

## **Growth and Development of Electronic Theses and Dissertation (ETDs) in India**

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### **Abstract**

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Universities are highly responsible for developing new theories through innovative research studies in all around the globe. Students and scholars are putting their best efforts to produce new facts and principles in these centres of higher studies. In India we have around 350 universities and every year almost 12000 PhDs are being produced by these universities. Avoiding duplication of research work is a serious matter of concern to all nations. Innovations in ICTs become a boon to avoid duplication as well as utilization of these studies. An electronic submission of these dissertations and theses are known as ETDs. The present study brings out the growth and the development of ETDs in India. The present study discusses about ETD, History of ETD activities , It also discusses National Policy framework in India for building ETD repositories. UGC Regulations 2005 and 2009, INDEST Consortium, ICSSR – NASSDOC and National Knowledge Commission have provided guidelines to improve the quality of research and also to provide world wide access to research under open access.

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### **Introduction**

The increased sophistication and availability of technology in daily life have changed the expectations of library users which demand remote access to full text resources including theses and dissertations.

The convergence of technology, open source initiatives, and emerging new paradigm on intellectual property rights has encouraged Electronic Theses and Dissertations (ETDs).

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Internet has changed the lives of people. In spite of the efforts in making information accessible, a majority part of the data is still in the custody of libraries. Due to the increasing prices of the serials and crises in access, there has been a driving force of the open access movement.

Thus, the main motivations behind OA initiatives were: high subscription rates, which were difficult to afford, and the large price discrepancy between individual and institutional subscription rates. Consequently, libraries ended up paying huge subscriptions for journals and they were becoming more restrictive. OA provides free, immediate, permanent online access to the full text of research articles for anyone, web-wide.

Open Access Movement is also known as open access publishing. According to BOAI, the concept of Open Access refers to "[the] free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself" (BOAI, 2002).

Open Access repositories (or archives) are digital collections that make their contents freely available over the Internet. These digital repositories collect the research output of the members of a university's research community and support the archiving and long-term preservation of the institution's intellectual output (Swan & Chan 2009, C). Mostly institutional repositories are hosted within academic libraries around the world to digitally collect and preserve academic papers and Theses and dissertations in order to make them freely accessible to the students, faculty and the public. They play an important role in the process of Research and hence there is a need to digitize Theses and dissertation collection of the institution so as to make it easily available online for easy reference and to avoid duplication of research. Theses and dissertation in electronic form is called Electronic Theses and Dissertations.

## **Review of Literature**

The term ETD refers to a master's thesis or doctoral dissertation that is archived and circulated electronically rather than archived and circulated in print.

Most ETDs take the form of text uploaded in a word processing format or in an Adobe portable document format (PDF) and look much like traditional print dissertations. These documents can be viewed with the free ADOBE ACROBAT READER and are searchable with licensed Adobe Acrobat software (a different version than the Reader). Increasingly, though, ETDs are uploaded in more sophisticated formats such as HTML and XML and include color images, streaming multimedia, animation, and interactive features. They may reside on a CD-ROM or the World Wide Web, where they are highly accessible to broad audiences.

Electronic Theses and Dissertations (ETDs) are regarded as the bedrock of graduate education. As secondary source of information, ETDs are known to be the rich and unique source of information. Often the only source for research work that does not find its way into various publication channels. Electronic theses and dissertations (ETDs) are a relatively new mode of research and scholarly communication. Lippincott states that an ETD program provides a process, standards, and software to automate functions, as well as a digital infrastructure for access and preservation (Lippincott, 2006). As a primary source of information, theses and dissertations are particularly useful to researchers, but many languish in obscurity in university libraries and archives. Digital library technologies have helped ETDs gain momentum (Jin, 2004). Theses submitted in support of a PhD are difficult to access, as they are only collected by the library of the university that granted the degree. ETDs can be easily located, readily accessible, and delivered over the Web (Vijaykumar and Murthy, 2001)

### **Advantages of ETDs**

Bandra (2002) identifies the merits of ETDs:

1. To empower students to convey a richer message through the use of multimedia and hypermedia technologies
2. To improve graduate education by allowing students to produce electronic documents, use digital libraries and understand issues in publishing;
- 3 To increase the availability of student research for scholars and preserve it electronically;
- 4 To lower the cost of submitting and handling theses and dissertations;
- 5 To empower universities to unlock their information resources; and

- 6 To advance digital library technology.

## **History of ETD Activities**

Fox, et al., (1999) describe the origins of a major ETD project in the US, beginning with 1987 with a workshop that focused on applying SGML, followed by the development of an SGML Document Type Definition (DTD) for ETDs. Virginia Tech University in the US began requiring electronic submission of theses and dissertations in 1997 (Seasmans, 2003). In the early 1990s, Adobe's Portable Document Format (PDF) became available. This format is widely used for ETDs. The University of Waterloo now receives nearly half its theses and dissertations electronically, and provides open access to about 500 ETDs a year (Jewell, 2006). In the mid-1990s, Cranfield LIS, as a member of the European Initiative in Library and Information in Aerospace (EURILIA) project, participated in a thesis scanning project. Cranfield LIS later collaborated to test the uploading of thesis metadata and full text. The UK has been a leader in ETDs, with funding from the Joint Information Systems Committee (JISC). ETDs fit in with the mission and strategic direction of JISC, including making research available quickly (Bevan, 2005).

## **Objectives of The Study**

- To study growth and Development of ETDs in India.
- To study current situation of ETD repositories in India
- To study composition and built of E-theses repositories in India.

## **Methodology**

The information on E-Theses repositories in World is available on Registry of Open Access Repositories (ROAR) and the Open DOAR i.e. Directory of Open access Repositories. The Open DOAR were evaluated by content analysis of ETD websites on the aspects like National and Institutional level ,Discipline ,Language ,Subject coverage, Core content type and software used.

## **International Initiatives towards ETDs**

Keeping in View the importance of ETD, several initiatives have been started in foreign countries like USA, UK, China, and Canada.

- Network Digital Library of Theses and Dissertations (NDLTD): Network Digital library of Theses and Dissertations is a non-profit organization involved in the development of accessible digital libraries of theses and dissertations
- CARL Institutional Repositories Program : Since 2003 ,the Canadian Association of Research Libraries has been promoting the use of institutional repositories in Canada through the CARL Institutional Repositories program.
- University Microfilms International(UMI): University Microfilms International (UMI) is an US based organization having a collection of about 1.6 million Theses and Dissertations .
- California Institute of Technology (CaltechTHESI) : CaltechTHESES contains Ph.D., Engineer's,Master's, and Bachelor's/Senior theses authored by Caltech students. The repository is updated continuously as students add new theses, and library staff scan and older theses.
- Library and Archives Canada (LAC) Canadian Theses Project LAC's Canadian Theses on Microfiche Service was launched in 1965 at the request of the deans of Canadian graduate schools.
- West Virginia University (WVU) ETDs West Virginia University implemented a policy in 1998 that all master's theses and doctoral dissertations are required to be submitted electronically.

### **ETD Initiatives in India**

First ETD repository was started at IIT Mumbai in 1999. Since then a 68 ETD repositories have been developed in India. Development of Union databases of Indian university libraries is one of the major activities of INFLIBNET .As per UGC-INFLIBNET programme, 157 Universities are funded for the creation of databases of doctoral theses along with books and serials collection available in each university .There was a need to integrate theses and dissertations produced in India in a single database to form a national repository.

Online availability of electronic theses through centrally maintained digital repositories will not only ensure easy access and archiving of Indian doctoral theses .INFLIBNET is now taking steps in this direction.

## **Government Initiatives for the Development of ETDs**

### **UGC Regulations 2005**

In 2005, the University Grants Commission of India (UGC) drafted a national policy framework entitled "UGC (Submission of Metadata and Full-text of Doctoral Theses in Electronic Format) Regulations, 2005". UGC's Regulatory Framework aims at evolving a mechanism to improve the quality, accessibility and availability of Indian theses and to implement uniform standards for creating metadata of doctoral theses and a system for collecting and collating this standardized data. (UGC Regulation, 2005) Regulation proposed two sets of planned actions, such as:

#### **➤ Creation of Indian National Theses Database (INTED)**

Proposed Indian National Theses Database (INTED) is an online centralized bibliographic database, where online submission of metadata sets of a PhD thesis is made mandatory when the researcher finally submits his/her PhD thesis to the Research Cell of a university. The PhD supervisor verifies and validates the metadata of submitting PhD thesis. The INTED will be freely accessible worldwide and will have simple and advanced search interfaces. Hence, bibliographic control of all recent PhD theses is assured. Although this online database will be accessible free of charge, its CD-ROM version will be made available at a price.

#### **➤ Submission of PhD Theses in Electronic Form**

The researcher will submit his/her PhD thesis in an appropriate electronic format, along side hard copies of his/ her thesis.

The UGC Regulations also suggest a specific content structure of electronic thesis, which is derived from the best practices of international ETD sites. The submitted electronic copy of the doctoral thesis will be stored in the respected University's ETD repository or institutional repository.

The ETD repository or institutional repository should be OAI-PMH compliant, so that metadata harvesting services can collect metadata of each submitted/ awarded doctoral thesis. The administrator of the ETD repository will also check the quality of metadata information.

The university will set up committees to formulate copyright and IPR policies, access policy, plagiarism monitoring policy, and other norms related to ETD repository. The access to ETD database can be allowed any of the following: worldwide open access, campus-only access, temporary restricted access, and mixed access (partially open). The ETD may contain textual data along with images, audio objects, video objects, animation objects, spatial objects and other kind of multimedia objects. The ETD can be navigated non-linearly. Thus, hard copy of a thesis document has less number of functionalities than electronic copy of a thesis. The proposed ETD repositories in universities will be developed using latest versions of IR software and will adopt latest versions of metadata schema to handle the advanced features of ETD.

### **UGC Regulations 2009**

In 2009, UGC has given one more regulation in context to “Minimum Standards and Procedure for awards of M. Phil / Ph.D.” Under Clause 19, the regulation provides guidelines for creation for Depository with UGC. The Clause 19 is reproduced as it is below.

“19. Following the successful completion of the evaluation process and announcement of the award of M.Phil/Ph.D., the university shall submit a soft copy of the M.Phil / Ph.D. thesis to the UGC within a period of thirty days, for hosting the same in INFLIBNET, accessible to all institutions / universities”.

### **Implications of UGC Regulations**

UGC Regulations 2005, though Regulations formulates a roadmap in achieving wide dissemination of results of doctoral research conducted in Indian universities and bibliographic control of theses and dissertations of research degrees, the universities and the researcher were reluctant to change their status quo.

This may be due to the fear of plagiarism as well as the fear that the contents will be observed by pioneers worldwide.

UGC Regulations 2009 has made it mandatory to deposit soft copy of thesis to INFLIBNET and set the minimum standards for the award of research degrees ultimately motivated to produce quality doctoral theses and maintain certain international standards. Online availability of electronic theses through centrally-maintained digital repositories will not only ensure easy access and archiving of Indian doctoral theses but will also help in raising the standard and quality of research. This would overcome serious problem of duplication of research and poor quality resulting from the "poor visibility" and the "unseen" factor in research output. As per the Regulation, the responsibility of hosting, maintaining and making the digital repository of Indian Electronic Theses and Dissertation (Shodhganga) accessible to all institutions and universities is assigned to the INFLIBNET Centre.

### **INDEST Consortium – Open Access Advocacy Group**

The Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium is an innovative initiative supported by the Ministry of Human Resource Development (MHRD) and All India Council for Technical Education (AICTE). Indian Institute of Technology Delhi (IITD) is the coordinating agency for this consortium. In 2003, INDEST core members proposed to establish an 'INDEST Digital Theses Archive.'

Six recommendations of Recommendations of INDEST Working Group on 'ETD and EPrint Archives' as reported in the document - Minutes of the Meeting held on 7th October, 2003 at IIT Delhi are reproduced below. (INDEST Working Group, 2003)

- All IITs (Indian Institute of Technology) and IISc (Indian Institute of Science) should implement electronic submission of theses and dissertations in addition to their current practice of submissions in theses and dissertations in print;
- Following the model set-up by the IISc Bangalore, all IITs may set-up e-print archives using OAI compliant e-print software. While pre-prints and re-prints may be submitted at e-print servers set-up at various IITs / IISc, a central server may be deployed to harvest the metadata from all such e-print archives. The use of OAI-compliant e-print software would facilitate such an environment.



It was strongly felt that if the pre-print / re-print submission is followed strictly at all IITs / IISc, the unified collection developed in the process at IITs and IISc (as well as at other such repositories) would offer a strong alternative to existing model of scholarly publishing;

- All INDEST Consortium members (i.e. IITs and IISc) should follow common protocols and procedures to ensure interoperability of digital collections built-up in the process of e-submissions of theses, dissertations and preprints. The IITs and IISc may adopt OAI-complaint software available in public domain, such as e-prints archive, D-space or the Virginia Tech. ETD, to ensure interoperability;
- 4. The ETD may be planned as distributed archives with individual institutions holding their theses and dissertations on their own servers while the metadata may be harvested either online or offline on a single server;
- IIT Bombay and IIT Kanpur, the two institutions who have already implemented ETD at their respective institutions, may provide trial access to their ETDs to other IITs / IISc;
- A core development group may be formed to give the technical specifications for the ETD as well as for preprints and for the development of the archive site. This group will also prepare a template for the ETD and preprint site, which can be used by any of the INDEST members to host their ETD archive. The Group may also finalize standards for the metadata needed for the ETD.

### **Implications of INDEST Recommendations**

48 centrally-funded Government institutions constitute the core group of the Consortium that are divided into the four categories based on e-resources allocated to them. These are IITs, IISc, National Institute of Technology (NITs), Indian Institute of Information Technology (IIITs), Indian Institute of Management (IIMs), etc. Some core member institutions have already established open access institutional repositories and ETD repositories in their respective institutions. Some core member institutions, such as, IISc, IITs, have started digitization of their back volumes of thesis and dissertation collections on project basis and make them available through open access or campus wide institutional/ETD repositories. ETD@IISc is considered as a role model of open access ETD repository in the INDEST family.

The INDEST Consortium in association with IISc prepared a number of guidelines on the ETD and organized training workshops for implementations of open access repositories in member institutions. This Consortium also provides consultative supports to other Indian consortiums, research agencies and individual institutions in formulation of open access policies and implementation of ETD/institutional repositories. (Das, A K, et.al., 2007) There is no visible progress with respect to having 'INDEST Digital Theses Archive' at the national level at this moment.

### **ICSSR – NASSDOC**

National Social Science Documentation Centre (NASSDOC), was established in 1969 as a Division of the ICSSR with the objective to provide library and information support services to researchers in social sciences; those working in academic institutions, autonomous research organisations, policy making, planning and research units of government departments, business and industry etc. NASSDOC also provides guidance to libraries of ICSSR Regional Centres and ICSSR supported Research Institutes.

NASSDOC has a programme of acquiring copies of unpublished Ph.D. theses in social sciences accepted by Indian universities. Since 2003 NASSDOC has revised its thesis acquisition policy. It has been decided to pay Rs 1500/- to a scholar for a copy of Ph.D. thesis. A scholar is required to submit a soft version, preferably CD-ROM, along with a hard copy (print version) of the thesis. (ICSSR, 2011) .

NASSDOC has signed a memorandum of understanding (MOU) with Vidyanidhi Digital Library Project of Mysore University to digitize the Ph.D. Theses collection of NASSDOC for wider dissemination to scholars. More than 2000 Ph.D. Theses have been digitized and put on CD – ROM format. The ultimate objective is to put them on the web, so that research scholars can view them on the website. Vidyanidhi Digital Library, University of Mysore Indian ETD Collection <http://dspace.vidyanidhi.org.in:8080/dspace/>

## Recommendations of National Knowledge Commission

The National Knowledge Commission of India (NKC), constituted on 13th June 2005, is a high level advisory body to the Prime Minister of India, with a mandate to guide policy and direct reforms. NKC's overarching aim is to transform India into a vibrant knowledge-based society. In its first annual report entitled 'Report to the Nation 2006', NKC published its first set of recommendations to the PM of India (NKC, 2006). If implemented, these recommendations will have far reaching implications in the knowledge creation and dissemination cycle. NKC strongly advocates open access to public-funded research literature. The theses and dissertations produced by state sponsored researchers would then make accessible through open access channels, such as, ETD repositories or institutional repositories. NKC also recommends expansion of Indian higher education system through establishment of new universities, including 50 national universities, totaling about 1500 universities across the country, which is about 3 times addition to existing system. This expansion would enable India to attain a gross enrolment ratio of higher education at least 15 per cent by 2015. This kind of phenomenon expansion requires a huge pool of qualified teaching and research staff, equipped with research degrees, to maintain a minimum standard of teaching and research. Similarly, present university system should also take proper measures to attract meritorious research students for future requirements and disseminate their research papers, theses and dissertations by establishing ETD/institutional repositories.

More recently in November, 2008, the National Knowledge Commission has in its report on 'More Quality Ph.Ds' has recommended to the Prime Minister of India that, "Ph.D thesis should be uploaded on the Internet, preferably on the proposed National Research Portal. In any event, open and free access to research output in archives and other digital media resources should be made mandatory". Also the same Commission in its report 'Libraries: A road map for revitalization' strongly recommended that , libraries should offer new services by creating" institutional repositories of research articles, reports, institutional publications and Electronic Theses and Dissertations ( ETD)" and to support these services the Commission further recommends that " all academic institutions must set up institutional repositories of ETD. This should be made mandatory for accreditation. Such repositories should offer open access" (National Knowledge Commission).

With this kind of initiatives and policy directions from the national bodies, ETD work in India will gain a momentum and facilitate wider access to Indian research. (NKC, 2008).

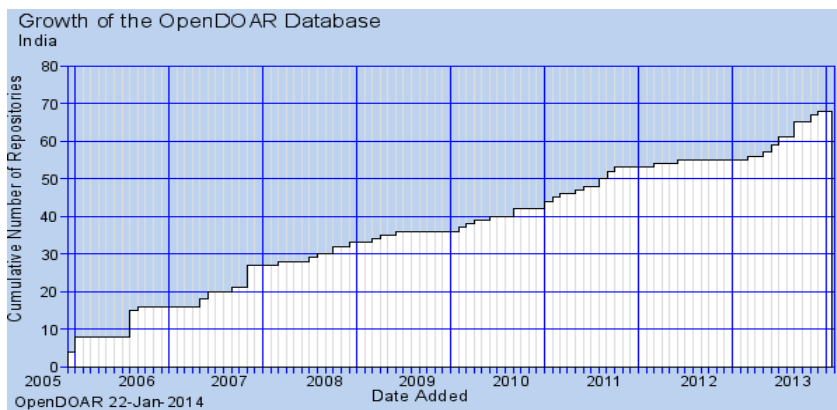
### Shodhganga-INFLIBNET Centre

Information and Library Network (INFLIBNET) Centre is an Autonomous Inter-University Centre (IUC) of University Grants Commission (UGC). It is involved in creating infrastructure for sharing of library and information resources and services among Academic and Research Institutions. It is providing a platform for research students, universities to deposit their theses through 'Shodhganga' project. 157 Universities have signed a Memorandum of Understanding {MoU} with INFLIBNET. Universities can also get funds from UGC for setting up Institutional and ETD repositories.

### Growth and Development of ETDs in India

Figure no 1 shows the growth of ETDs in India the study shows development of ETDs in India is at a slow pace from 5 in 2005 to 69 in 2013. There was an increase of 64 ETDs in a span of 8 years. There are 2575 ETD repositories registered worldwide on Open DOAR. As compared to the worldwide country's contribution to ETD repositories, India's contribution is 3%.

**Figure no.1: Growth of ETDs in India**



### Composition of Built of ETD Repositories in India

As per figure no.2 it is seen that Dspace is the most widely used open access repository software in India and worldwide. Dspace is freely available as open source software for building open digital repositories. It is free and easy to install and completely customizable to fit the needs of any organization .Dspace preserves and enables easy and open access to all types of digital content including text, images .mpegs and data sets .

**Figure No.2: Analysis of ETD website by Software Used**

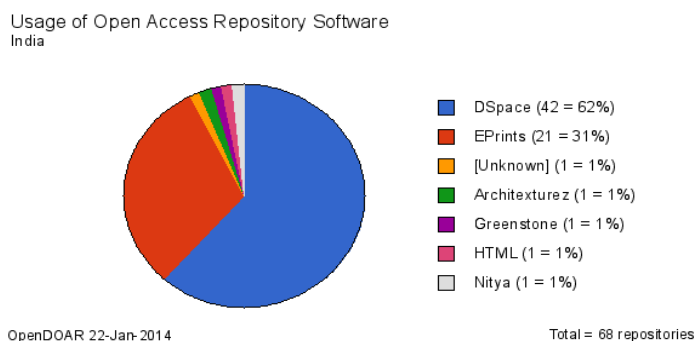
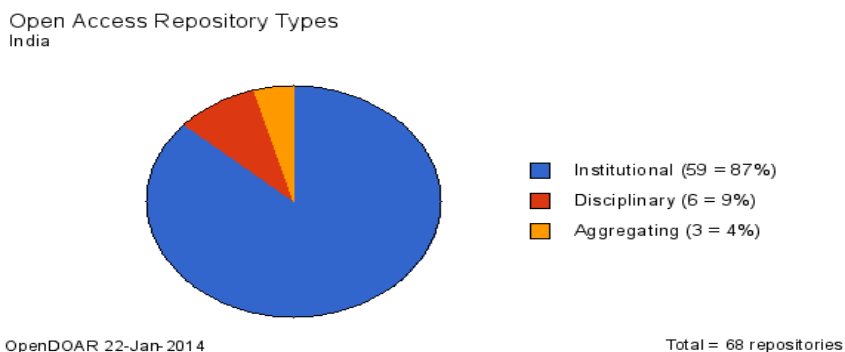


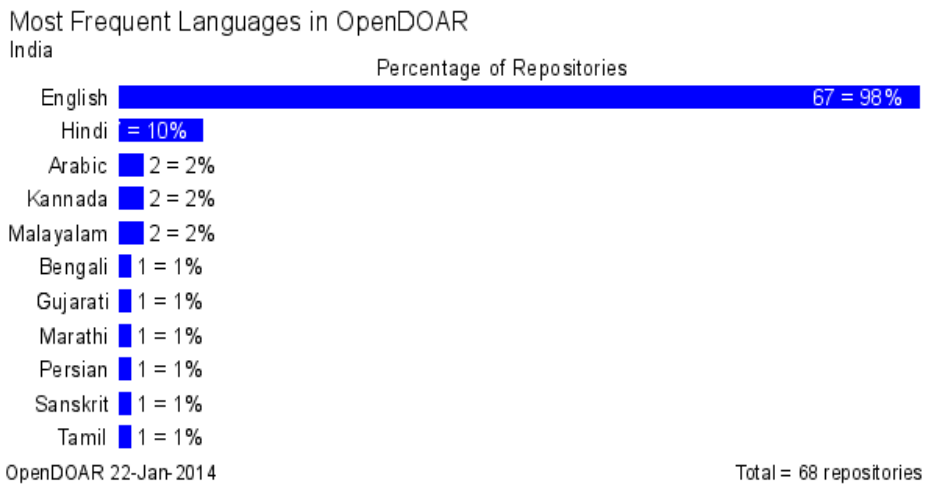
Figure no 3 shows that Out of 68 ETDs registered in Open DOAR,87% repositories are institutional and two ETD initiative are national. They are Vidyanidhi project of university of Mysore and Shodganga project of INFLIBNET in India ,the state like Karnataka is having largest number of ETD repository organizations.

**Figure No.3: ETD Repository Types in India**

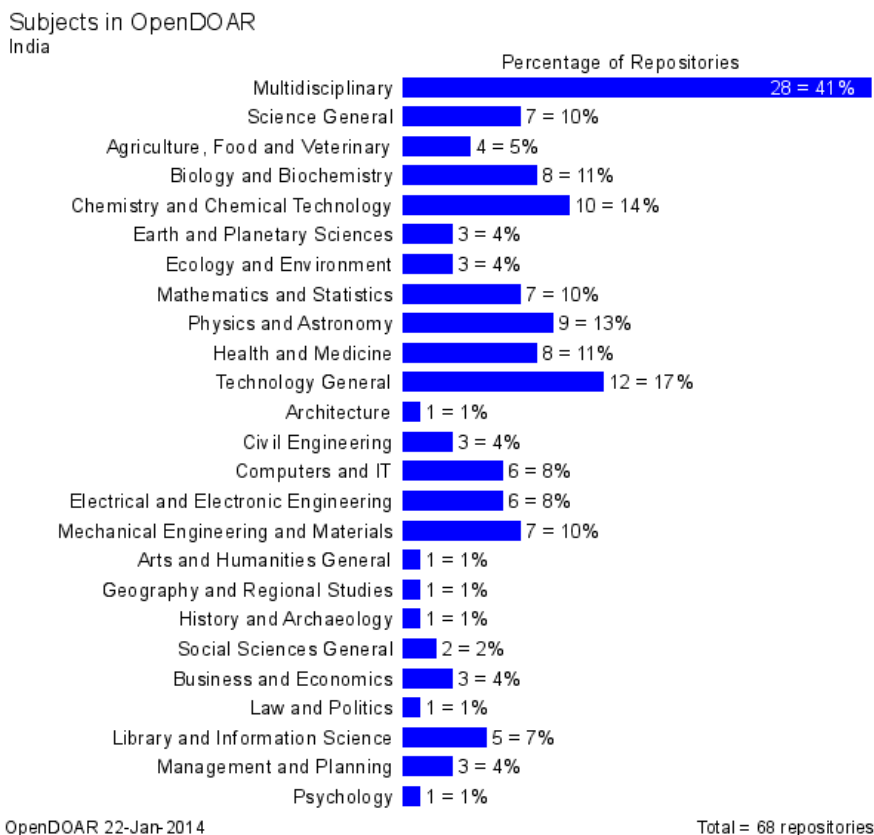


It is seen from figure no. 4 that English is the most commonly used language in the ETDs in India and worldwide .There are some multilingual ETD repositories in India like KNoor of university of Kashmir, Mahatma Gandhi University Theses online, Vidyanidhi, Librarian's Digital Library, and Etheses etc. Along with ETDs, these repositories also contain journal articles, conference proceedings, books, patents, multimedia objects etc.

**Figure No.4: Language Wise Analysis of ETD Website**



It is found from figure no.5 that 28 ETD repositories include multidisciplinary subjects. 8 ETD repositories include Biology and Biochemistry Mathematics and Statistics include 7 repositories .computer and IT includes 6 repositories whereas Library and information science include 5 repositories.

**Figure No.5: Subject Coverage of ETD Repository**

## Conclusion

The greatest advantages of ETDs are avoiding duplication in research work, ensuring quick retrieval of information, promoting resource sharing, and providing a permanent solution to the problem of space. There is no system of theses and dissertations legal deposit in India and universities/ institutions are not under the jurisdiction of the archiving organizations, so the collecting work is not very smooth and some theses and dissertations are simply lost or accumulate dust. There is need for concerted effort by all ETD stakeholders to integrate theses and dissertations produced in India in a unified database to be coordinated by a central agency of Government of India. INFLIBNET is now taking steps in this direction. It has started developing a complete national union catalogue of ETDs in India.

There is a need to organize ETD Awareness programs to improve an understanding of the issues and options for the institutions planning to implement ETD repositories. Workshops and training programs for both researchers and faculty members need to be conducted on issues of copyright, choice of access, and encourage researcher to submit theses online.

The biggest constraint faced by the administrators in developing ETD repository is copyright and Intellectual Property Rights ,unwillingness of the researchers to deposit their theses, fear of plagiarism , problem of long term preservation, lack of institutional policy ,funding problem , lack of necessary infrastructure , whereas the interest of people and institution must be constant and effective .UGC Regulations is playing an important role in developing ETD repositories in India in near future by making it mandatory to deposit a soft copy of thesis to its database.

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