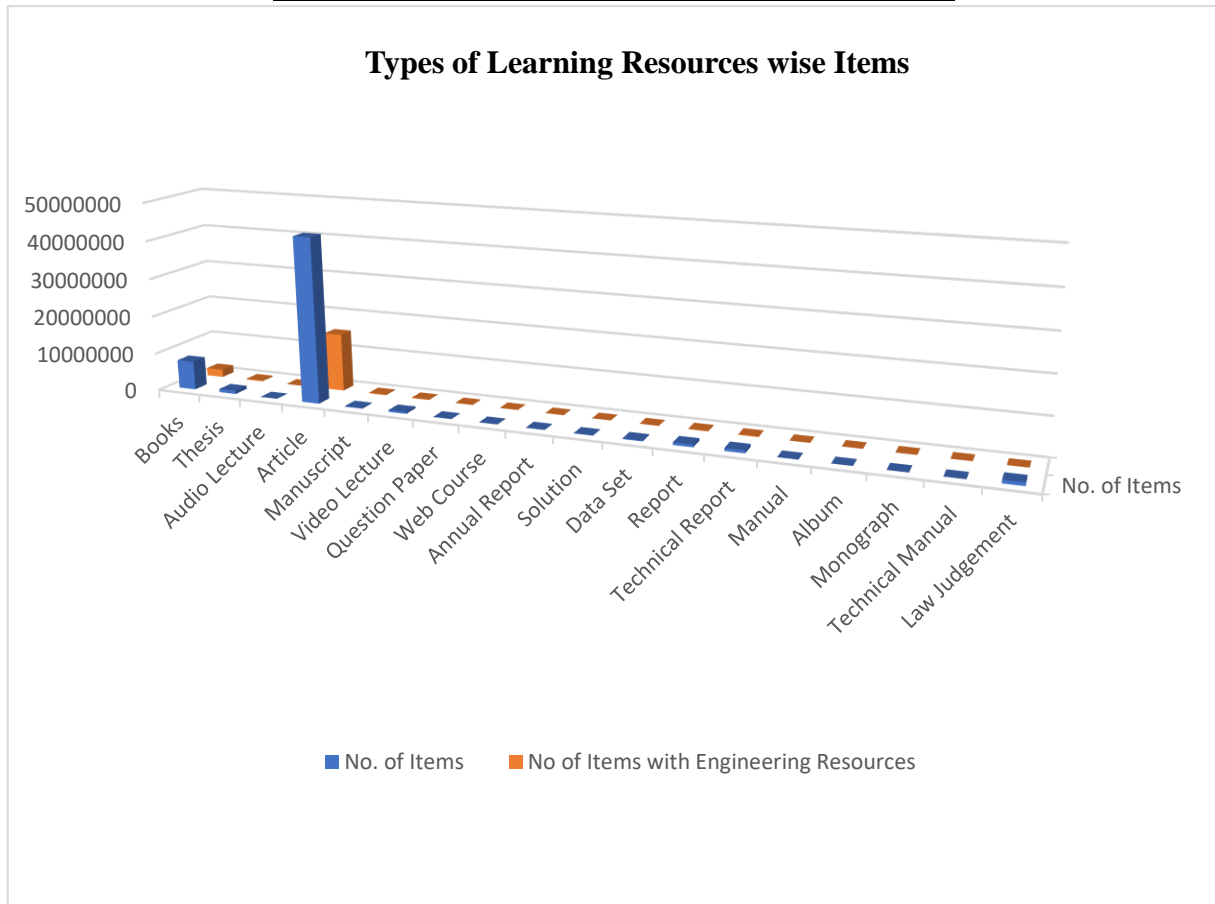
5.2 Test Preparation

This tab provides on the NDLI home page from the COVID-19 pandemic period. This tab open for all and there is without log-in users can access the content. This tab includes [Includes: CBSC Examination preparatory, IIT-JEE NEET, Joint Admission test for Masters (JAM), Graduate Aptitude test in Engineering (Gate), National Eligibility test (UGC NET), Career Development and Recruitment]. The highlights are as follows;

5.2.1 IIT-JEE NEET

This tab provides access the content for Joint Entrance Test (JEE) and National Eligibility cum Entrance Test (NEET) preparations.

National Digital Library of India Tutor (NDLI Tutor) (Questions & Solutions): There is following items available. The 3000 contents from JEE Advanced and 8720 from JEE Main and also 1496 contents from NEET.

5.2.2 Graduate Aptitude test in Engineering (GATE)

There are 183 contents in the form of question papers. The following table shows that highest question papers of Technology discipline subjects are available at NDLI.

Table 6: Question Papers for GATE

Subjects	No of Items
Computer Science	9
Natural Science & mathematics	47
Technology	119
The Arts, Fine & Decoration	9
Total →	183

(Retrieved on dated 18/12/2022 from https://ndl.iitkgp.ac.in/)

5.3 Study at Home

The study at home tab includes School, Humanities, Engineering, Literature, Science and Law & Management. Here, it is studied on Engineering.

5.3.1 Engineering

This contains lecture videos and notes of NPTEL/SWAYAM courses, presentations used by faculties in classes, online class lectures, questions/solutions of common subjects for students of all engineering discipline.

6. NDL Mobile App

NDLI is offered the NDLI mobile app which enable to filtered and federated searching facility to the users, so that users can find out the right resource with least effort and in minimum time. Users can freely download NDL App for smartphone from Google Play store.

Figure 6: Mobile App: National Digital Library
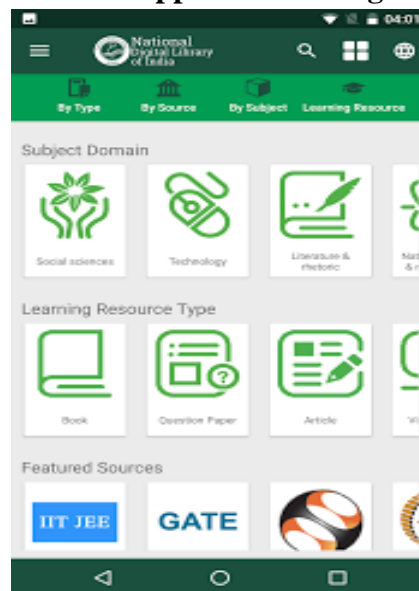
7 Conclusion:

National Digital library of India has potential to improve and support teaching– learning, life-long learning and research activities of the country. Now a days worldwide efforts are being done to encourage the open access of e-resources. India is also making various efforts to encourage the open access system. NDLI is one of best option to provide open access of e-resources to the user.

The available items of the NDLI are more associated with engineering resources. It is boon for engineering discipline users. Highest resources available linked with the engineering discipline related

subjects in comparison other discipline subjects. NDLI mobile app is also facilitate for the users. It is very useful to the user for searching and downloading the NDLI contents.

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