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OPEN ACCESS RESOURCES IN SCIENCE AND TECHNOLOGY: AN OVERVIEW.

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Abstract

Open access resources include open access archives/repositories, open access journals, open access books and open educational resources etc., the objective of the study is to find open access resources available in Science and Technology. To achieve this objective the investigator visited several Science & Technology University library websites and research organisations websites to locate the resources. In the findings investigator discussed the several resources related to Science and Technology like open DOAR, PubMed Central, arXiv, BioMed Central, DOAJ, Bentham Open, PLOS Journals, Hindawi journals, Springer Open, Wiley open access journals, Science Direct open access journals, NISCAIR Journals, Indian Academy of Sciences journals, Indian Journals.com, E-Books Directory, DOAB, Shodhganga, NPTEL, Swayam etc.,

Key Words: Open access, arXiv, DOAJ, NISCAIR, NPTEL, Shodhganga.

Introduction

Open Access (OA) according to SPARC, "Open Access is the free, immediate, online availability of research articles coupled with the rights to use these articles fully in the digital environment. Open Access ensures that any can access and use these results-to turn ideas into industries and breakthroughs into better lives"[1]. Since the early 1990s OA journal publishing has been growing at a far faster rate than traditional subscription journal publishing. This has been particularly true in the Scientific Technical and Medical (STM) fields. There is a great deal of misinformation concerning OA publishing which is often disparaged as lower quality than traditional subscription publishing(Solomon, Laakso, &Björk, 2013)[2]. There are three ways to achieve OA: the gold, green and hybrid. The gold road to OA means journals are available free to the public immediately upon publication but the author or sponsor has to pay article processing charges (APC). In green road to OA author archives his pre or post published articles by depositing in subject/disciplinary repository or posting in a personal webpage or depositing in Institutional Repository after the expiry of embargo period. In hybrid OA author publishes articles in traditional subscription journals are made openly available to public by paying an article processing charges (APC). Open access resources cover various aspects such as open access repositories/archives, open access journals, open access books, open educational resources, open access search engines and open source software. In this study the investigator wants to identify the open access resources available in Science and Technology discipline.

Science and Technology

Science and technology together form one of the major domains with major contributions to enhance the living standards. Considering its impact on development of the society, this domain attracts major funding in research. When it comes to publishing in Science and Technology all major publishing houses are present. A major part of funding is being spent for accessing the

scholarly resources and that lead to the movement of OA. Many OA publications and repositories are started to support research and promote research in S&T.

Objective and Methodology

The main objective of the study is to find out the resources available in open access archive /repositories, open access journals, open access books and open educational resources related to Science and Technology discipline. To find out various open access resources available in the field of Science and Technology, the investigator visited the several Science & Technology University library websites and research organisations websites to locate the resources. Large number of resources are identified and discussed here.

Following sources are found and discussed.

Open Access Archives	Directory of Open Access Repository (DOAR) PubMed Central arXiv
Open Access Journals	Biomed Central Directory of Open Access Journals (DOAJ) PLOS journals Physical Review X Hindawi Journals Bentam open Springer open Open Science Directory Free Medical Journals Wiley open access journals Science Direct open access journals Taylor and Francis open access journals Some of the open access journal publications in India
Open Access Books	E Books Directory Directory of Open Access Books (DOAB) PDF Drive
Open Thesis and Dissertations	Networked Digital Library of Thesis and Dissertations EBSCO open dissertations SHODGANGA
Open Access Search Engines	OAIster CiteseerX
Open Educational Resources	NPTEL e-PG Pathashala MIT Open Course Ware SWAYAM

Open Access Archives

Directory of Open Access Repository

OpenDOAR is a registry of academic open access repositories. It is a single platform to find out and locate repositories. DOAR provides information about repositories including its collection statistics and technical details. India is represented with 86 repositories in OpenDOAR.

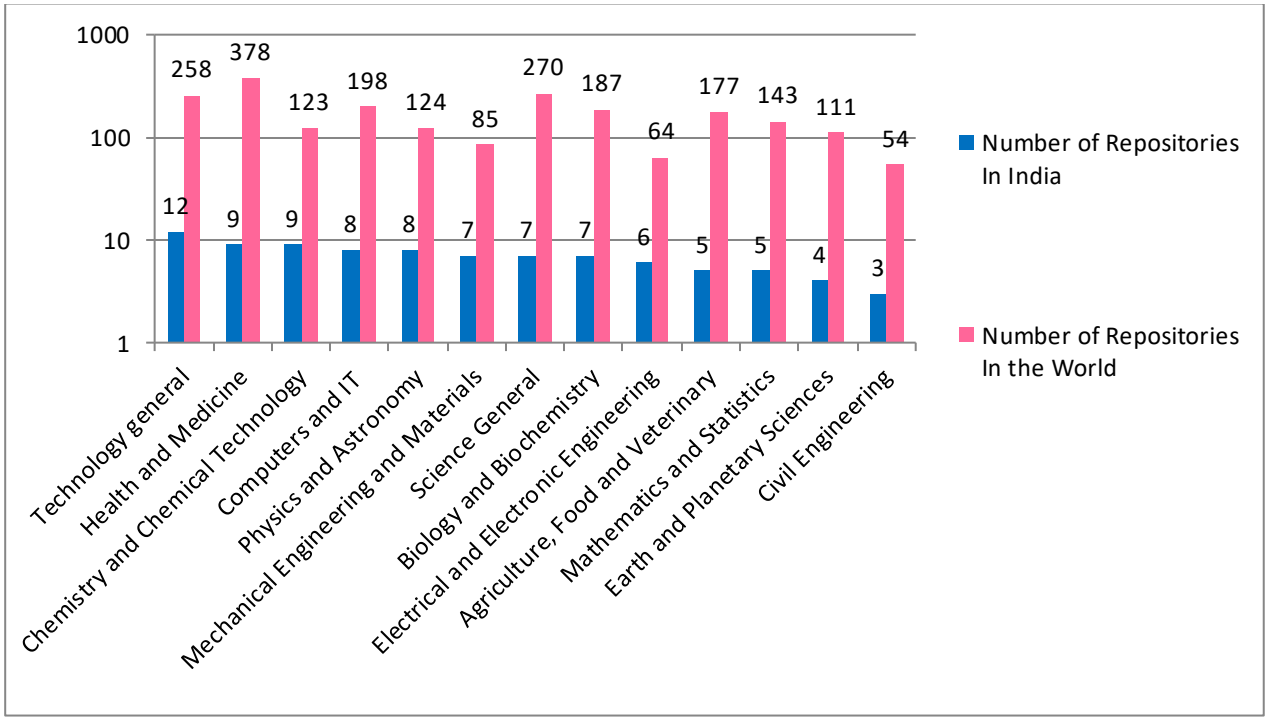

Figure1: Representation of Indian repositories as per SHERPA statistics[1]

Pubmed Central

PubMed Central (PMC) of National Library of Medicine (NLM) is an open access archive for biomedical and life sciences journal literature in the form of published articles or accepted manuscripts.PMC is also an archive for NLM's printed journals content. The full text journal articles are of three types, journals with complete issues or volumes, articles from NIH (National Institute of Health) funded research and publisher contributed articles. The Open Access Subset collection contains articles made available under a Creative Commons or similar license for liberal redistribution and reuse.

arXiv

It is an archive dedicated for pre-prints primarily meant for sharing of research articles. Open access to 1,531,132 e-prints/pre-prints in the areas of Physics, Mathematics, Computer Science, Nonlinear Sciences, Quantitative Biology, Quantitative Finance, Statistics, Electrical Engineering, Systems Sciences and Economics. arXiv is supported and managed by Cornell University with direction from the arXiv Scientific Advisory Board and the arXiv Member Advisory Board, and with the assistance of many subject arbitrators.

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[1]Sources: http://v2.sherpa.ac.uk/view/repository_visualisations/1.html, http://v2.sherpa.ac.uk/view/repository_by_country/in.html

Open Access Journals

Biomed Central

BMC brings out328 open access peer reviewed journals to public, contributing research findings from researchers in Science, Technology, Engineering and Medicine. In 1999 BMC prepared high class research open to everybody who required access it and in making the open access model for a long time, BMC distorted the world of scholarly publishing. Science and Technology discipline wise number of journals available given below.

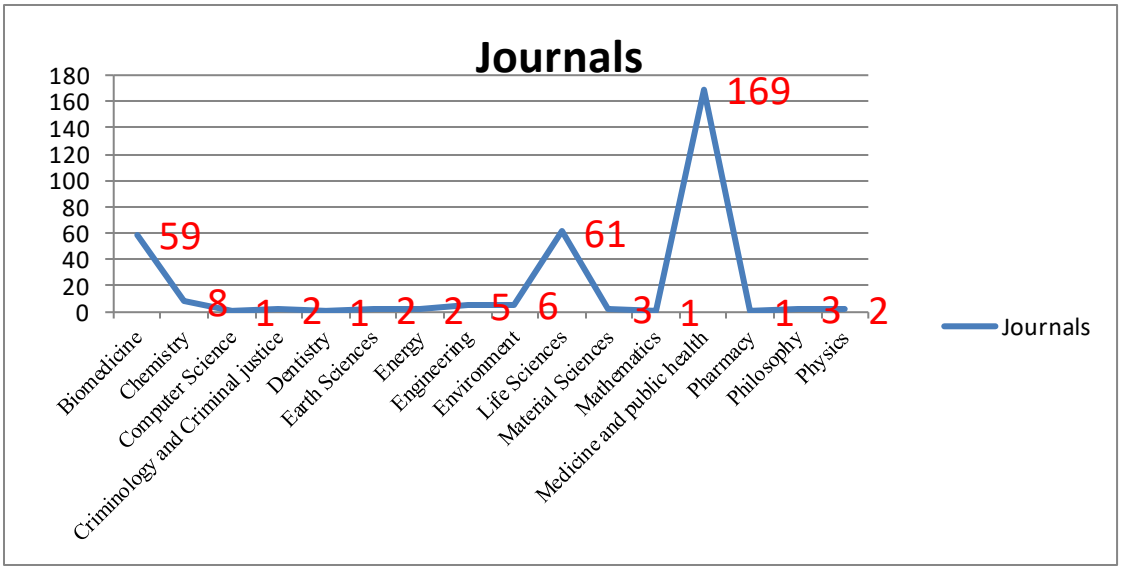

Figure 2: S&T journals available in BMC

Directory of Open Access Journals (DOAJ)

The DOAJ (Directory of Open Access Journals) was established in 2003 at Lund University, Sweden, with 300 open access journals. At present, the autonomous database contains 12000 open access journals covering all disciplines of science, technology, medicine, social science and humanities. The Number of journals and articles available in the field of science and technology is given below.

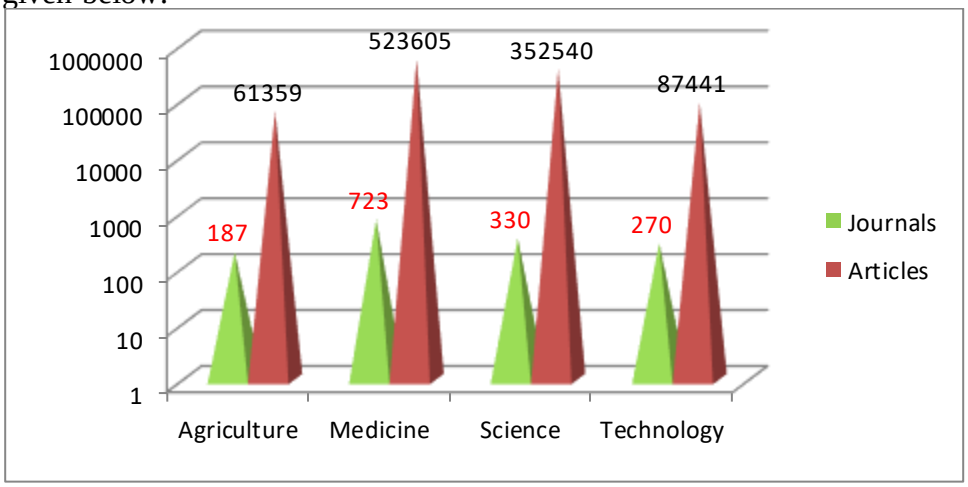

Figure 3: S&T content in DOAJ

PLOS Journals

PLOS brings out a group of seven peer-reviewed Open Access journals features eminence research, specialist interpretation and significant investigation across all disciplines of science and medicine. Each journal is editorially self-regulating and expert with regard to its selection criteria and span of content. All PLOS content is openly available for the public to share, reprocess and remodel with proper acknowledgment.

1. PLOS ONE
2. PLOS Biology
3. PLOS Medicine
4. PLOS Computational Biology
5. PLOS Genetics
6. PLOS Neglected Tropical Diseases
7. PLOS Pathogens[2]

Physical Review X

Physical Review completely open access journal that places a high importance on originality, eminence, and long-term impact in the science it publishes. It publishes a top quality set of papers from all disciplines of pure, applied, and interdisciplinary physics that have the probable to manipulate contemporary and future research and to have a long-lasting and insightful impact in their significant fields. It offers back volumes from 2011 to till date. As per their website information 275 articles published in 2018 further 5,84,000 articles are downloaded in 2018.

Hindawi journals

Hindawi brings out open access and peer reviewed journals from many disciplines of science, technology and medicine, as well as numerous areas of social science. Hindawi's journals are indexed in Web of Science, INSPEC, PubMed, Mathematical Reviews, Scopus and Chemical Abstracts. In Hindawi there are 232 journals available in Science and Technology discipline.

Bentham Open

Bentham Open brings out numerous open accesses peer-reviewed journals. These open access journals cover foremost areas of science, medicine, technology and social sciences. Bentham Open offer authors a stage to quickly publish their research in a high merit peer-reviewed journal. All peer-reviewed accepted submissions congregation high research and moral principles are published with open access to all. Articles are approved under the conditions of the Creative Commons Attribution 4.0 International Public Licence. Science and Technology discipline wise journals available list.

[2]Source: https://www.plos.org/publications

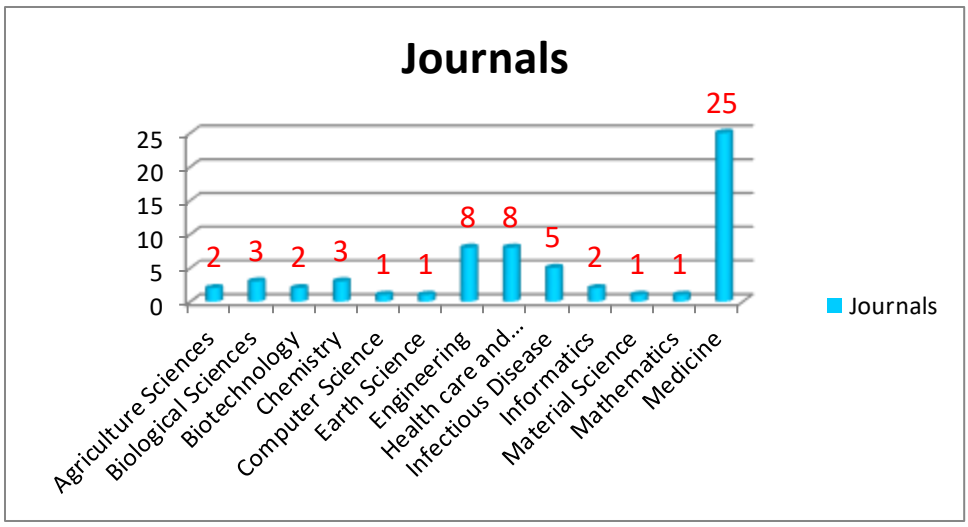

Figure 4: List of journals in Bentham

Springer Open

Springer Open started in June 2010; contain Springer's collection of 200+ peer-reviewed fully open access journals across all disciplines of science and technology. Science and Technology discipline wise number of journals available are given below.

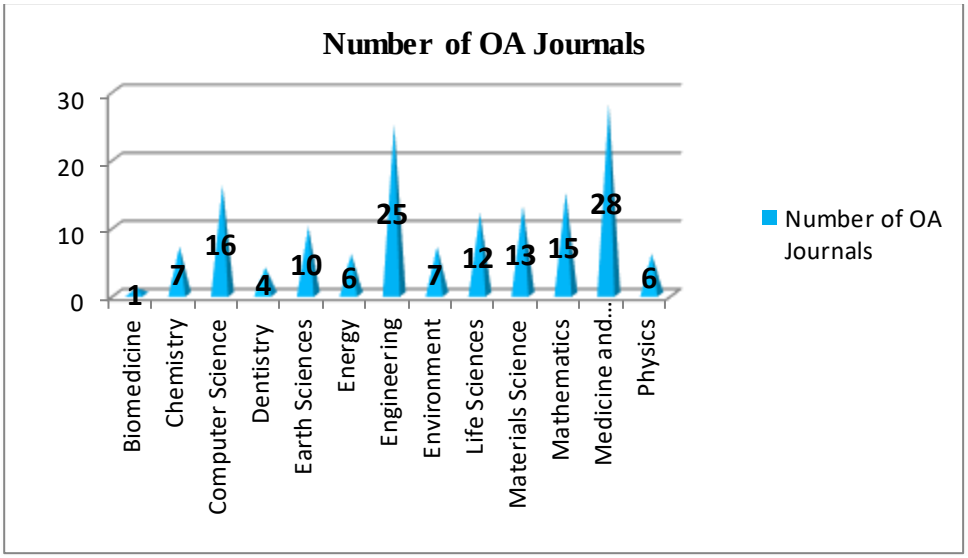

Figure 5: OA journals available in Springer Open

Open Science Directory

The Open Science Directory bas been implemented by EBSCO and the Hasselt University Library based upon a demand by marine information management specialists team up within the support of the IOC's (Intergovernmental Oceanographic Commission of UNESCO) IODE (International Oceanographic Data and Information Exchange) programme. About 130000 scientific journals are available in the 'Open Science Directory'. Science and Technology discipline wise available journals are given below.

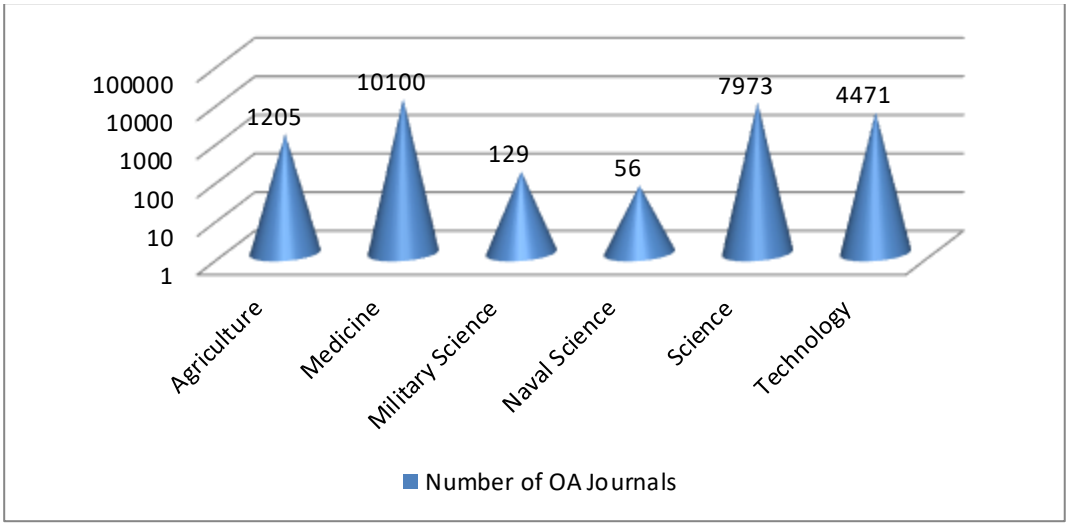

Figure 6: OA journals in open Science Directory

Free Medical Journals

The Free Medical Journals site was initiated to support the availability of full text medical journals. This portal provides access to 99 open access journals in various areas of medical science. The aggregator service Amedeo is also associated with the Free Medical Journals.

Wiley Open Access journals

Wiley Open Access brings out trustworthy open access journals across numerous research areas. Wiley Open Access journals are maintained by a network of reliable journals and societies as well as globally renowned editorial board members. All published article in Wiley Open Access journals are instantaneously freely available to public to download, distribute and to read. Wiley Open Access publishes 108 online journals across biological, chemical and health sciences.

Science Direct Open Access Journals

Articles published in Elsevier open access journals are undergone peer review process and upon approval are instantaneous and permanently open to all public to read, download and share. Science Direct provides 718 open access journals to public, out of which 694 are Science and Technology journals as detailed below.

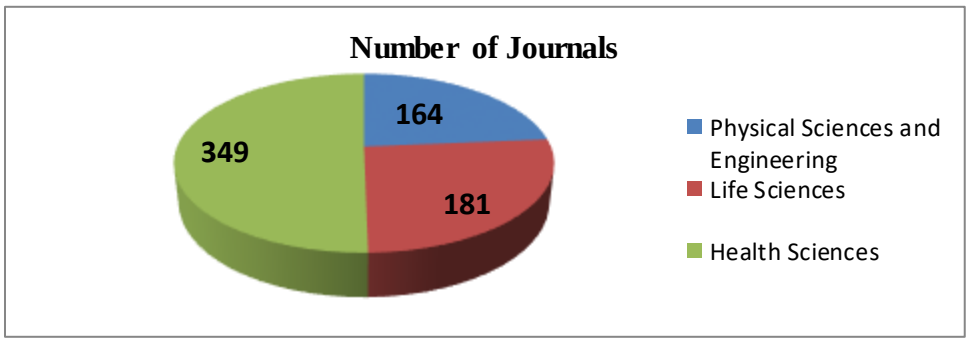

Figure 7: Journals in Elsevier OA content

Taylor and Francis Open Access Journals

Taylor & Francis bring out elevated excellence, thoroughly peer-reviewed open access (OA) research across all areas. Authors who are publishing OA in a Taylor & Francis or Routledge journal gain from: an ample option of journals to publish in, immediate online publication, specialist editorial boards, Creative Commons licensing opportunity and Article metrics. In Taylor and Francis 295 OA journals are available.

In India several Institutions and research organizations publishing open access journals in Science and Technology (S&T) discipline. Indianjournals.com publishes 31 journals out of which 29 are S&T journals. Indian Academy of Sciences publishes 12 S&T journals. National Institute of Science Communication and Information Resources (NISCAIR) publishes 17 OA journals out of which 14 are S&T journals. Defence Research and Development Organisation (DRDO) publishes 3 journals out of which 2 are Science and Technology journals.

Open access Books

E-Books Directory

E-Books Directory is a everyday increasing list of links to open available e-books, documents and lecture notes found all over the internet. Authors can submit their own e-books, or add any other resources they come across. Those who are having smart phones they have the provision to access this website with small screen sizes. The directory has **10931** open e-books in **709** categories. Science and Technology discipline wise number of books available given below.

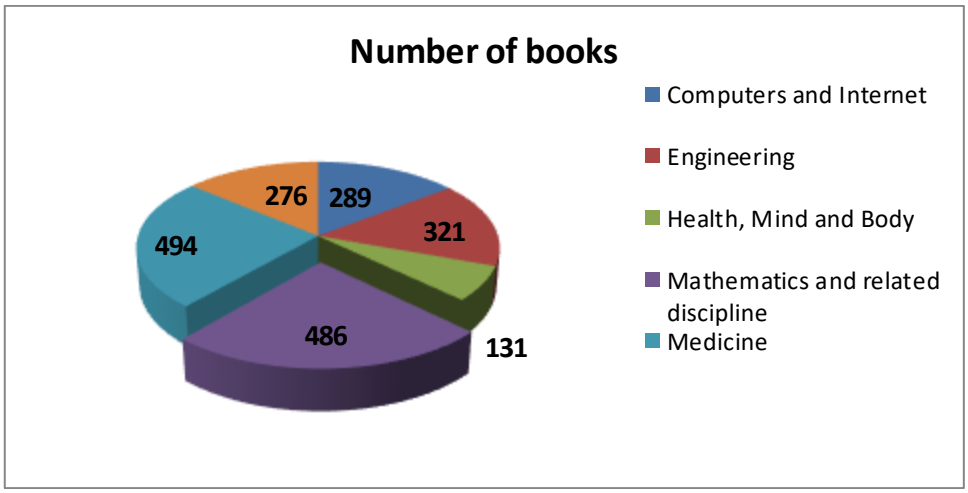

Figure 8: OA e- books

Directory of Open Access Books

The Directory of Open Access Books is a provision of OAPEN Foundation. The OAPEN Foundation is a global project committed to Open Access monograph publishing, founded at the National Library in The Hague. Science and Technology discipline wise books available are given below.

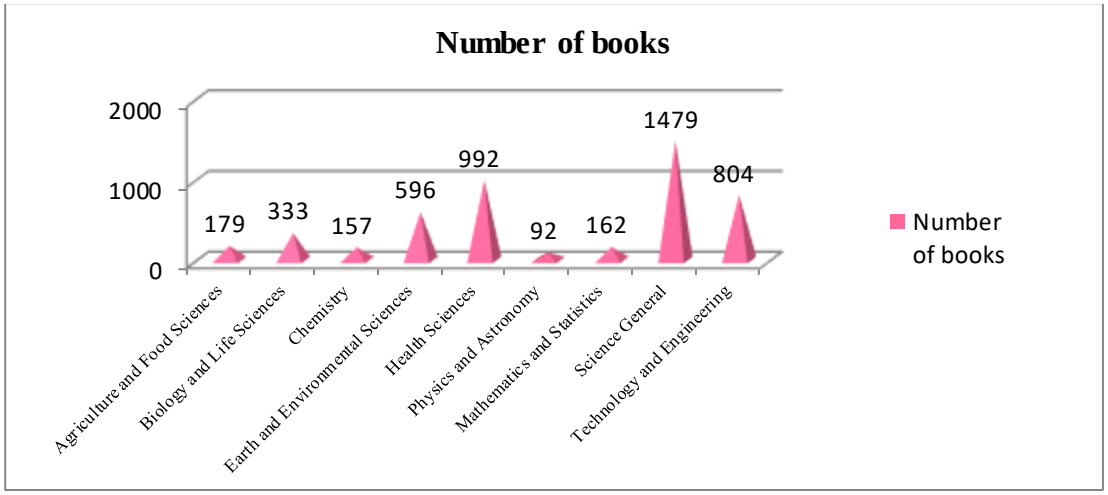

Figure 9: S&T books in DOAB

PDF Drive

PDF Drive is a search engine which indexes the content available in PDF format. Full text journal articles, e-books, reports etc. belong to various disciplines can be located and the files can be downloaded from its original source.

Open Thesis and Dissertations

Networked Digital Library of Theses and Dissertations (NDLTD)

The Networked Digital Library of Theses and Dissertations (NDLTD) is a global organization devoted to support the acceptance, creation, utilization, distribution and maintenance of electronic theses and dissertations (ETDs). This organization support electronic publishing and open access to research in order to enhance the contribution of information worldwide. This organization website includes resources for university administrators, librarians, faculty, students and the common public. 5,770,236 ETD are available globally.

EBSCO Open Dissertations

OpenDissertations.org is partnership between EBSCO and BiblioLabs that carry an original move towards to escalating traffic and discoverability of ETD research. The program is free to researchers and contributing institutions with the careful necessary creation considerable open-access content further freely discoverable to end-users inside and outside academic institutions.

SHODHGANGA

Shodhganga project is maintained by INFLIBNET Centre. The UGC in its notification dated 5th May 2106 mandates researchers in Indian Universities to submit their electronic version of theses and dissertations to Shodhganga project with an aspire to make possible open access to Indian theses and dissertations to the scholarly community globally. Open access theses repository not only ensures easy access and archiving of Indian theses but also facilitate in increase standard and eminence of research. In Shodhganga project 451 Indian Universities are participating by signing a Memorandum of Understanding with INFLIBNET centre. As on the date of writing this article there are 2,26,108 Thesis are available in this project.

Open Access Search Engines

OAIster

OAIster is an open access resources to union catalogue of millions of documents. This catalogue was constructed through collected from open access collections internationally using the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). OAIster consist of further 50 million documents that characterize digital resources from more than 2,000 participants. OCLC FirstSearch service provides the facility to search the OAISter database; this is the complement and providing another valuable access point for this prosperous database.

CiteSeerx

CiteSeerx is a bibliographic database mainly for the domain of computer and information science. CiteSeerx intend to develop the propagation of scientific literature and to offer developments in functionality, utilization, accessibility, price, completeness, effectiveness and relevance in the access of scientific and academic information. CiteSeerx also provides technological and resource support to other digital libraries.

Open Access Educational Resources

NPTEL

The seven Indian Institute of Technology namely Delhi, Kanpur, Bombay, Madras, Kharagpur, Rookee and Gawahati established the project National Programme on Technology Enhanced Learning (NPTEL) in 2003 along with Indian Institute of Science, Bangalore. In the first phase 235 courses in video or web format developed and identified five core disciplines namely computer science and engineering, electronics and communication engineering, electrical engineering, mechanical engineering and civil engineering. Postgraduate and undergraduate level an additional 600 web and video courses were created in all major branches of physical sciences and engineering. Management courses are created for postgraduate level only.

e-PG Pathshala

UGC implemented the e-PG pathshala project of the Ministry of HRD under its National Mission of Education through ICT (NME-ICT). The courses are prepared by the subject specialists working in Indian universities and other R & D institutes across the country. The quality of the content is the key element of any education system, curriculum based, interactive e-content in 70 subjects across all areas of arts, fine arts, social sciences and humanities, mathematical and natural sciences, languages and linguistics have been developed by the specialist in the subject filed. In this project every subject had a team of principal investigator, paper coordinator, content writers, content reviewers, multimedia team and Language editors are working. In this project more than 5000 experts, more than 3000 quiz and 70 subject, more than 23,000 video and e-text and 723 papers are accessible.

MIT Open Course Ware

MIT open course ware created MIT's entire subject materials in teaching are available openly to the public with free of charge. With more than 2,400 courses are existing, OCW is distributing on the pledge of open sharing of information. MIT courses are licensed with creative commons attribution-Non commercial–Share Alike.

SWAYAM

Government of India started the SWAYAM programme and intended to reach the three fundamental principles of Education policy viz., access, equity and quality. The intentional of this attempt is to take the unsurpassed education resources to all, including the most underprivileged. All the courses are interactive in nature designed by the experts in the field and are openly available to pubic in India with free of cost. Further 1,000 and above specially selected teachers and faculty prepared these courses from across the country. SWAYAM courses are in 4 quadrants they are 1. Video instructions 2. Especially arranged reading materials that can be download or printable. 3. Self-evaluation examination through tests and interrogate and 4. An online debate for clearing the doubts.

Conclusion

There is an enormous growth in open access resources in the field of Science and Technology, more number of resources available especially in medicine related discipline. As the cost of the journal subscription and books are increasing day by day, this study will help the Science and Technology related researchers to get access to these open access resources without any hindrance. For librarians this study will help them to direct their Science and Technology related users to utilize these open access resources for their academic purpose. Open Educational Resources like NPTEL and MIT Courseware contents and videos will help engineering related discipline users to make use of these resources for their academic endeavour.

References

1. https://sparcopen.org/open-access/
2. Solomon, D. J., Laakso, M., &Björk, B.-C. (2013). A longitudinal comparison of citation rates and growth among open access journals. *Journal of Informetrics*, *7*(3), 642–650. https://doi.org/10.1016/j.joi.2013.03.008
3. http://www.opendoar.org/
4. https://www.ncbi.nlm.nih.gov/pmc/about/intro/
5. https://arxiv.org/help/general
6. https://www.biomedcentral.com/
7. http://www.doaj.org/
8. http://www.plos.org/
9. https://journals.aps.org/prx/about
10. https://www.hindawi.com/journals/
11. https://benthamopen.com/about-us.php
12. https://www.springeropen.com/about
13. http://www.opensciencedirectory.net/
14. http://www.freemedicaljournals.com/
15. https://authorservices.wiley.com/open-research/open-access/browse-journals.html
16. https://www.elsevier.com/about
17. https://www.tandfonline.com/openaccess
18. http://www.indianjournals.com
19. https://www.ias.ac.in/Journals/Overview/
20. https://www.niscair.res.in/
21. https://www.drdo.gov.in/ drdo/English/index.jsp?pg=journals.jsp
22. http://www.e-booksdirectory.com/
23. https://www.doabooks.org/doab?func=about&uiLanguage=en
24. https://www.pdfdrive.com/category/66/p2/
25. http://www.ndltd.org/about
26. https://biblioboard.com/opendissertations/

27. http://shodhganga.inflibnet.ac.in/
28. https://www.oclc.org/en/oaister.html
29. http://csxstatic.ist.psu.edu/home
30. https://nptel.ac.in/about_nptel.php
31. https://epgp.inflibnet.ac.in/
32. https://ocw.mit.edu/about/
33. https://swayam.gov.in/about

Additional Web References

- http://library.iitgn.ac.in/resourceguide/subjects/guide.php?subject=OAR
- http://crl.du.ac.in/oa/index.htm
- http://www.ndltd.org/resources/find-etds
- https://clarivate.com/products/journal-citation-reports/
- https://www.inflibnet.ac.in/
- http://www.delnet.in/
- http://lib.unipune.ac.in:8002/
- https://library.annauniv.edu
- https://lib.icar.gov.in/
- http://www.library.iitkgp.ac.in/
- https://www.iitbhu.ac.in/cf/lib