E-THESIS REPOSITORIES IN THE WORLD:

A CRITICAL ANALYSIS

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By

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II Om Jai Shri Ganeshaya Namah II

Dedicated to

My Parents, My Didi

My Husband- Harshavardhan

&

My Son- Aryamaan

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Ms. Shantashree Sameerkumar Sengupta

CERTIFICATE

Certified that the work incorporated in the thesis entitled "**E-THESIS REPOSITORIES IN THE WORLD: A CRITICAL ANALYSIS**" submitted by Ms. Shantashree Sameerkumar Sengupta was carried out by the candidate under my guidance. Such material as has been obtained from other sources has been duly acknowledged in the thesis.

Place: Pune **Dr.S.K.Patil**

Date: **29.11.2014** **Research Guide**

DECLARATION

I declare that the thesis entitled "**E-thesis Repositories in the World: A Critical Analysis**" submitted by me for the degree of Doctor of Philosophy is the record of work carried out by me during the period from 26th October 2010 to 29th November 2014 under the guidance of Dr.S.K.Patil and has not formed the basis for the award of any degree, diploma, associateship, fellowship, titles in this or any other University or other institution of Higher learning.

I further declare that the material obtained from other sources has been duly acknowledged in the thesis.

Place: Pune **Ms.Shantashree Sameerkumar Sengupta**

Date: **Research Student**

ABSTRACT

The advent of Information Communication & Technology (ICT) has resulted into a revolution in the ways of production, dissemination, preservation and accessibility of information. Traditional librarianship has opened its doors and embraced ICT to enhance and improve the quality and quantity of services provided by libraries. Libraries have expanded their scope to Library & Information Centres. With the changing trends of libraries, the users have also moved to advanced stages of accessing the information.

Theses and dissertations are one of the major sources of authentic in-depth information on a particular topic on which a researcher conducts extensive research work. In spite of being a main source of scholarly communication, the print theses and dissertations is mostly not accessible to outside world. In this way, the important information remains unused and unknown to users. The Electronic format of the theses and dissertations makes it possible for the information content to be used by information seekers.

'Open Access' is a boon for the users who strive for information. Policy Guidelines framed by National and International Organizations like UNESCO, BOAI, Berlin Declaration, ECHO Charter, Bethesda Statement, Salvador Declaration, National Open Access Policy and National Knowledge Commission's Report on Open Access (India) have promoted the benefits of open access for researchers, organizations, public and funding organizations.

Institutional repositories provide access to various institutional documents through open access. The type of contents vary from books, journals, conference proceedings, theses, dissertations, newspaper clippings, datasets, manuscripts, software, lectures, learning objects, maps, pre-prints, post-prints, research reports, audio-visual material etc.

The present research work deals with the Electronic Thesis Repositories which are a major form of grey literature of any organization. There are various benefits of ETDs

like they help in increasing the citation count of the author and the institution, minimum time required for dissemination of scholarly information, various file formats can be incorporated in the electronic form which is not possible in the print theses and dissertations and they provide a solution of long term preservation of theses and dissertations. In spite of the benefits of ETDs, authors hesitate in depositing their research work in electronic format mainly due to fear of plagiarism.

There are various concepts in the whole process of setting up of an ETD Program. The present research work aims to study the various concepts of ETDs by analyzing the E-thesis Repositories in the world and collecting data from the Repository administrators through Web Questionnaire. The fourteen research objectives are divided into nine sections of Background Information of E-thesis Repository; Repository Materials; Hardware & Software;Ways of Providing Access to ETDs; Budget & Human Resource; Metadata & Interoperability Standards; Preservation Policies; Copyright Issues;Language Compatibility, Linkages with various National and International ETD Projects & Currency of Information.

The Review of Literature was conducted exhaustively using various keywords belonging to the area of research from print and non-print sources of information. The major trend observed in the international literature emphasized on importance of ETDs in academic libraries, world wide open access initiatives, overview of country specific ETD Projects, copyright and preservation issues related to ETDs, selection of software and Policy Guidelines framed by international organizations. Trend observed in ETD literature published in India highlight on contribution of UGC, NKC and INFLIBNET towards Open Access and ETDs, selection of software, copyright and IPR issues, developments in open access initiative in India and development of ETD projects in various institutions across India.

List of E-thesis Repositories was prepared using Registry of Open Access Repositories (ROAR) and Directory of Open Access Repositories (OpenDOAR). Only those E-thesis repositories were considered whose interface was in English and which contained English language theses and dissertations. Out of total population of 258 repositories in English Language, 154 were finalized using Krejcie & Morgan Table for Determining Sample Size. The selected repositories belonged to 43

countries and had more than 1000 ETDs in their repositories. The Repository Administrators of these repositories were mailed the Web Questionnaire Link through e-mail for data collection. The Web Survey Questionnaire was developed using SurveyMonkey Web Questionnaire Tool.

NDLTDs support and promotion of the present research work helped the researcher to get a good response rate of 62.33% from across the world. The USA and UK ranked highest in the list of respondents. The researcher received overwhelming response from various developing countries also. This proved that Open Access Movement is gaining momentum not only in developed countries like the USA and UK but also in several developing countries.

The findings are presented in Chapter 6 with objective wise conclusion and suggestions. Some major recommendations are:

1) Institutions prefer pilot testing stage before final implementation in order to understand and rectify any problems related to uploading of data, software related problems and choice of most appropriate user friendly repository software.
2) All institutions should motivate their researchers to contribute their work in the repository and wherever required there should be a mandatory policy for deposition of research work in electronic format.
3) Benefits of ETD submission should be promoted in order to encourage the institutes in setting up ETD only repository.
4) Institutions must make the choice of appropriate open source software depending on their requirements. Thorough study of available documentation should be referred for getting a complete overview of facilities provided by the software.
5) All E-theses repositories must employ at least basic method of monitoring usage of items deposited in the repository.
6) State/ Central Governments must make policy guidelines to promote open access, building of institutional repositories and a central pool of research work should be built which will help to promote ETD submission in controlled budgetary provision.
7) Metadata being the most important part of submission of research work in repository must be prepared by Librarian or at least library staff members since metadata creation needs accuracy, completeness and should be accessible easily.

8) Repositories must have well defined policies for preservation, withdrawal and copyright of items deposited in electronic format.
9) Measures should be adopted for protection and copyright and institutes should provide full-text access to ETDs without any restriction.

The researcher in the concluding part has suggested some topics related to ETDs in which research can be conducted.

The present trend of growth and development of E-thesis repositories assure that there is a promising future of the concept and open access will spread its wings in more and more countries across the world.

LIST OF ABBREVIATIONS USED IN THE THESIS

Sr.No.	Abbreviation	Full Form
1.	AAU	Association of African Universities
2.	ADT	Australasian Digital Theses
3.	AIFF	Audio Interchange File Format
4.	ALA	American Libraries Association
5.	ALCTS	Association for Library Collections and Technical Services
6.	ANRT	Atelier National de Réproduction des Thèses
7.	AUO	Ankara University Open Access Program
8.	AVI	Audio Video Interleave
9.	BASE	Bielefeld Academic Search Engine
10.	BL	British Library
11.	BOAI	Budapest Open Access Initiative
12.	CASSIR	Cross Archive Search Services for Indian Repositories
13.	CAUL	Council of Australian University Librarians
14.	CCS	Committee on Cataloging
15.	CCSDS	Consultative Committee for Space Data Systems
16.	CFTRI	Central Food Technological Research Institute
17.	CNI	Coalition for Networked Information
18.	CNUDST	Centre intégréd' information scientifique et technique
19.	CONZUL	Council of New Zealand University Librarians
20.	CRC	Centre for Research Communications
21.	CRIS	Current Research Information System
22.	CRTD	Central Repository of Theses and Dissertations
23.	CSIR	Council of Scientific and Industrial Research
24.	CUSAT	Cochin University of Science &Technology
25.	DARPA	Defence Advanced Research Projects Agency
26.	DART	Europe-Digital Access to Research Thesis-Europe
27.	DATAD	Database of African Theses and Dissertations
28.	DC	Dublin Core
29.	DOAJ	Directory of Open Access Journals
30.	DRIVER	Digital Repository Infrastructure Vision for European Research
31.	ECHO	European Culture Heritage Online
32.	EO	Economists Online
33.	EPC	Electronic Publishing Centre
34.	ePub	electronic publications
35.	ETD	Electronic theses and dissertations
36.	EThOS	Electronic Theses Online Service
37.	FAIR	Focus on Access to Institutional Resources
38.	FEDORA	Flexible Extensible Digital Object and Repository Architecture
39.	FERPA	Family Educational Rights and Privacy Act
40.	FRAD	Functional Requirements for Authority Data

41.	FRBR	Functional Requirements for Bibliographic Records
42.	GIF	Graphics Interchange Format
43.	GSDL	Greenstone Digital Library
44.	HEI	Higher Education Institutions
45.	HP	Hewlett-Packard
46.	HTML	Hyper Text Mark-up language
47.	HUSCAP	Hokkaido University Collection of Scholarly and Academic Papers
48.	ICSSR	Indian Council of Social Science Research
49.	ICT	Information Communication and Technology
50.	IETD	Integrated Electronic Thesis Dissertation
51.	IGNOU	Indira Gandhi National Open University
52.	IIA	Indian Institute of Astrophysics
53.	IISc	Indian Institute of Science
54.	IISR	Indian Institute of Spices Research
55.	IIT	Indian Institute of Technology
56.	INFLIBNET	Information & Library Network
57.	IPR	Intellectual Property Rights
58.	IR	Institutional Repository
59.	ISTEC	Ibero-American Science Technology Education Consortium
60.	JISC	Joint Information Systems Committee
61.	JNU	Jawaharlal Nehru University
62.	JPEG	Joint Photographic Experts Group
63.	KDWebS	Knowledge Discovery System based on Web Services
64.	KHK	Katholieke Hogeschool Kempen
65.	KIPS	Kenya Information Preservation Society
66.	KNAW	Royal Netherlands Academy of Arts & Sciences
67.	KNUST	Kwame Nkrumah University of Science and Technology
68.	KOS	Knowledge Organization Systems
69.	LAC	Library and Archives Canada
70.	LCSH	Library of Congress Subject Headings
71.	LIBER	Ligue des Bibliothèques Européennes de Recherche
72.	LISA	Library & Information Science Abstracts
73.	LIS	Library & Information Science
74.	LISTA	Library, Information Science& technology Abstracts
75.	LOCKSS	Lots of Copies Keep Stuff Safe
76.	MGU	Mahatma Gandhi University
77.	MIRACLE	Making Institutional Repositories a Collaborative Learning Environment
78.	MIT	Massachusetts Institute of Technology
79.	MoU	Memorandum of Understanding
80.	MPEG	Moving Picture Experts Group

81.	MyCoRe	MILESS Community Content Repository
82.	MyTO Portal	Malaysian Theses Online
83.	NAL	National Aeronautics Laboratory
84.	NARCIS	National Academic Research and Collaborations Information System
85.	NASSDOC	National Social Science Documentation Centre
86.	NCCR	National Centre for Catalysis Research
87.	NDC	National Documentation Centre of Greece
88.	NDLTD	Networked Digital Library of Theses and Dissertations
89.	NISSAT	National Information System for Science and Technology
90.	NKC	National Knowledge Commission
91.	NML	National Metallurgical Laboratory
92.	NORA	National Online Repository of the Arts, Singapore
93.	NPTEL	National Program on Technology Enhanced Learning
94.	NSF	National Science Foundation
95.	NTUA	National Technical University of Athens
96.	NWO	Netherlands Organisation for Scientific Research
97.	OA	Open Access
98.	OAI	Open Access Initiative
99.	OAI-PMH	Open Archives Initiative-Protocol for Metadata Harvesting
100.	OAIS	Open Archival Information System
101.	OATD	Open Access Theses and Dissertations
102.	OCLC	Online Computer Library Center
103.	OCL	Open Content Licences
104.	OCR	Optical Character Recognition
105.	OER	Open Educational Resources
106.	OPAC	Online Public Access Catalogue
107.	OpenDOAR	Directory of Open Access Repositories
108.	ORE	Object Reuse and Exchange
109.	OSI	Open Source Initiative
110.	OSU	Oregon State University
111.	PDF	Portable Document Format
112.	PMH	Protocol for Metadata Harvesting
113.	PNG	Portable Network Graphics
114.	PPT	Power-Point Presentation
115.	PQDT	ProQuest Digital Theses
116.	RDA	Resource Description and Access
117.	RDF	Resource Description Framework
118.	RLUK	Research Libraries UK
119.	ROAR	Registry of Open Access Repository
120.	RQF	Research Quality Framework

121.	SGML DTD	Standard Generalized Mark-up Language Document Type Definition
122.	SGML	Standard Generalized Markup Language
123.	SHERPA/ RoMEO	definitive listing publishers' copyright agreements & retained author rights
124.	SHERPA-JULIET	Research Funders Archiving Mandates and Guidelines
125.	SHERPA	Securing a Hybrid Environment for Research Preservation and Access
126.	SISSA	Scuola Internazionale Superiore di Studi Avanzati (International School for Advanced Studies, Italy)
127.	SOAR	Shocker Open Access Repository
128.	SPARC	Scholarly Publishing & Academic Resources Coalition
129.	SUDOC	Système Universitaire de DOCumentation
130.	SURA	South-eastern University Research Association
131.	SWORD	Simple Web-service Offering Repository Deposit
132.	TIFF	Tagged Information File Format
133.	TISS	Tata Institute of Social Sciences
134.	UAE	United Arab Emirates
135.	UCT-CS	University of Capetown-Department of Computer Science
136.	UC	University of California
137.	UGC	University Grants Commission
138.	UNESCO	United Nations Educational, Scientific, and Cultural Organization
139.	URDIP	Unit for Research & Development of Information Products
140.	USETDA	United States Electronic Theses and Dissertation Association
141.	UTOG	UK Theses Online Group
142.	VIKRAM	Virtual Knowledge Resources and Management
143.	VT	Virginia Tech
144.	WAV	Waveform Audio File Format
145.	WIT	Waterford Institute of Technology
146.	WSU	Wichita State University
147.	WVU	West Virginia University
148.	XML	eXtensible Mark-up Language

CHAPTER 1

INTRODUCTION

1.1 Introduction:

The present age of information has changed the traditional library concept. Nowadays, the concepts of digital library, electronic library are being popularized. Application and development of Information Communication and Technology (ICT) brought a revolution in collection and services provided by libraries. The knowledge that was traditionally kept closed in a book, journal, conference proceedings, research reports, thesis or dissertation etc. has now got an opportunity to break the barriers and reach out to maximum users in minimum time. 'Open Access' has expedited the process of dissemination of information to anyone, anytime and anywhere.

The Open Access movement led to development of Institutional Repositories that emerged as a new strategy in 2002. The leadership of the Massachusetts Institute of Technology (MIT) in the development and deployment of the DSpace institutional repository system http://www.dspace.org/, created in collaboration with the Hewlett Packard Corporation, has been a model pointing the way forward for many other universities.

Information explosion, lack of library budget, space problem, high information demand, increasing subscription amount of journals, have forced the libraries to seek different ways by which one can collect, store and disseminate information among the users. To solve such problems, the concept of Institutional Repositories is developed among the academic institutions all over the world. Institutional repositories contain digitized assets of the institute like books, journals, conference proceedings, theses and dissertations, research reports, datasets, newspaper clippings, datasets etc.

The Open Access movement which started with Budapest Open Access Initiative (BOAI) in 2002 has now spread its wings to almost all developed and developing countries with several National and International Organizations framing Policy Guidelines for development of open access.

1.1.1 Definition of Institutional Repository:

According to Clifford Lynch "a university based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long term preservation where appropriate as well as organization and access or distribution." [1]

Institutional repositories may be made accessible to users locally or globally with or without restrictions. These repositories contain pre-prints/ post-prints of research articles, research reports, conference papers, teaching materials, project reports, doctoral theses and dissertations, datasets resulting from research projects, committee papers, computer software, works of art, photographs, audio/ video recordings, patents, standards etc. The IR may cover content of which copyright is owned by the workforce or the institution or for which permission has been obtained from the publisher to include a copy of the content in the repository. The content of the IR is institutionally bounded, scholarly in nature, cumulative in growth and perpetual in access.

1.1.2 Need for Institutional Repository-

Institutional repository is essential for any organization because of the following reasons-

1. Technological changes.
2. Significant increase in the overall volume of research.
3. Increasing need of archival and access to unpublished information bearing objects.

4. Increasing demand to access knowledge objects from anywhere at any time.
5. Increase in uncertainty over who will handle the preservation archiving of digital scholarly research materials.

1.1.3 Benefits of Institutional Repository-

Kamila (2009)[2] and Thorat & Patil (2011)[3] have identified the benefits of institutional repositories for the user, for the contributor who contributes his/her documents to the repository, for the organization whose faculty members deposit their research work and benefits from library, teaching and learning point of views.

A) For the user

- Easy access, best quality material in original digital format for the users.
- Gray literature, material not easily found through conventional means, will be actively recruited for the repository. This can include material such as working papers, pre-prints, white papers, conference presentations.

B) For the contributor

- Greater citation, digital platform to publish publications, preservation of the publications in digital form, easy to reuse.

C) For the Organization

- The scholarly material produced by the university is available in one place, reflecting the intellectual achievements of the institution, and serving as a valuable marketing tool.
- Documents reflecting the institutional history of the university, both scholarly and non-scholarly, are preserved for future use, much like a traditional archive preserves paper material.
- Material that is not traditionally published is included in the repository, including drafts of unpublished articles or book chapters, unpublished research, student works, learning objects, and creative works.

D) Other Benefits

- Increased visibility to the Library
- Responsiveness to local user needs and preferences
- Showcase and preserve scholarly output and historic documents
- Support teaching and learning
- Provide curatorial stewardship for disorganized and scattered digital materials

An institutional repository contains various documents like books, journals, conference proceedings, research reports, datasets, electronic theses and dissertations, software, newspaper clippings etc. It is built using open source digital repository software like DSpace, EPrints, Greenstone, Fedora etc. Although, there are lot many benefits of depositing research reports/work to repository but due to barriers like copyright infringement, lack of awareness, absence of mandatory policies of deposition of documents in institutional repositories, faculty members/students are still reluctant to contribute to the repository. Repository Administrators face a difficult time in promoting the benefits of repositories, how they help in increasing the citation count of the individual researcher as well as the institution etc.

For implementation of a repository, the institution needs to perform pilot testing of software to be used for building the repository and then finalize the most suitable and user-friendly one depending on various parameters. Trained staff is required for successful implementation and operation of the repository.

Along with other pre-requisites, the institutional repository must have well framed preservation policy in order to preserve the digitized documents, withdrawal policy including the rules for withdrawing items from the repository and copyright policies that inform the researcher/author about his/ her rights after submitting the documents to the repository.

1.2 Significance of the present study:

In the age of information explosion, information gets scattered and is available in various forms. Theses and dissertations are a type of grey literature and the research results produced, remain limited only to the researcher and the department/ university to which the theses or dissertation is submitted. They are one of the forms of primary sources of information which contain detailed, sometimes unexplored information about a particular concept. When the thesis or dissertation is submitted in print format, it becomes difficult for the information contained in it to become accessible and disseminated to outsiders/users throughout the world. In this way, the valuable information of the thesis or dissertation mostly remains unnoticed or unused by anyone.

Many times the user remains unknown about the required information because of lack of resources. Due to increasing rates of subscription of print and non-print journals, escalating prices of books, databases etc. users are depending on quality resources which are available through open access via World Wide Web.

The emergence of Institutional Repositories works as a boon for such users. Also, for the individual institute/ university it becomes the best way in which institutes can digitize the scholarly publication of their faculty members. These repositories contain pre-prints/ post-prints of research articles, research reports, conference papers, teaching materials, project reports, doctoral theses and dissertations, datasets resulting from research projects, committee papers, computer software, works of art, photographs, audio/ video recordings, patents, standards etc.

E-Theses & Dissertations provide a technologically advanced medium with endless multimedia capabilities that far exceed the print and bound copies of theses and dissertations housed traditionally in individual university libraries. A worldwide repository of electronic theses and dissertations (ETDs) could provide worldwide access to the most up-to-date research generated by masters and doctoral students. E-theses repositories is one of the most important types since it enables the user to know the variety of research topics in which research has been

conducted all over the world. Till date (i.e.30.7.2014) 284 E-thesis repositories are registered in Registry of Open Access Repository (ROAR)[4] and 1477 E-thesis Repositories in Directory of Open Access Repositories (OpenDOAR)[5]. With the presence of a huge collection like this, it becomes important to analyze these repositories according to

- country of origin and subject(s) covered
- barriers faced while building the E-thesis repositories
- documents covered other than ETDs
- Software and hardware requirements, file formats included
- Copyright and preservation issues
- Metadata and interoperability standards
- Budget and Human Resource required
- accessibility issues
- time period covered & currency of information
- user opinion
- language

The present research work is important and will be useful for users/information seekers who want detailed information about various aspects of ETDs and E-thesis Repositories. With the help of the web questionnaire tool, researcher will be able to get first-hand information from the repository administrators' right from the initial stages of implementation of E-theses repository to the final stage of self-evaluation of the functioning of repository.

1.3 Statement of Problem:

E-thesis or Electronic Theses and Dissertation (ETD) are digitized format of the print theses or dissertation.Yiotis[6] mentioned theses including dissertations as 'cherished academic genre' of literature for universities holding them. Digital Access to Research Thesis-Europe (DART-Europe)[7] defines Electronic theses and dissertations mentioning the different forms that it may take-

- It may be an electronic version of a recently produced printed thesis. A typical example would be a text-based piece of work produced in Word and converted into PDF.
- It may be a text-based thesis produced some time ago that has been scanned and converted into PDF.
- It may be a digital thesis that includes audio or visual material and it may not even be designed to be read in a traditional linear format. A thesis of this type, which incorporates multimedia as an integral part of the work, may not have a paper equivalent.
- It may be a publication-based thesis which includes only a limited amount of text followed by the bibliographic details of the associated publications (including links to electronic versions of the relevant journal articles etc).

While browsing the literature available on open access and institutional repositories, the researcher found that not much research has been done on electronic theses and dissertations. The literature discussed mostly about open access journals or institutional repositories in general. The available literature on ETDs is scattered and there is not an exhaustive source to provide information on ETDs right from their initial stages of inception till the last stage of evaluation and enhancing the ETD Program. Since, thesis and dissertation is one of the most important types of grey literature and there was not a single doctoral research work found exclusively on this theme, therefore the researcher was motivated to undertake the study of **'E-thesis Repositories in the World: A Critical Analysis'** which will provide authentic information from repository administrators of E-thesis Repositories across the world. Also, the work could result into a comprehensive source of ETD and its related concepts.

1.4 Aims & Objectives of the present study:

The researcher aims to make the present research work a comprehensive source of information covering various aspects of ETD. The research discusses the concept of ETD right from its origin till present status at a global level. The aims and objectives of the present study are divided into various sections according to the

background information, materials deposited, hardware and software requirements, accessibility issues, budget considerations, human resource required, Metadata and interoperability standards, preservation policies and copyright issues of ETDs.

Section A: Background Information of E-Theses Repository

1) To identify time required for planning, pilot testing, final implementation of E-theses repository and to perform other pre-requisites prior to implementation of E-theses repository.
2) To find out the reasons of contributing to E-thesis repositories and identify factors that act as barrier in setting up E-theses Repository.
3) To determine the subject coverage and country wise distribution of E-theses repository.
4) To study the objectives for setting up an E-theses repository and ways of creating awareness amongst institutional members about E-theses repository.

Section B: Repository Materials

5) To identify type of documents (other than ETDs) included in E-theses repository and discover the number of E-theses and other documents (if any) in the repository.
6) To know which file formats are supported by the repository.

Section C: Hardware & Software

7) To find out the software used for setting up E-theses repository, factors influencing the choice of repository software and server connectivity issues of E-theses repositories.

Section D: Ways of Providing Access to ETDs and Usage Monitoring Techniques

8) To identify the ways in which access is provided to E-theses deposited in the repository and to find out the information regarding authorized contributors to the repository.
9) To investigate the various monitoring techniques of use of ETDs and check the usage frequency of ETDs.

Section E: Budget Consideration & Human Resource

10) To explore issues related to budget considerations and human resource management of the E-theses repository.

Section F: Metadata & Interoperability Standards

11) To find out the metadata and interoperability standards of the repository.

Section G: Preservation Policy

12) To enquire about the long term preservation policy and withdrawal policies employed by the E-theses repository.

Section H: Copyright/IPR Issues of E-Theses

13) To explore issues related to Copyright protection/ IPR of E-theses.

Section I: Language Compatibility, Linkages with other ETDs & Currency of Information

14) To find out language compatibility, linkages with other national and international level ETD Projects and frequency of updating the E-theses repository.

1.5 Hypotheses:

1. The maximum number of E-theses repositories in the world is created by the Institutes and Universities of developed countries due to presence of information resources, finance, good infrastructure, research facilities, Information Technology development etc. E.g. United States of America, United Kingdom etc. (Proved in Chapter 5, Q.1d)
2. Maximum number of E-theses repositories is devoted to scientific disciplines compared to social sciences because of majority of research conducted in the stream. (Proved in Chapter 5, Q.1c)
3. Open Access Repositories are on a rise compared to Subscription based due to popular demand of Open Access by research community. (Proved in Chapter 5, Q 21)

4. DSpace is the most widely used open source software package for building institutional repositories. (Proved in Chapter 5, Q 17)

1.6 Scope & Limitations:

The present study provides context to growth, development and management of E-theses repositories in the world covered by The Registry of Open Access Repositories (ROAR) and Directory of Open Access Repositories (OpenDOAR). According to ROAR, the first e-theses repository was developed in 1993 (Biblioteca Digital de Teses e Dissertacoes) and the most recent one, MyTO Portal (Malaysian Theses Online) in 19th June 2014.

Both ROAR and OpenDOAR do not completely represent open access initiatives as they depend on voluntary registration. ROAR also includes archives in testing or development phase which may not be openly accessible. While ROAR can provide a graphical representation of the cumulative growth of records in Indian open access archives over the last few years, OpenDOAR has subject and content type classification potentially useful to librarians.

Some of these were under development or in testing phase and not yet registered with ROAR or OpenDOAR. Others are on intranets and not yet openly accessible.

Limitation of the present study:

The researcher will be considering only those E-thesis repositories whose interface is in English Language and which contain E-theses in English language. Other foreign language E-thesis repositories are not covered for the research study.

1.7 Research Methodology:

Research methodology consists of various procedural steps such as identification of appropriate research method, tools and techniques for data collection and analyzing the collected data.

For the present research, the list of E-thesis repositories available in the world was prepared from Registry of Open Access Repository (ROAR) and Directory of Open Access Repositories (OpenDOAR). Search was also conducted in various search engines especially Google using search statements like 'E-thesis repositories', 'ETD repositories', 'ETD Repository Directory'. Some sites also provided links to other E-thesis repositories in the same country as well as World ETDs. Such URL were visited and checked by the researcher before inclusion in the research study. Various print and non print-articles, conference proceedings, books also helped the researcher to identify few E-theses repository.

The final list of repositories was prepared after checking and deleting the duplicate entries of the e-theses repositories retrieved from various searches. Only such repositories were included in the list whose website was active and which had no broken links. Some of the repositories were found to have shifted from their registered URL in ROAR or OpenDOAR.

The total number of e-theses repositories across the world retrieved till 1st February 2013 is 584, out of which 258 were having their interface in English language and consist of E-theses in English language. The final sample of E-thesis repositories to be considered for present research was prepared using the '*Table for Determining Sample Size from a Given Population'* by Krejcie and Morgan[8] (1970). With reference to the table, for the present Population of 258 repositories, a sample size of 154 E-thesis repositories was selected. From each country, only those E-thesis repositories were selected which had a collection of more than 1000 E-theses.

Only regarding India (being the mother country), out of the 31 repositories which were identified, 27 repositories were found in working condition and were considered for the present research.

Descriptive research methodology was found to be the most appropriate one for the present study. Since the population considered is vast in scope and nature, therefore Survey Technique will be employed using Questionnaire tool. In order to expedite the distribution of questionnaire and to get quick response in minimum possible time, Web Survey Questionnaire was framed using the 'SurveyMonkey Web Survey Questionnaire Tool'[9]. The researcher paid annual subscription of 'Gold Plan' for the SurveyMonkey Questionnaire in order to avail facilities like unlimited questions, unlimited responses, question and answer piping, question randomization or flipping, text analysis for open responses and SPSS integration. The subscription period was from 15th March 2013 to 14th March 2014.

The e-mail ids of Repository Administrators were collected by individually browsing all the 154 E-theses Repository websites. In case, direct e-mail ID of the Repository Administrator was mentioned on the website, then the questionnaire was mailed using the 'Contact Us' option provided in the website. The First mail was sent on 22nd March 2013, First reminder on 29th April 2013, second reminder sent on 24th June 2013, third and last reminder was sent on 2nd August 2013. The reminder mails were posted in the institutional mail ids of the Repository Administrators as well as in the NDLTD listserv Mailing List. The researcher also made calls to E-theses Repository Administrators in India but could not get a positive response. The Research Guide also made calls to some of the Indian repository administrators who then filled in the web questionnaire.

In due course of work, the researcher received lot of support and help from one of the Board of Directors of NDLTD (Networked Digital Library of Theses and Dissertations, USA), Ms.Iryna Kuchma (EIFL Open Access Program Manager) who posted information regarding the research work and promoted the web questionnaire link in the Social Networking Site of NDLTD (Facebook Page of NDLTD). Ms.Kuchma also posted the questionnaire link to 'NDLTD listserv' through which the questionnaire was sent to approximately 500+ NDLTD listserv

members from across the world. Due to the promotion by NDLTD, the researcher could receive response from 28 E-theses repositories. Ms. Kuchma also provided explanation and additional information about some ETD concepts through e-mail.

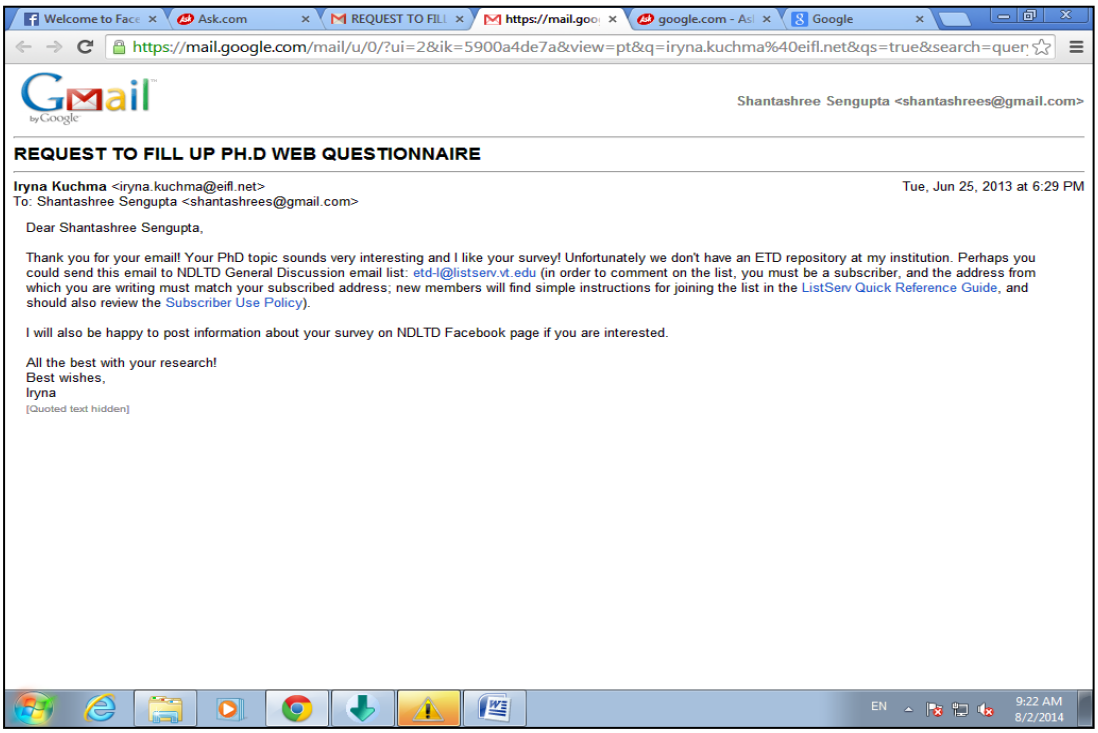

Fig. 1.1: NDLTD Board of Director Member Ms.Iryna Kuchma's Mail informing the Researcher to Join the NDLTD Listserv Group

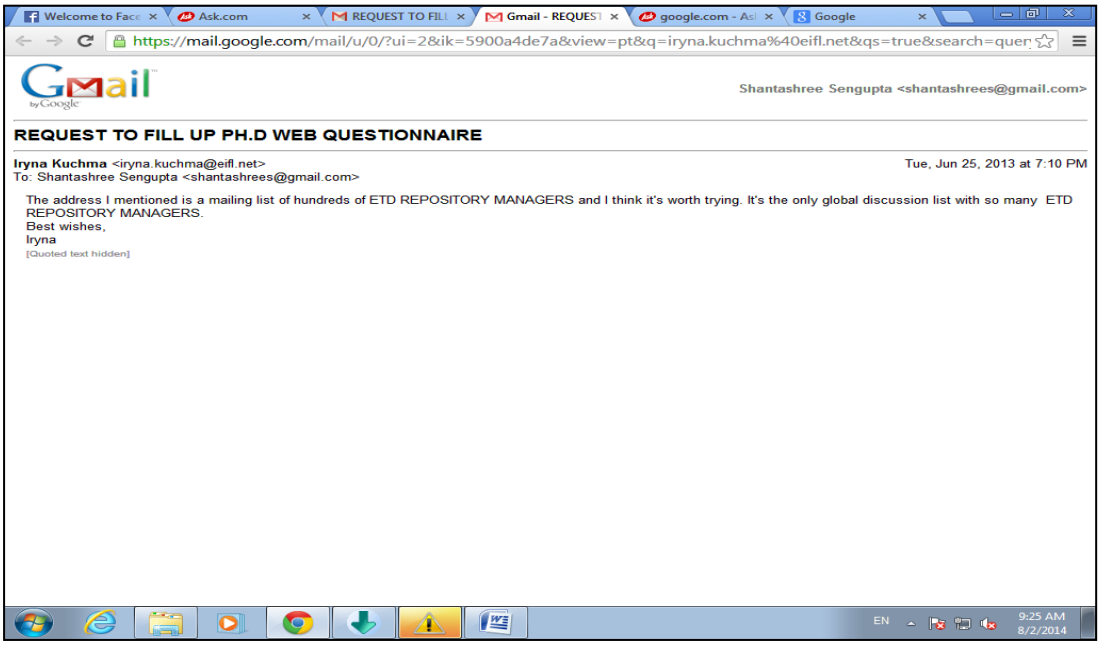

Fig.1.2: NDLTD's Iryna Kuchma's Mail informing about the advantage of joining NDLTD Mailing List

Fig. 1.3: NDLTD Facebook Posting of the Web Questionnaire Link

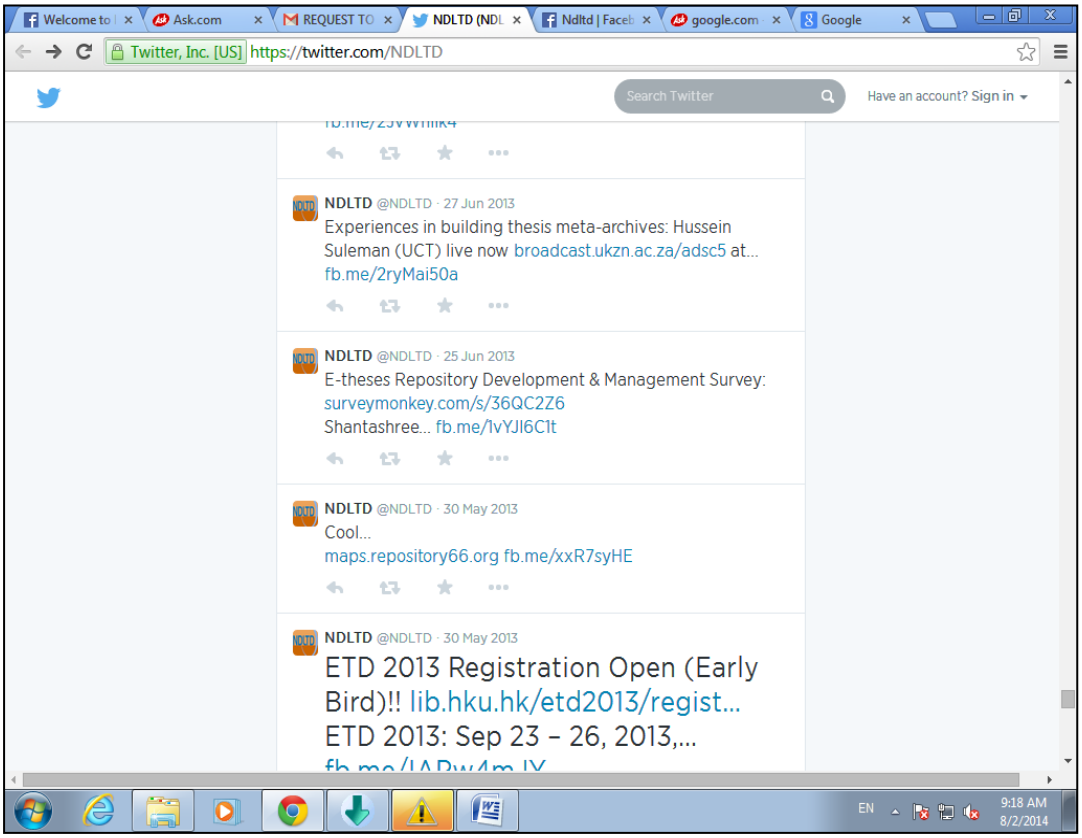

Fig. 1.4: NDLTD Twitter Posting of the Web Questionnaire Link

The last response was received in December 2013. The web questionnaire subscription ended in 14th March 2014 after which it was the web-link was closed. The data analysis and interpretation was conducted by the researcher after March 2014.

The country wise distribution of e-theses repositories is as follows-

Sr.No.	Continent	Country	Total Population of E-thesis	No. of E-thesis Repositories finalised for data collection	Response Received
	Africa				
1		Zimbabwe	01	01	01
2		Kenya	03	03	01
3		Namibia	01	01	01
4		Nigeria	02	01	01
5		South Africa	08	04	04 (01 from NDLTD)
6		Tanzania	01	01	---
7		Ghana	01	01	01
8		Tunisia	---	---	01 (from NDLTD)
9		Senegal	---	---	01 (from NDLTD)
	Asia				
10		Bangladesh	01	01	---
11		Indonesia	06	02	01
12		Republic of Korea	01	01	01
13		Kyrgyzstan	01	01	---
14		Lebanon	01	01	---
15		Malaysia	05	03	02
16		Pakistan	01	01	---
17		Philippines	01	01	---

18		Saudi Arabia	02	02	---
19		Sri Lanka	01	01	---
20		Turkey	01	01	---
21		Nepal	---	---	01(from NDLTD)
22		India	27	27	12 (02 from NDLTD)
	Australasia				
23		Australia	12	05	04
24		New Zealand	05	04	01
	Europe				
25		Belgium	03	03	01
26		Finland	02	02	01
27		France	04	03	01
28		Germany	05	03	01(01 from NDLTD)
29		Hungary	02	02	01
30		Ireland	07	04	04
31		Italy	12	10	03
32		Lithuania	01	01	---
33		Netherlands	06	05	03
34		Norway	04	03	02
35		Slovenia	01	01	---
36		Sweden	08	06	06 (01 from NDLTD)
37		Switzerland	04	03	02
38		United Kingdom	25	14	08 (02 from NDLTD)
39		Spain	---	---	01 (1 from NDLTD)
40		Bulgaria	---	---	01(from NDLTD)
41		Portugal	---	---	01(from NDLTD)

	North America				
42		United States of America	82	27	23 (14 from NDLTD)
43		Canada	10	04	04 (02 from NDLTD)
	TOTAL	**43**	**258**	**154**	**96**

Table 1.1 : Country wise Distribution of E-thesis Repositories

The interpretation of responses received is presented using tables and graphs.

1.8 Chapterization:

The entire research study has been divided into six chapters. The brief content of each chapter has been given below:

Chapter 1: Introduction

This chapter provides general information about open access, institutional repositories, and its benefits for the research community, organization; statement of the problem. The aims and objectives, scope and limitations, significance of present study and research methodology of the study are presented in this chapter.

Chapter 2: Review of Literature

The information published in various forms of literature in global platform related to the present topic of research are collected and discussed in the chapter. The researcher referred various books, print and non-print journals, ProQuest Database, Emerald Database, Science Direct, ERIC and EBSCO databases, conference proceedings, journals in subjects other than library and information science etc.

Chapter 3: Open Access Repositories: A Historical Review

The present chapter details the concept of 'Open Access (OA)' by giving an overview about history of open access, defining it, types of OA, explaining its needs and barriers to open access; needs and barriers are explained as mentioned by SPARC Open access document. The chapter also includes various National and International Policy Guidelines for the development and promotion of Open Access like BOAI, ECHO, Bethesda Statement, Berlin Declaration, Salvador Declaration, UNESCO Guidelines, National OA Policy (India) and National Knowledge Commissions recommendations on Open Access. The advantages of Open Access institutional repositories are also discussed with a sneak preview of commonly used open source software packages for building an institutional repository. Copyright issues related to Open Access are also covered.

Chapter 4: E-Thesis Repositories: An Overview

The present chapter discusses the concept of electronic theses and dissertations in detail by covering the history of ETDs, the benefits and risks involved; NDLTDs 'Standard Set of Metadata Elements'; file formats of ETDs; preservation strategies and copyright issues' brief introduction of fully operational ETD Projects and National and International Level; and NDLTDs Guide to Set up ETD Program. The chapter concludes with a list of commonly used terminologies for ETD system and their meaning.

Chapter 5: Data Analysis and Interpretations

The responses received from the data collected from the Online Survey received from 43 countries are presented and discussed in this chapter. The analysis of the questionnaire has been divided into eleven sections similar to the online questionnaire dealing with personal information of the repository administrator, background information of the implementation of the repository, repository materials, budget, copyright and preservation issues, accessibility issues, metadata, hardware and software requirements etc. Interpretations are done in tabular and graphical manner.

Chapter 6: Findings, Conclusions and Suggestions

In this chapter the research objectives will be verified with the findings of the data collection, conclusions are drawn and appropriate suggestions are given. The chapter concludes with suggestive list of research topics in the field of ETDs on which research may be conducted in future.

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CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction:

Literature Search or Literature Review is an attempt to identify, locate and synthesize completed research reports, articles, books, and other materials about the specific problems of a research topic. It is a chronological presentation of growth and development of literature in a particular field over a period of time. It helps to narrow down the research problem, suggests new approaches to the planning of investigations and assists investigators to develop firmer understandings of theoretical implications. The researcher gets a guideline to formulate and identify the objectives, hypothesis, methods for collection and analysis of data.

The present literature review is grouped in the following manner:

2.2 Review of Literature at International Level

- 2.2.1 Electronic Theses and Dissertations
- 2.2.2 Institutional Repositories
- 2.2.3 Open Access

2.3 Review of Literature at National Level

- 2.3.1 Electronic Theses and Dissertations
- 2.3.2 Institutional Repositories
- 2.3.3 Open Access

The literature review was conducted using the following sources of information. These include Library & Information Science Abstracts (LISA), Library, Information Science & technology Abstracts (LISTA); Popular databases like Emerald, EBSCO, ERIC, ScienceDirect, JSTOR; E-journals like Information Research, Library Philosophy & Practice, Annals of Library & Information

Studies, Chinese Librarianship; Print Journals like DESIDOC Journal of Library & Information Technology, Library Herald, Journal of Indian Library Association; Thesis and Dissertations and various books were also referred. The researcher also referred journals from disciplines other than library and information science. These resources helped the researcher to get in-depth knowledge about the research problem.

The keywords/ search terms used for literature review are Electronic Thesis and Dissertations, ETD Repositories, Open Access, Open Access Initiative, Open Access Repositories, Institutional Repositories, Scholarly Communication, Digital Repositories, Open Source Software, ETD initiatives in the world, ETD initiatives in India, E-resources.

2.2 Review of Literature at International Level:

2.2.1 Electronic Theses and Dissertations (ETDs)

McMillan, G (1996)[1] mentioned the importance of electronic theses and dissertations for graduate school libraries. The author suggests expanding current theses cataloguing and taking advantage of online information prepared by authors so that the bibliographic records provide OPACs with much more valuable information than does traditional theses cataloguing.

McMillan, G (1999)[2] presented findings at Virginia Tech as a case study of shifting book-length works to electronic documents for the global digital library. He explains how the new genre of Electronic theses and dissertations (ETDs) are emerging in part as a result of the work to build the Networked Digital Library of Theses and Dissertations(NDLTD). Virginia Tech began requiring ETDs January 1, 1997 and has since received over 1450.

Sharretts, C., Shieh, J.& French, J (1999)[3] described University of Virginia's attempt of implementing Electronic Theses and Dissertations (ETD). The researcher found that the uniqueness of the ETD lies in the fact that the whole

process was assimilated through the technical skills and intellectual efforts of faculty and students. It creates no extra network load and is fully automatic, from the submission of data, to the conversion into MARC, and the subsequent loading into the Library's online catalogue VIRGO.

Niederer, U., Weigel, U., Gillieron-Garber, M. & Bohler, K (2000)[4] discussed several projects focusing on the perspectives of Swiss university libraries of electronic publishing of theses.

Ubogu, F (2001)[5] overviewed existing African theses and dissertation projects, including the Database of African Theses and Dissertations (DATAD) and the African Universities Dissertations Abstracts (AFUDA) projects. The author also discusses the status of the Rhodes University project and reports responses from other institutions in the region, and makes suggestions for accelerated involvement of tertiary institutions in Africa, especially Southern Africa, in the international network of theses and dissertations.

MacColl, J (2002)[6] explained the importance of Electronic Theses and Dissertations (ETDs) in general and how the ETD movement in UK can be initiated. UTOG, the UK Theses Online Group, which was established several years ago, could not spread the awareness of importance of ETD. The author proposed a plan in order to develop a strategy for the development of ETDs in the UK. The researcher hopes that making submission of ETDs mandatory may be fruitful for the project.

Reich, V (2002)[7] described the LOCKSS (Lots of Copies Keep Stuff Safe) model with respect to history behind its development, design and technology involved and the present status of the model. The author requests Publishers and Librarians to participate in the movement. The article provides detailed information about LOCKSS.

Bakelli, Y and Benrahmoun, S (2003)[8] explored the problem of the long-term conservation and preservation of electronic theses in the Algerian context, and

shows how international recognised standards and techniques for setting up and organising the local ETD's archives may be applied.

Hahsler, M (2003)[9] presented a report on the effort of the library of the Vienna University of Economics and Business Administration to integrate a digital library component for research documents authored at the university into the existing library infrastructure. A project title ePub (electronic publications) was started in June 2001 that aimed to collect and manage the university's research-related documents (PhD theses, working papers, and later on master's theses) in electronic form and to make them available online.

Koulouris, A & Kapidakis, S (2003)[10] examined the disposition policies of Electronic Theses and Dissertations (ETDs) among three institutions: National Documentation Centre of Greece (NDC), Virginia Tech (VT) and West Virginia University (WVU) of USA. The researchers also compared the implemented disposition policies by the three institutions and analysed their similarities and differences. It was found that the ETDs are freely available to onsite and offsite users. Since there was restricted usage of ETDs, they suggested alternative access policies to make them more open and accessible to all.

Andrew, T (2004)[11] discussed the Theses Alive! Project of the Edinburgh University Library to investigate the technological and cultural issues involved for Great Britain higher education institutions wishing to attain electronic theses capability and to initiate a pilot national service through partner institutions as of April 2004.

Beaven, J (2004)[12] emphasized on the importance for U.S. University Libraries to keep low-technology backups of their online thesis collection to prevent problems when formats of books and documents change.

Jones, R (2004)[13] evaluated two open source software packages to deliver E-theses functionality via a Web-based interface ETD-db by Virginia Tech, and DSpace by Hewlett-Packard (HP) and the Massachusetts Institute of Technology

(MIT) and found that DSpace was much ahead of ETD-db. Jones carried out the research in the backdrop of the Theses Alive!Project through which UK institutions can implement their own E-theses or Electronic Theses and Dissertations (ETD) online submission system and repository.

Fineman, Y (2004)[14] stated that ETDs in music are not living up to their potential since the students preparing musical ETDs face additional challenges and problems with the integration of a variety of music formats and software into text documents and with the appropriate use of copyrighted materials. The researcher argues that the advantages of electronic theses and dissertations (ETD) in music are far more than the disadvantages and it's very unfortunate that many people are reluctant to use it.

Yi, J (2004)[15] introduced the China Networked Digital Library of Theses and Dissertations project initiated by the China Academic Library and Information System and current research into related technologies, including metadata standards, OAI metadata harvesting protocol, standard document format and intellectual property protection.

Baty, P (2005)[16] reported the online selling of dissertations that are openly published on university Web sites to students to pass off their work in Great Britain.

Bevan, S (2005)[17] described the issues involved in the introduction of mandatory submission of electronic theses at Cranfield University. The research concluded that there are a number of issues that will need to be addressed from the points of view of librarians, academic staff and registry staff and that one effective method of managing the process is to set up a working group with all stakeholders in the process.

Copeland, S., Penman, A. & Mime, C. (2005)[18] described the key findings of the UK JISC-funded Electronic Theses project that was led by The Robert Gordon University, as well as the results of associated projects that formed part of the

JISC-funded "FAIR" programme, and the way in which the recommendations will be taken forward.

Grant, C (2005)[19] reported the introduction of VALET for ETDs, that will be available freely as open-source software, VALET is a Web submission solution for managing electronic theses and dissertations.

Greig, M (2005)[20] described the strategies that have been adopted by staff at Glasgow University Library in trying to implement electronic theses and the challenge that have been faced. The article also covers the external developments, which may help speed up the transition to electronic theses.

Kushkowski, J (2005)[21] reported on the Web citation behaviour of print and electronic thesis authors at Iowa State and Virginia Tech from 1997 to 2003. It examines the rates of Web citation in economics theses and dissertations between 1997 and 2003. The study suggested that students who are required to publish their theses digitally exhibit citation behaviour that is no different from students who produce their theses in print.

Orphan, S (2005)[22] reported that the U.S. Networked Digital Library of Theses and Dissertations (NDLTD) offer tutorial for graduate students and their faculty advisors. NDLTD provides support for institutions to initiate and sustain their electronic theses and dissertations programs.

Russell, J (2005)[23] provided information on the Electronic Theses Online Service (EThOS) Project in Great Britain. The aim of the project was to open up repositories of theses in British libraries such as the British Library and the National Library of Wales.

Susan, H., Lona, H. & Wolverton, J (2005)[24] conducted survey of selected academic institutions in the U.S. to identify these factors for consideration, and to present an array of potential strategies for successful implementation of ETD initiatives.

Wojtas, O (2005)[25] reported on a project by the Joint Information Systems Committee (JISC), the Consortium of Research Libraries in the British Isles and the British Library to preserve printed and electronic theses and academic dissertations centrally and make them generally accessible.

Atkinson, L (2006)[26] presented the results of a recent University of Calgary Archives project to investigate the replacement of existing theses and dissertations database which is developed using D Space. It was found open source software, WebGenCat is a more sophisticated database than D-Space and it more closely meets the needs of the University Archives in all aspects of its functionality. Also, it provides more appealing display and is user-friendly than D-Space.

Arabito, S. & Asnicar, F (2006)[27] explained 'OpenstarTs-a lean approach' to Electronic Theses & Dissertation publishing included in the project "University and work opportunities in Friuli Venezia Giulia", under a grant from the Italian Department of Education and Higher Education. The OpenstarTs is an action project of The University of Trieste which aims at overcoming the present weaknesses of slow cataloguing, duplication of tasks, lack of space and unfit deposits.

Hoover, L (2006)[28]studied the presence or absence of an abstract, keywords, full-text availability, classification number, and subject headings for citations obtained by the Web-based methods of access, compared the search options, the description of types of information in ETD citations, and the appendix, a webliography of the sites discussed and effective electronic retrieval of agricultural and food information. He studied the Agriculture and Food Related Theses and Dissertations Available on the Web.

Jewell, C., Oldfield, W., & Reeves, S (2006)[29] discussed issues associated with open access (OA) to electronic theses and dissertations (ETDs) and to describe the University of Waterloo E-thesis Project and its partnerships with Theses Canada and the Networked Digital Library of Theses and Dissertations. The

researcher found that Author-created metadata forms the UW E-theses searchable database of records link to theses in full text.

Lowry, C (2006)[30] reflected on intellectual property issues about open access of electronic theses and dissertations (ETD) in the Digital Repository at the University of Maryland. The author believes that tackling disciplinary differences entailed from repository posting or archiving is the right thing to do.

Russell, J (2006)[31] assessed the impact of the new Electronic Theses Online Service (EThOS) on the availability of British doctoral theses. At least 100 British Higher Education Institutions (HEI) were participating in EThOS. All digitised or harvested theses are included in the digital preservation programme of the British Library (BL).

Tonta, Y. & Al, U (2006)[32]analyzed the bibliometric features (the number of pages, completion years, the fields of subject, the number of citations, and their distribution by types of sources and years) of 100 theses and dissertations completed at the Department of Librarianship of Hacettepe University, Turkey between 1974 and 2002. They found that Journal articles get cited more often than monographs and the percentage of citations to electronic publications is on the rise. Findings suggested that there exist a correlation between the number of citations a journal receives and its availability through the university library at the time the dissertation was completed.

Caldwell, T (2007)[33]provided information on the EThOSnet project. The project is intended at digitizing doctoral theses in order to prepare them for the Electronic Theses Online Service in 2009. The prototype of the project was created by the Joint Information Systems Committee and the Consortium of Research Libraries in the British Isles.

Galimberti, P & Vignocchi, M (2007)[34] presented the status of e-theses collections in Italy, focusing on the major drivers for change that contributed to create the basis of a national e-theses provision service able to collaborate with

other international services. Finally, it illustrates the AMS Tesi di Dottorato Bologna University project for open access doctoral e-theses as a case study of a viable integrated system offering added value services.

Paillasard, P., Schopfel, J. & Stock, C. (2007)[35] presented the former French database for print theses 'Téléthèses' that merged with the national academic union catalogue 'Sudoc' (Système Universitaire de DOCumentation), and gives an overview on initiatives for open archives and repositories for electronic theses and dissertations as well as the national program for these documents.

Park, E., Qing, Z. & McKnight, D (2007)[36] explained the set-up of a protocol for electronic thesis and dissertation (ETD) submission for the electronic thesis initiative pilot project at McGill University in Montreal, Canada. It was found that all theses experienced some degree of information loss during the conversion. They found that the software used for ETD submission is DigiTool, which was still being tested for storage, cataloguing, and dissemination capability. For full implementation, three major issues need to be addressed further: conversion; metadata; and file formats.

Park, E., Nam, Y. & Oh, S. (2007)[37] focused on a survey by the National Assembly Library of Korea on management of electronic theses at several university libraries in Korea. The survey found that 91 percent of the libraries are digitizing theses and dissertations, 73 percent had a copyright policy for electronic dissertations, while 46 percent libraries provided access to full-text via the Internet. The researchers recommend standardization of metadata scheme for exchanging information between the member libraries and the implementation of an Integrated Electronic Thesis Dissertation (IETD) system model.

Al Salmi, J (2008)[38] tried to establish the framework for understanding the positive and negative factors affecting the adoption and development of electronic theses and dissertations (ETD) programs with particular reference to the situation in the Arab Gulf States. The author found that technological factors, legal issues and other administrative issues discourage the adoption of ETD

programs. It was found that most issues influencing the adoption and development of ETD programs can be resolved by undertaking appropriate promotional and advocacy activities.

Asner, H & Polani, T (2008)[39] focused on the electronic thesis and dissertation project at the Ben Gurion University of the Negev, Be'erSheva in Israel. They survey the status of the electronictheses and dissertation (ETD) movement in the country as part of the worldwide spread of ETDs outside the U.S., particularly in Europe, Latin America, Australasia, and Asia. The authors also explore the percentages of academic publishers who consider ETD's existence as prior publication of the book or article derived from that thesis.

Fyffe, R & Welburn, W (2008)[40] discussed opportunities for academic libraries concerning the development of repository programs for Electronic Theses and Dissertations (ETDs). They explored benefits for students and universities, including the expressive qualities of ETDs, increased visibility, operational efficiency, and knowledge-sharing, issues for administrative discussion are examined, with particular focus given to copyright management. The article also provides a list of university ETD Web sites.

McCutcheon, S and others (2008)[41] aimed to describe work at Kent State University Libraries and Media Services to promote and devise electronic thesis and dissertation (ETD) storage at OhioLINK's ETD Center, to find efficient methods to represent these unique scholarly materials within the library's catalog, and to foster the establishment of state-wide library catalog standards for ETDs. The researchers devised a semi-automated process that extracts student-supplied metadata already available in the OhioLINK ETD Center to provide almost instantaneous access to unique resources through the library catalog.

Moyle, M (2008)[42] gave an overview of DART-Europe (Digital Access to Research Theses - Europe), its progress and its future plans, with particular reference to the DART-Europe E-theses Portal.

Richardson, W., Srinivasan, V & Fox, E (2008)[43] proposed the design for a scalable, Web Services based tool KDWebS (Knowledge Discovery System based on Web Services), to facilitate automated knowledge discovery in NDLTD. Suber, P (2008)[44] argues for mandating open access (OA) to electronic theses and dissertations (ETDs) since they are the most invisible form of useful literature and the most useful form of invisible literature.

Stock, C (2008)[45] described some tendencies concerning electronic theses and dissertations in Europe as observed during explorations of institutional and other repositories, with specific regard to the full text. In the first part the author examined the changing landscape in repositories where access to the complete full text of a thesis is no longer a unique offer, but partial access, temporary embargoes and bibliographic citations is also found. In the second part, we take a closer look at the language issue of ETDs.

Thomas, K (2008)[46] described several web-based resources that aim to preserve grey literature, which refers to booklets, research reports and PDF documents published in-house by organisations. These include the Electronic Theses Online Service (EThOS) where electronic theses and dissertations held by British institutions can be accessed by users, OpenDOAR which offers a directory of academic open access repositories and OAIster which catalogues digital resources from 900 contributors.

Yiotis, K (2008)[47] introduced the electronic theses and dissertation (ETD) repository as a subset of local institutional digital repositories. The paper discusses the originating institutions and organizations including Virginia Tech Initiative, the Networked Digital Library of Theses and Dissertations, the United Nations Educational, Scientific, and Cultural Organization and the United States Department of Education.

Averkamp, S. & Lee, J. (2009)[48] described the workflow used by the University of Iowa Libraries to populate their institutional repository and their catalogue with the data collected by ProQuest UMI Dissertation Publishing during the

submission of students' theses and dissertations. Re-purposing the metadata from ProQuest allowed the University of Iowa Libraries to streamline the process for ingesting theses and dissertations into their institutional repository. The article includes a discussion of the benefits and limitations of the workflow described.

Boock, M. & Kunda, S (2009)[49] compared past processes and workflows for print theses and dissertations of 2005 with the present workflow for electronic form in Oregon State University Libraries followed in 2007**.** The authors provide the rationale for changes and review the cost- and time-savings produced. They also describe the changing roles of students, technicians, and librarians in the metadata process as well as the value of students describing their own work.

Carbery, A (2009)[50] discussed the electronic dissertations (ETDs) policy implementation on the libraries of Waterford Institute of Technology (WIT) in Ireland. The paper cites that the benefits of having ETDs include better accessibility, faster availability of present research, and searchability. It also discussed the e-thesis mandatory submission, required ETD formats, and access policies. The workflow in the integration of ETD to the collection of library is also outlined.

Deng, S. & Reese, T. (2009)[51] presented methods for customized mapping and metadata transfer from DSpace to Online Computer Library Center (OCLC), which aims to improve Electronic Theses and Dissertations (ETD) work flow at libraries using DSpace to store theses and dissertations by automating the process of generating MARC records from Dublin Core (DC) metadata in DSpace and exporting them to OCLC. The paper discusses how the Shocker Open Access Repository (SOAR) at Wichita State University (WSU) Libraries and ScholarsArchive at Oregon State University (OSU) Libraries harvest theses data from the DSpace platform using the Metadata Harvester in MarcEdit developed by Terry Reese at OSU Libraries. It analyses certain challenges in transformation of harvested data including handling of authorized data, dealing with data ambiguity and string processing.

Fox, E., MacMillan, G. & Srinivasan, V (2009)[52] presented a technique for identifying science, technology, engineering, and mathematics from a large electronic theses and dissertations collection. The article introduces the highly successful Networked Digital Library of Theses and Dissertations (NDLTD) project and demonstrates a semiautomatic approach to topic categorization using the NDLTD's Union Catalog metadata.

Lubas, R (2009)[53] reviewed practices for thesis and dissertation metadata creation with a focus on DSpace instances, best practice recommendations for author-submitted metadata, recommendations for subject analysis, and training for metadata practitioners. The article recommends processes for author submission, metadata quality control and enhancement, and cross walking of the metadata to the library's catalog to maximize discovery.

O'Leary, K (2009)[54] provided information on the Electronic Theses Online Service (EThOS) funded by the Joint Information Systems Committee (JISC), Research Libraries UK (RLUK) and project partners, which aims to make Great Britain lead the international electronic theses provision. The article explores the benefit of EThOS to library staff, institutions and researchers, which are generally about managing and accessing theses at a decreased period of time.

Ribaric, T (2009)[55] presented information on digitization services at the Internet Archive and informs about the method to use software utilities developed by him to automate scanned dissertations and associated Dublin Core XML files to create an Electronic Theses and Dissertations (ETD) Portal using the DSpace platform. The author created an institutional repository at the library of Brock University. DSpace has been used as software platform to create an ETD portal to ingest a collection of dissertations created by the University. The digitization service offered by the Internet Archive provides digital representations of theses.

Russell, J (2009)[56] assessed the impact of the new Electronic Theses Online Service (EThOS) on the availability of British doctoral theses. At least 100 British higher education institutions (HEI) are said to be participating in EThOS.

It notes that the cost of digitising the thesis when it is ordered is shouldered by the HEI that holds it.

Wong, I & Yiu-On, L (2009)[57] discussed and analyzed the efforts of Hong Kong Baptist University Library to create a virtual union catalogue for dissertations and theses collections as a single search platform to retrieve the bibliographic records, abstracts and full-texts of Hong Kong postgraduate students' theses and dissertations from seven university library online public access catalogues (OPACs).

Joint, N. (2009)[58] presented an overview of ETD (electronic thesis and dissertation) collection development trends to date, with an emphasis on the comparative merits of different national models of digital thesis provision. The paper finds that the case for the superior benefits of digital thesis services as opposed to print-only thesis provision has undoubtedly been made.

Lippincott, J & Lynch, C (2010)[59] discussed the electronic thesis and dissertation (ETD) programs for graduate education in the U.S. A brief overview of the history of the development and deployment of ETD programs in U.S. universities and colleges is given, along with their important role in managing paper dissertations.

Ramirez, M. & McMillan, G. (2010)[60] shared several campus approaches to Family Educational Rights and Privacy Act (FERPA) and electronic student work. The Family Educational Rights and Privacy Act (FERPA) and its relevance to student work should be a consideration when widely distributing scholarship like e-portfolios, ETDs, and senior capstone projects. They were surprised to find that very little has been published about FERPA and online student works such as ETDs.

Ratanya, F. (2010)[61] discussed a project that focuses on digitization of theses and dissertations by the Kenya Information Preservation Society (KIPS) and found that KIPS has been compiling the database titled "The Union List of Theses and

Dissertations Held in Universities and Research Institutions in Kenya" since 1999, and as of May 2010, KIPS has already produced three union lists.

Ardalan, R & Feyzbaksh, O (2011)[62] examined the extent of Electronic Theses and Dissertations (ETDs) in Iran. The paper notes that many theses and dissertations submitted in the libraries remain without being referred even once. Electronic publication can make these works accessible to students, researchers, and others who perhaps lack time, search capabilities, or finances. The paper looks at what universities are doing about the problem, and summarizes the current position in Iran university libraries.

Park, E & Richard, M (2011)[63] assessed the metadata element sets of electronic theses and dissertations that are currently used at Canadian academic institutional repositories, and discuss issues related to variations and inconsistencies in Dublin Core data used by participating repositories. The formats and usage patterns of metadata elements at ten participating institutional repositories are identified and analyzed.

Wolverton, R., Hoover, L & Fowler, R (2011)[64] conducted a survey on subject analysis of theses/dissertations in print and electronic formats. Questionnaire was sent to 280 academic libraries classified as Doctorate-granting Universities under the 2007 Carnegie Classification. The survey results indicated that subject analysis was done by a large majority of respondents, with a number of comments expressed about challenges facing current subject-analysis practices.

McCutcheon, S. (2011)[65] mentioned that thousands of theses and dissertations (TDs) that produced each year, it is well worth disseminating them as widely as possible. ETD are used considerably more than print TDs. ETD records created automatically contain errors, omissions, and special characters. Name authority control provides disambiguation of authors with the same name. ETDs with Subject Headings (LCSH) are 30% more retrievable than with keywords alone.

Howard, R.I., & Goldberg, T. (2011)[66] described several stages in a university library's approach to providing access to theses and dissertations, culminating in a decision to use CONTENTdm and its Dublin Core-based metadata along with our ability to provide even wider access in the future through OCLC. The researchers found that electronic open access to theses and dissertations increases their usage; a digital management software package streamlines their management and presentation.

Ivanovic, L., Ivanovic, D., & Surla, D.(2012)[67] discussed the extension of the Current Research Information System (CRIS) at the University of Novi Sad, Republic of Serbia, to incorporate electronic theses and dissertations (ETDs). The ETDs repository can exchange data with CRIS institutional repositories and Networked Digital Library of Theses and Dissertations members. In this way, the international visibility of theses and dissertations created at the University of Novi Sad is enhanced without duplicating data entry in various systems.

MacDonald, J.R.W., & Yule, D. (2012)[68] created a tool named Jarrow for collecting and disseminating theses and dissertations electronically. After reviewing available open-source software for theses submission and open-source institutional repository software, they discussed why and how Jarrow was created and how it works.

Ashman, A.B. (2013)[69] conducted an informal survey on the use of Resource Description and Access (RDA) as a cataloguing method for new electronic theses and dissertations (ETDs) in which the University of Louisville in Kentucky recently adopted. Many academic libraries continue to modify their cataloguing method due to the continuous changes in ETD cataloguing. It also presents several studies in which the 2013 survey was referenced, including the one conducted by Patterson, White, and Whittaker in 1977.

Clobridge, A (2013)[70] presented an overview of the Open Access Theses and Dissertations (OATD) project, an open access discovery tool led by Thomas Dowling of for the Z. Smith Reynolds Library at Wake Forest University, which

assists researchers in gaining access to open access electronic theses and dissertations. A discussion of the mechanism by which OATD works, and of the challenges which researchers often face when attempting to access electronic open access theses and dissertations, is presented.

Ezema , I.J., & Ugwu, C.I. (2013)[71] investigated the current status of electronic theses and dissertation (ETD) projects in Nigerian university libraries. Only three out of the eight universities surveyed have started ETD projects in their libraries. The study also revealed that university libraries in Nigeria stand to benefit immensely from ETD projects. The results of the study also revealed some challenges of ETD in Nigeria. The findings identified strategies to mitigate these challenges.

Hakimjavadi, H., & Masrek, M.N. (2013)[72] evaluated the status of eight interoperability protocols within repositories of electronic theses and dissertations (ETDs) as an introduction to further studies on feasibility of deploying these protocols in upcoming areas of interoperability. This study revealed that, despite its drawbacks, Protocol for Metadata Harvesting (PMH) is still the most utilized interoperability protocol within ETD providers, ETD software developers, and implementers, followed by ATOM and Object Reuse and Exchange (ORE) protocols.

Hawkins, A.R., Kimball, M. & Ives, M. (2013)[73] argued against policies that require students to submit theses and dissertations to electronic institutional repositories. The article counters a variety of arguments often used to justify this practice. It also reports on the results of an examination of electronic thesis and dissertation policies at more than 150 university libraries and graduate schools, offering a system of criteria and scoring for ranking these policies according to their respect for student copyright and intellectual property.

Kravjar, J, & Duskova, M.(2013)[74] analysed the creation and two years' operation of the national corpus of bachelor, master, diploma, dissertation and habilitationtheses of Slovak higher education institutions and the follow-up

plagiarism detection system. The national corpus is called The Central Repository of Theses and Dissertations (CRTD). Each thesis has to be entered in CRTD before defence and it is then checked for plagiarism.

Peponakis, M (2013)[75] argued that metadata of library catalogues can stand autonomously, providing valuable information detached from the resources they point to and, therefore, could be used as data in the context of the Semantic Web. Peponakis presented an analysis of this perception followed by an implementation proposal for a Master's thesis and PhD dissertation repository. The analysis builds on the flexibility of the Resource Description Framework (RDF) and takes into account the Functional Requirements for Bibliographic Records (FRBR) and Functional Requirements for Authority Data (FRAD) in order to reveal the latent academic network by linking its entities to a meaningful and computationally processable set.

Ramirez, M.L., Dalton, J.T., McMillan, G, Read, M & Seamans, N.H.(2013)[76] investigated social sciences, arts, and humanities journal editors' and university press directors' attitudes toward ETDs. The findings indicate that manuscripts that are revisions of openly accessible ETDs are always welcome for submission or are considered on a case-by-case basis by 82.8% of journal editors and 53.7% of university press directors.

Schopfel, J (2013)[77] described the ANRT, its purpose and activity in the French national network for the dissemination and preservation of PhD theses. The paper includes a historical study and an evaluation of current activities and future perspectives. The ANRT has played a significant role in the back-office of the French network for the dissemination and preservation of PhD theses for over 40 years. Its online catalogue contains more than 200,000 PhD theses that academic or other research institutions can order in print format or on microfiche.

Schopfel, J. & Soukouya, M. (2013)[78] presented a project for the digitizing of Ph.D theses of two universities in Togo, and then discussed questions and problems related to the specific conditions of the project, in order to contribute to

the understanding of the dynamics and rich diversity of the open access movement. Many librarians perceive ProQuest's Dissertations and Theses as the key resource for searching dissertations and theses. However, the Online Computer Library Center's (OCLC's) WorldCat also provides a means for locating electronic dissertations and theses.

Procious, A (2014)[79] compared ProQuest and WorldCat and found two key observations. First, both databases provided access to a similar number of citations. Second, WorldCat consistently had twice as many citations for which ProQuest had no records. WorldCat provides an important means of locating electronic theses and dissertations.

2.2.2 Institutional Repositories

Crow, R (2002)[80] presented the SPARC (The Scholarly Publishing & Academic Resources Coalition) Position Paper which examines the Institutional Repositories (IRs) from complementary perspectives of being a central component in reforming scholarly communication by stimulating innovation in a disaggregated publishing structure and by serving as a tangible indicator of an institution's quality, thus increasing its visibility, prestige, and public value. The paper also describes the potential role of IR and explores their impact on major stakeholders in the scholarly communication process.

Lynch, C (2003)[81] described the development of institutional repositories in 2002 that emerged as a new strategy allowing universities to apply serious, systematic leverage to accelerate changes taking place in scholarship and scholarly communication, both moving beyond their historic relatively passive role of supporting established publishers in modernizing scholarly publishing through the licensing of digital content, and also scaling up beyond ad-hoc alliances, partnerships, and support arrangements with a few select faculty pioneers exploring more transformative new uses of the digital medium. The author mentioned cautions to be taken and the future developments to take place for the development of IR.

Warner, S (2003)[82] presented a brief survey of Open Access Initiative e-print repositories and of services using metadata harvested from e-print repositories using the OAI-PMH. The paper also discusses several situations where metadata harvesting may be used to further improve the utility of e-print archives as a component of the scholarly communication infrastructure.

Mackie, M (2004)[83] described some strategies that can be used to help populate an institutional repository. DAEDALUS is a three-year project based at the University of Glasgow funded under the JISC Focus on Access to Institutional Resources (FAIR) Programme. The main focus of the project has been developing institutional repositories to hold content ranging from peer-reviewed published papers to theses and working papers. Separate repositories have been developed for published material and other material.

Thomas, A & Rothery, A (2005)[84] explored how online repositories are being used to store and share e-learning content, and show how taking the user perspective might challenge the emerging approaches to repository development. They found that there is an increase in use of repositories to use and to share online learning and teaching content within and between institutions.

Bayram, O., Atilgan, D. & Arslantekin, S (2006)[85] discussed the issues concerning metadata in Ankara University Open Access Program (AUO). The paper outlines a method for creating a format using Dublin Core (DC) elements of an institutional repository at Ankara University. The researchers discussed how essential elements of metadata repository can be created to simplify the process of submission and repository management of the program.

Herb, U (2006)[86] described PsyDok repository of The Saarland University and State Library, Germany. PsyDok acts as a supraregional, subject specific repository for digital scientific documents and is the central point for free of charge psychological full-text publishing. PsyDok gives scientists an infrastructure for self-archiving and facilitates their walk on the green road to Open Access.

Masako, S. & Shigeki, S (2006)[87]summarised the developments of Hokkaido University Repository right from its launch in early 2004. It is named the Hokkaido University Collection of Scholarly and Academic Papers (HUSCAP).

Feijen, M. and others (2007)[88] presented an outline of the DRIVER (Digital Repository Infrastructure Vision for European Research) Project and its achievements till 2007 in supporting and enhancing digital repository development in Europe. The author concludes mentioning the success of DRIVER I and commencement of DRIVER II by the end of 2007.

Groenewegen**,** D & Treloar, A (2007)[89] described the work of the ARROW Project to meet the requirements of the Research Quality Framework (RQF) to be introduced in 2008. They proposed RQF Model which they aim would provide easy online access to research outputs, as well as promoting an expanding use of repositories within Australian institutions.

Kennan, M (2007)[90] summarised the response to the exploratory survey that was conducted to analyse the rapidly changing research evaluation and funding landscape in Australian universities, specifically in relation to open access and institutional repositories. Results of the survey proved that respondents highly valued peer review.

Koulouris, A and others (2007, 2008)[91, 92] described the challenge, development and pilot implementation of the Institutional Repository (IR) at the National Technical University of Athens (NTUA). They evaluated the IR service pilot period, focusing on the ETD submission process; to refine and improve the above mentioned process and, finally, to promote the concept of self-archiving and open access. Data collection was done by implementing a web-based survey, targeting on the users who submit ETD. A positive user attitude towards the procedure was noted.

Abrizah, A (2009)[93] reported the findings of web-based survey carried out on academics of a research intensive university in Malaysia, investigating their use of

open access repositories, advocacy undertaken, and reasons for contribution or non-contribution to Institutional Repositories (IRs). The findings indicated that faculty who planned to contribute to the IR in the future agreed with of the concept of open access and had a greater altruism in making their work publicly accessible.

Brownlee, R (2009)[94] discussed metadata management and repository service levels and sustainability in University of Sydney Library's Repository.

Melero, R and others (2009)[95] analysed the current state of Spanish open-access institutional repositories and to describe their characteristics. This is the first detailed study of Spanish institutional repositories. The main inhibitors identified were the absence of policies, the lack of integration with other national and international systems and the lack of awareness efforts among academia.

Mondoux, J & Shiri, A (2009)[96] tried to find out whether institutional repositories where implemented in Canadian post-secondary institutions and if they were, then what type of Knowledge Organization Systems (KOS) were incorporated in them. 28 IR in post-secondary institutions using DSpace platform were identified for the research work. The findings suggested that very few IRs had incorporated complex KOS. Also, browsing and searching options were available but user interfaces were not modified to enhance information retrieval.

Koulouris, A. & Anagnostopoulos, A (2010)[97] described theses e-submission tool of National Technical University of Athens. It was found that the tool improved the IR service, which can be certified by the continuing evaluation process.

Koumoutsos, K., Mitrelis, A. & Tsakonas, G (2010)[98] evaluated University of Patras' institutional repository, namely 'Nemertes' which is operating on a DSpace installation and theses and dissertations' collection and is placed at the center of evaluation as the most important collection accommodated in the service. The findings show that users found 'Nemertes' a valuable service despite of all deficiencies found.

Kurtz, M (2010)[99] provided an overview of Dublin Core (DC) and DSpace together with an examination of the institutional repositories of three public research universities. She examined the quality of records with reference to the methods of educating repository users. The findings show that one repository used librarians to oversee the archiving process, while the other two employed two different strategies as part of the self-archiving process.

Mallery, M (2010)[100] briefly summarised the construction and contents of The Association for Library Collections and Technical Services (ALCTS) Institutional Repository of the American Libraries Association.

Puplett, D (2010)[101,102] summarized the proceedings of the Conference on the 'Subject Repositories: European Collaboration in the International Context' held at the British Library, London on 28-29 January 2010. The conference launched Economists Online (EO), an innovative economics subject repository. The author overviewed the existing subject repositories, along with an analysis of the scholarly communications landscape in economics and how the new EO subject repository fits into this environment.

Shoeb, Z (2010)[103] discussed the current practices and issues of access management for digital repositories including user authentications, user authorization, authentication, and the technology of secured digital communication of digital materials. The paper also gives a basic idea about access management practices in Bangladesh by the digital content providers.

Ezema, I.J. (2011)[104] explored the potential of open access institutional repositories (IR) in enhancing the global visibility and impact of Nigerian scholarly publication. While the paper acknowledges several problems that impede the building of open access IR, it equally highlights some necessary requirements for the building of IR with a road map for the development of functional IR in Nigeria.

Fralinger, J. & Bull, J. (2013)[105] identified factors that might affect the international usage of US institutional repositories as part of assessment efforts to determine an IR's return-on-investment. While many IRs reported various rates of international usage, the largest group of respondents did not report an international usage rate for both page hits and downloads, despite overwhelmingly expressing an importance of international traffic to their IR and parent institution.

Armstrong, M (2014)[106] explored management models that institutional repositories can use for research dissemination. The article challenges the existing ideology surrounding institutional repositories and helps frame these services as a core component for fulfilling an important university mission.

Bonilla-Calero, A.W. (2014)[107] analysed the advantages of using an Institutional Repository as a complementary source to evaluate the research output produced by a University. The paper is aimed at researchers and experts that use Web of Knowledge and Scopus services to evaluate research output. It recommends that they consider using Institutional Repositories as an additional, practical and complementary tool to traditional databases.

2.2.3 Open Access

Budapest Open Access Initiative (2002)[108] defined Open Access for the first time and mentioned that removing access barriers to the scholarly literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge.

European Culture Heritage Online (ECHO) Charter (2002)[109] aimed of an electronic representation of the European cultural heritage on the web which will make it more widely available than ever before in its history and thus strengthen its function as a bond of the European community. The basic idea was to establish

an open-source culture of the public and scholarly exploitation of cultural heritage on the Internet.

Bethesda Statement on Open Access Publishing (2003)[110] stimulated discussion within the biomedical research community on how to proceed, as rapidly as possible, to the widely held goal of providing open access to the primary scientific literature.

Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003)[111] was drafted to promote the Internet as a functional instrument for a global scientific knowledge base and human reflection and to specify measures which research policy makers, research institutions, funding agencies, libraries, archives and museums need to consider.

Antelman, K (2004)[112] conducted a research to find out whether open access articles have a greater research impact. The research was conducted on mathematics, electrical and electronic engineering, political science, and philosophy which were chosen with the expectation that they would represent different points on the continuum of open-access adoption. The researcher found that, across all four disciplines, freely available articles had great research impact.

Suber, P (2004)[113] provided detailed introduction to open access (OA) for those who are new to the concept. He explains that, Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions. He further explains two primary vehicles for delivering OA to research articles - OA journals and OA archives or repositories.

De Robbio, A & Coll, I (2005)[114] described technical and organisational characteristics of E-LIS, the International open archive, its configuration and customization, and discusses its policies, aims and mission. The paper also emphasises that the promotion of E-LIS further enhances the OA movement in general, so E-LIS can be regarded as a tool for the dissemination of the OA philosophy.

Bailey, C (2006)[115] studied open access movement from its various aspects like the importance of open access in today's world, initiatives taken for their development, copyright practices and types of open access journal publishers.

Liu, Z. & Wan, G (2007)[116]analyzed the publication trends of scholarly journal articles on open access in the library and information science literature from 2000 to 2005. The authors used the method of content analysis to systematically analyze the selected scholarly articles. A total of 227 articles were selected from the relevant databases and a comprehensive bibliography on open access. It was found that general works, library science journals, viewpoint articles, library professionals, and U.S. authors predominated in the categories under investigation.

Wang, X & Su, C (2007)[117] explained the concept of open access, various Open Access (OA) operational models, and key stakeholders. They interviewed six prominent Chinese scholars and analyzed their perspectives of OA development in China and also evaluated the similarities and differences of OA development by using the developed counties as best practice benchmark. The paper concludes with suggestions and recommendation of improved research methods and questions for future studies.

Bjork, B., Roos, A & Lauri, M (2009)[118] conducted a research to find out the total yearly volume of peer-reviewed scientific journal articles published world-wide as well as the share of these articles available openly on the Web either directly or as copies in e-print repositories.

Canada, D (2009)[119] overviewed open access and its benefits to developing countries for research and educational goals. Canada also discussed specific examples of how the open access movement is making inroads toward greater information access in India, Latin America, and Africa. Findings showed that open access movement is making creating possibilities to provide equal access to knowledge to all countries, regardless of economic status. Canada mentioned that there should be a combined commitment by governments, education and research

institutions, as well as private organizations to provide funding and increase awareness of the open access movement and open access resources.

Stevenson, A (2009)[120] presented a report on the four day Annual Open Repositories Conference held at Georgia Tech in Atlanta over 18-21 May 2009 that addressed developments surrounding the Fedora, DSpace and EPrints systems that occurred over 2008. The author also presented his work on the SWORD (Simple Web-service Offering Repository Deposit) Project which is concerned with lowering the barriers to deposit contributions.

Westra, B., Ramirez, M., Parham, S. & Scaramozzino, J (2010)[121] presented a webliography of materials primarily or solely devoted to medical informatics and social sciences. The webliography covered documents from associations and organizations, directories of data repositories, metadata standards, software and middleware, assessment tools, open access journals and e-mail lists.

Zuccala, A (2010)[122] examined how residents and citizens of The Netherlands perceive open access to acquire preliminary insight into the role it might play in cultivating civic scientific literacy. Open access refers to scientific or scholarly research literature available on the Web to scholars and the general public in free online journals and institutional repositories.

Swan, A (2012)[123] presented the 'Policy Guidelines for the Development and Promotion of Open Access' issued by UNESCO, to demystify the concept of Open Access (OA) and to provide concrete steps on putting relevant policies in place. The overall objective of the Policy Guidelines is to promote Open Access in Member States by facilitating understanding of all relevant issues related to Open Access.

Mavodza, J. (2013)[124] highlighted the open access (OA) initiatives initiated in 2013 in the United Arab Emirates (UAE). The paper finds that the UAE open access initiatives may be the beginning of advances towards encouraging contributing to OA peer-reviewed article publication for enabling knowledge

creation. This paper reinforces many of the concepts being discussed regarding OA initiatives both in the UAE and globally.

2.3 Review of Literature at National Level:

2.3.1 Electronic Theses and Dissertations

Urs, S & Raghavan, K (2001)[125] focused on the Vidyanidhi project started at the University of Mysore in India and sponsored by the National Information System for Science and Technology (NISSAT), which is emerging as a national effort to create, maintain and provide network access to digital library of Indian theses.

Vijayakumar, J & Murthy, T (2001)[126] emphasized the importance of ETDs over their traditional format as they can be easily located, readily accessible and delivered over the web. They discussed the contributions of INFLIBNET towards creating digital library ofETDs and also urged that UGC as the apex body dealing with Indian Universities should release funds for launching ETD project.

Padmavathi, T., Lal, K & Mahakuteshwar, H (2005)[127] discussed an initiative of CFTRI to develop a digital library of theses and dissertations using open source software — Greenstone Digital Library (GSDL). The article also mentions few Digital Library of Electronic Theses and Dissertations (ETDs) projects in USA and India and provides a brief background to the Central Food Technological Research Institute (CFTRI), the objectives of digitization, and some statistics of the digital resources available at the Institute.

Vijayakumar, J., Hosamani, H, & Murthy, T (2005)[128] found that the nation lacks proper implementation of integrated system to locate and access Ph.D theses. 'University News' is the only available current printed listing of Ph.D theses. Still, not all university libraries have collaborated with University News or INFLIBNET to electronically deposit their Ph.D theses.

Vijayakumar, J., Murthy, T., & Khan, M (2004 &2005)[129,130,131,132] analyzed the opinions of selected Ph.D researchers and guides from selected Indian Universities funded under UGC, connected or getting connected to UGC INFONET program on Copyright and IPR issues related to ETDs. On the basis of the output, the papers suggest that Universities can start collecting e-format of theses, creating a digital archive for easy access.

Vijayakumar, J., Murthy, T. & Khan, M (2006)[133] proposed a model digital library using DSpace for Indian universities in order to create their ETDs and provide access either on their Intranet or the Internet.

Das, A., Sen, B & Dutta, C (2007)[134] discussed the policy frameworks, strategic dimensions and analyze SWOT of existing ETD initiatives in India. The researchers explain valuable contribution of UGC Regulations 2005 and National Knowledge Commission's Recommendations 2005 towards open access and ETDs. The study indicates that national ETD initiatives are still in developmental phase where more action plans are needed.

Vijayakumar, J., Murthy, T. & Khan, M (2007)[135] conducted a study to examine the opinion of librarians and research scholars regarding the use of electronic information services to support the accessibility of doctoral theses in India.It was detected through the study that majority of librarians were aware of the concept of electronic theses and dissertations (ETD), but less than half of them supported the concept of making electronic theses available online.

Francis, A., Devi, C & Razzak, C (2007)[136] evaluated development and digitization work of ETD in Kerala Agricultural University & Indian Institute of Spices Research (IISR). The findings suggested that use of ETDs is popular among scientists and researchers.

Ghosh, M (2007)[137] presented a report of the ETD 2007 symposium based on the main theme "Added values to e-theses" and highlight major events of the symposium held at Uppsala library, Sweden, during 13-16 June 2007. It provided

unique opportunity to all the stakeholders of ETDs to explore the collaborative agenda emerged due to the changes in scholarly communication, long-term digital preservation, ETD repository development and open access movement.

Suber, P., Nair, R & Hussain, K (2009)[138] discussed the importance of doctoral dissertations, public fund utilized for their production and need for their open access. They describe the development of Mahatma Gandhi University (MGU) Open Access Digital Archive and how the MGU archives reveal the increasing number of production of doctorates in science and technology.

University Grants Commission, India (2009)[139] provided guidelines for submission of electronic version of theses and dissertations by the researchers in universities with an aim to facilitate open access to Indian theses and dissertation to the academic community world-wide. As per the Regulation, the responsibility of hosting, maintaining and making the digital repository of Indian Electronic Theses and Dissertation (called 'Shodhganga'), accessible to all institutions and universities, is assigned to the INFLIBNET Centre by UGC. Till date there are 4200+ theses submitted to the database.

Sarkar, P. & Mukhopadhyay, P (2010)[140] presented a method of metadata harvesting from different Open Archives Initiative-Protocol for Metadata Harvesting (OAI-PMH) complaint institutional digital repositories containing Electronic Thesis & Dissertations (ETDs). The researchers report designing of a prototype union catalog of ETDs as a single-window search interface to facilitate retrieval of ETDs on global scale.

Swain, D (2010)[141] explored the issue of Electronic Thesis & Dissertation (ETD) initiatives, adoption and subsequent implications from studies carried out in different parts of the world. The researcher found that in spite of production of some doctoral thesis electronically, there is no government initiative for storage and dissemination of ETD, national policies are also lacking. He also mentions that Librarians must take initiative to make progress in this crucial area.

INFLIBNET (2012)[142] introduced “ShodhGangotri” wherein research scholars / research supervisors in universities are requested to deposit electronic version of approved synopsis submitted by research scholars to the universities for registering themselves for the Ph.D programme. The repository reveals the trends and directions of research being conducted in Indian universities; on the other hand it would avoid duplication of research. Synopsis in “ShodhGangotri” would later be mapped to full-text theses in "ShodhGanga". As such, once the full-text thesis is submitted for a synopsis, a link to the full-text theses would be provided from ShodhGangotri to "ShodhGanga".

Lihitkar, S.R. & Lihitkar, R.S. (2014)[143] attempted to find out the institutions that are developing electronic theses and dissertations (ETDs) in India, and to compare the ETDs in India based on a predetermined parameter. In analysis and findings, a detailed report of the analysis of data collection and its subsequent interpretations are given.

2.3.2 Institutional Repositories

Anuradha, K (2005)[144] presented the results of an effort to develop an Institutional Repository of publications of Indian Institute of Science (IISc), Bangalore. The researchers stated that the IR named ‘PRABHAVI’ helps in preserving and archiving IISc researchers locally and also provide wide accessibility and visibility to the IISc research work. The paper reports only the preliminary work which provides access to IISc research work as reported in external sources. The IR creators plan to expand its scope to include internal sources of information.

Alexander, M & Gautam, J (2006)[145] highlighted the Indian initiatives in the field of institutional repositories. Out of 273 universities and institutions of higher learning in India, there are only 15 registered archives. All these archives are registered in the Institutional Archives Registry. The authors conclude that IRs are still in a formative stage in India and the government and funding agencies in

India should insist that publicly funded research be available through institutional repositories that are open to all.

Fernandez, L (2006)[146] evaluated the growth and development of online research repositories in India within the broader framework of open access. Based on participant feedback a list of best practices is presented. The author expects that the study will have definite implications for the role of Canadian librarians in the promotion of Canadian research.

Patel, Y., Vijayakumar, J.& Murthy, T (2006)[147] narrated the practical experiences and provide an overview of INFLIBNET's institutional repository and dArchive-India developed for Indian academic and research community to archive their intellectual work.

Sahu, D. & Parmar, R (2006)[148] discussed the status of open access in India through open access journal publishing, open access archives, open access repositories developed and open access projects going on in India.

Sutradhar, B (2006)[149] described how an institutional repository (IR) was set up, using open source software, at the Indian Institute of Technology (IIT) in Kharagpur. It provided evidence on how to set up an IR and how to create different communities and, under each community, many collections, using the DSpace software. It was found that setting up an IR is very simple but its maintenance is very difficult.

Katariya, S (2007)[150] discussed the concept of Intellectual Repository (IR), its need, importance, benefits, critical issues, major problems in establishment and maintenance of IR, role of librarians, intellectual society, academic and government institutions. The researcher also gives an overview of IR initiative taken in the institutions of higher learning in Indian Scenario.

Doctor, G & Ramachandran, S (2008)[151] explored the creation of a pilot institutional repository at the ICFAI Business School, Ahmedabad and discussed

the results of a survey conducted to ascertain different considerations for implementing an institutional repository and the future scope. The results indicated a positive trend in usage of e-resources and Business Schools in India need promotion about usage of Institutional Repositories which will help them in digitizing research papers, conference papers for knowledge sharing and future use.

Dhiman, A & Sharma, H (2008)[152] described the concept of Institutional Repositories by explaining definition and benefits of IR, most commonly used open source software for IR and they also list 21 important Institutional Repositories in India.

Mittal, R & Mahesh, G (2008)[153] identified and evaluated collections within digital libraries and repositories in India available in public domain. The researchers found that DSpace is the most favorably used open source software for creation of digital repositories. It was found that due to lack of awareness and funds for creation of institutional repositories, their present situation in India is still lagging behind.

Singh, S., Pandita, N. & Dash, S (2008)[154] discussed key issues in establishing and maintaining an open access repository by taking OpenMED@NIC as a case. The researchers suggest that once the repository is established, it requires spreading awareness among academic and scientific community about various benefits of open access self-archiving.

Ghosh, M (2009)[155] examined the developments in ETD repositories, in particular PhD thesis repositories, in India. The purpose is to perform a preliminary study and explore the possibilities for creating a national repository for the deposit, discovery, use and long-term care of research theses in an open access environment. The survey revealed that digital preservation of theses and dissertations is already in progress, though some of them are still in a preliminary stage.

Lihitkar, S., Lihitkar, R & Agashe, A (2009)[156] studied the Indian scenario in developing the institutional repositories. Total 33 institutional repositories were identified which were analyzed on criteria like software used, size of the items, contents included, languages, description and country. Findings suggested that DSpace and EPrints are commonly used open source software for institutional repositories. IGNOU posted the maximum number of items and Science and Technology items are maximum in India.

Sawant, S (2009)[157] studied the Indian efforts towards open access movement with special reference to institutional repositories. She examined institutional repositories developed in India from two perspectives: IR Development and Management and Users of institutions having IR.

Wani, Z., Gul, S & Rah, J (2009)[158] overviewed the development of open access repositories registered with OpenDOAR database. The researchers study the OARs in terms of country, subjects archived, language diversity, operational status, software used and various types of OARs. The study also emphasizes into the Asian contribution and brings into light detailed profile of Asia.

Gopakumar, V and Baradol, A (2010)[159] discussed the changes that open access and institutional repositories have brought in the scholarly publishing scenario at the international level and their impact on libraries and librarianship.

Gutam, S., Mishra, A., Pandey, P. & Hariharan, C (2010)[160] discussed the growth of open access repositories in the country. The data collected from the Registry of Open Access Repositories (ROAR) and Internet suggests that there is a remarkable growth of open access repositories since 2004 after taking call from Budapest Open Access Initiative and Berlin declaration. They identified 68 open access repositories from India, out of which 11, were listed in the top 800 repositories of the web of world repositories. The researchers concluded that even in the absence of any national open access policy, the institutions, academies and scholars have contributed to the open access movement in India.

Kumar, V and Chitra, S (2010)[161] discussed Open Content Licences (OCL) in the digital content distribution. Some popular OCL are also mentioned. The paper concludes mentioning that more business models should be introduced for open content distribution to attract more content development.

Thaker, U & Oza, N (2010)[162] described Institutional Repository as an indispensable tool for knowledge management process. The researchers re-established Dr.S.R.Ranganathan's philosophy of knowledge generation, evaluation and utilization especially of nascent micro thoughts and its mechanisms in contemporary digital arena.

Beena, C & Archana, N (2011)[163] described the real time experience of managing and sharing of intellectual wealth of academia of Cochin University of Science &Technology (CUSAT) by using open source platforms. The researchers explore different intellectual information resources in the current era and also aim to suggest cost effective strategy of implementing new open access tools and technology for effective managing of intellectual informatics.

Mukherjee, B and Nazim, M (2011)[164] analyzed the present trend of institutional archives worldwide. The factual data of each individual repository was collected from various Directories of Institutional Repositories using survey method. Data was analyzed in terms of quantity of institutional archives increased during 2006 to 2010, country-wise contents of institutional archives, host domains, and policy of institutional archives. The results of the study suggest health growth in terms of quantity of institutional archives' increase worldwide. The researcher also found that the development is more prevalent in developed countries than in developing countries.

Krishnamurthy, M & Kemparaju, T (2011)[165] studied the Institutional Repositories (IRs) in use in Indian Universities and research institutes. The twenty repositories studied covered collections of diverse types. The researchers found that in spite of presence of various elite institutions in India, the growth of

institutional repositories in Indian Universities has not been of the desired level, the institutions lack expertise and resources required to set up IRs.

Kumar, S, Singh, S & Karisiddappa, C.R. (2011)[166] identified two major roles of institutional repositories. The first role is of 'a catalyst' since it helps in reforming scholarly communication and second one is 'enhancing visibility of research and prestige of the organization by preserving the intellectual resources of the institutes.' The authors have an attempt to explore institutional repositories from these two major perspectives and to study the various roles played by the stake holders in reforming scholarly communication process.

Sawant, S (2011)[167] studied various issues concerning the institutional repository software involved in development of IRs in India. The research findings showed that 79% of IRs used DSpace Software. End-user interface was found to be the top ranking IR system feature. She also found that in India many institutions conduct workshops to train library professionals and non-professionals to develop IR using DSpace.

Bhat, M.H. (2014)[168] explored various types of research materials in Indian institutional repositories. The study revealed that barring a few repositories the collections of most of the repositories are very low. The percentage of archived materials is high for journal papers, and moderate for conference papers/thesis. However findings also show that percentage of archiving is very low for preprints/working papers, teaching resources and patents.

2.3.3 Open Access

Koganuramath, M & Angadi, M (2003)[169] presented the functional components of the Tata Institute of Social Sciences (TISS) Digital Library have been presented as a model for the information services of the library. The digitisation activities and procedures are also discussed.

Rajashekhar, T (2004)[170] discussed two components of open access publishing in Indian context. The first focuses on the relevance of open access publishing in developing countries, the potential for open access publishing in India and a few current open access initiatives in India. The second component proposes a possible technical model to organise open access publishing in India.

Chandra, H (2005)[171] discussed the importance, objectives and major developments in open access initiative. He further examined the specific use of digital information services including the digital reference service mentioning that there is a strong need in our country to understand and implement the Open Access Initiative. The researcher also highlights various steps taken regarding developing open access system at the Central Library of IIT Madras.

Das, A., Sen, B & Dutta, C (2005)[172] explored the digital libraries projects and initiatives in India that can be helpful to the distant and open learners.

Kumari, L (2005)[173] outlined international efforts of strong research and development base in both the governmental and private sectors in all areas of science and technology with a special focus on Indian Universities. The researcher found that in India there is a wide gap in urban and rural attitude. Also, efforts of open archives and open access initiatives have to be consolidated and have a long way to go.

Ghosh, S & Das, A (2006)[174] provided information about the present state of open access literature by various Indian institutions. The study is conducted by bifurcating the open access initiative according to Institutional Repositories, Open access journals, Metadata Harvesting Services and Open Courseware. The results indicated that providing global access to local research is a challenge in India. Also, the usage statistics of some repositories show that the researchers of developed nations are accessing the Indian literature available in the open access journals and archives.

Hirwade, M & Hirwade, A (2006)[175] described metadata, Open Access Initiative Protocol for Metadata Harvesting (OAI-PMH) and major Metadata Harvesting services in India.

Hirwade, M & Mahajan, K (2006)[176] studied creation and maintenance of E-LIS, a famous international disciplinary archive in Library & Information Science, was studied. The study also included content analysis of E-LIS. Majority of information is created in digital form. Using metadata to record data about information sources allows an initial assessment of compatibility and provides an avenue for exchanging information between systems.

Hirwade, M & Rajyalakshmi, D (2006)[177] outlined the features of open access, open access journals and open access archives. Few open access initiatives are described in detail. The researchers found that national level efforts are essential to promote and co-ordinate open access publishing systems. Research councils like CSIR & UGC should take initiatives towards self-archiving of results of all research.

Workshop on Open Access and Electronic Publishing, Bangalore (2006)[178] brought together policy makers and research scientists from major developing countries to frame National Open Access Policy for Developing Countries on the lines of BOAI and other world conventions on open access.

Arunachalam, S (2008)[179] discussed two ways of achieving open access (OA) and argues that sharing knowledge and building partnerships have been recognized as the best and most optimal means of creating and benefiting from knowledge. It focuses on various fronts where OA is making good progress, and also deliberates on issues like OA endeavors in India, OA and sustainable development and what needs to be done in India to promote OA activities.

Lone, F., Rather, R and Shah, G (2008)[180] evaluated the initiatives taken by India to make the intellectual output accessible for all by publishing them in Open Access resources and by archiving them in open access archives or repositories.

The results revealed that India is continuously contributing in Open Access literature as some of the premier institutions, particularly in the science and technology area, are providing Open Access to their research publications. The position of India in terms of number of journals in the Directory of Open Access Journals (DOAJ) is 7th, well ahead of countries such as China, Australia, and Japan and is sharing 10th position with the Sweden and Spain in Directory of Open Access Repositories (OpenDOAR) in terms of number of repositories in the world.

Sathyanarayana, N (2008)[181] highlighted Open Access Initiative (OAI), its formal origin at the Budapest meeting which was organized by the Open Society Institute, and its aims to make published scholarly content freely available on the Web with an intent that the Web would make it easy to access. It also discusses the J-Gate and Open J-Gate open access databases and their salient features.

Swan, A (2008)[182] focused on how open access can help resolve the problems of maximizing the visibility, and thus the uptake and use, of Indian research outputs. The mechanisms to provide open access to scholarly communications, impediments to Open Access in India, and how self-archiving can provide a boost to open access movement has been highlighted in this document. The author argues that it is important to emphasize that only mandatory policies work well.

Sawant, S (2009)[183] gathered data related to open access journal initiatives in India with respect to its type, funding agency/host organization, full text availability, article charges etc. Results show that all 178 open access journals were peer reviewed, indexed and abstracted in various indexing and abstracting services, listed with DOAR and Open J-Gate.

Senthilkumar, R & Krishnamoorthy, E (2009)[184] mentioned open access system as one of the best practices to be implemented in library and information centre especially in college and university libraries. The authors believe that implementation of open access system enables users to use the library without any hesitation and with full liberty.

Bhat, M (2010)[185] discussed open access repositories from aspects like Open Access advocacy, apprehensions about Open Access policies, case studies throughout the world regarding implementation and development of IRs, copyright and preservation issues about open access.

Chakraborty, S (2010)[186] stated various advantages of open access by listing major open access publishers in India and at international level. She also analyzed Directory of Open Access Journals (DOAJ).

Ghosh, M (2011)[187] reviewed some of the current literature and discusses some ways to advocate for open access (OA) programs adopted by libraries in various institutions. This overview provides a list of relevant literature in the area of library advocacy, with regard to the on-going needs of OA repositories. The article also includes a note on Open Access Initiatives in India.

Singh, D & Ramesh (2011)[188] identified Open Access Scholarly resources worldwide and also delineates their services. The paper is useful to both scientific community and LIS professionals to reap benefits from the vast open access resources.

Mishra, S (2012)[189] described the scholarly communication process and the history and developments of scholarly publishing with special reference to journal publishing. The author recommends adoption of open access to scientific information and research, open peer review, open educational resources and social media in the scholarly communication process which will help not only increase access to scholarly information, but also increase communication amongst scholars and students.

Hemantha Kumar, G (2012)[190] and others evaluated the initiatives taken by India to make intellectual output accessible for all by publishing them in open access resources like open access journals and repositories. The results revealed that India is continuously contributing in open access literature as some of the premier institutions, particularly in the agriculture sciences. The position of India in terms

of number of journals in the Directory of Open Access Journals (DOAJ) is 5th and in Directory of Open Access Repositories (OpenDOAR) India has 11th place in the world repository.

Sahu, S.K. & Arya, S.K. (2013)[191] analyzed the awareness of open access publishing among researchers and faculty members of Indian institutions, and to evaluate the development of open access initiatives in India. The results showed that India's contribution has increased in the last few years. It was found that the awareness about such open access information sources and initiatives among the research community is increasing.

Sawant, S. (2013)[192] compiled open access resources in library and information science (LIS) and their usefulness in the LIS teaching and learning process. The paper is the first study to report various forms of open access literature in library science subject area.

2.4 Summary

The present chapter discusses the literature available in various forms on electronic theses and dissertations, open access, institutional repositories and its related concepts. Variety of print and non-print sources of information, databases, journals, conference proceedings etc are accessed in order to get clear idea of concepts embedded in the ETD Program and the major initiatives in the field of ETD which led to their growth and development in worldwide manner.

The major trend observed in the international literature emphasized on importance of ETDs in academic libraries, world wide open access initiatives, overview of country specific ETD Projects, copyright and preservation issues related to ETDs, selection of software and Policy Guidelines framed by international organizations.

Trend observed in ETD literature published in India highlight on contribution of UGC, NKC and INFLIBNET towards Open Access and ETDs, selection of

software, copyright and IPR issues, developments in open access initiative in India and development of ETD projects in various institutions across India.
Literature Search is a continuous process, since almost every day new information is being published or put on the Internet giving nascent piece of information on ETD/Open Access/Institutional Repositories.

The next chapter overviews Open Access Repositories by presenting its historical background, benefits, types, national and international policy guidelines framed, open source software packages and copyright issues.

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CHAPTER 3

OPEN ACCESS REPOSITORIES: A HISTORICAL REVIEW

3.1 Introduction:

Internet with the help of harvesting techniques and search engines makes it possible for the user to discover publications of relevance if they are deposited in Open Access Repositories. Open access pattern was mainly developed in order to remove the barrier between information produced and the clientele of information. Open Access (OA) means that electronic scholarly articles can be accessed anywhere, anytime, by anyone without the limitations of time and space. OA facilitates increase in citations and flow of ideas by widespread dissemination of electronic documents that was not possible so easily with the print formats. It helps in international intellectual collaboration of ideas, knowledge and information.

3.2 History of Open Access (OA):

Simeon Warner[1]in his presentation during symposium on "Free Culture and the Digital Library" in October 2005 traced back the history of open access to the beginning of arXiv, the first major pre-print archive in 1990s. This archive initially aimed to facilitate the sharing of pre-print articles between scholars in the high-energy theoretical physics community, expanded to subjects including mathematics, computer science and quantitative biology, as well as many other branches of physics. Email was the most common technique used to distribute pre-prints of articles between interested scholars and research groups, but arXiv provided a place where these pre-prints could be deposited, organised and subsequently disclosed to the wider community. Originally both deposit and distribution was also by email, though this was quickly followed by ftp and not long after by Web interfaced to support this interaction. arXiv proved that

Internet and the Web can be used to disseminate scholarly communication in various ways.

As mentioned by Chris Awre[2], "the success of arXiv stimulated similar activity in other subject fields like CogPrints, covering psychology, linguistics, neuroscience and computer science; RePEc, focused on economics; and the NDLTD, addressing the disclosure of theses and dissertations. The increasing number proved that it would be valuable for open access archives to cooperate to enable easier access across them by researchers and others wishing to access their contents. In October 1999 a meeting in Santa Fe, USA led to the Santa Fe Convention of the Open Archives Initiative, subsequently renamed the Open Archives Initiative (OAI) and its Protocol for Metadata Harvesting (OAI-PMH), now at version 2.0. The Initiative is a series of organisational principles and technical specifications to facilitate a level of interoperability between e-print archives. The underlying mechanism to enable interoperability is metadata harvesting, where metadata from different e-print archives can be harvested into a central service or services that can then be searched independently."

3.3 What is Open Access (OA):

a) Stevan Harnad, world's most famous Open Access Advocates states that "Open Access(OA) is free, immediate, permanent online access to the full text of research articles for anyone, webwide."[3]

b) The Scholarly Publishing and Academic Resources Coalition (SPARC) further extended Harnad's definition as "Open Access means free, immediate, availability on the public internet of those works which scholars give to the world without expectation of payment-permitting any user to read, download, copy, distribute, print, search or link to the full text of these articles, crawl them for indexing, pass them as data to software or use them for any other lawful purpose."[4] The definition of Open Access by SPARC explains the meaning of OA by covering various aspects of OA.

3.4 Types of Open Access:

According to Keith Jeffery[5], OA can be delivered in two ways:

- '*green*': the author can self-archive at the time of submission of the publication (the 'green' route) whether the publication is grey literature (usually internal non-peer-reviewed), a peer-reviewed journal publication, a peer-reviewed conference proceedings paper or a monograph

- '*gold*': the author or author institution can pay a fee to the publisher at publication time, the publisher thereafter making the material available 'free' at the point of access (the 'gold' route). The two are not, of course, incompatible and can co-exist.

The 'green' route makes publications available freely in parallel with any publication system but is not, itself, publishing. The 'gold' route is one example of electronic publishing. At present it is much more common to have non-OA electronic access to publications in a publisher's database for a subscription fee.
The second dimension to be distinguished is the timing and quality aspect: preprints are pre-peer-review articles, post-prints are post-peer-review and post-publication articles while eprints can be either but in electronic form.

A third dimension is white/grey literature. White literature is peer-reviewed, published articles while grey is preprints or internal 'know-how' material.

3.5 Benefits of Open Access:

According to Budapest Open Access Initiative[6] (2001) “removing access barriers will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge.”

The benefits of open access can be studied according to the various components which will be beneficial by opting for Open Access regarding the documents. The major components of an Open Access System are Researchers (whose articles, ETDs, pre-prints, post-prints etc. are disseminated through open access), Educational Institutions (Institutions who opt for putting their organisational resources for open access), Business (organisations who work in the process of providing open access), Public and Research Funders (Institutions/ organisations who fund research work).

3.5.1 SPARC explained the benefits of Open Access including all the five beneficiaries of Open Access[7]-

a) *Researchers*

- Increases readers' ability to find use relevant literature
- Increases the visibility, readership and impact of author's works
- Creates new avenues for discovery in digital environment
- Enhances interdisciplinary research
- Accelerates the pace of research, discovery and innovation

b) *Educational Institutions*

- Contributes to core mission of advancing knowledge
- Democratizes access across all institutions-regardless of size or budget
- Provides previously unattainable access to colleges and schools
- Provides access to crucial Science, technology, Engineering and Management materials
- Increases competitiveness of academic institutions and students
- Contributes to a better educated work force

c) *Business*

- Access to cutting edge research encourages innovation
- Stimulates new ideas, new services, new products
- Creates new opportunities for job creation

d) *Public*

- Provides access to previously unavailable materials relating to health, energy, environment and other areas of broad interest
- Creates better educated population

- Encourages support of scientific enterprise and engagement in citizen science

e) *Research Funders*

- Leverages return on research investment
- Creates tool to manage research portfolio
- Avoids funding duplicative research
- Creates transparency
- Encourages greater interaction with results of funded research

3.5.2 Benefits of Open Access-SPARC Europe

SPARC Europe[8] which is a membership organization for European research libraries and research organizations also mentioned the benefits of Open Access or No Restricted Access to research and data by discussing it from the point of view of various stakeholders in the system of scholarly communication.

1) *Researchers as authors*: immediate visibility for research output and thus increased visibility and usage of their results. Open Access may even lead to an increase of impact.
2) *Researchers looking for information*: access to literature everywhere, not only from a campus but also from any site with Wi-Fi access.
3) *Funding agencies*: increased return on investment (ROI), increased visibility.
4) *Universities & research institutes*: greater visibility, clearer management information.
5) *Libraries*: increased access for target audience, financially a more attractive model than the current subscription model.
6) *Teachers & students*: unrestricted access to material, enriched education, allowing equality of learning in poor as well as in rich nations.
7) *Science*: enhanced and accelerated research cycle.
8) *Citizens & society*: access to knowledge / access to the results of publicly funded research.
9) *Enterprises*: access to critical information.
10) *Publishers:* transparent business model, ultimate online article distribution, ultimate visibility for articles.

3.5.3 UNESCO's Policy Guidelines for the Development and Promotion of Open Access (2012)

UNESCO's Policy Guidelines provides basic explanation of Open Access and related policies. It mentioned the following benefits of Open Access [9]:

- Open Access improves the speed, efficiency and efficacy of research
- Open Access is an enabling factor in interdisciplinary research
- Open Access enables computation upon the research literature
- Open Access increases the visibility, usage and impact of research
- Open Access allows the professional, practitioner and business communities, and the interested public, to benefit from research

3.5.4 The National Open Access Policy for Developing Countries- Bangalore, India

The Policy discusses the benefits of open access from the Researcher and Country's point of view whose researchers submit their documents for open access.[10]

A) Benefits of Open Access to (Country's Name):

- **[**Country-name's] research will be more accessible to global researchers, hence better known and more widely used and cited. The prestige of [country-name] researchers will increase significantly.
- All [country-name] research will be open to all [country-name] entrepreneurs and the general public with Internet access. This will be beneficial both commercially and culturally.
- Access, usage and citation data on this research will increasingly become available for analysis to help shape researchers', institutions' and nations' strategies and policies.

B) Benefits of Open Access to Researcher:

- As ***authors*****,** researchers benefit because their research papers are given a much wider dissemination and can be read without restriction by anyone with Internet access. This increases the impact of their research. Indeed,

evidence is accumulating to show that open access articles are cited 25-250% more than non-open access articles from the same journal and year.

- As ***readers*****,** researchers benefit because they will increasingly be able to access and use the full text of all the research published in their area, not just the research available to them via the subscriptions their institution can afford. This is particularly important where neighbouring countries share common problems and need to collaborate in their research effort.

3.5.5 Benefits of Open Access by Alma Swan

Alma Swan[11] identified the advantages of Open Access based on the results obtained from tests being conducted to identify the Open Access Citation Advantage for increasing the visibility, findability, accessibility of research articles in the following ways:

a) A ***General OA advantage:*** The advantage that comes from citable articles becoming available to audiences that had not had access to them before, and who would find them citable.
b) An ***Early Advantage:*** the earlier an article is put before its worldwide potential audience may affect subsequent citation patterns
c) A ***Selection Bias***: authors make their better articles Open Access more readily than their poorer articles.
d) A ***Quality Advantage***: better articles gain more from the General OA Advantage because they are by definition more citable than poorer articles.

3.6 Barriers to Open Access:

In spite of various benefits experienced by the researchers and institutions from open access, there are many researchers and institutions that are reluctant to deposit their documents for open access. Advocates of open access have studied the barriers that create unwillingness of researchers/ institutions to submit their research work and other documents for open access.

Keith Jeffery[12] identified two major barriers to open access-

- *Loss of publisher income:* The major objection to 'green' self-archiving comes from publishers and learned societies (many of which depend on subscriptions to their publications) who fear that 'green' OA threatens their business viability. To date there is no evidence that 'green' archiving harms the business model of publishing. There is evidence that 'green' archiving increases utilisation, citation and impact of a publication. Whilst the major commercial publishers provide additional value-added services that could offset the impact of OA on current business models, the impact on learned societies may require new business models to be developed.

- *Copyright:* Copyright agreements between authors and publishers may inhibit the 'green' route. However, to date, between 80 and 90% of publication channels (the variability depends on exactly what is counted) allow 'green' author deposit although some insist on an embargo period before the publication is available for OA. In contrast some publishers of journals - of which 'Nature' is the most well-known - do not demand copyright from the author but merely a licence to publish, leaving copyright with the author or their institution.

Mathias Klang[13] (2009) conducted action research in Lund University, Sweden to explore the barriers to open access to scientific research output in Sweden. The action research was conducted by interviewing Librarians of nine University Librarians of Sweden. The interviews reflected different areas of concern which can be divided into the following groups:

1) Copyright Concerns
2) Research Culture
3) Administrative Concerns
4) University Context
5) Legal Culture
6) Information Needs

1) *Copyright Concerns:*

All the interviewees identified copyright as a major source of concernin their everyday work. The main source of trouble was the lack of information about the copyright and copyright licenses and their interpretation in everyday working of library. The concern with copyright was more serious among the libraries that had a larger amount of researchers and a well-functioning self-archiving system. However, even the smaller universities expressed concern with the complexities of copyright in relation to their everyday work.

Some of the universities also expressed concerns that they did not have access to sources of legal advice. Libraries without access to university legal departments felt that the lack of such a function was an important flaw in the organisation in relation to copyright. Libraries with access to university legal departments felt that these departments tended not to resolve the issues at hand and felt a need for a more specialized legal position dedicated towards copyright.

2) *Research Culture:*

The interviewees also informed about the preference of researchers to publish their research work in traditional journals rather than opting for open access. The interviewees also mentioned that the researchers used to get convinced after all the benefits of open access were explained to them. But it was difficult to reach out to the researchers since information sent via e-mail was highly ignored. Personal meetings or group meetings were much useful to make understand the benefits of open access.

3) *Administrative Concerns:*

Major administrative concerns identified were to motivate researchers to deposit their research work in open access system. Also, it was found that wherever data was not input my librarian, lot of errors used to take place in the metadata stage. The final administrative concern was with archiving the publications that contained copyrighted material.

4) *University Context*:

The differences in size, age, organization, and culture of the universities all affected the way in which the adoption of open access was proceeding at the different universities. All these factors affect the way in which the university can demand action from its researchers and the way in which the researchers will react towards the demands.

5) *Legal Culture*:

Universities without access to legal departments felt that they had no one to understand their needs however universities with legal departments said that no one could ever understand the library need and importance of copyright from the point of view of library. In most cases, the universities have a reliance on the copyright licenses entered into between the university and the researcher guaranteeing that the researcher has the right to archive and that all copyrightable material in the publication is there with permission. However in some cases the legal administration of these licenses is carried to such extremes that open access is possible in theory but in practice it is difficult to implement

6) *Information Needs*:

Many of the interviewees felt that the resources allocated towards open access were adequate. What was missing was reaching researchers and administrators with more information. It was felt that this information in itself would convince the readers that open access was a worthwhile activity.

These informational needs could be broken down into different types of information. Many interviewees felt that a copyright helpdesk was necessary; others felt that additional documentation was required to educate both librarians and researchers. Many pointed to the lack of courses and seminars that needed to be held in this area.

From the above mentioned barriers as figured out and explained by Jeffery and Klang, it can be seen that Copyright Issue is one of the major and most important factor causing barrier in depositing and disseminating scholarly information through open access. Researchers and institutions are very concerned about the

copyright infringement that takes place when the document is distributed through open access. Also, researchers especially in social sciences prefer publications in traditional print journals rather than opting for open access electronic journal. In order to prevent the infringement, plagiarism software can be deployed which will detect the unauthorized usage of research work.

3.7 Efforts towards Open Access Initiative (OAI):

3.7.1 *International Efforts*

A) Budapest Open Access Initiative (BOAI)-14th February 2002, Budapest, Hungary[14, 15]

The Budapest Open Access Initiative defined Open Access for the first time. By Open Access to literature, they meant '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. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited'.

The initiative mentioned that removing access barriers to the scholarly literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge.

The Open Society Institute, the foundation network founded by philanthropist George Soros, is committed to providing initial help and funding to realize this goal. It will use its resources and influence to extend and promote institutional self-archiving, to launch new open-access journals, and to help an open-access

journal system become economically self-sustaining. While the Open Society Institute's commitment and resources are substantial, this initiative is very much in need of other organizations to lend their effort and resources.

BOAI invited governments, universities, libraries, journal editors, publishers, foundations, learned societies, professional associations, and individual scholars who share our vision to join us in the task of removing the barriers to open access and building a future in which research and education in every part of the world are that much freer to flourish.

B) ECHO (European Cultural Heritage Online) Charter- 2002[16]

The ECHO initiative has been motivated by the observation that, at present, information relevant to cultural heritage still plays only a marginal role in the Internet: the number one medium for current and future scientific work, communication and general archiving. The basic idea of the ECHO-initiative therefore is to establish an open-source culture of the public and scholarly exploitation of cultural heritage on the Internet. This idea comprises the promotion of content-driven technology in information management.

The long-term vision of ECHO is that of an electronic representation of the European cultural heritage on the web which will make it more widely available than ever before in its history and thus strengthen its function as a bond of the European community. In addition, this vision also includes a new perspective on the ways in which electronically represented sources of cultural heritage can be explored from a scholarly point of view, eventually overcoming traditional, medium-based boundaries between disciplines in favour of an overarching study of the underlying cultural worlds. The long-term vision of ECHO finally comprises the expectation that a content-driven innovation of information technology will provide a new driving force for technological development in Europe.

C) Bethesda Statement on Open Access Publishing- Released on 20th June 2003[17]

The following statements of principle were drafted during a one-day meeting held on April 11, 2003 at the headquarters of the Howard Hughes Medical Institute in Chevy Chase, Maryland. The purpose of the document is to stimulate discussion within the biomedical research community on how to proceed, as rapidly as possible, to the widely held goal of providing open access to the primary scientific literature. Their main aim was to agree on significant, concrete steps that all relevant parties —the organizations that foster and support scientific research, the scientists that generate the research results, the publishers who facilitate the peer-review and distribution of results of the research, and the scientists, librarians and other who depend on access to this knowledge— can take to promote the rapid and efficient transition to open access publishing.

The document is divided into four sections:

1) Definition of Open Access Publication-

An Open Access Publication is one that meets the following two conditions:

i) The author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use.

ii) A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository).

2) Statement of the Institutions and Funding Agencies Working Group

3) Statement of the Libraries & Publishers Working Group

4) Statement of Scientists and Scientific Societies Working Group

D) Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities- October 2003[18]

In accordance with the spirit of the Declaration of the Budapest Open Access Initiative, the ECHO Charter and the Bethesda Statement on Open Access Publishing, Berlin Declaration was drafted to promote the Internet as a functional instrument for a global scientific knowledge base and human reflection and to specify measures which research policy makers, research institutions, funding agencies, libraries, archives and museums need to consider.

In order to realize the vision of a global and accessible representation of knowledge, the future Web has to be sustainable, interactive, and transparent. Content and software tools must be openly accessible and compatible.

Open access contributions must satisfy two conditions:

1. The author(s) and right holder(s) of such contributions grant(s) to all users a free, irrevocable, worldwide, right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship (community standards, will continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now), as well as the right to make small numbers of printed copies for their personal use.

2. A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in an appropriate standard electronic format is deposited (and thus published) in at least one online repository using suitable technical standards (such as the Open Archive definitions)that is supported and maintained by an academic institution,

scholarly society, government agency,or other well established organization that seeks to enable open access, unrestricted distribution, inter-operability, and long-term archiving.

E) Salvador Declaration on Open Access: The Developing Perspective, Brazil-September 2005[19]

Participants of the International Seminar on Open Access for Developing Countries, Salvador, Brazil in September 2005 discussed various benefits of open access especially for developing countries and planned to work together to ensure that scientific information is openly accessible and freely available to all. They mentioned that,

1) Scientific and technological research is essential for social and economic development.
2) Scientific communication is a crucial and inherent part of the activities of research and development. Science advances more effectively when there is unrestricted access to scientific information.
3) More broadly, open access enables education and use of scientific information by the public.
4) In a world that is increasingly globalized, with science claiming to be universal, exclusion from access to information is not acceptable. It is important that access be considered as a universal right, independent of any region.
5) Open Access must facilitate developing countries' active participation in the worldwide exchange of scientific information, including free access to the heritage of scientific knowledge, effective participation in the process of generation and dissemination of knowledge, and strengthening the coverage of topics of direct relevance to developing countries.
6) Developing countries already have pioneering initiatives that promote Open Access and therefore they should play an important role in shaping Open Access worldwide.

The international community members urged governments to make Open Access a high priority in science policies including:

- requiring that publicly funded research is made available through Open Access;
- considering the cost of publication as part of the cost of research;
- strengthening the local OA journals, repositories and other relevant initiatives;
- promoting integration of developing countries scientific information in the worldwide body of knowledge.

F) UNESCO's Policy Guidelines for the Development and Promotion of Open Access-2012[20]

The Constitution of UNESCO in Article I, Clause 2 mentions that "UNESCO maintains increases and diffuses knowledge; encourages cooperation among the nations in all branches of intellectual activity and initiates methods of international cooperation." The overall objective of the Policy Guidelines is to promote Open Access in Member States by facilitating understanding of all relevant issues related to Open Access. Specifically, it is expected that the document shall:

- Enable Member State institutions to review their position on access to scientific information in the light of the Policy Guidelines;
- Assist in the choice of appropriate OA policy in the specific contexts of Member States; and
- Facilitate adoption of OA policy in research funding bodies and institutions by integrating relevant issues in the national research systems.

UNESCO supported the development and distribution of Micro CDS/ISIS (Information Storage and Retrieval Software) and Greenstone Digital Library Software.

3.7.2 *National Efforts:*

A) National Open Access Policy for Developing Countries[21]

Indian Institute of Science, Bangalore (India) organised two days' Workshop on Electronic Publishing and Open Access from 2-3 November 2006. It was supported by the Open Society Institute.

The Bangalore workshop was convened to bring together policy makers and research scientists from major developing countries to agree a path forward towards adopting full Open Access to publicly-funded research publications. The importance of access to the world's research information for the development of a strong economy and a vibrant research capability is widely acknowledged, yet financial barriers limit access by developing countries to the research information they need. Equally, the unique research carried out in countries representing 80% of the world's population is largely 'invisible' to international science because of economic or other constraints. The resolution of many of the world's problems, such as emerging infectious diseases, environmental disasters, HIV/AIDS or climate change, cannot be achieved without incorporation of the research from developing countries into the global knowledge pool.

Building on the Budapest Open Access Initiative recommendations, and past Declarations of commitments to the strategy of Open Access, particularly the Salvador International Declaration on Open Access for Developing Countries, and recognising the benefits that Open Access will bring to the strengthening of science, participants to the Workshop agreed the following model National Open Access Policy for Developing Countries.

According to the National Open Access Policy for Developing Countries, "The [*country-name*] Government/Government Department expects the authors of papers reporting publicly-funded research to maximise the accessibility, usage and applications of their findings."

To this end:

As a condition for research funding, the [*country-name*] Government:

a) requires electronic copies of any research papers that have been accepted for publication in a peer-reviewed journal, and are supported in whole or in part by Government funding, to be deposited in an institutional digital repository [IR] immediately upon acceptance for publication;
b) encourages Government Grant Holders to provide Open Access to their deposited papers immediately upon deposit;
c) encourages Government Grant Holders to publish in a suitable Open Access Journal where one exists.

The National Policy also discussed benefits of open access to scientific research, research institutes, universities, authors and readers (previously covered in 3.5). Also, methods to implement the policies are mentioned in form of Frequently Asked Questions (FAQs).

B) National Knowledge Commission's Report of the Working Group on Open Access and Open Educational Resources-2005[22]

As the world of information is relentlessly growing, India has opportunity to participate as one of the forerunners in development of knowledge and economy. This development cannot be achieved without improvement in the higher education system. To serve this purpose, the National Knowledge Commission (NKC) made few recommendations to the then Prime Minister of India. This report can serve as valuable tool to improve the access to and quality of our higher education system.

One of the many steps NKC recommends to address these pressing problems is to increase the amount of Open Educational Resources (OER) and Open Access (OA).Indian students will have access to previously inaccessible information as well as the knowledge on how to access global educational resources.

Open Educational Resources (OER):

Open Educational Resources can be defined as free and open digital publications of high quality materials organized as courses that include lectures, related reading materials, snapshots of discussions, assignments, evaluations, etc. Access to these resources radically breaks down the barriers to quality education and allows everyone to access course material that is prepared and evaluated by experts. OER material has been prepared in an open standard format and is interactive in nature.

Several universities in the United States are involved in Open Educational Resources generation. These include MIT, Utah State University, Carnegie Mellon, Yale, Johns Hopkins University, etc. Australian and Chinese universities are also participating in the development of open educational resources.

In India, the major initiatives for creating open educational tools and resources are-

- National Program on Technology Enhanced Learning (NPTEL) carried out by seven IITs, the Indian Institute of Science, and other premier institutions around the country and being funded by the Human Resource Ministry.
- Eklavya Project Launched by IIT Bombay
- E-Grid supported by Human Resource Ministry at IIIT, Kerala.

The working group suggests the creation of the Institute for **Vi**rtual **K**nowledge **R**esources **a**nd **M**anagement (VIKRAM) to monitor and support the implementation, adoption and sustainability of the network-based education resources. The activity and approach recommended here engages multiple areas (IT, education, research, innovation etc.). Therefore, it is imperative that VIKRAM while having linkages to existing educational and IT organizations remain independent.

Open Access Resources:

Open Access is a term used to describe published academic papers, books, reports, and other periodicals that are electronically available to readers without financial or technological barriers. The importance of open access for fundamental as well as applied research and education cannot be over

emphasized. India has done fairly well in the Open Access area by making 81 scientific journals accessible under OA. The Indian Institute of Science, Bangalore, is coordinating the Digital Library of India project along with Carnegie Mellon University. In this project, 21 other Indian institutions are also participating and have digitized more than450,000 books, out of which 220,000 books are now web-accessible.

The working group, after taking into consideration the current status of Open Access in India and worldwide, has the following recommendations to increase Open Access content from India, increase the public awareness and utilization of OA material.

1) On a policy level, all research articles published by Indian authors receiving any government or public funding must be made available under Open Access and should be archived in the standard OA format on his/her website. Further, as a national academic OA portal is developed, these same research articles should be made available through this portal.
2) The government should allocate specific funding to increase the current digitization efforts of books and periodicals which are outside copyright protection.
3) Separate funding should be allocated to develop a new higher quality OCR software package so that new and old fonts in many different Indian languages can be converted into ASCII code.
4) A training program needs to be developed to take the materials available under Open Access to remote towns and villages. One possible mechanism for this is to outfit a vehicle with mobile internet connectivity and a high speed printer and binder. With these resources, the "OA" vehicle could travel to rural locations, print and bind the book or material requisitioned by the users at the location, and charge the users only the cost necessary for printing and binding.
5) On a systemic level, our nation's universities and various academic institutions need high bandwidth connections and a national backbone which will provide advanced networking capabilities. There is an urgent need to develop Indian Research and Education Network/ Knowledge Network where each connected institution will have at least 100 Mbps or 1 Gbps connectivity.

6) This level of connectivity will not only advance the OA activities nationally, but provide global connectivity as well.

The above mentioned recommendations of various national and international Working Groups and Declarations prove that Open Access movement has gained its momentum in the scholarly world. Developing countries too have stepped into the movement and are trying hard to set up a system and create awareness about the benefits of open access. Institutions across the world have joined the Open Access Revolution and the researcher hopes that very soon all the research work done will be available through open access without any embargo.

3.8 Open Access Institutional Repositories:

Alma Swan[23] mentions that "Institutional repositories are digital collections of the outputs created within a university or research institution. Whilst the purposes of repositories may vary (for example, some universities have teaching/learning repositories for educational materials), in most cases they are established to provide Open Access to the institution's research output and this is the focus here."

According to Registry of Open Access Repositories (ROAR)[24] and Directory of Open Access Repositories (OpenDOAR)[25] there are currently more than 3790 institutional repositories across the world.

3.8.1 Advantages of Institutional Repositories:

In briefing paper on Open Access Institutional Repositories, Alma Swan[26] mentioned the following purposes and benefits for an institution-

1) Opens up the outputs of the university to the world
2) Maximises the visibility and impact of these outputs as a result
3) Showcases the university to interested constituencies – prospective staff, prospective students and otherstakeholders
4) Collects and curates digital outputs
5) Manages and measures research and teaching activities

6) Provides a workspace for work-in-progress, and for collaborative or large-scale projects
7) Enables and encourages interdisciplinary approaches to research
8) Facilitates the development and sharing of digital teaching materials and aids
9) Supports student endeavours, providing access to theses and dissertations and a location for the development of e-portfolios

3.8.2 What do Institutional Repositories Contain?

ROAR and OpenDOAR have classified the Institutional repositories according to the following types of documents-

- Articles
- Journals
- Books & Monographs
- Conference Proceedings
- Datasets
- Learning & Teaching Objects
- Multimedia
- Patents
- References
- Software
- Theses
- Unpublished
- Demonstration
- Web Observatory

3.8.3 Open Source Software (OSS) Packages Used for a Repository:

3.8.3.1 Concept of Open Source Software

OSS can be defined from different point of views to reflect string of ideas in the field. According to Chudnov[27],

a. An OSS is typically created and maintained by developers crossing constitutional and national boundaries, collaborating by using internet based communication and development tools.

b. Output is generally a certain kind of 'free', often through a license that specifies that applications and source code are free to use, modify and redistribute it as long as all user modifications are similarly licensed.
c. Quality, not profit drives open source developers who take personal pride in seeing their working solution adopted

The Open Source Initiative (OSI) identified ten criteria for a software product to be called open source. They are:

1) Free distribution
2) Source Code
3) Derived Works
4) Integrity of the Author's Source Code
5) No discrimination against persons or groups
6) No discrimination against fields of endeavour
7) Distribution of license
8) License must not be specific to a product
9) The license must not restrict other software
10) The license must be technology neutral

3.8.3.2 Various OSS Packages:

There are several open source software packages used for developing institutional repositories. There are 153 open source software listed in OpenDOAR, of which some of them are explained below:

1) DSpace[28, 29]

In March 2000, Hewlett-Packard Company (HP) awarded $1.8 million to the MIT Libraries for an18-month collaboration to build DSpace™, a dynamic repository for the intellectual output in digital formats of multi-disciplinary research organizations. HP Labs and MIT Libraries released the system worldwide on November 4, 2002, under the terms of open source license. As faculty and other researchers develop research materials and scholarly publications in increasingly complex digital formats, there is a need to collect, preserve, index and distribute them: a time-consuming

and expensive chore for individual faculty and their departments, labs, and centres to manage themselves. The DSpace system provides a way to manage these research materials and publications in a professionally maintained repository to give them greater visibility and accessibility over time.

DSpace uses a qualified Dublin Core metadata standard for describing items intellectually (specifically, the Libraries Working Group Application Profile). Only three fields are required: title, language, and submission date, all other fields are optional. There are additional fields for document abstracts, keywords, technical metadata and rights metadata, among others. According to the ROAR and OpenDOAR, 1472 institutional repositories (as on 26th July 2014) are developed using DSpace Platform. It is the most preferred open source software package for institutional repositories.

2) EPrints [30, 31]

EPrints is the first free and open source software package for building open access repositories that are compliant with the Open Archives Initiative Protocol for Metadata Harvesting. It shares many of the features commonly seen in document management systems, but is primarily used for institutional repositories and scientific journals. EPrints has been developed at the University of Southampton School of Electronics and Computer Science and released under a GPL License.

EPrints was created in 2000 as a direct outcome of the 1999 Santa Fe meeting. Version 3 of the software was officially released in during the Open Repositories Conference in San Antonio, Texas on the 24th of January 2007.

Other than DSPace it is the most widely used open source software used for institutional repository. According to the ROAR and OpenDOAR, 532 institutional repositories (as on 26th July 2014) are developed using DSpace Platform.

3) Bepress (Berkeley Electronic Press)[32]

Bepress was developed in 1999 by UC Berkeley Professors Robert Cooter, Aaron Edlin, and Ben Hermalin. Bepress began by developing an innovative online editorial management system specifically designed to make peer-review workflow as quick and easy as possible. The statistics available in ROAR shows that all over the world 326 Institutional Repositories (as on 26th July 2014) are developed Bepress Platform.

To address the broader crisis in scholarly communications, Bepress then set out to provide authors and universities with a solution for them to share their research openly and widely. Thus Bepress pioneered Digital Commons, a software service that is now the leading hosted institutional repository (IR).

4) Digital Commons[33]

Digital Commons is the leading hosted institutional repository (IR) software platform. It offers the features of a traditional IR as well as professional-grade publishing software, management tools, and individual faculty and researcher pages to promote and disseminate scholarship and serve academia.Institutional repositories, regardless of platform, require lots of customizations. Digital Commons repositories can be customized and tailored to users' diverse needs. In addition, users are fully supported during the entire repository lifecycle: development, implementation, maintenance, and upgrades. According to OpenDOAR, 126 institutional repositories (as on 26th July 2014) are developed on Digital Commons platform.

5) Fedora[34]

Fedora digital object repository management system is based on the Flexible Extensible Digital Object and Repository Architecture (Fedora). It is a Linux-based operating system. One can use Fedora in addition to, or instead of, other operating systems such as Microsoft Windows™ or Mac

OS X™. Fedora is sponsored by Red Hat, the world's most trusted provider of open source technology. Red Hat invests in Fedora to encourage collaboration and incubate innovative new free software technologies.

Fedora software development began in 1997 as a DARPA and NSF funded research project at Cornell University. The University of Virginia and Cornell University jointly developed Fedora with funding provided by a grant from the Andrew W. Mellon Foundation. The software is flexible enough for serving variety of digital documents with different functionalities such as digital asset management, institutional repositories, digital archives, content management systems, scholarly publishing enterprises, digital libraries etc.

First version of Fedora was released in November 2003. Recently in April 2014, Fedora Version 21 was released. According to ROAR, 43 institutional repositories (as on 27th July 2014) are built using Fedora Open Source Software.

6) Greenstone[35]

Greenstone is produced by the New Zealand Digital Library Project at the University of Waikato. It is developed and distributed in cooperation with UNESCO and the Human Info NGO. It is open-source, multilingual software, issued under the terms of the GNU General Public License. The first version of Greenstone was made available during 1997. The use of Greenstone is very popular in developing countries as it is very easy to create collections in Greenstone as well as it has one of the important features of exporting collections on CD-ROM, this feature is found very useful since in many places there is poor Internet connectivity. It has helped libraries to carry whole collection on CD-ROM and CD-ROM collections can run on standard PC. ROAR and OpenDOAR include 53 institutional repositories (as on 27th July 2014) developed on Greenstone Software.

7) DoKS (Document and Knowledge Sharing)[36]

DoKS is an open source project initiated by the library of the Katholieke Hogeschool Kempen (KHK) during 2003 for organising electronic theses and curricular vitae of Graduating students at Flemish University Colleges, Belgium. The Project was funded by the Institute for the Promotion of Innovation by Science and Technology in Flanders, private industry partners and non-profit organisations. DoKS software model is basically to organise electronic thesis collection for the students passing from any university. The software has an in-built unique feature of creating curriculum vitae of all graduating students depending on the data of student administration files.According to ROAR and OpenDOAR, 5 institutional repositories (as on 29th July 2014) are built using DoKS Open Source Software.

8) MyCoRe[37, 38, 39]

MyCoRe (MILESS Community Content Repository) is an open source project which provides a system for creating digital libraries and content repositories. It is developed at Essen University, Germany. The first official version was launched during 2004. In the MyCoRe Project a group of universities from Germany are working on the development of MyCoRe. The technical base of the system is formed of Java class libraries, XML technology and different database backend. ROAR &OpenDOAR have 8 institutional repositories(as on 29th July 2014) listed in their directories which are developed using MyCoRe software.

9) ETD-db[40]

ETD-db has been developed by one or two developers at Virginia Tech, and endorsed by the Networked Digital Library of Theses and Dissertations (NDLTD). The development of the official release of this package paused on February 2002 at version 1.7c, but it is still used as their ETD

submission, archive and search tool. During 2000-2005, it was the most widespread E-theses package in use, in part due to the support it has from the NDLTD. ETD-db depends upon the Perl programming language and the MySQL open source database system. ROAR & OpenDOAR have 14 institutional repositories (as on 29th July 2014) listed in their directories which are developed using ETD-db software.

10) Drupal [41, 42]

Drupal is a free and open-source content management framework written in PHP and distributed under the GNU General Public License. It is used as a back-end framework for at least 2.1% of all websites worldwide ranging from personal blogs to corporate, political, and government sites. It was developed by Dries Buytaert as a message board and became an open-source project in 2001. According to ROAR and OpenDOAR, 15 institutional repositories (as on 29th July 2014) are built using Drupal Open Source Software.

3.9 Open Access and Copyright:

The Budapest Open Access Initiative (BOAI)[43] states that open access is completely compatible with copyright. Copyright law gives the copyright holder the right to make access open or restricted, and the BOAI seeks to put copyright in the hands of authors or institutions that will consent to make access open. Compatibility of open access and copyright is explained in more detailed way by BOAI by discussing the issue with reference to self-archiving and open access journals.

1. **Self-archiving**:

   Authors of preprints hold the copyright to them and may post them to open access archives with no copyright problems whatever. If the preprint is later accepted for publication in a journal that requires authors to transfer copyright to the publisher, then the journal may or may not give permission for the

refereed post-print to be posted to an open access archive. If permission is granted, then again there is no copyright problem. If permission is denied, then the preprint may remain in the open access archive because it is a different work from the post-print and the author never transferred the copyright on the preprint. Moreover, the author may post to the archive a list of corrigenda, or differences between the preprint and post-print. This is not quite as convenient for readers as seeing the whole post-print online, but it provides them with the equivalent of the full text of the post-print and is infinitely more useful than no free access at all. For more details, see the section on self-archiving.

2. **Journals**:

Open access journals will either let authors retain copyright or ask authors to transfer copyright to the publisher. In either case, the copyright holder will consent to open access for the published work. When the publisher holds the copyright, it will consent to open access directly. When authors hold the copyright, they will insure open access by signing a license to the publisher authorizing open access. Publishers of open-access journals will have such licenses already prepared for authors. There are many ways to write such a license.

The BOAI does not advocate open access for copyrighted literature against the will of the copyright holder or in violation of copyright law. Nor does it advocate any change in copyright law. It seeks to maximize open access within existing copyright law, in accordance with the wishes of the copyright holders.

3.10 Summary:

The present chapter details the concept of 'Open Access (OA)' by giving an overview about history of open access, defining it, types of OA, explaining its needs and barriers to open access . The needs and barriers are explained as mentioned by SPARC Open access document.

The development of open access roots back to various International Open Access Policies like BOAI in 2002, ECHO Charter 2002, Bethesda Statement on Open Access Publishing (2003), Berlin Declaration (2003) and Salvador Open Access Policy for Developing Countries (2005). Depending on these international policies, some national policies were also developed which promoted the open access movement in the respective countries. For example in India, open access got major encouragement due to National Open Access Policy for Developing Countries-2006 (India) and National Knowledge Commission's Report on Open Access-2005 (India).

The next section discusses the Open Access Institutional Repositories, its advantages and the various popularly used open source software packages used for building an institutional repository.

The concluding part of the chapter presented the issue of open access and copyright based on the BOAI statement on Copyright, self-archiving and open access journals.

The next chapter expounds the concept of one of the most important type of content included in Open Access Repositories i.e. Electronic Thesis and Dissertation (ETD) and will discuss various concepts related to ETD.

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CHAPTER 4

E-THESIS REPOSITORIES: AN OVERVIEW

4.1 Introduction:

An ETD or Electronic Thesis & Dissertation is similar to traditional theses but more appropriate for worldwide access and retrieval with the help of computer, laptop, tablet, mobile phone etc. Depending on the nature of accessibility provided, an ETD can be accessed anytime, anywhere. It helps in increasing the visibility of the individual researcher as well as the institution involved in the research work. The Networked Digital Library of Theses & Dissertations (NDLTD) which is an international organization promotes the adoption, creation, use, dissemination and preservation of electronic theses and dissertations in various subjects and languages accessible through its union catalog. Since its inception, ETD activities have always been associated with enhancing the quality of education.

4.2 History of Electronic Thesis & Dissertation (ETD):

As mentioned by Edward Fox, Gail McMillan & V.Srinivasan[1], the history of ETDdates back to a Workshop in 1987 in Ann Arbor, Michigan, led by Nick Altair of University Microfilms International (UMI), who was involved in the Electronic Manuscript Project. The idea of marking up dissertations according to Standard Generalized Mark-up Language Document Type Definition (SGML DTD) was pursued by Virginia Tech working with SoftQuad, and led to perhaps the first ETD in 1988. Virginia Tech's demonstration effort was initially fundedby Gary Hooper of the Research Division. Still, making ETDs a common practice had to wait for improved technology support, among other things.

The project could not be developed for few years, until 1991, when Virginia Tech's Dean Gary Hooper financed further critical development. Before the

release of the first version of PDF in 1992 and Adobe's Acrobat tool in 1993, a Virginia Tech team comprising of John Eaton (Graduate School), Edward Fox (Computer Science, Computing Center), and Gail McMillan (University Libraries) began discussionsabout ETDs with Adobe and worked with a pre-release version of their software. The Coalition for Networked Information (CNI) launched a discovery project guided by the Council of Graduate Schools, UMI, and Virginia Tech to explore ETDs. Ten universities inthe United States and Canada sent representatives from their graduate programs, libraries, and computing/IT groups to an October 11, 1992, Design Meeting in Washington, D.C. This group agreed that working toward ETDs would be a reasonableinitiative, so discussions continued at sessions of the CNI 1993 Spring Meeting held the following March in San Francisco. At the July 1993 meeting of the Monticello Electronic Library Project in Atlanta, participants from the South-eastern United States alsodiscussed the role of ETDs in education and libraries.

Subsequently, the Virginia Tech library drafted a workflow description, developed andtested ETD submission scripts, and prepared a demonstration website in 1995. Followingthe faculty's recommendation from the Degree Requirements, Standards, Criteria, and Academic Policies Committee in 1996, graduate students were given the option tosubmit their theses and dissertations online. The library added incentives by waiving the Archiving Fee (previously the Binding Fee) for all who would submit ETDs in 1996. On January 1, 1997, ETDs became a requirement at Virginia Tech; West Virginia University followed in 1998 with its own requirement.

ETD initiatives have benefited from several funding sources. When the South-easternUniversity Research Association (SURA) sold SURAnet, some of the funds went to support a 1996-1997 project led by Eaton, Fox, and McMillan to launch ETD activitiesthroughout the South-eastern United States (SURA 1997). Then the US Department of Education funded a 1996-1999 project led by these investigators to extend ETD efforts more broadly. The resulting National Digital Library of Theses and Dissertations quickly expanded into an international initiative, and was renamed the Networked Digital Library of Thesesand Dissertations (NDLTD).

In 1998, the first ever ETD Conference was organised in Tennessee. Virginia Tech organised the second ETD Conference in 1999. The trend is still continued every year by different institutions hosting the conferences and focussing on a particular theme of ETD. The series of these conferences help in disseminating ideas and best practices in ETD.

4.3 Definition of Electronic Thesis & Dissertation (ETD):

ETD has been defined in various ways by national and international organisations, universities, institutions etc. explaining its characteristics, features, benefits and use.

1) Networked Digital Library of Theses & Dissertations (NDLTD) define ETD as:

"Electronic theses and dissertation (ETD) can be accessed on the web in full or partial-text."[2]

2) According to The George Washington University (Washington DC),

"An ETD is a thesis/ dissertation created as an electronic document (or set of electronic documents). The electronic documents that make up an ETD can be created using any popular word processing software program. One can also use advanced software programs to produce multimedia animations and sounds for use in an electronic version of a thesis/dissertation."[3]

3) Harrod's Librarians' Glossary and Reference Books defines ETD as,

"the digital version of a thesis or dissertation whose initiation is generally credited to Virginia Polytechnic Institute (Virginia Tech) who started creating ETDs in 1994."[4]

4) The most comprehensive definition of ETD is given by Virginia Tech Digital Library and Archives where they define ETD by explaining its content, importance in candidate's academic career, benefit of getting transformed from print to electronic format and it also highlights the aim of Virginia Tech

to make all the research work produced in the institute openly accessible to the public all over the world via Internet. According to Virginia Tech,

"A dissertation or thesis is a work submitted in support of candidature for a doctorate or master's degree, respectively which presents the author's research and findings. Electronic versions of theses and dissertations are called ETDs. An ETD documents the author's years of academic commitment. It describes why the work was done, how the research relates to previous work as recorded in the literature, research methods used, the results, interpretation and discussion of the results, and a summary with conclusions. It provides a technologically advanced medium to express author's ideas. They are prepared using almost any word processor or document preparation system."[5]

By taking into consideration various benefits of ETD, the researcher defines ETD as-

"ETD is electronic version of print thesis or dissertation that may include various file formats and can be produced using any popular word processing software. It facilitates dissemination of research through World Wide Web in an effective, expeditious and economic manner."

4.4 Benefits of ETD:

A thesis or dissertation is the document submitted by a candidate for an academic degree and it presents the research work performed by the researcher. Submitting thesis or dissertation in electronic format has further enhanced the usability of the document since it becomes readily available for dissemination through Internet. Some of the specific benefits of ETD[6, 7] are:

1) *Improved presentation of work:*

ETD can be created using any popular word processing software and it also enables the inclusion of audio-video files, images, spreadsheets, graphs, animations etc. This helps the researcher to express his/her ideas in a better way. Such facilities are not available with the print version.

2) *Improved Accessibility and Increase in Citation Index:*

ETD facilitates prompt dissemination of research work across the world through World Wide Web without the limitations of time and space. This helps in increasing the citation count of the researcher/ author and increases prestige of the institution.

3) *Increase control:*

After submitting the ETD, the researcher can control the availability of his/her thesis or dissertation by choosing:

a) To embargo(restriction in access for a specific period of time)
b) To make it accessible full-text under open access.

4) *Improves library services:*

ETDs provide an economical solution for archiving and preservation of theses and dissertations which are one of the most important types of grey literature. Being in electronic format, it reduces the cost involved in the process of preservation, reduces need of library storage space thereby improving library services.

5) *Lower Printing Costs:*

Researcher can save a huge amount required for printing purposes if thesis or dissertations have to be submitted in electronic format.

4.5 Risks of ETD:

Jordan Lee and Brian Yandell (1999)[8] of University of Wisconsin-Madison composed a 'Working Draft on Risks and Benefits of Electronic Dissertations'. The risks of electronically submitting thesis or dissertations are-

1) This is a new system, and issues related to this are yet to be resolved regarding formats. Changes as standards are settled may affect submission and future access.
2) Immediate access can give competitive colleagues an edge. This can be overcome to some degree by delayed access.

3) Intellectual property rights: Electronic publishing might interfere with publication of chapters in some journals. This varies from journal to journal and discipline to discipline, and is in a great state of flux at this time. We believe this will not be an issue for electronic dissertations in the long run, but at present this is uncertain.
4) Electronic publishing can interfere with publication of a whole thesis as a book. Some publishing houses will not consider works that have appeared in any form on the web, even if it might undergo substantial revision before book publication.
5) Copyright issues about web-published material are not well understood.
6) Plagiarism on the Internet is a growing concern. Under widely accepted "fair use" principles, anyone can copy part of your dissertation as long as it is for noncommercial purposes. Ethically it is important to properly cite such work. However, it is possible with cut-and-paste technology to repackage large chunks of work as "new".

The apex body of higher education in India, University Grants Commission (UGC), in "Electronic Thesis Online (India) UGC (Submission of Metadata and Full-text of Doctoral Theses in Electronic Format) Regulations 2005"[9] mention risk of plagiarism as one of the most important concerns for students and faculty. The regulations also mention how the electronic format of theses and dissertations has made plagiarism an easy task. The regulations also explain the working of plagiarism detecting software and how the use of such software packages is useful in detecting plagiarism in submitted ETDs.

4.6 ETD-MS: Interoperability Metadata Standard for Electronic Theses and Dissertations:

Metadata is the term used to describe data about data. According to NDLTD, for items in open access repositories, metadata usually consists of a full bibliographic reference, abstract, keywords and similar information about the related digital object(s) i.e. ETDs. UGC-ETD Guidelines[10] mention that the following three types of metadata are associated with the digital objects:

- Descriptive Metadata: Include content or bibliographic description consisting of keywords and subject descriptors.
- Administrative or technical Metadata: Incorporates details on original source, date of creation, version of digital object, file format used, compression technology used, object relationship, etc. Administrative data may reside within or outside the digital object and is required for long-term collection management to ensure longevity of digital collection.
- Structural Metadata: Elements within digital objects that facilitate navigation, e.g. table of contents, index at issue level or volume level, page turning in an electronic book, etc.

Institutions dealing with electronic theses and dissertations have developed their own standards or adapted the existing metadata standards. NDLTD, the world's largest consortium of ETD Universities and which maintains an international union catalogue of ETDs from around the world has defined a '*Standard Set of Metadata Elements*' [11] used to describe an electronic thesis or dissertation which is not a replacement for metadata scheme already in use for any university but should be used as a guideline to develop a cross-walk between local metadata standards and a single standard used for sharing information about ETDs. The set is based on the work of Dublin Core Metadata Initiative and the proposed set of qualifiers put forward by the DC Date Working Group.

4.7 Standards for Metadata Harvesting:

Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)-

Harrod's Librarian's Glossary & Reference Books mentions, "OAI-PMH is the protocol which provides an application-independent interoperability framework for the Open Archives Initiative to enable the automatic gathering of metadata across multiple repositories."[12]

The OAI-PMH is a protocol devised to make machine-readable metadata widely available for use. The development of the OAI-PMH protocol took root in a

meeting that was convened in late 1999 at Santa Fe, New Mexico to address problems of the e-print world. As disciplinary e-print servers became more common, it was difficult to support searching across multiple repositories. Repositories needed greater capabilities to automatically identify and access papers that had been deposited in other repositories.

The Open Archives Initiative Protocol for Metadata Harvesting[13] provides an application-independent interoperability framework based on metadata harvesting. There are twoclasses of participants in the OAI-PMH framework:

- *Data Providers* administer systems that support the OAI-PMH as a means of exposing metadata; and
- *Service Providers* use metadata harvested via the OAI-PMH as a basis for building value-added services.

The metadata stored in the data providers' database is transferred in bulk to the metadata database of the service providers. The transfer of metadata is done in a series of requests and responses between the data provider and the service provider/harvester. The OAI-PMH Protocol depends upon the HTTP-transaction framework for communication between a harvester and a repository. Requests may be made using either the HTTP GET or POST methods. All successful replies are encoded in XML, and all exception and flow-control replies are indicated by HTTP status codes.

4.8 File Formats for ETDs:

Virginia Tech[14], the first University to create ETDs have recommended a list of file formats for electronic theses and dissertations are-

- **Full-text of ETDs**

1) PDF(.pdf)-

PDF is an acronym of Portable Document Format and is most commonly used format for submitting full-text of ETDs. PDF is used to present documents in a manner independent of application software, hardware and operating

systems. PDF is best used to store vector-based graphics (i.e. graphics drawn using lines and curves rather than pixels).

- **Additional texts/notices**

2) PPT(.ppt)-

PPT or Power-Point Presentation may also be included in ETDs.

3) JPEG(.jpeg or .jpg)-

JPEG or Joint Photographic Experts Group is a commonly used method for glossy compression for digital images particularly produced by digital photography. The degree of compression can be adjusted taking into consideration the storage size and image quality.

- **Images**

4) GIF(.gif)-

Graphics Interchange Format or GIF is a bitmap image format that was introduced by CompuServ in 1987, has since come into widespread use on the WWW due to its wide support and portability. Itis best used to store screen-quality images that do not contain many colours. GIF files are typically very small, but cannot reproduce the range of colours necessary to reproduce photographic images which JPEG can do.

5) TIFF(.tif)-

TIFF, an acronym for Tagged Information File Format is an archival format, meaning that is does not sacrifice image quality in order to reduce file sizes. The TIFF format is widely supported by image-manipulation applications, by publishing and page layout applications, and byscanning, faxing, word processing, optical character recognition and other applications.TIFF images are excellent for storing detailed, high quality images.

6) PNG(.png)-

Portable Network Graphics (PNG) is a bitmap file format that supports loss less data compression. It was created as an improved, non-patented replacement for GIF and is the most used loss less image compression format on the internet. Since it can store high color images, it can also be used for storing photographic content.

7) MPEG(.mpeg)-

Moving Picture Experts Group or MPEG is the oldest and most widely used supported format for movies. The MPEG format is most commonly used as an output format from UNIX utilities that generate video content.

8) QuickTime(.mov .qt)-

QuickTime is an extensible multimedia framework developed by Apple Inc., capable of handling various formats of digital video, picture, sound, panoramic images, and interactivity. Support for QuickTime is good on Macintosh and Windows but not much on Unix.

- **Video**

9) AVI(.avi)-

Audio Video Interleave (AVI) files contain both audio and video data in a file container that allows synchronous audio-with-video playback.It is more of a Windows supported format and is not as well supported on other formats.

10) WAV(.wav)-

Waveform Audio File Format or WAVE is a default standard for Windows Sound Files. It is also supported by other platforms. It is mainly used for raw and uncompressed audio files.

11) AIFF(.aif)-

Audio Interchange File Format (AIFF) is an audio file format standard used for storing sound data for personal computers and other electronic audio devices. The AIFF format is a Macintosh-specific equivalent of the WAV format. It is not as well supported on all platforms as the WAV format.

- **Audio**

12) MPEG-3 (.mp3)-

MPEG-3 (or MP3) format eliminates sound data which is not as strongly perceived by the human ear and brain, and as such creates files of reasonable quality that are as much as 10 times smaller than the raw data itself. MP3 files are good for storing long passages of sound content where high quality is not required.

- **Other file formats**

13) Zip Files-

It is an archive file format that supports lossless data compression. A .zip file may contain one or more files or folders.

14) HTML-

Hyper Text Mark-up language (HTML) is the language with which Web pages are designed. This standard has been defined by the World Wide Web Consortium (W3C). HTML allows web documents to be created with ease. HTML is a plain text file and any text editor as simple as Notepad can be used to create HTML documents.

15) XML-

eXtensible Mark-up Language (XML) provides a structured representation of data that can be implemented broadly and is easy to deploy. XML is a subset of SGML (Standard Generalized Mark-up Language), modified and optimized for delivery over the Web. This standard has been defined by the World Wide Web Consortium (W3C). XML can be used to format and transfer data in an easy and consistent way. XML is also a plain text format.

4.9 Digital Preservation Strategies of ETDs:

A digital preservation strategy is a well-considered and documented approach to the preservation of digital objects.

4.9.1 Definition of Digital Preservation:

a) Harrod's Librarian's Glossary & Reference Book explain Digital Preservation as "method of keeping digital materials 'alive' so that they remain usable as technological advances render original hardware and software specifications obsolete."[15]

b) The Working Group on Defining Digital Preservation- Association of Library Collections & Technical Services (a Division of ALA) states "Digital preservation combines policies, strategies and actions to ensure the accurate rendering of authenticated contentover time, regardless of the challenges of media failure and technological change. Digital preservation applies to bothborn digital and reformatted content."[16]

4.9.2 Need of Digital Preservation:

Digital Preservation Europe Project[17] mentioned the reasons for taking care of digital objects and need for digital preservation-

a) *Storage media/data carrier problem:*

Digital objects are much more 'fragile' than traditional analogue documents such as books or other hard copy mediums.They are also much more venerable to physical damage. Digital objects require pro-active intervention to remain accessible.

b) *Hardware obsolescence:*

After five years if a digital object and the disk are in perfect condition, also we have the software that can open the file, but if that file is on a disc your computer doesn't have a drive for, you will not be able to access it.

c) *Software and format obsolescence problem:*

The software or file format can become obsolete for a number of reasons. Without the intervention of digital preservation techniques the information contained will no longer be accessible.

4.9.3 What does 'Long-Term' Digital Preservation mean?

Consultative Committee for Space Data Systems (CCSDS, 2002)[18] explain the meaning of 'Long-term' in digital preservation as "a period of time long enough for there to be concern about the impacts of changing technologies, including support for new media and data formats, and of a changing user community, on the information being held in a repository. This period extends into the indefinite future."

4.9.4 Criteria for Selecting a Digital Preservation Strategy:

Various theories have been developed to preserve digital material which range from preserving the original technology on which the archival object

runs to preserving only significant properties of the object which are defined independently of any hardware or software platform.

Thibodeau[19] suggests that a digital archive should take the following four criteria into consideration when selecting a preservation strategy:

a) *Feasibility:* possession of hardware and software capable of implementing the chosen method.
b) *Sustainability:* the method should be capable of being applied indefinitely into the future; or there should be another path which will offer a sequel to the method if it ceases being sustainable.
c) *Practicality:* implementation should be within reasonable limits of difficulty and expense.
d) *Appropriateness:* The chosen approach should be appropriate for the particular types of digital objects to be preserved and the objectives of their preservation.

4.9.5 Digital Preservation Strategies:

Many digital preservation technologies have been proposed but a single technology is not suitable for all data types and institutions.

Tristram (2002)[20] discussed following digital preservation techniques-

1) Bitstream Copying:

It is more commonly known as "backing up your data" and refers to the process of making an exact duplicate of a digital object. It is often combined with remote storage so that the original and the copy are not subject to the same disastrous event. Bitstream copying should be considered the minimum maintenance strategy for even the most lightly valued, ephemeral data.

2) ***Refreshing:***

Refreshing is the process of copying digital information from one long-term storage medium to another of the same type, with no change in the bitstream (e.g. from an older CD-RW to a new CD-RW). Refreshing is a necessary component of any successful digital preservation program, but is not itself a complete program.

3) ***Durable/Persistent Media:***

Durable media has no impact on any other potential source of loss, including catastrophic physical loss, media obsolescence, as well as obsolescence of encoding and formatting schemes. It has the potential for endangering content by providing a false sense of security.

4) ***Technology Preservation:***

This type of preservation is based on preserving the technical environment that runs the system, including operating systems, original application software, media drives, and the like. It is sometimes called the "computer museum" solution. This is not a strategy that an individual institution can implement. Maintaining obsolete technology in usable form requires a considerable investment in equipment and personnel.

5) ***Digital Archaeology:***

Digital Archaeology includes methods and procedures to rescue content from damaged media or from obsolete or damaged hardware and software environments. It is explicitly an emergency recovery strategy and usually involves specialized techniques to recover bitstreams from media that has been rendered unreadable, either due to physical damage or hardware failure such as head crashes or magnetic tape crinkling.

6) ***Analog Backups:***

It combines the conversion of digital objects into analog form with the use of durable analog media. An analog copy of a digital object can, in some respects, preserve its content and protect it from obsolescence, while

sacrificing any digital qualities, including sharability and lossless transferability.

7) Migration:

Migration is to copy data, or convert data, from one technology to another, whether hardware or software, preserving the essential characteristics of the data. Migration includes refreshing as a means of digital preservation but differs from it in the sense that it is not always possible to make an exact digital copy or replica of a data base or other information object as hardware and software change and still maintain the compatibility of the object with the new generation of technology.

8) Replication:

Replication is a term used to mean multiple things. Bitstream copying is a form of replication. Open Archival Information System (OAIS) considers replication to be a form of migration. LOCKSS (Lots of Copies Keeps Stuff Safe) is a consortial form of replication, while peer-to-peer data trading is an open, free-market form of replication.

9) Reliance on Standards:

It seeks a way to "harden" the encoding and formatting of digital objects by adhering to well-recognized standards and favouring such standards over more hard and less well-supported ones. It assumes in part that such standards will endure and that problems of compatibility resulting from the evolution of the computing environment (applications software, operating systems) will be handled by the continuing need to accommodate the standard within the new environment.

10) Normalization:

It is a formalized implementation of reliance on standards. Within an archival repository, all digital objects of a particular type (e.g., colour images, structured text) are converted into a single chosen file format that is thought to embody the best overall compromise amongst characteristics

such as functionality, longevity, and preservability. The advantages and disadvantages of reliance on standards also apply to normalization.

11) Canonicalization:

It is a technique designed to allow determination of whether the essential characteristics of a document have remained intact through a conversion from one format to another. Once created, this form could be used to algorithmically verify that a converted file has not lost any of its essence. Canonicalization has been postulated as an aid to integrity testing of file migration, but it has not been implemented.

12) Emulation:

It combines software and hardware to reproduce in all essential characteristics the performance of another computer of a different design, allowing programs or media designed for a particular environment to operate in a different, usually newer environment. Emulation requires the creation of emulators, programs that translate code and instructions from one computing environment so it can be properly executed in another.

13) Encapsulation:

It may be seen as a technique of grouping together a digital object and metadata necessary to provide access to that object. Appropriate types of metadata to encapsulate with a digital object include reference, representation, provenance, fixity and context information. Encapsulation is considered a key element of emulation.

14) Universal Virtual Computer:

It is a form of emulation. It requires the development of a computer program independent of any existing hardware or software that could simulate the basic architecture of every computer since the beginning, including memory, a sequence of registers, and rules for how to move information among them. Users could create and save digital files using the application software of their choice, but all files would also be backed up in a way that could be read by the universal computer.

4.10 Copyright & ETDs:

Copyright is one of the most important factors of ETD. Infringement of Copyright Act is one of the major barriers in submission of ETDs in repository. In spite of the benefits of ETD, due to the fear of getting their intellectual work plagiarised, researchers hesitate to submit their ETDs and contribute in the scholarly output of the institution through open access.

Harrod's Librarian's Glossary & Reference Book explains Copyright as "a procedure whereby the originator of a piece of intellectual property (book, article, piece of music etc.) acquires a series of rights over the work created, including copying, publishing, performing, broadcasting and adaptation."[21]

Ramaiah[22] mentioned that-

1) The author of the ETD automatically holds the copyright. There is no need to transfer copyright.
2) Registering of Copyright is optional. It can be done yourself or through ProQuest (a fee is required in both cases)
3) The author gets cultural and legal benefits.
4) Use of a copyright statement in your ETD is not required, but is highly recommended.

According to the Office of Graduate & Professional Studies, Theses Office, Texas A&M University[23], any submitted thesis or dissertation is automatically copyrighted under U.S. Federal Law (United States Code, Title 17) as soon as the respective student saves a draft of it on paper or computer.

Stanford University Libraries & Academic Information Resources[24] mention that "in copyright law, copying is known as 'reproduction', and it's one of the exclusive rights of copyright owner. The right to publicly display a work is an exclusive right of copyright owner. While there is no general exemption for preservation activities in copyright law, there are exemptions that can help individuals and especially libraries and archives legally preserve expressive

works for the future. Furthermore, in the absence of a specific exemption, one can always consider fair use as a defense when making a preservation copy."

For the present research study, the researcher became member of NDLTD Listserv member in order to get information and participate in discussions related to various topics of ETD. In order to get the authentic information regarding copyright policies for ETDs, the researcher posted the following query to the ETD mailing group (etd@ndltd.org) on 29th May 2014-

Dear Professionals,

Once a student submits a Doctoral Thesis or Master's Thesis, with whom does the copyright of the thesis remain and why?

a) with the researcher?

b) with the University?

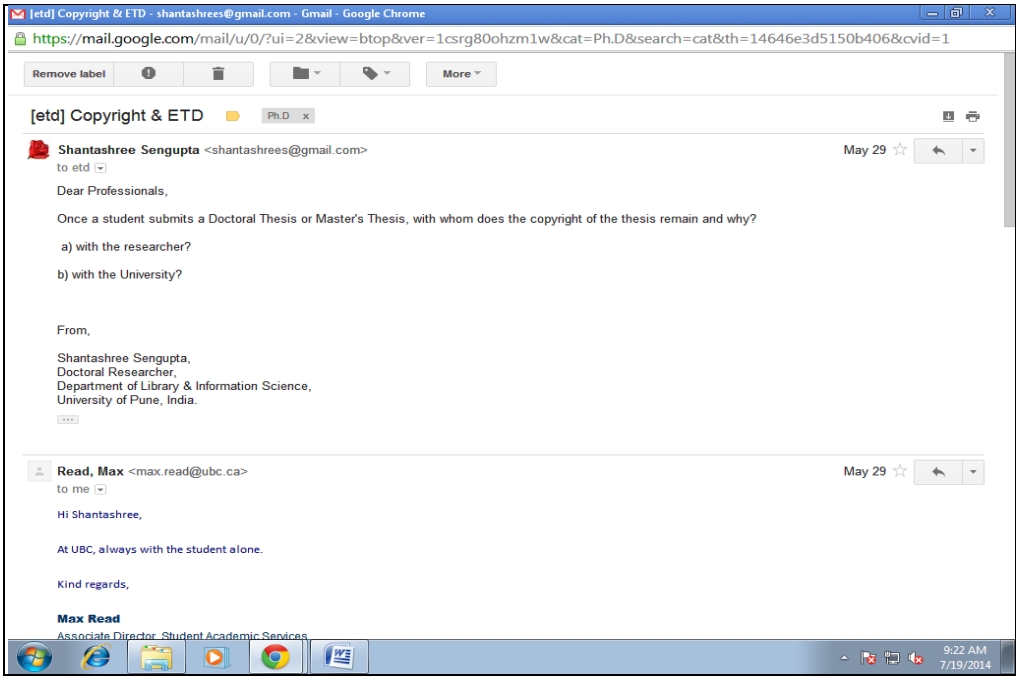

Fig. 4.1: Researcher posted query to NDLTD Mailing Group

Three Repository administrators replied to the query.

i) Max Read (Associate Director, Student Academic Services, Office of the Dean and Vice-Provost, Graduate and Postdoctoral Studies, The University of British Columbia, Vancouver Campus) informed of researchers retaining the Copyright after submitting the ETD.

(Max Read, personal communication, May 29, 2014)

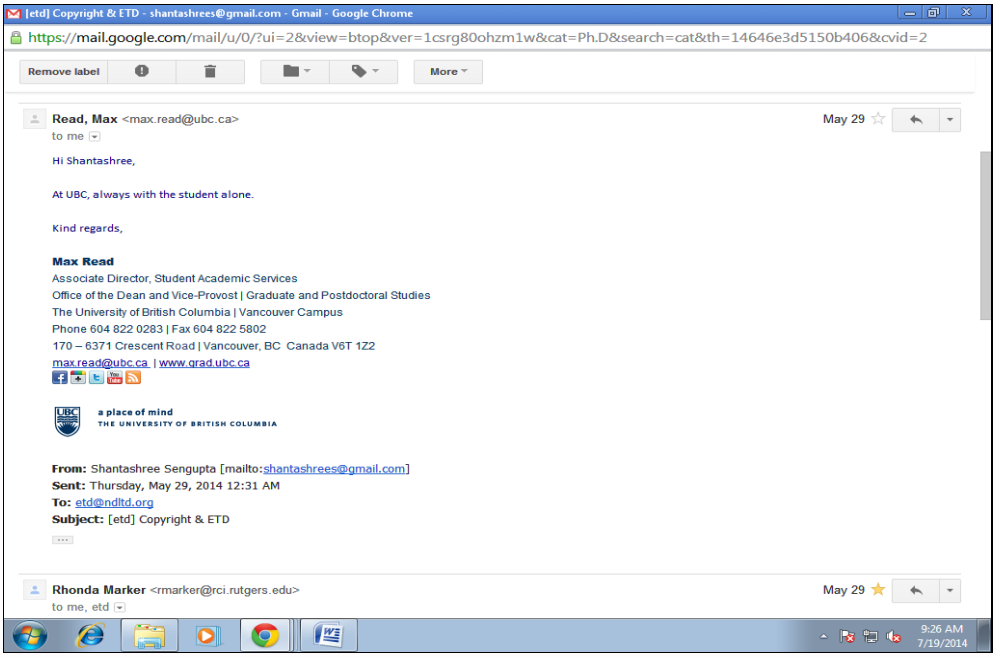

Fig. 4.2: Response to researcher's query by Max Read

ii) **Rhonda Marker (**Head, Scholarly Communication Center, Repository Collection Librarian, Rutgers University Libraries, Rutgers, The State University of New Jersey) mentioned that "university's copyright policy says that the author holds copyright in his/her thesis or dissertation."

Marker also provided the Rutgers University Copyright Policy[25] which reaffirms the faculty's rights to retain copyright ownership to the scholarly and artisticworks they create, such as books, monographs, journal articles, musical compositions, and artwork, in whatever format they are created, print or electronic, without regard to the extent of university resources involved in the creation of these works. Students typically will own the copyright to works created as a requirement of their coursework, degree, or certificate program. The university, however, retains the right to use student works forpedagogical, scholarly, and administrative purposes.

(Rhonda Marker, personal communication, May 29, 2014)

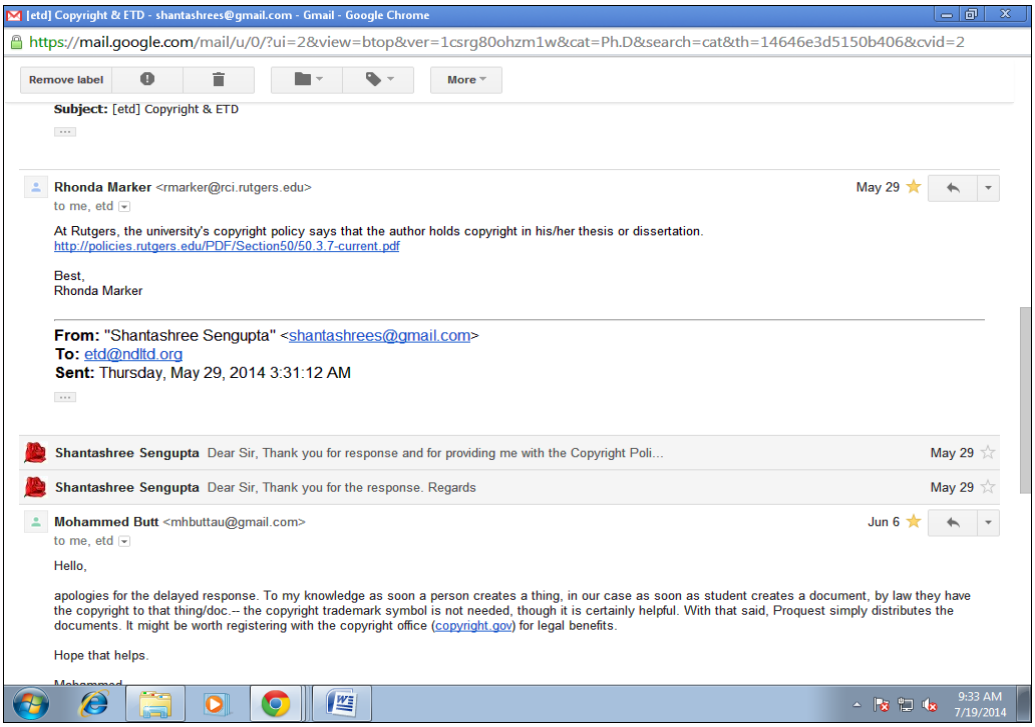

Fig. 4.3: Response to researcher's query by Rhonda Marker & Mohammed Butt

iii) Mohammed Butt (American University Library) mentions that "as soon a person creates a thing, in our case as soon as student creates a document, by law they have the copyright to that thing/doc. The copyright trademark symbol is not needed, though it is certainly helpful. ProQuest simply distributes the documents. It might be worth registering with the copyright office (copyright.gov) for legal benefits.

The responses received from the repository administrators clarify that once the ETD is submitted to the repository, the author of the ETD retains the copyright. (Mohammed Butt, personal communication, June 6, 2014)

4.11 Types of Access Provided for ETDs:

Theses and dissertations are one of the most important forms of grey literature that provide access to the intellectual thoughts of the researcher. It is one of the major sources of scholarly communication. Print formats of theses and

dissertations are kept in closed access in the respective institution/ university's library due to which the research done by the researcher remains locked and unavailable for use. Submission of theses and dissertations in electronic format has made the dissemination of information possible outside the boundaries of institution/university libraries with the help of World Wide Web. However, in order to keep a check in the purpose and amount of use of ETDs, researchers/institutions/universities have developed different types of access categories of ETDs.The types of access as mentioned by UGC, India for ETD are as follows[26]:

1) *Worldwide Access:* This access level allows immediate worldwide access to all ETDs, as soon as they are submitted. Onsite and offsite users can read and download the ETDs.

2) *Campus-only Access:* The access in this category is restricted only to a particular group of users' on-campus. The access is controlled either by IP addresses, a valid ID, or through a proxy server.

3) *Temporary Restricted Access:* The ETD could be restricted for one, two or three years and then it is released for worldwide access, unless the University / Department authorities give an approval for delayed release.

4) *Mixed Access:* The student has the opportunity to release parts of the ETD but not the entire thesis or to publish two versions of a chapter, each with different access levels.

Peter Suber[27], one of the most famous supporters of open access mentions that 'ETDs are the most invisible form of useful literature and the most useful form of invisible literature.' Suber identified nine major reasons for providing mandatory open access to ETDs-

1. Nowadays most theses and dissertations are born digital. They are already ETDs even if the university only wants to deal with printouts.
2. ETDs are Phase One, royalty-free works of research literature. Their authors lose no revenue by consenting to OA.

3. ETDs are not formally published. Hence there are no publishers in the picture to resist or oppose OA. There are no publisher fears of lost revenue to answer. There are no publisher permissions to seek. There are no publisher negotiations to delay or deter OA archiving.
4. Mandates work and exhortations do not. This is the universal lesson from OA mandates to date, whether at funding agencies or universities.
5. OA solves the invisibility problem for ETDs. Without OA, there is almost no access, visibility, or indexing for dissertations. They are hard to retrieve even if discovered, and they are hard to discover. When they are OA, ETDs are not only searchable by cross archive search tools that index the ETDrepositories; they are also indexed (in growing numbers but jerky stages) by Google, Yahoo, and Microsoft. Scirus already indexes the ETDs held by the Networked Digital Library of Theses and Dissertations (NDLTD).
6. Universities are in a good position to mandate OA. They can make it a simple condition of submission and acceptance.
7. Mandating OA for ETDs will educate the next generation of scholars about OA, when they do not already know about it.
8. An OA mandate will elicit better work.
9. Finally, an OA mandate shows that the university takes the dissertation seriously.

Suber strongly believed that OA for ETDs is one of the best ways to increase visibility and impact. He knew about the students fears that OA for ETDs will prevent future publication are understandable but groundless. According to Suber "there are easy work-arounds for ETDs describing patentable discoveries or containing chapters for which copyright has already been transferred to publishers."

4.12 ETD Initiatives at International Level:

4.12.1 Networked Digital Library of Theses and Dissertations (www.ndltd.org)[28]

The Networked Digital Library of Theses and Dissertations (NDLTD) is an international organization dedicated to promoting the adoption, creation, use, dissemination, and preservation of electronic theses and dissertations (ETDs). They support electronic publishing and open access to scholarship in order to enhance the sharing of knowledge worldwide. The website includes resources for university administrators, librarians, faculty, students, and the general public and include topics like how to find, create, and preserve ETDs; how to set up an ETD program; legal and technical questions; and the latest news and research in the ETD community.

The National Digital Library of Theses and Dissertations was established in 1996, directed by an informal steering committee. As its scope became international, the organization kept the acronym NDLTD, but changed its name to the Networked Digital Library of Theses and Dissertations.

4.12.2 DART-Europe E-theses Portal (http://www.dart-europe.eu/)[29]

DART-Europe is a partnership of research libraries and library consortia who are working together to improve global access to European research theses. DART-Europe is endorsed by LIBER (Ligue des Bibliothèques Européennes de Recherche), and it is the European Working Group of the Networked Digital Library of Theses and Dissertations (NDLTD).

The DART-Europe partners help to provide researchers with a single European Portal for the discovery of Electronic Theses and Dissertations (ETDs), and they participate in advocacy to influence future European e-theses developments. DART-Europe offers partners a European networking forum on ETD issues, and may provide the opportunity to submit collaborative funding applications to achieve DART-Europe's vision for ETDs.

4.12.3 DIVA (http://www.diva-portal.org/)[30]

DiVA - Academic Archive On-line, is a publishing system for research and student theses and a digital archive for long-term preservation of publications. DiVA began its development in the year 2000 at Uppsala University Library. Today the technical development is driven by the EPC in co-operation with the participating universities and colleges. All universities and publicly financed research institutions both in Sweden and abroad are welcome to join DiVA in its co-operative effort. DiVA portal is a finding tool for research publications and student theses written at the following 34 universities and colleges of higher education. Publications found in DiVA portal can also be found in the local databases using a local interface.

4.12.4 PQDT OPEN-ProQuest Digital Theses (http://pqdtopen.proquest.com/)[31]

It provides free of charge access to full text of open access theses and dissertations in PDFformat.

4.13 ETD Initiatives: Country Specific

4.13.1 EThOS-Electronic Theses Online Service (http://ethos.bl.uk/)[32]

EThOS is the United Kingdom's national thesis service which aims to maximise the visibility and availability of the UK's doctoral research theses. It demonstrates the quality of UK research, and supports the UK Government's open access principle that publications resulting from publicly-funded research should be made freely available for all researchers, providing opportunities for further research. EThOS helps institutions to meet the expectation of the UK Research Councils according to whom, PhDs supported by a Research Council Training Grant should be made freely available in an open access repository. There are approximately 350,000 records relating to theses awarded by over 120 institutions. Around 120,000

of these also provide access to the full text thesis, either via download from the EThOS database or via links to the institution's own repository. Of the remaining 250,000 records dating back to at least 1800, three quarters are available to be ordered for scanning through the EThOS digitisation-on-demand facility.

4.13.2 Theses Canada (http://www.collectionscanada.gc.ca/)[33]

Canadian universities participate in the program voluntarily by submitting approved theses and dissertation to Theses Canada. Library and Archives Canada (LAC) staff provide advice to Canadian universities that are establishing electronic theses and dissertations (ETD) programs and welcome new electronic participants. Library & Archives Canada (LAC) collection includes two formats, electronic theses and theses on microfiches. The electronic theses and dissertations on this site are for the personal use of students, scholars and the public. Any commercial use, publication or lending of them in libraries is strictly prohibited.

4.13.3 ADT-Australasian Digital Theses Program (http://www.caul.edu.au/)[34]

This program began in 1998 as a project funded by the ARC, transferred to Council of Australian University Librarians (CAUL) in July, 2001, became fully supported by CAUL members in 2003 and CONZUL members from 2006. The ADT officially became the Australasian Digital Theses Program in September, 2005, when CAUL adopted the revised business plan which includes the New Zealand Universities as full members.The Australasian Digital Theses (ADT) Program ceased operation on 28 March, 2011. The database server has been decommissioned, and the content of that database is accessible from the National Library of Australia's Trove service. Each participating university will continue to host their own digital theses and house their own print and other non-digital theses.

4.13.4 DissOnline & Online Dissertations at the German National Library (http://www.dnb.de/EN/Wir/Kooperation/dissonline/dissonline_node.html)[35]

The German National Library has the largest national collection of online dissertations in Europe. Since 1998, it holds the German National Library online dissertations and post-doctoral theses; the stock has since grown to more than 120,000 documents.

4.13.5 NARCIS (http://www.narcis.nl/)[36]

National Academic Research and Collaborations Information System (NARCIS) is the main national portal for those looking for information about researchers and their work. Besides researchers, NARCIS is also used by students, journalists and people working in educational and government institutions as well as the business sector.NARCIS provides access to scientific information, including (open access) publications from the repositories of all the Dutch universities, KNAW, NWO and a number of research institutes, datasets from some data archives as well as descriptions of research projects, researchers and research institutes.

4.13.6 National ETD Portal-South African theses and dissertations (http://www.netd.ac.za/)[37]

This site is run by the University of Cape Town UCT-CS Digital Libraries Laboratory on behalf of the NDLTD. Metadata for all theses and dissertations produced internationally are collected and made accessible, as well as disseminated further, from this site.

4.13.7 China Doctoral/Master Dissertation Database (http://www.cnki.net/)[38]

The database has collected dissertations covering basic science, engineering technologies, agriculture, medical science, philosophy, humanity, social sciences, and so on. By June 2011, the database had collected more than 1,50,000 excellent domestic doctoral dissertations from 397 institutions and 11,50,000 excellent domestic master dissertations from 598 institutions.

4.13.8 DATAD- Database of African Theses & Dissertations (www.aau.org)[39]

African research results are rarely indexed in major international databases, a problem that is further exacerbated by the inaccessibility of theses and dissertations completed in the region, many of which contain local empirical data that is not available in international literature. The Association of African Universities (AAU) found it necessary to initiate and support efforts towards putting Africa's research output onto the mainstream of world knowledge. The ideaof DATAD was born out of a project in 2000 as a result of a positive recommendation of a feasibility study carried out for a pilot project to index, abstract, and distributes theses and dissertations completed in African universities. The Database of African Theses and Dissertations (DATAD) is a programme to improve management and access to African scholarly work. Theses and dissertations represent a significant proportion of Africa's research activity.

4.14 ETD Initiatives in India (Full-text):

4.14.1 Shodhganga (http://shodhganga.inflibnet.ac.in)[40]

"Shodhganga" is the name coined to denote digital repository of Indian Electronic Theses and Dissertations set-up by the INFLIBNET Centre. The word "Shodh" originates from Sanskrit and stands for research and discovery. The "Ganga" is the holiest, largest and longest of all rivers in Indian subcontinent. The Ganga is the symbol of India's age-long culture and civilisation, everchanging, ever-flowing, ever-loved and revered by its people, and has held India's heart captive and drawn uncounted millions to her banks since the dawn of history. Shodhganga stands for the reservoir of Indian intellectual output stored in a repository hosted and maintained by the INFLIBNET Centre.

The Shodhganga@INFLIBNET is set-up using open source digital repository software called DSpace. The DSpace uses internationally recognized protocols and interoperability standards. Shodhganga provides a platform for research scholars to deposit their Ph.D. theses and make it available to the entire scholarly community in open access. The repository has the ability to capture, index, store, disseminate and preserve ETDs (Electronic Theses and Dissertations) submitted by the researchers.At present 182 Universities have signed MoU with Shodhganga and 18143 theses are uploaded.

ShodhGangotri is the Repository of Research in Progress in India in various universities in variety of subjects. Shodhganga is an extension to ShodhGangotri.

4.14.2 Vidyanidhi Digital Library of Indian Doctoral Dissertations (http://dspace.vidyanidhi.org.in:8080/dspace)[41]

Vidyanidhi (Meaning 'Treasure of Knowledge' in Sanskrit) is India's premier Digital library initiative to facilitate the creation, archiving and accessing of doctoral theses. This project was initiated in the year 2000 at the Department of Library & Information Science, University of Mysore, Manasagangotri, Mysore sponsored by the National Information System for Science and technology (NISSAT), Department of Scientific & Industrial Research, Ministry of Science & technology, Government of India. The initiative is supported and founded by The Ford Foundation and Microsoft Foundation. It also has a strategic support from the University Grants Commission (UGC).

4.14.3 CSIR Explorations (http://eprints.csirexplorations.com/)[42]

CSIR Explorations is a digital library of electronic dissertations, theses and research reports of the fellowships and projects supported by CSIR. URDIP is working in close association with the Human Resource Development Group of CSIR and National Information System for Science and Technology (NISSAT) of DSIR to put this database of basic research in the public domain on the World Wide Web It is developed using EPrints.

e-Thesis is a database of doctoral theses submitted by CSIR fellows. It is the only one central authoritative source for information about CSIR doctoral dissertations. The potential users of this database include doctoral candidates who would like to make sure that their proposed thesis topics have not already been written about. Students, faculty and other researchers may search it for titles related to their scholarly interests. The database represents the work of authors from over 250 national laboratories, universities and research institutes in India.

4.14.4 KrishiPrabha (http://krishikosh.egranth.ac.in/)[43]

KrishiPrabha is a full-text electronic database of Indian Agricultural Doctoral Dissertations submitted by research scholars to the 36 State/Deemed Agricultural Universities during the period from 1.1.2000 to 31.12.2006. This database has been created by Nehru library, Ch. Charan Singh Haryana Agricultural University, Hisar with financial support from Indian Council of Agricultural Research, New Delhi under its National Agricultural Innovation Project.

4.14.5 Librarians' Digital Library (http://drtc.isibang.ac.in)[44]

Librarians' Digital Library is a repository where any digital resource related to Library and Information Science domain can be archived by anyone across the world. The site is not updated anymore.

4.14.6 DELNET Database of Theses and Dissertations[45]

A database of Theses and Dissertations submitted to Indian Universities has been started, which covers various subjects. The database has 70,293 records. Access is provided only to DELNET members.

4.14.7 NASSDOC Database of Ph.D Dissertations[46]

National Social Science Documentation Centre (NASSDOC) was established in 1969 as a division of Indian Council of Social Science Research (ICSSR). It provides library and information support services to researchers in social science. It provides access to bibliographic details of 5000 dissertations in Social Sciences.

4.15 ETD Directories/ Registries:

4.15.1 ROAR-Registry of Open Access Repositories (http://roar.eprints.org) [47]

The aim of ROAR is to promote the development of open access by providing timely information about the growth and status of repositories throughout the world. Open access to research maximises research access and thereby also research impact, making research more productive and effective. ROAR is hosted at the University of Southampton, UK and is made possible by funding from the JISC. ROAR is part of theEPrints.org network. Presently it holds information about 3793 repositories across the globe in 12 types of content. It provides information about 284 repositories containing ETDs.

4.15.2 OpenDOAR (www.opendoar.org)[48]

The Directory of Open Access Repositories (OpenDOAR) is an authoritative directory of academic open access repositories. OpenDOAR is one of the SHERPA Services including RoMEO and JULIET, run by the Centre for Research Communications (CRC). Current development work is currently funded by JISC, with contributions from the CRC host organisation, the University of Nottingham. Repositories need to be categorised with clear information on their policies regarding tagging peer-reviewed/non peer-reviewed material, their subject coverage, the constituency they draw on for content, their collection and preservation etc.Presently it provides

information about 2700 repositories from the world in 12 types of content. It provides information about 1474 repositories containing ETDs.

4.15.3 OAIster (www.oaister.org)[49]

OAIster began at the University of Michigan in 2002 funded by a grant from the Andrew W. Mellon Foundation and with the purpose of establishing a retrieval service for publicly available digital library resources provided by the research library community. During its tenure at the University of Michigan, OAIster grew to become one of the largest aggregations of records pointing to open access collections in the world.

In 2009, OCLC formed a partnership with the University of Michigan to provide continued access to open access collections aggregated in OAIster. Since OCLC began managing OAIster, it has grown to include over 30 million records contributed by over 1,500 organizations. OCLC is evolving OAIster to a model of self-service contribution for all open access digital repositories to ensure the long-term sustainability of this rich collection of open access materials. OAIster data is harvested from Open Archives Initiative (OAI)-compliant digital libraries, institutional repositories and online journals using the self-service WorldCat Digital Collection Gateway. OAIster.worldcat.orgis a freely accessible OCLC site for searching the millions of OAIster records alone.

4.15.4 BASE-Bielefeld Academic Search Engine (http://www.base-search.net/)[50]

BASE is one of the world's most voluminous search engines especially for academic open access web resources. BASE is operated by Bielefeld University Library.As the open access movement grows and prospers, more and more repository servers come into being which use the "Open Archives Initiative Protocol for Metadata Harvesting" (OAI-PMH) for providing their contents. BASE collects, normalises, and indexes these data. BASE provides more than 60 million documents from more than 3,000 sources. It provides access to the full texts of about 70% of the indexed documents. The index

is continuously enhanced by integrating further OAI sources as well as local sources. Our OAI-PMH Blog communicates information related to harvesting and aggregating activities performed for BASE.BASE is a registered OAI service provider and contributed to the European project "Digital Repository Infrastructure Vision for European Research" (DRIVER). Database managers can integrate the BASE index into your own local infrastructure (e.g. meta search engines, library catalogues) via an interface.

4.15.5 ScientificCommons (http://en.scientificcommons.org/)[51]

ScientificCommons is a project of the University of St. Gallen Institute for Media and Communications Management. The major aim of the project is to develop the world's largest archive of scientific knowledge with full-texts freely accessible to the public. It includes a search engine for publications and author profiles. It also allows the user to turn searches into customized RSS Feeds of new publications. ScientificCommons also provides a full-textcaching service for researchers. Since the beginning of 2013, ScientificCommons has been inaccessible.

4.16 UNESCO's Contribution towards ETD:

The UNESCO Guide to Electronic Theses and Dissertation[52] promotes the sharing of knowledge available in universities across the world. The Guide is specifically designed by academic researchers. The Guide is an international, "living" document, written by ETD scholars throughout the world. It is published and mainly funded by UNESCO. It was prepared by an international team of faculty and staff; coordinated by Shalini Urs and edited by Joseph Moxley. This work is a living document that will continue to be updated in connection with the work of the Networked Digital Library of Theses and Dissertations; It was born as a result of the support provided by UNESCO in grants given to Virginia Tech, USA and the University of Montreal.

Participants in the project are from the Australian Digital Theses Project, the Humboldt-University Berlin, Germany, the Ibero-American Science Technology Education Consortium (ISTEC), the National Library of Portugal, the Digital Library of Indian Electronic Theses (VIDYANIDHI), the Virginia Tech University, USA; the University of Chile, the University of Lyon, France, and the University of Montreal, Canada. At present it is available in English and Spanish. French, Russian and German versions are under preparation due to presence of various translators funded in part by UNESCO, and others volunteering their assistance.

The UNESCO ETDs Guide aims to help all those interested in projects and programmes involving ETDs. Its goal is of aiding students of every university in creating electronic documents and using digital libraries. It has particular focus on the emerging genre of ETDs, which should enhance the quality, content, form, and impact of scholarly communication that involves students engaged in research. The guidelines given intend to help universities to develop their local infrastructure, especially regarding electronic publishing and digital libraries, which in turn build upon networking, computing, multimedia, and related technologies.
The various sections of the Guides are aimed to address the needs of universities (including administrators and faculty), students (including those who wish to create ETDs as well as those who wish to make use of already-created works), and those involved in training or setting up ETD projects or programmes.

4.17 How to Set Up an ETD Program

NDLTD has provided the most comprehensive and Model Guidelines to Set up an ETD Program. [53]

Step 1: Assemble the team

Set up a project team with representatives from the library, the IT department, the Faculty of Graduate Studies, senior administrators from

the university, and the Graduate Student Association. It is important to have cross-institutional representation in order to develop a balanced initiative.

Step 2: Prepare the Proposal

Prepare a pilot project proposal for consideration by the appropriate university administrators. This is the stage during which you should work out policies specific to your university.

You may want to include information about ETDs providing increased exposure to the university and graduate students' research and scholarship, publication potential, intellectual property and rights management, plagiarism, orientation and training, standards, costs, restrictions on access, archiving and preservation.

Step 3: Decide on Software and Metadata

This is also the time to decide which technical infrastructure you plan to use. These days most universities are implementing institutional repositories (IRs), which include ETD collections. There are any number of choices of institutional repository software available, both open source and proprietary. Some examples of open source systems include: Archimede, DSpace, Eprints, Fedora, and ETD-db. The latter is specifically designed for theses. Examples of proprietary systems include: Digital Commons, CONTENTdm, DigiTool, Open Repository, and Vital. Smaller institutions that have no IR may choose a remote-host option, such as Open Repository through BioMed Central. Digital Commons provides a total beginning-to-end submission package. Other non-IR options include: the ETD Administrator from ProQuest/UMI and VALET for ETDs from VTLS. The NDLTD highly recommends use of ETD-MS, the metadata standard specifically for electronic theses and dissertations. This standard includes minimal basic descriptive information related to an ETD. Other popular metadata schemes include Dublin Core

and MARC.

Step 4: Create an ETD Website

Once the project is approved, set up a website for ETDs. This can be done by the IT staff at your university or by the university library or graduate school. Information on the websiteshould include an overview of your ETD program, submission guidelines, ETD procedures, policies, information on tutorials etc.

Step 5: Train Graduate Students

Implement an orientation and training program for graduate students. They may need training on all aspects of ETDs, including creating the word document, application of styles, use of templates, conversion to PDF, and submitting online to the institutional repository. Some universities offer in-person training sessions and/or online training resources. Ohio State University has a tutorial on Creating a PDF. West Virginia University also has a Convert to PDF tutorial. The University of Victoria, Canada, has developed the online tutorial How to Submit an ETD.

Step 6: Set Up the ETD Workflow

Establish the ETD workflow, deciding who is responsible for the various stages of the process from submission to approval, preservation, and access. In the most common scenario students upload their ETD files to the Graduate School office where they are reviewed, approved, and released to the Library for preservation and access. The metadata is then made available for harvesting by other organizations, such as Google Scholar or the NDLTD.

Step 7: Establish a Pilot Project

Run a pilot project either with a limited number of students or with one or two specific departments for a semester or another limited time period. This will allow you to fine-tune your procedures and workflow. As few as

20 or 30 ETDs are sufficient to run a pilot project.At the end of their pilot projects some universities adopt a voluntary e-theses submission model for a set time period before moving to mandatory submission of electronic theses and dissertations. If possible, the best practice is to recommend mandating ETDs at your institution as soon as you begin your ETD submission program (by decree by the Provost or Graduate School Dean, on recommendation of faculty governance).

Step 8: Prepare for OAI Harvesting

Once your ETD submission program is established, have your IT staff prepare your ETD collection for Open Access Initiative (OAI) harvesting. The IT staff should read the Technical Requirements in order to implement the IR as an OAI data repository. Some systems have a built-in OAI interface. An open source version called OAIcat from OCLC is available online.

Step 9: Evaluate and Enhance the Program

Like any program, your institution's ETD submission program should be periodically evaluated and enhanced.

- Software should be upgraded.
- Graduate School staff should always be aware of policy changes and how copyright impacts the program.
- IT staff must monitor appropriate listservs in order to become aware of upgrades, enhancements, and security issues.
- Library staff can implement enhancements to the program, such as creating catalogue records automatically from the ETD-MS metadata.
- Administrators should be aware of changing standards (e.g., PDF/A) and legislation (e.g., copyright, privacy issues, etc.).
- To stay informed about ETDs, your institution may want to become a member of NDLTD, subscribe to the ETD-L and network with NDLTD in Facebook.

4.18 ETD Terms and Definitions:

Some of the most commonly used terms and their definitions related to electronic thesis and dissertations are given below:[54]

1) **Access Type:**

   The manner in which an ETD is made available (or not) to the university community and/or public.

2) **Archiving:**

   The application of processes, techniques and protocols to preserve the scholarly record over time.

3) **Availability:**

   Level of access to which an ETD is available to the general public or in the institutional repository.

4) **Born Digital:**

   An item is born–digital if it has been generated entirely electronically by using a word-processor and/or electronic composition software. For electronic files which have been produced by scanning.

5) **Copyright:**

   A form of protection grounded in the U.S. Constitution and granted by law for original works of authorship fixed in a tangible medium of expression. Copyright covers both published and unpublished works. As intellectual property law, copyright protects original works of authorship including literary, dramatic, musical, and artistic works, such as poetry, novels, movies, songs, computer software, and architecture.

6) **Closed Access:**

   The full text and sometimes the metadata of closed access ETDs are only available to authorized members of University staff and external examiners for administrative purposes. This is also known as an

'embargoed' or 'No Access'ETD.

7) **Creative Commons:**

A non-profit corporation dedicated to making it easier for people to share and build upon the work of others, consistent with the rules of copyright. They provide free licenses and other legal tools to mark creative work with the freedom the creator wants it to carry, so others can share, remix, use commercially, or any combination there of.

8) **Digital Library:**

A managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network.

9) **Digital Preservation:**

The management process of ensuring digital objects and information are accessible over the long term. Development of standards, format compatibility, format migration and systems interoperability are important aspect of this process. Digital preservation systems are under development to provide appropriate digital preservation techniques.

10) **Dissertation:**

A research document written by a post-Master, Doctoral-level student. The term 'dissertation' may be used in some countries or universities to mean a post-baccalaureate, Master-level research project.

11) **Dissemination:**

Methods of distributing electronic documents on the Web.

12) **Embargo:**

Restricting access to an electronic document for a specific period of time. Also, called Publication Delay.

13) EPrint:

Any version of a work available online which has been either submitted for formal publication or has been accepted after formal review. The term encompasses both preprint and post-print.

14) Fair Use:

One of the more important copyright limitations is the doctrine of 'fair use.' The doctrine of fair use has developed through a substantial number of court decisions over the years and has been codified in section 107 of the copyright law. Section 107 contains a list of the various purposes for which the reproduction of a particular work may be considered fair, such as criticism, comment, news reporting, teaching, scholarship, and research. Section 107 also sets out four factors to be considered in determining whether or not a particular use is fair:

1. The purpose and character of the use, including whether such use is of commercial nature or is for non-profit educational purposes
2. The nature of the copyrighted work
3. The amount and substantiality of the portion used in relation to the copyrighted work as a whole
4. The effect of the use upon the potential market for, or value of, the copyrighted work

The distinction between fair use and infringement may be unclear and not easily defined. There is no specific number of words, lines, or notes that may safely be taken without permission. Acknowledging the source of the copyrighted material does not substitute for obtaining permission.

15) Infringement:

Misuse of copyrighted material.

16) Institutional Repository:

An online database that provides access to digital collections such as

theses and dissertations for online viewing and provides the associated metadata regarding the documents (e.g. student and university name, year of graduation, document title, abstract, keywords). A type of digital repository designed to collect the work of a particular institution.

17) Intellectual Property Rights:

Intellectual property (IP) refers to creations of the mind: inventions, literary and artistic works, and symbols, names, images, and designs used in commerce. IP is divided into two categories: Industrial property, which includes inventions (patents), trademarks, industrial designs, and geographic indications of source; and Copyright, which includes literary and artistic works such as novels, poems and plays, films, musical works, artistic works such as drawings, paintings, photographs and sculptures, and architectural designs. Rights related to copyright include those of performing artists in their performances, producers of phonograms in their recordings, and those of broadcasters in their radio and television programs.

18) Keywords:

Search terms or phrases relating to the item/body of work. Keywords are often words or phrases from the document title and/or abstract, are discipline-specific and which provide topic/subject search terms for online discovery.

19) LOCKSS:

Lots of Copies Keeps Stuff Safe. Originally developed the Stanford University Libraries, this digital preservation methodology allows inter-institutional sharing of archival collections. The NDLTD participates in the MetaArchive cooperative, a consortium of LOCKSS institutional partners.

20) Mandate:

Required ETD submission policy. Often the University President, Provost, or Graduate School Dean may implement such a policy to launch an ETD program at their institution.

21) Metadata:

Data that describes other data. For items in open access repositories, this usually consists of a full bibliographic reference, abstract, keywords, and similar information about the related digital object(s) (i.e. ETDs).

22) Open Access:

Information readily available on the Web at no cost and without access restrictions.

23) Open Access Initiative:

The OAI develops and promotes interoperability standards that aim to facilitate the efficient dissemination of content. Its major contribution is the OAI Protocol for Metadata Harvesting (OAI-PMH), a set of guidelines that enable repositories to expose the metadata describing their content to service providers who harvest the metadata into large aggregations.

24) OAI-PMH:

Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). Standards for metadata harvesting.

25) OpenDOAR:

The Directory of Open Access Repositories. Allows users to search for specific repositories, or search within the contents of all the repositories in the directory.

26) Plagiarism:

The use or close imitation of the language and thoughts of another author and the representation of them as one's own original work. Within academia, plagiarism by students, professors, or researchers is considered academic dishonesty or academic fraud, and offenders are subject to academic censure, up to and including expulsion. The development of the Internet, where articles appear as electronic text, has made the physical act of copying the work of others as well as the detection of plagiarism much easier.

27) Preservation:

The management process of ensuring printed and digital objects and information are accessible over the long term.

28) Print-only Access:

Theses and dissertations are in paper and are placed on library shelves. Secure method to assure few people will ever view theses and dissertations. ETD is accessible only from library shelves or Interlibrary Loan. May also apply to some ETD programs where an indefinite campus restriction is allowed. Although ETD submission may be required, access may be limited to login for authorized university community or by interlibrary loan request by print distribution.

29) Restricted Access:

For ETDs this generally signifies that the complete work or aspects of the work will not be accessible to the public for a specific period of time. During this time the ETD may or may not be available to the university community, although the metadata is generally available to the public. This term may used to refer to ETDs that are available to a limited population as well as ETDs where access is embargoed.

30) RoMEO Project:

A project that defined the archiving policies of publishers. Now part of SHERPA. You will see publishers defined as having a Romeo color of white, yellow, blue, and green, which mean:

- White: archiving not formally supported
- Yellow: can archive preprint (i.e., re–refereeing)
- Blue: can archive post–print (i.e., final draft post–refereeing)
- Green: can archive preprint and post-print

31) Scholarly Communications:

The creation, transformation, dissemination and preservation of knowledge related to teaching, research and scholarly endeavours. Among the many scholarly communications issues include author rights, the economics of scholarly resources, new models of publishing including open access, institutional repositories, rights and access to federally funded research, and preservation of intellectual assets.

32) Self-archiving:

Placing a copy of your work in a digital/institutional repository or professional or departmental website.

33) Sequestered:

The act of removing, separating or seizing anything from the possession of its owner under process of law for the benefit of creditors or the state. For ETDs, this is usually an 'embargoed' or 'No Access' condition, typically requested for security purposes.

34) SPARC:

The Scholarly Publishing and Academic Resources Coalition is an international alliance of academic and research libraries working to correct imbalances in the scholarly publishing system.

35) SWORD:

A repository deposit protocol; in other words, a way to get items into the repository. Funded and supported by the Joint Information Systems Committee (JISC), SWORD allows you deposit resources (like electronic theses and dissertations) into repositories powered by platforms such as DSpace, Eprints, Fedora, IntraLibrary, and Zentity.

36) University-only Access:

The full text of university-only ETDs are only available to authorized members of University students, faculty and staff, or in some situations access may be restricted within a State or consortium arrangement of member schools via login or IP restriction. Many universities allow interlibrary loan service to provide print and/or electronic versions as requested from other academic libraries.

37) Withheld:

Theses and dissertations are withheld from the public for a certain period of time or indefinitely.

4.19 Summary:

The present chapter gives the overview of Electronic theses and Dissertations by explaining various concepts related to ETDs.

The chapter starts with the sneak preview of historical events which led to the production of first E-thesis in 1992 by Virginia Tech. The researcher discussed various definitions of ETDs given by various international organizations and reference source. A comprehensive definition of ETD is also stated by the researcher.

The chapter then proceeds to benefits and risks involved in submitting theses or dissertation in electronic format. The researcher mentions NDLTDs

'Standard Set of Metadata Elements' which can be used as a standard for sharing information about ETDs by the institutions.

Various file formats included in electronic format of theses and dissertations is also discussed. PDF is the exclusively used format for submitting full-text of ETDs. But there are various other formats used for submitting additional files. The next section explains very important concept for ETDs related to Preservation and Copyright of ETDs. The researcher discussed definition of digital preservation, need, concept of long term preservation, criteria for selecting most appropriate digital preservation strategy for an institution, benefits and various traditional and modern strategies of preservation used for archiving and preserving the ETDs. Views of other authors and Copyright Act are presented in this section.

The discussion now proceeds towards brief introduction of some fully operational ETD Projects at International Level, Specific Country related ETDs, Full-text ETD Projects in India and various Directories/Registries which provide list of E-theses Repositories.

The concluding section presents NDLTDs Guide to Set up ETD Program in an Institution. Also, there are numerous technical terms involved in ETD Program. The researcher listed some of the most commonly used terms and provided definitions. The terms are selected from USETDA and NDLTDs ETD Terms and Definitions. Being pioneering international organization, NDLTD explained ETD from various angles.

The next chapter analyses the data collected with the help of responses received to the web survey questionnaire sent through e-mail to various E-theses repositories across the globe.

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CHAPTER 5

DATA ANALYSIS & INTERPRETATION

5.1 E-Theses Repository Development & Management

The present chapter analyses and interprets the responses received from the web survey questionnaire. The questionnaire was prepared through SurveyMonkey which is an online questionnaire tool. The survey questionnaire web-link was e-mailed along with a covering letter to the E-theses repository developers/managers.

Out of the 154 E-thesis repositories to whom the e-mail was sent, 96 responded, making the response rate to 62.33%. After closing the survey, the researcher exported the data collected into Microsoft Excel with the help of the Export facility available in SurveyMonkey. The collected data is even represented in graphs and charts which facilitated better analysis of results.

The questionnaire contained forty-nine questions which were divided into following eleven sections:

- Personal & Institutional Information
- Background Information
- Repository Materials
- Hardware & Software
- Accessibility Issues
- Budget Considerations
- Human Resource
- Metadata Standards and Interoperability
- Preservation Policy
- Copyright/IPR Issues
- Additional Information

The sections can be briefed as follows,

1) **Personal & Institutional Information:**

   The present section covered eight questions related to basic the institute and the E-theses repository manager.

2) **Background Information:**

   This section contained ten questions for collecting background information to understand issues regarding implementation, pre-requisites and factors that acts as barriers for setting up of an E-theses repository.

3) **Repository Materials:**

   The present section had five questions which aimed to find out the type of documents covered in the E-theses repository and the various file formats supported by the repository.

4) **Hardware and Software:**

   Proper selection of hardware and software is an important part of setting-up a repository. The four questions included in this section will help to understand the type of software chosen and the reasons behind selecting it.

5) **Accessibility Issues:**

   The purpose of the six questions of this section is to collect information regarding issues related to accessibility, contributors of ETDs, and techniques applied by the repositories to monitor usage.

6) **Budget Considerations:**

   Financial support is very important factor for the set-up of a repository. The two questions of this section will provide information regarding the source of funding for implementation of ETD Program and will also inform about the percentage of fund allocated for overall maintenance and staff of the repository.

7) **Human Resource:**

Human Resource is the main component for the development of a Repository. The three questions of this section will provide information regarding the people who developed the E-theses Repository, whether the Repository Management is an individual person's work or is it a team work and staff employed for the development and maintenance of the repository.

8) **Metadata Standards & Interoperability:**

This section contains two questions related to Metadata standards ot the E-theses Repository.

9) **Preservation Policy:**

Preservation of documents is of major concern in the world of electronic documents. The present set of five questions will help the researcher to collect information about the various digital preservation policies that are applied for preserving ETDs. This section also deals with the issues related to withdrawing policy of the ETD from the repository.

10) **Copyright/Intellectual Property Right Issues:**

Copyright and IPR issues is of great concern in the electronic era. The following section deals with four questions related to provision of Copyright Information,Copyright Owner of the ETD after submission and measures taken by the repository to protect ETDs from getting plagiarized.

11) **Additional Information:**

The concluding section of the questionnaire contains eight questions and deal with various issues related to E-theses Repository Manager's own experience during the set-up of the repository, indexing of the repository in search engines and directories, languages covered and links provided by the repository to other ETD Projects.

SECTION-1: PERSONAL & INSTITUTIONAL INFORMATION

Q1. Please provide the following information:

Sr.No.	Answer Options	Response Percent	Response Count
a	Salutation (Dr/ Mr/ Ms etc.)	90.5%	86
b	Name	94.7%	90
c	Job Position	95.8%	91
d	Name of the Institution/ University	100.0%	96
e	Repository Name	100.0%	96
f	URL of the E-theses Repository	96.8%	92
g	Subject coverage of the Institution/ University	95.8%	91
h	Subject coverage of the E-theses Repository	94.7%	90
i	Country	100.0%	96

Table 5.1: Personal Information of the E-theses Repository Administrator

Question 1 is related to the General Information regarding the E-theses Repository Developer or Manager. It also provides information regarding the Repository name, Website address of the repository, Subject coverage of the Institute/ University, Subject Coverage of the E-theses Repository and Country to which it belongs.

93.7% (90) repository administrators mentioned their names. 95.8% (92) repositories have their own URLs through which the ETDs can be accessed on internet. Having website of institutional repository or E-theses repository increases the possibility of getting indexed by search engines and repository directories like ROAR, OpenDOAR etc. The in-depth analysis and interpretation of the data collected is as follows:

a) Salutation:

Sr.No.	Salutation	Responses Received	Percentage
1	Dr.	14	14.6%
2	Prof.	01	1.0%
3	**Mr.**	**38**	**39.6%**
4	Mrs.	09	9.4%
5	Ms.	28	29.2%
6	Not Mentioned	06	6.2%
	Total	**96**	**100%**

Table 5.1.1: Salutation of E-theses Repository Administrators

Table 5.1.1 shows that out of the 96 E-theses Repository Managers who have responded to the questionnaire, 14.6% possess Doctorate Degree (Ph.D) and only 01 repository administrator have Professor Rank. Being foreign names, in some cases, it was not possible to recognize the gender.

b) Job Position

Sr.No.	Job Position	Responses Received	Percentage
1.	Academic Support Librarian and Repository Manager	01	1.1%
2.	Assistant Dean	01	1.1%
3.	Assistant Librarian	04	4.2%
4.	Associate Director	01	1.1%
5.	Bibliographic Access and Metadata Coordinator	01	1.1%
6.	Deputy Director	01	1.1%
7.	Digital Curation Co-ordinator	01	1.1%
8.	Digital Librarian	03	3.2%
9.	Digital Repository Co-ordinator	04	4.2%

10.	Director Library Services	03	3.2%
11.	Electronic Resources Librarian	01	1.1%
12.	Head Electronic Publishing Group	01	1.1%
13.	Head of Information Management	01	1.1%
14.	Head, Digital Initiatives	02	2.1%
15.	Information Technology Engineer	01	1.1%
16.	IR Librarian	03	3.2%
17.	IT manager	01	1.1%
18.	**Librarian**	**27**	**28.5%**
19.	Library and Information Officer & Head	01	1.1%
20.	Library assistant	01	1.1%
21.	Library Manager	01	1.1%
22.	Library Systems Administrator	01	1.1%
23.	Library Technician & Institutional Repository Manager	02	2.1%
24.	Metadata Control and Cataloguing	01	1.1%
25.	Metadata Librarian	01	1.1%
26.	Principal Technical Officer	02	2.1%
27.	Professor	01	1.1%
28.	Program Manager	02	2.1%
29.	Repository Administrator	10	10.5%
30.	Repository Manager	03	3.2%
31.	Scholarly Communication Librarian	03	3.2%
32.	Scientific Information Officer	01	1.1%
33.	Systems Librarian	03	3.2%
34.	Not Mentioned	04	4.2%
	Total	**96**	**100%**

Table 5.1.2: Variety of Job Positions

Table 5.1.2 provides the list of Job Positions held by professionals managing the E-theses Repository. The researcher could come across various job

positions around the world who manage the functioning of E-theses Repository. Ninety five participating institutions responded to the question.

Thirty-four different Job Positions were found, in which 28.5% E-theses Repositories were managed by Librarians, followed by 10.5% which are managed by Repository Administrators and 4.2% by Assistant Librarian and Digital Repository Co-ordinator. There were four respondents who did not mention their Job Position.

c) Subject Coverage of the Institution/ University and Subject Coverage of the E-theses Repository

Sr.No.	Subject	Response Received	Percentage
1	Engineering	24	25.00%
2	Medical Science	18	18.75%
3	Chemistry	14	14.58%
4	Physical Sciences	12	12.50%
5	Humanities	11	11.45%
6	Arts	11	11.45%
7	Social Sciences	11	11.45%
8	Technology	10	10.41%
9	Economics	08	8.33%
10	Education	07	7.29%
11	Business	06	6.25%
12	Law	06	6.25%
13	IT	06	6.25%
14	Life Science	05	5.20%
15	Management	04	4.16%
16	History	04	4.16%
17	Architecture	03	3.12%
18	Environment	03	3.12%
19	Psychology	03	3.12%

20	Sports Science	03	3.12%
21	Computer Sciences	03	3.12%
22	Animal Sciences	03	3.12%
23	Languages	03	3.12%
24	Aerospace	02	2.08%
25	Library Science	02	2.08%
26	Pharmacy	02	2.08%
27	Theology	02	2.08%
28	Veterinary Science	02	2.08%
29	Political Science	02	2.08%
30	Food Science	02	2.08%
31	Media & Communication	02	2.08%
32	Administration	01	1.04%
33	Agriculture	01	1.04%
34	Correctional Research	01	1.04%
35	Fine Arts	01	1.04%
36	Metallurgy	01	1.04%
37	Music	01	1.04%
38	Natural Resources	01	1.04%

Table 5.1.3: Subject Coverage of the Institution/University & E-thesesRepository

The Subject Coverage of the Institution as well as the E-theses Repository was found to be similar. The results obtained regarding the subject coverage of the institution/E-theses repository is tabulated in Table 5.1.3. It was found that the repositories contained e-theses belonging to 38 different subjects.

The data received shows that of the participating institutions, 25% of the institutions contain E-theses submitted in various areas of 'Engineering', followed by 18.75% institutions which contain E-theses in Medical Sciences, Chemistry (14.58%) and so on.

The above data also indicates that 80% of E-theses Repositories are dedicated to Scientific Subjects, which is much higher compared to the Arts, Humanities &Social Sciences. This proves that major amount of research is done in scientific subjects and ETDs have made a major impact in scientific subjects compared to their social science counterparts.

d) Country wise Distribution of E-theses Repositories:

Sr.No.	Country	No. of E-thesis Repositories to which Questionnaire was sent	No. of E-thesis Repositories Responded	Percentage
1	**USA**	**27**	**23**	**23.95%**
2	India	27	12	12.50%
3	United Kingdom	14	08	8.33%
4	Sweden	06	06	6.25%
5	Australia	05	04	4.16%
6	Canada	04	04	4.16%
7	Ireland	04	04	4.16%
8	South Africa	04	04	4.16%
9	Italy	03	03	3.12%
10	Netherlands	03	03	3.12%
11	Malaysia	03	02	2.10%
12	Norway	03	02	2.10%
13	Switzerland	03	02	2.10%
14	Belgium	03	01	1.04%
15	Bulgaria	01	01	1.04%
16	Finland	02	01	1.04%
17	France	03	01	1.04%
18	Germany	03	01	1.04%
19	Ghana	01	01	1.04%
20	Hungary	01	01	1.04%
21	Indonesia	02	01	1.04%

22	Kenya	03	01	1.04%
23	Namibia	01	01	1.04%
24	Nepal	01	01	1.04%
25	New Zealand	01	01	1.04%
26	Nigeria	01	01	1.04%
27	Portugal	01	01	1.04%
28	Senegal	01	01	1.04%
29	Spain	01	01	1.04%
30	Tunisia	01	01	1.04%
31	Zimbabwe	01	01	1.04%
32	Republic of Korea	01	01	1.04%
	Total	**154**	**96**	**100.00%**

Table 5.1.4: Country-wise Distribution of E-thesis Repositories

The above table details the country wise distribution of e-thesis repositories. Out of the 43 countries which have e-thesis repositories in English language, 32 countries responded. Web Survey questionnaire was e-mailed to the E-theses Repository Managers of selected repositories from 43 countries out of which 32 countries responded. The data collection received a major support from NDLTD, who promoted the web survey questionnaire through their Social Networking Webpage.

USA contains the highest number of E-thesis Repositories i.e. 23.95% followed by United Kingdom 8.33%. India occupies the second rank by having a share of 12.5% repositories. Being the mother country, the researcher considered all the 27 active E-thesis Repositories in India, but only 12 provided data for the present research work. Countries like Sweden, Canada, Ireland, South Africa, Italy, Netherlands, Bulgaria, Ghana, Hungary, Namibia, Nepal, New Zealand, Nigeria, Portugal, Senegal, Spain, Tunisia, Zimbabwe and Republic of Korea gave 100% response.

The data collection shows that developed countries like USA, UK, Australia etc. have large number of E-thesis Repositories which means that Open Access Movement and

ETD culture is well accepted in these countries. In developing countries like India, Africa etc. the trend is in developing phase. The range of countries having institutional repositories also show that almost all the countries in the world have started including e-theses into their repositories considering its various benefits or mandatory policies which are discussed later in this chapter.

SECTION 2: BACKGROUND INFORMATION

Q2. How much time was required for implementation of E-theses Repository including planning and pilot testing? (Please type number of months)

Sr.No.	Months Required	No. of E-thesis Repositories	Percentage
1	0 month	02	2.1%
2	1 month	04	4.2%
3	2 months	01	1.0%
4	3 months	07	7.2%
5	4 months	04	4.2%
6	5 months	03	3.1%
7	6 months	12	12.5%
8	7 months	01	1.0%
9	8 months	02	2.1%
10	9 months	02	2.1%
11	**12 months**	**23**	**24.0%**
12	15 months	02	2.1%
13	18 months	03	3.1%
14	24 months	09	9.4%
15	36 months	04	4.2%
16	48 months	02	2.1%
17	No Response	15	15.6%
	Total	**96**	**100%**

Table 5.2: Time required for planning and implementation of E-theses repository

Table 5.2 shows that 23(24%) institutions required 12 months for implementation of E-theses Repository. This period included planning and pilot testing of software to be used for developing E-theses repository. 12 (12.5%) institutions required 06 months for implementation of E-theses Repository followed by 09 (9.4%) which required 24months. Two repositories (2.1%) required 48months, the highest in this category

for planning and implementation of software for the repository. The researcher found that in some cases, software used for pilot testing was different from the one finalized for implementation of the repository.

According to the researcher the results obtained from pilot testing of particular software where not satisfactory due to which the institutes opted for other software during final implementation. Out of the 96 responses received, 14 E-theses Repository skipped the question. It was also found that 02 institutions (2.1%) directly launched the E-theses Repository without having any pilot testing.

Q3. When did your E-theses Repository become operational i.e. available to authorized users for submission and searching of digital content?

Sr.No.	Year of Launch	No. of E-thesis Repositories	Percentage
1	1988	01	1.00%
2	1997	01	1.00%
3	1998	01	1.00%
4	2000	02	2.10%
5	2002	04	4.20%
6	2003	04	4.20%
7	2004	06	6.30%
8	2005	04	4.20%
9	2006	06	6.30%
10	**2007**	**11**	**11.40%**
11	**2008**	**11**	**11.40%**
12	2009	10	10.40%
13	2010	09	9.40%
14	2011	03	3.10%
15	2012	06	6.30%
16	2013	04	4.20%
17	No Response	13	13.50%
	Total	**96**	**100.00%**

Table 5.3: Year-wise distribution of E-theses Repository

Table 5.3 proves that although the first step towards E-thesis Repositories was taken in 1988 but the increase in number of implementation of E-thesis Repositories can be

seen in the beginning of 21st Century. The years 2007 and 2008 show the maximum set up of E-theses repositories. The second-half of the first decade of 21st Century i.e. from 2005 to 2010, several institutions across the world joined the Open Access movement and established ETD Repositories.

The major reasons for the organisations/institutions supporting the Open Archives Initiative are the declarations made by the Budapest Open Access Initiative (2002), European Culture Heritage Online (ECHO) Charter (2002), Bethesda Statement on Open Access Publishing (2003) and Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003) which emphasized on removing access barriers to the scholarly literature to promote research, share it globally and to make the literature useful to its maximum extent. Other than these several reports were presented by individual universities and/or researchers which discussed thebenefits of Open Access and ETDs in particular.University of North Texas mentioned that, although the institution started mandatory ETD as early as 1999, the ETDs were located somewhere in theinstitution central IT system and they were not migrated to the current fully functional digital library system until 2007.

The number of repositories is showing an increasing trend in the second decade also due to various projects being taken on National and/or International level for the promotion of E-thesis Repositories.

Q4. How would you classify your repository in terms of development?

(Choose only one option)

Sr.No.	Answer Options	Response Count	Response Percent
1	Prototype (A preliminary model from which other forms are developed)	4	4.2%
2	Recently Launched	5	5.2%
3	**Fully Operational Repository**	**83**	**86.4%**
4	I don't Know	4	4.2%
	Total	**96**	**100%**

Table 5.4: Classification of E-theses repository

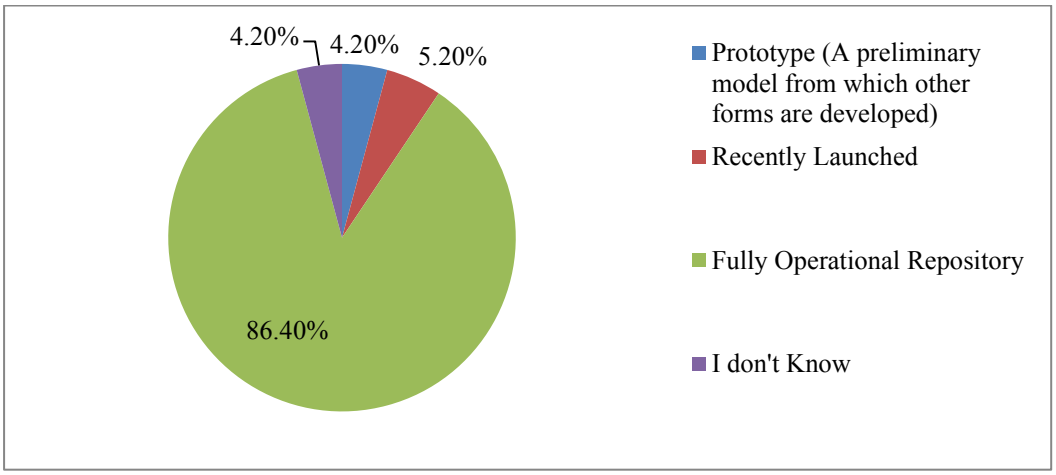

Fig 5.1: Classification of Repository

The researcher found that 86.4% E-thesis Repositories were fully operational. Five repositories (5.2%) were recently launched. 4.2% E-thesis Repositories are Prototype Models from which final version of Repositories will be developed depending on the feedback and results received. The data collected also shows that, 4.2% Repository Managers did not know of the Status of the Repository i.e. whether it is fully operational or recently launched or a preliminary version.

Q 5.How important were the results of the following exploratory activities in terms of influencing your institutions decision about implementing an E-theses Repository? (Please choose all that apply)

Sr. No.	Answer Options	Very Important	Important	Somewhat Important	Least Important	Don't Know	N/A	Response Count
1	An analysis of literature review of Electronic Thesis & Dissertations (ETDs)	**30.9% (29)**	28.7% (27)	14.9% (14)	16.0% (15)	4.3% (4)	5.3% (5)	94
2	Attending Open Source Software Implementation training &workshops	25.0% (23)	**34.8% (32)**	17.4% (16)	17.4% (16)	2.2% (2)	3.3% (3)	92
3	Learning about available expertise and assistance	35.5% (33)	**38.7% (36)**	15.1% (14)	4.3% (4)	2.2% (2)	4.3% (4)	93
4	Learning about successful implementation at other institutions	**44.6% (41)**	37.0% (34)	8.7% (8)	5.4% (5)	1.1% (1)	3.3% (3)	92
5	Demonstrating operational E-theses repositories to institutions decision makers	33.0% (29)	**35.2% (31)**	15.9% (14)	9.1% (8)	3.4% (3)	3.4% (3)	88

Table 5.5: Results of exploratory activities before setting up E-theses repository

The above table shows that 30.9% respondents feel that it is Very Important to analyze the literature review of Electronic theses and Dissertations in order to influence institution's decision for the implementation of E-theses Repository. Studies done by McMillan (1996 & 1999)[1,2], Sharretts et.al. (1999)[3], Mac Coll (2002)[4], Vijayakumar (2001)[5] and Ghosh (2011)[6]show that for setting up of institutional or e-theses repository, it is very important to study the literature available worldwide on Institutional Repositories, ETD Projects, Open Access Initiatives etc. since literature reviews usually discuss the research proposals and results of particular research. Markey et.al. (2007)[7] conducted MIRACLE (Making Institutional Repositories a

Collaborative Learning Environment) Project to understand the implementation of institutional repositories in academic institutions. The project findings emphasized on the importance of analyzing literature reviews. According to Boote&Beile (2005)[8], 'a thorough and sophisticated literature review is the foundation and inspiration for substantial and useful research'.

34.8% respondents feel that Attending Open Source Software Implementation training & workshops is Important whereas 25% people feel that it is Very Important because workshops and seminars provide platform through which institutions/ individual get updated information on key issues related to concerned topics, to interact with other people who may be experiencing similar issues and problems, to tackle issues together etc. Organisers of some workshops/seminars sometimes also invite Expert Speakers who have the necessary subject expertise and practical implementation experience which will be beneficial for the participants of the workshops.

38.7% people feel that Learning about available expertise and assistance is Important. In the research conducted by Krishnamurthy & Kemparaju (2011)[9], it was found that in spite of presence of elite institutions in India, due to lack of expertise and resources available, the growth of institutional repositories in India has not been of the desired level. Checking out the available expertise is important for hassle free continuity in the working of repository.

According to 44.6% respondents, learning about successful implementation at other institutions is Very Important factor for influencing institutions. Susan et.al.(2005)[10], Carbery (2009)[11] in their research papers have focused on the point of knowledge of successful implementation of ETD repositories in various institutions.

35.2% respondents say that demonstrating operational E-theses repositories to institutions decision makers is 'Important'.Andrew (2004)[12] discussed about the Theses Alive! Project of Edinburgh University in order to initiate a pilot national service of ETDs through partner institutions in Great Britain in 2004.Fox et.al. (2009)[13] introduced and demonstrated the highly successful NDLTD, which explained the complete working of NDLTD as the largest collection of ETDs in the world. Demonstration of operational repositories help to get the institutional decision makers

interested in the benefits that the institution will get after adopting open access. It is also an effective way to clarify product related concerns.

There were a negligible percentage of respondents who did not know or never thought of the above mentioned activities which might influence the institution's decision makers about implementing E-theses Repository.

Q 6.Rate the relevance of the following objectives in setting up E-theses Repository

Sr. No.	Answer Options	Highly Relevant	Relevant	Slightly Relevant	Not Relevant	Don't Know	Response Count
1	Enhanced exposure to ETDs	**74.5% (70)**	19.1% (18)	2.1% (2)	1.1% (1)	3.2% (3)	94
2	Promote data sharing & knowledge	**70.2% (66)**	24.5% (23)	3.2% (3)	0.0% (0)	2.1% (2)	94
3	Promote new modes of publication	**51.6% (48)**	31.2% (29)	9.7% (9)	5.4% (5)	2.2% (2)	93
4	Preservation of digital resources	**66.7% (62)**	24.7% (23)	4.3% (4)	2.2% (2)	2.2% (2)	93

Table 5.6: Objectives for the set-up of E-theses Repository

Table 5.6 rates the relevance of various objectives in setting up of E-theses repository. The most relevant statement, according to repository objectives, was using them as a mode ofenhancing exposure to ETDs with 74.5% considering this highly relevant. Promoting datasharing was also considered highly relevant by 70.2% and relevant by 24.5%. Thepreservation of digital resources was also voted as highly relevant by 66.7% respondents. However, compared to other objectives, using therepository as a

means of promoting new modes of publication received a low response with 51.6% considering it highlyrelevant or 31.2% relevant.

The findings from the literature review indicated that the main objectives for E-theses Repository development is enhanced exposure to ETDs and to promote data sharing and knowledge through open access. Studies conducted by Russell (2006)[14], Ghosh (2007)[15], Ratanya (2010)[16], Bhat (2010)[17] mention preservation of digital resources as one of the important reasons for implementing E-theses repository. The same factor gains important in the present study too as the third most highly relevant reasons.

Some repositories, along with performing the function of dissemination of resources, also work as publishing systems. However, the number is lowest compared to others. Russell, I.G. (2009)[18] in her doctoral research work had similar findings which show that enhanced exposure to ETDs is the main reason why Institutions want to set up E-theses repository.

Q7. Why do you think contributors of your institutions will submit their Thesis & Dissertations in your E-theses Repository? (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count	Rank
1	**To provide maximal access to the research results**	**75.5%**	**71**	1
2	Mandatory policy of the institute	74.5%	70	2
3	To encourage open access	56.4%	53	3
4	Increase institution's prestige	55.3%	52	4
5	Increase in citation counts to your institution's intellectual output.	52.1%	49	5
6	Solution to the problem of preserving your institutions intellectual output	42.6%	40	6
7	An increase in your library's role in facilitating	40.4%	38	7

	research work			
8	Reduction in the amount of time between discovery and dissemination of research findings to scholarly communities	31.9%	30	8
9	Solves the space problem which otherwise gets created in order to maintain printed copies of Thesis & Dissertations	31.9%	30	8
10	To reduce traditional channels of dissemination of information	19.1%	18	9
	Others (Please Specify)		8	

Table 5.7: Reasons for contribution in E-thesis repositories

Question No. 7 asked for possible reasons for which contributors of the institution will submit their theses and dissertations in the E-theses Repository. The question was a mix of close ended list with 10 options from which respondents were allowed to choose all the probable reasons and they were also given freedom to specify other reasons not mentioned in the list.

The above table shows that 75.5% respondents feel that the major reason for contributing ETDs in the repository is 'to provide maximal access to the research results'. Similar results were received by Sawant (2009)[19] in her doctoral research wherein a varied group of respondents comprising of Under-Graduate & Post-Graduate students, M.Phil/Ph.D researchers, Teachers, Scientists from various scientific institutions of India, were asked the main reason for contributing their research work in Institutional Repositories.

The second important reason is the 'Mandatory Policy of the institute'. Studies done by Bevan (2005)[20] and Swan (2008)[21]discussed the e-thesis mandatory submission policies and how it helps to increase the number of contributors in the repository. 56.4 % respondents feel that contributors of their institutions will contribute E-thesis in their repository 'to encourage open access.'

Reasons for contributions from 'Others'

Reasons for contribution	**No. of Responses**
Persistent URLs will always remain valid	01
In Spain we have a national law which requires that the thesis be deposited in an institutional repository	01
Primary reason is that submission electronically is much easier than submitting print. Students do not deposit direct into our repository. Our process begins with their submission to Graduate College and ends with auto-publishing into the repository.	01
All other reasons are positive benefits, which we use to promote IR services for other types of collections	01
Contribution to the tenure track of the researcher	01
We have a mandatory policy for registering publications, but it is not mandatory to archive full-text	01
Contributors like having their "name" & "research" readily available on the internet	01
Total	**07**

Other reasons specified by the respondents for contributing in the E-theses Repository are mentioned in the above table. Totally 07 reasons were specified. eRepositoryManager of Stellenbosch University (South Africa) considers submitting e-thesis to the repository as a persistent thing since it will be forever available on the Internet for access. Universidad Complutense de Madrid (Spain) mentioned the presence of Mandatory National Law for submitting e-thesis in their institutional repository. Such initiatives at National Level have not been come across so far. Submission of e-thesis is considered a much easier option compared to submitting print. Dalarna University (Sweden) has a mandatory policy for registering publications, but full-text submission is not compulsory. Head of Digital Production Centre, Wageningen University (Netherlands)mentionsdepositing e-thesis in the repository as a good medium through which an individual researcher's contribution can be tracked. Oklahoma State University (USA) Digital Initiatives Head mentioned publicity as one of the reasons since people like to have their 'name' and 'research' readily available on the Internet.

Q 8. Which of the following acted as barriers in implementing ETD program? (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count	Rank
1	**Concern about Copyright/ IPR issues of ETDs**	**71.9%**	**64**	**1**
2	Faculty had no knowledge on what an ETD is and what are its benefits.	49.4%	44	2
3	Plagiarism Issues	49.4%	44	2
4	Absence of stringent rules regarding mandatory contribution of ETDs.	40.4%	36	3
5	Tendency to prefer traditional format of thesis & dissertations	25.8%	23	4
6	Time consuming submission procedures	24.7%	22	5
7	Lack of on campus technical expertise	22.5%	20	6
8	Lack of support from Administrative Authorities of the Institution	21.3%	19	7
9	Lack of Information &Communication Technology (ICT) trained contributors	15.7%	14	8
10	Training for use of software to create Repository	12.4%	11	9
11	Difficulties in long term preservation of digital files	11.2%	10	10
12	Lack of financial support	11.2%	10	10
13	Inability of contributors to formulate quality metadata	7.9%	7	11
14	Equipment availability	7.9%	7	11
	Other (please specify)		10	

Table 5.8: Barriers in implementing E-theses Repository

The above question deals with the factors that acted as barriers in implementing ETD Program. List of 14 factors were given and the respondents were given a choice to

choose all that applied during the implementation of their institutional e-theses repository. Also, they were given the option to specify barriers other than the ones mentioned.

The major barrier identified by 64(71.9%) respondents for implementation of an e-theses repository is 'Concern about Copyright/IPR issues of ETDs'. Park, Nam & Oh (2007)[22] discussed the survey conducted by National Assembly Library of Korea on management of electronic theses at several university libraries in Korea. The survey found that 91% of the libraries are digitizing theses and dissertations and 73% had a copyright policy for electronic dissertations.

Fyffe & Welburn (2008)[23] discussed opportunities for academic libraries concerning the development of repository programs for Electronic Theses and Dissertations (ETDs) with particular focus given to copyright management.Vijayakumaret.al. (2004& 2005)[24, 25] analysed the opinions of selected Ph.D researchers and guides from selected Indian Universities funded under UGC on Copyright and IPR issues related to ETDs and alsodescribed a framework for Indian Universities to go about with creating their own Institutional Repositories of Theses and Dissertations and also highlighted the Formats, Software and copyright issues related to ETD archiving. All these studies show that Copyright issues are very important to be addressed properly before implementing E-theses Repository.

Davis & Connolly (2007)[26] analysed the reasons for non-use of Cornell's Institutional Repository and found that the major reasons mentioned by the academics for not depositing in the IR was redundancy with other modes of disseminating information, confusion with copyright, fear of plagiarism and inconsistent quality. The respondents for the present research also identified 'Plagiarism Issues' as second most important reason that acts as barrier along with 'Lack of faculty knowledge about ETD and their benefits'. Both the reasons received 44 responses. 'Absence of stringent rules regarding mandatory contribution of ETDs' scored 3rd Rank with 40.4% respondents choosing it as one of the main barriers that hinders contribution of ETDs in repository.

Melero (2009)[27] analysed the current state of Spanish open-access institutional repositories and the main inhibitors identified were the absence of stringent policies, the lack of integration with other national and international systems and the lack of awareness among faculty.Evaluationof collection of digital libraries and institutional repositories in India conducted by Mittal & Mahesh (2008)[28] also mention lack of faculty awareness as one of the major reasons for weak status of Institutional Repositories in India.

'Inability of contributors to formulate quality data' and 'Equipment Availability' share the lowest rank as they are identified by only 7.9% respondents as barriers for contributing in E-theses repository.

'Other' barriers specified are:

Barriers	No. of Respondents
We had no barriers	04
Student's concern regarding fees in 2005. Now it is free.	01
We still also produce print copies!	01
Fear of losing subsequent publishing and commercialization opportunities because the IP was exposed in the open access manuscript	01
Implementing ETD worked very fine, based on a well-established pilot study	01
Those checked the most obvious but to a degree some others with lesser impediments.	01
The decision to place the online theses in the already existing RMIT Research Repository was made as a result of another online service ceasing	01
Total	**10**

The 'Other' reasons specified by 10 respondents bring into consideration some interesting facts. Four respondents' namely Georgetown University (USA), University of Nebraska-Lincoln (USA), Universidad Complutense de Madrid (Spain) and CQUniversity Australia did not face any problems while implementing ETD Program. During the initial days of ProQuest (USA) in 2005, students were concerned regarding fees that will be charged for accessing the E-theses repository. Later, they had no problem, since access was made free of cost. Chalmers University of

Technology (Sweden) mentioned that they accept thesis in both print and electronic format. Uppsala University Library (Sweden) could solve all the problems by doing a pilot study before final implementation. Monash University Research Repository (Australia) users had the fear of losing subsequent publishing and commercialisation opportunities since IP address was exposed in the open access manuscript.

Q 9. Have you ever attended an ETD Symposium/Conference/Workshop?

Sr.No.	Answer Options	Response Percent	Response Count
1	Yes	66.3%	63
2	No	33.7%	32
	Total	**100%**	**95**

Table 5.9: Attending ETD Symposium/Conference/Workshop

The above question deals with attending ETD Conferences/Workshops/Symposium in order to get in-depth knowledge, practical knowledge about the implementation and benefits of E-theses repository. Out of 95 respondents, 63 (66.3%) attended ETD Conferences/workshops/symposium. Remaining 33.7% did not attend any such program.

Similar response was received by NDLTD Working Group on International Activities (2010)[29] when they conducted a survey with basic aim of advising NDLTD Board on how to promote their activities to maximum extent through ETD Symposia series etc. The Working Group received response from 89 respondents from 22 countries. 64% of the 89 respondents attended an ETD Symposium whereas 36% never attended any symposium.

Q 10. If yes, then attending ETD Symposium/Conference/Workshop makes you aware of:(Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Importance of networking with others around the world**	**86.9%**	**53**
2	Common problems faced during implementation of ETD program	78.7%	48
3	Requirements for successful set up and operation of ETD program	78.7%	48
4	Probable solutions to problems encountered	75.4%	46

Table 5.10: Reasons for attending ETD Symposium/Conference/Workshop

Q.10 further explains the reasons and results of attending ETD Symposium/Conference/Workshop. 89 respondents replied the question. Highest number of respondents 53 (86.9%) felt that, attending workshop/symposium/conferences help them to understand the importance of networking with others around the world. 78.7% respondents felt that workshops/conferences/symposium make them aware of common problems faced during implementation of ETD program and required material/finance/recourses' for successful set up and operation of ETD program. 46 respondents (75.4%) experienced that, attending workshops etc. make them aware of probable solutions to problems encountered. NDLTD Working Group on International Activities (2010) conducted a survey with basic aim of advising NDLTD Board on how to promote their activities to maximum extent through ETD Symposia series etc. The respondents were asked the reason of attending ETD conference/workshops. 60% of the total 89 respondents answered the question and had common opinion that attending such events help to understand importance of networking with others around the world (organisation of collaboration), common discussion of common problems and finding interesting solutions to the way others have tackled challenges.

Q 11. How do you create awareness about E-theses Repository and its advantagesamongst members of your institutions? (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Links from Library website/Institutional website**	**80.4%**	**74**
2	Conducting Open Access Seminar/ Symposiums	60.9%	56
3	Framing mandatory rules for faculty members to contribute their ETDs	57.6%	53
4	Presentations about the benefits of ETDs at faculty meetings	55.4%	51
5	Promotional brochure	39.1%	36
6	Writing articles in the institutions newsletter	34.8%	32
7	No special effort is taken to promote the E-theses Repository	8.7%	8
	Others (please specify)		14

Table 5.11: Ways of creating awareness about E-theses repository

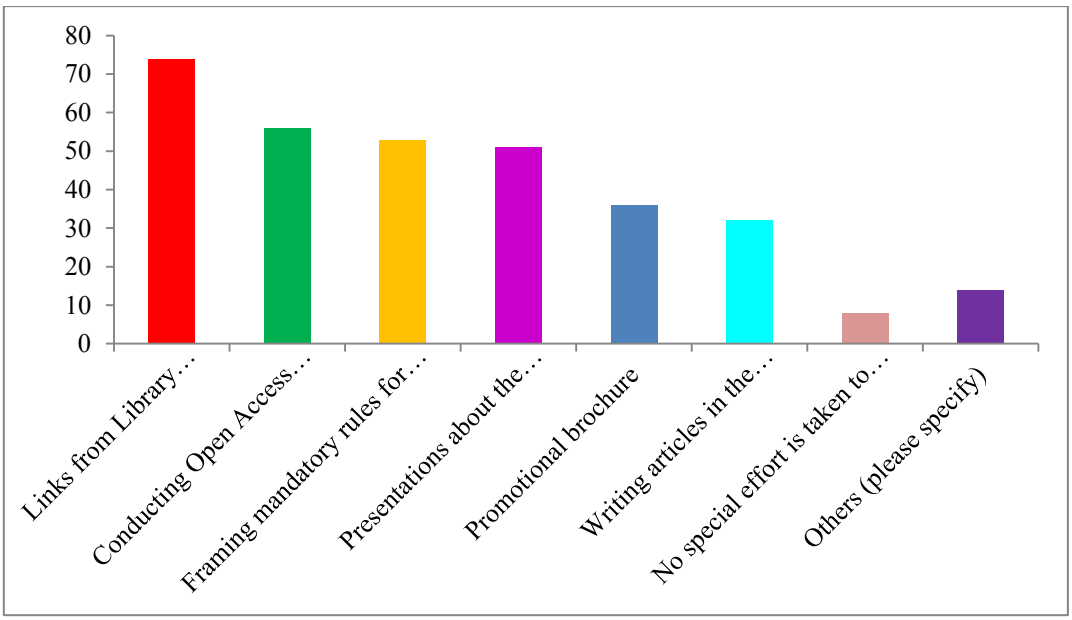

Fig. 5.2: Methods of Creating Awareness about E-theses repository

Q.11 asked respondents the various ways employed to create awareness about E-theses Repository amongst members of their institutions. The respondents were given seven options and were allowed to choose more than one, if required. Theywere also given the option to mention 'Other' methods used to promote the E-theses Repository. It was noticed that 'Links from library website/institutional website' was the highly implemented promotional activity with 80.4% respondents opting for it, followed by 'Conducting Open Access Seminar/ Symposiums' that scored 60.9% (56). Less preference was given to 'Framing mandatory rules for faculty members to contribute their ETDs' (57.6% i.e. 53), 'Presentations about benefits of ETDs at faculty meetings' (55.4% i.e. 51). Only 8.7% i.e. 8 respondents said that 'No special effort is taken to promote the E-theses Repository'.

'Other' Promotional activities specified are:

Sr.No.	Activity Specified	Response Count
1	Use of social media (Facebook, blogs, twitter, mailing lists, LinkedIn)	03
2	Mandatory for students (not faculty).	02
3	Presentations to colleges/departments on campus, Presentation to faculty on invitation, Presentation during Research Seminars, etc.	02
4	The library runs a 6-week Workshop on Information Literacy exclusively for PhD students. One of the classes is entitled 'your research and building a network' and talks about LSE Thesis Online and sharing research findings using social media. Conduct workshops for students on writing and submitting dissertations. Meet with graduate school administrators and graduate program directors to explain the process.	02
5	Outreach to faculty in various departments for undergraduate theses. The Graduate School of Arts and Sciences already has a mandate in place for Master's students.	01
6	Classes for students, faculty and staff about their repository, its benefits,	01

	copyright and intellectual issues, and how to deposit theses	
7	Write articles about the repository for presentation at ETD meetings	01
8	Mandatory part of promotion procedure	01
9	Word of mouth during informal meetings, phone calls and e-mails	01

The above table mentions the 'Other' promotional activities specified by respondents. Totally fourteen respondents have specified promotional activities practised by them other than the one listed in the web-questionnaire. Majority of the respondents specified use of social media like Facebook, Twitter, LinkedIn, Blogs etc. for creating awareness about the benefits of E-theses Repository.

Rutgers University (USA) & Boston University (USA) mention framing of mandatory policies for students to submit E-theses in repositories. Stellenbosch University (South Africa) & Oklahama State University (USA) promote advantages of E-theses Repository with the help of presentations to faculty, researchers, and students during seminars, in classes etc.

Along with London School of Economics & Political Science (UK), Rutgers University (USA) conducts workshops, information literacy programmes for students. A special class is conducted by London School of Economics & Political Science entitled 'your research and building a network'that talks about LSE Thesis Online and shares research findings using social media.

Brandeis University (USA) mentioned providing 'Outreach to faculty in various departments for undergraduate theses.' The Graduate School of Arts and Sciences already has a mandate in place for Master's students. California Institute of Technology (USA) conducts classes for students, faculty and staff to make them aware about the institution's repository, its benefits, copyright and intellectual issues, and procedure to deposit theses. Yale University (USA) promotes E-theses repository by writing articles about its benefits and presenting them at the ETD meetings.

Creating awareness about E-theses repository is a mandatory part of promotion procedure for Leiden University (Netherlands). Ounongo University (Namibia) practices word of mouth publicity process during informal meetings, through phone calls and e-mails briefing about the advantages of E-theses repository.

All the above mentioned activities prove that all over the world, institutions/repository managers etc. are trying various ways to promote E-theses repository with available manpower and budget.

Fernandez (2006)[30] in her research evaluated growth and development of online research repositories in India. Based on participant's feedback a list of best practices is also prepared. She found that respondents organised seminars, workshops, sent e-mails to faculty members in order to promote open access. Sawant (2009) presented the status report of institutional repository initiatives in India. She also found that 'Links from library website' is the second most popular promotional activity practised after 'Personal Contact' with faculty members.

SECTION 3: REPOSITORY MATERIALS

Q 12. Does your repository contain digital documents other than ETDs?

Sr.No.	Answer Options	Response Percent	Response Count
1	Yes	89.6%	86
2	No	10.4%	10
	Total	**100%**	**96**

Table 5.12: Digital documents other than ETDs

Table 5.12 shows that majority of E-theses Repository i.e. 89.6% contain digital documents other than ETDs. There are 10 repositories (10.4%) which allow submission of only ETDs. They are mentioned in the table below:

Sr.No.	Name of the Institute	Country
1	INFLIBNET	India
2	Saurashtra University	India
3	Universite de Thies	Senegal
4	Yale University	USA
5	Universiti Utara Malaysia	Malaysia
6	University of Pretoria	South Africa
7	The British Library	UK
8	CSIR-URDIP	India
9	University of Waterloo	Canada
10	INP Toulouse	France

In the study done by Sawant (2009) it is found that 12 institutions in India who have their repositories allow submission of 21 types of digital documents. Journal articles were found to the most favourable document. Study conducted by Bailey (2006)[31] mentioned that 37 respondents who have institutional repositories contain 20 types of digital documents.

Q 13. If yes, select the type of the digital documents other than ETDs that your Institutional Repository contains.

Sr.No.	Answer Options	Peer-Reviewed	Non Peer-Reviewed	Don't Know	Response Count
1	**Journal Articles**	**72**	**4**	**2**	**78**
2	Conference/ Seminar Papers	50	14	2	66
3	Conference Proceedings	37	15	3	55
4	Post-Prints	35	10	4	49
5	Journals	32	5	3	40
6	Books	30	22	6	58
7	Technical Reports	24	24	4	52
8	Pre-Prints	24	23	3	50
9	Annual Reports	18	13	2	33
10	Manuscripts	14	21	0	35
11	Speeches	14	11	1	26
12	Datasets	11	16	3	30
13	Audio Visual Material/ Multimedia	10	24	3	37
14	Lectures, Assignments, papers and projects prepared by students	10	20	3	33
15	Photographs	9	25	2	36
16	Newspaper Articles	9	14	1	24
17	Habilitation	8	3	6	17
18	Convocation Address	7	3	4	14
19	Patents	7	6	5	18
20	Maps	5	12	2	19
21	Software	4	3	4	11
22	Newspaper Clippings	3	9	1	13
	Other (Please Specify)				23

Table 5.13: List of digital documents (other than ETDs) in the Institutional repository

Table 5.13 shows the response received from ninety-six respondents. 'Journal Articles (78 i.e. 82.1%)' as the most favourable digital document included other than ETDs in the E-theses Repository followed by 'Conference/Seminar Papers (66i.e 69.5%), Books (58 i.e. 61%), Conference Proceedings (55 i.e.57.9%) and Technical Reports (52 i.e. 54.73%). The web questionnaire provided list of twenty two types of digital documents most commonly included in the institutional repositories, divided into categories of peer-reviewed, non peer-reviewed and don't know (repository manager not sure about the reviewing status of the document).

With the literature review done for the present research, a new type of digital document came to notice i.e. 'Habilitation' which is a Professional thesis submitted by the candidate after pursuing Ph.D and is regarded as the highest Academic Qualification in European Countries. Seventeen respondents out of 95 i.e 17.89% selected 'Habilitation' as one of the types of digital documents submitted other than ETD. The data received shows higher number of paper based digital equivalents like Journal Articles, Books, Conference papers, Technical Reports etc. included in the repositories. An interesting result is that Books are the third most popular document to be digitised in the repository.

'Other' materials mentioned by the respondents included in their repositories are:

Sr.No.	'Other' Materials included	Response Count
1	Book Chapters	05
2	Working Papers	03
3	Unpublished papers	02
4	Monographs	01
5	Dictionaries	01
6	Discussion papers	01
7	Archives, UoN Open & Distance Learning Modules	01
8	Presentation Slides, Exhibition	01
9	Posters	01
10	Artefacts	01

11	Designs	01
12	Images	01
13	Digitized lithographs	01
14	Exam papers	01
15	Other texts	01
16	Manuals	01
	Total	**22**

Twenty-two respondents mentioned sixteen types of documents included in the repository. Five respondents namely Cranfield University (UK), University of Birmingham (UK), Robert Gordon University (UK), Ecole Polytechnique Fédérale de Lausanne (Switzerland) and University of Agder (Norway) include digitised 'Book Chapters' in their repository. University of Zimbabwe Library (Zimbabwe), University of Agder (Norway) & Stellenbosch University (South Africa) permit the submission of digitised 'Working Papers' which are preliminary scientific or technical papers.

CFTRI (India) and California Institute of Technology (USA) allow the submission of 'Unpublished papers' since these works are sometimes widely cited, circulated by informal means.

The other thirteen repositories contain digitised monographs, dictionaries, lithograph, artefacts, designs, images, exam papers etc.

Q 14.The ETDs included in your repository are:

Sr.No.	Answer Options	Response Percent	Response Count
1	**Peer-reviewed**	**59.4%**	**57**
2	Non Peer-reviewed	28.1%	27
3	Don't know	12.5%	12
	Total	**100%**	**96**

Table 5.14: Peer-review or Non Peer-review Status of ETDs

Q. 13 and Q. 14 are related to each other in the way that in the responses received for the former, the type of document accepted i.e. whether peer-reviewed or non-peer-reviewed is also mentioned. The third category is included because for some of the materials accepted, the repository managers don't know whether they are reviewed or not.

For the present research, the data collected shows that, 59.4% i.e. 57 repositories deposit Peer-reviewed material, 28.1% mentioned that they include Non Peer-reviewed material and 12.5% 'Don't know' whether the materials deposited are reviewed or not.

Using Peer-review documents provides authenticity to the materials included in the Repository. It is a form of quality assurance. Tenopir & King (2001)[32] mention that publishers in order to promote the dissemination of the publication collect manuscripts according to the interests of particular readership and ensure quality of the material provided.

The responses received for the present research show that 75.8% repositories include Peer-reviewed Journal articles followed by 52.6% repositories which contain Peer-reviewed Conference/Seminar Papers. Some of the repositories clearly notify peer-reviewed or non-peer-reviewed document using symbols. These conditions of peer-reviewed and non-peer-reviewed directly affect the range of types of materials to be included in the repository. Solomon (2007)[33] mentions peer reviewing process as one of the most important mechanisms for validating the information contained in scholarly journals.

On the other hand, twenty five repositories i.e. 26.3% respondents stated that they include Non peer-reviewed Photographs followed by twenty four repositories i.e. 25.2% repositories include non-peer-reviewed Technical Reports.

Q 15. Mention the number of digital documents that your repository contains.

Sr.No.	Digital Documents	Response Percent	Response Count
1	Doctoral Theses	90.1%	73
2	Master's Theses	80.2%	65
3	Bachelor's Theses	46.9%	38
4	Technical Reports	45.7%	37
5	Journal Articles	64.2%	52
6	Annual Reports	27.2%	22
7	Convocation Address	21.0%	17
8	Journals	28.4%	23
9	Photographs	29.6%	24
10	Manuscripts	24.7%	20
11	Audio Visual Material	33.3%	27
12	Books	49.4%	40
13	Maps	21.0%	17
14	Conference Proceedings	34.6%	28
15	Conference Papers	39.5%	32
16	Pre-Prints	21.0%	17
17	Post-Prints	19.8%	16
18	Newspaper Clippings	19.8%	16
19	Lectures, Assignments, papers and projects prepared by students	24.7%	20
20	Patents	22.2%	18
21	Datasets	25.9%	21
22	Software	12.3%	10
23	Speeches	14.8%	12
24	Newspaper Articles	18.5%	15
25	Habilitation	14.8%	12

Table 5.15: Number of Digital Documents in the repository

Q. no. 15 was close ended and the respondents were required to mention the number of digital documents under each category. The Institution wise distribution of digital documents in Table 5.15.1 provides a detailed report of the collection of each

repository as mentioned by the Repository Manager in the Web questionnaire response. The total number of digital documents as obtained from the data collection is 24, 35, 078.

Some of the repositories could not mention the statistical information for all the digital documents included by them since there was no system adopted for counting all the

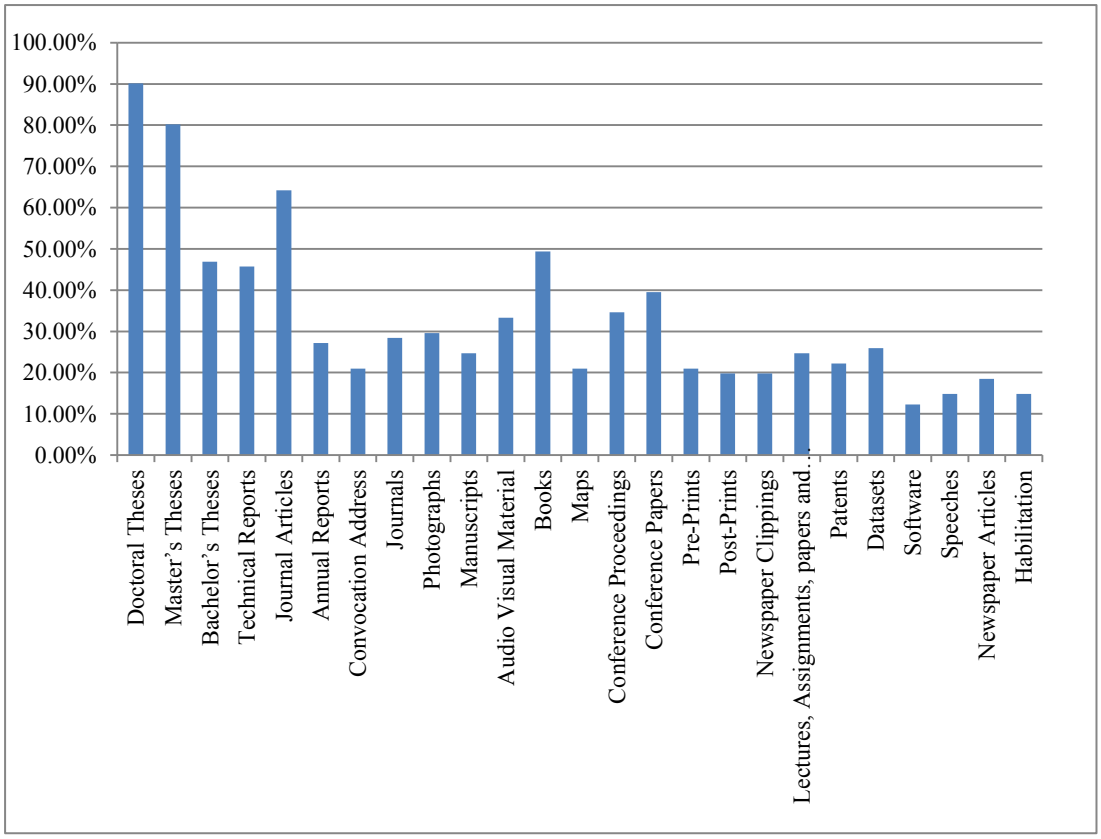

Fig.5.3: Number of Digital Documents in the Repository

types of documents or till now they have never counted their collection. Not all the repositories contain all types of digital documents.

As mentioned in Q.12 about 10 repositories containing only ETDs, such repositories have clearly mentioned 'NA (Not Applicable)' for digital documents other than ETD.The category of ETD is classified into Doctoral Theses, Master's Theses & Bachelor Theses. The total number of ETDs available from the collected data is 4,70,368. British Library's EThOS with 70000+ ETDs ranked first in the list followed

Table 5.15.1: Institution wise distribution of digital documents

Sr. No	Institution	YoI	DT	MT	BT	TR	JA	AR	CA	J	PG	MSS	AV	B	M	CPr	CP	Pr-P	Po-P	NC	L	P	D	S/W	S	NA	H	TOTAL
1	IIT-D	05	483	----	----	---	2200	----	6	---	----		--	----	----	---	----	---	----	---	---	---	---	---	---	---	---	**2689**
2	NAL	04	10	---	---	3500	1100	---	---	---	---	---	---	15	---	900	---	---	---	---	---	---	---	---	---	---	---	**5525**
3	TISS	08	87	797	---	----	20	----	---	----	----	---	----	9	----	---	---	---	---	---	---	---	---	---	---	---	---	**913**
4	SU	12	1014	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1014**
5	UoM	11	1202	2446	718	173	8153	---	---	---	---	---	---	225	---	---	8273	58	---	---	---	---	10	---	---	---	---	**21258**
6	CU	03	1712	----	----	113	1469	243	---	---	---	--	4	----	----	1	372	----	241	---	----	----	1	---	----	----	----	**4156**
7	RGU	08	1213	----	----	----	296	28	----	---	---	---	---	---	---	81	---	----	----	----	----	----	----	----	----	----	----	**1618**
8	UoA	---	35	1256	----	----	424	——	---	---	---	---	---	74	---	---	55	----	----	----	----	----	----	----	----	----	----	**1844**
9	UT	10	----	----	1050	----	----	----	----	----	----	----	---	--	----	----	---	---	----	----	----	----	----	----	----	----	----	**1050**
10	UZ	---	----	923	126	----	396	----	---	—	-----	----	----	----	----	----	50	----	----	---	----	----	----	----	----	----	---	**1495**
11	NAUA	11	50	1000	----	----	----	----	---	----	----	----	-- -	.---	----	----	---	---	----	----	----	----	----	----	----	----	----	**1050**
12	St U	10	1800	4500	---	17	600	---	---	---	---	2	---	2	---	87	34	---	---	---	---	---	25	---	---	---	---	**7067**
13	CNUDST	---	1245	---	---	------	---	---	---	---	------	- -	---	---	---	---	---	---	---	---	---	---	---	----	---	---	---	**1245**
14	MU-S	12	1031	----	----	----	189	----	----	11	----	7	---	9	---	---	2	---	2	----	3	---	---	---	----	----	----	**1254**
15	SSB	---	1100	---	----	---	---	---	---	----	-----	---	---	----	---	---	---	---	---	---	---	---	---	---	---	---	---	**1100**
16	UN	07	5674	9847	3564	----	----	----	----	----	----	----	----	.---	----	----	----	----	----	----	----	----	----	----	----	----	----	**19085**
17	CSU	07	998	1181	322	1205	8	---	---	6	24433	4	61	7	319	---	---	2	540	---	48	---	13	---	12	---	---	**29159**
18	NML	09	17	32	----	----	----	53	----	----	----	----	----	2	240	---	---	1830	----	---	58	16	----	----	----	----	----	**2248**
19	CFTRI	04	199	121	----	----	4436	----	--	----	---	---	---	25	---	---	---	----	----	---	1332	---	---	----	----	----	----	**6113**
20	MIT	----	13604	17431	7341	24856	1290	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	**64522**
21	GU	09	5364	----	124	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	**5488**
22	RU	07	1130	2570	----	----	----	----	' —	----	---	---	300	10	3000	----	----	----	----	----	---	—	26	----	----	----	----	**7036**
23	SIU	05	231	1001	----	----	----	----	—	----	----	----	----	----	-	----	----	----	----	----	----	----	----	-		----	----	**1232**
24	CIM	13	---	1	---	275	55	4	3	---	400	---	2	---	---	5	---	---	---	1500	160	---	---	---	8	---	---	**2413**
25	HU	98	2700	200	----	----	11000	----	---	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	**13900**
26	UoAL	10	1031	----	----	----	----	----	—	—	—	-----	—	—	—	—	—	——	----	—	----	----	----	----	----	----	----	**1031**

Sr. No.	Institution	Vol	DT	MT	BT	TR	JA	AR	CA	J	PG	MSS	AV	B	M	CPr	CP	P r-P	Po-P	NC	L	P	D	S/W	S	NA	H	TOTAL
27	UCM	04	6362	456	512	939	5125	----	---	----	1161	112	----	190	---	320	----	----	----	----	----	1	---	----	----	----	---	**15178**
28	UMA	07	5901	1016	14	----	---	----	---	----	----	----	--	--.-	----	--	--	----	----	--	----	----	---	----	----	----	--	**6931**
29	UNT	07	3000	5000	---	20000	---	834	---	4300	93000	---	4000	10643	5000	---	450	---	---	289	---	6037	6000	3	---	222000	---	**380556**
30	UO	---	1021	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1021**
31	UH	08	1091	30	652	28	3	---	—	----	14	---	18	10	---	---	---	---	---	---	249	---	161	---	----	---	----	**2256**
32	LSEPS	10	758	300	---	---	---	---	---	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	----	**1058**
33	BU	08	----	872	82	21	----	----	---	----	336	---	3965	---	---	---	---	—	----	----	---	----	----	----	----	----	----	**5276**
34	CUT	04	277	2838	500	192	1277	---	---	---	---	---	---	22	---	---	865	16	---	---	---	3	---	---	24	---	---	**6014**
35	ICS	13	5	823	201	---	3	---	1	----	----	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	—	**1033**
36	CIT	02	6217	448	115	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**6780**
37	NU	08	1452	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1452**
38	TS U	10	475	410	226	---	----	----	----	----	----	----	—	----	—	----	---.	----	----	----	----	----	----	----	----	----	----	**1111**
39	RU	07	5502	2445	----	----	----	----	----	----	--	----	----	----	----	----	----	—	----	----	----	----	----	----	----	----	----	**7947**
40	YU	02	-----	1041	----	---	----	---	---	----	----	—	—	-----	----	—	----	----	----	----	----	----	----	----	----	----	--	**1041**
41	BU	13	1	561	570	----	----	----	----	----	----	----	----	---	----	----	----	----	----	----	----	----	----	----	----	---	----	**1132**
42	St JFC	12	---	564	486	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1050**
43	USF	03	400	650	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1050**
44	JNU	13	6000	12000	-----	-	----	----	----	----	---	----	--	----	---	----	----	----	---	800000	----	----	----	----	----	---	----	**818000**
45	UUM	09	1000	2008	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	**3008**
46	DIT	09	241	221	----	----	----	----	---	----	----	----	----	----	----	----	.---	----	----	----	----	----	----	----	----	----	----	**462**
47	UJ	09	2000	5000	----	50	400	50	100	----	----	---	---	---	---	250	---	----	----	----	----	----	---	----	----	----	----	**7850**
48	IIA	----	102	12	----	16	----	112	----	----	24	----	5	---	---	---	---	---	----	169	----	----	----	----	----	----	----	**440**
49	UPM	08	5222	----	----	----	4220	----	----	2	---	---	---	42	---	726	---	---	----	2364	----	7	---	----	----	----	----	**12583**

Sr. No	Institution	Vol	DT	MT	BT	TR	JA	AR	CA	J	PG	MSS	AV	B	M	CP r	CP	Pr-P	Po-P	NC	L	P	D	S/W	S	NA	H	TOTAL
50	SISSA	00	800	250	----	----	300	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	**1350**
51	UB	08	2300	600	----	20	850	----	----	----	450	140	60	50	----	----	50	40	----	----	----	----	15	----	----	----	50	**4625**
52	TU Delft		6500	8500	----	5700	8000	----	----	----	10000	----	20000	2000	----	100	3000	----	----	----	---	400	---	----	----	----	----	**64200**
53	NUIM	10	640	445	----	194	2010	----	----	----	----	----	----	15	----	525	525	----	----	----	----	----	----	----	----	----	----	**4354**
54	KNUST	09	----	4403	----	340	----	----	201	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	262	----	----	**5206**
55	UP	00	5857	2183	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	**8040**
56	EPFL	04	5763	1792	----	----	100023	----	---	----	---	---	---	---	---	---	9806	----	----	----	----	----	----	----	----	----	----	**117384**
57	OU	88	898	430	----	----	610	----	----	----	----	397	----	184	----	27	1572	----	----	----	7686	2	1	----	----	316	----	**12123**
58	UG	08	500	550	—	---	—	--	_—	-	---	-	-	-	----	-	-	-	-	----	--	—	—	—	—	—	—	**1050**
59	MU		1884	8	1	831	49864	---	---	5	9988	17	259	2012	125	1	12108	NC	NC	- -	—	281	4	1	103	759	---	**78251**
60	DCU	08	790	305	—	34	909	---	- -	----	--	----	----	12	- -	- -	NC	----	---	---	- -	---	--	----	----	----	----	**2050**
61	US	12	----	353	1958	----	343	--	---	--	--	70	----	9	--	308	---	---	—	----	---	1	--	---	----	---	----	**3042**
62	WU	03	5466	1566	397	----	----	---	---	----	----	----	----		-----	—	----	---	_	----	----	---	--	---	--	---	----	**7429**
63	KTHRIT	00	2532	2871	705	809	586	---	----	----	----	----	----	13	---	5	1134	----	----	----	----	7	--	----	----	----	----	**8662**
64	UT	06	476	564	---	----	----	---	---	--	---	---	-	---	---	---	---	---	-	----	----	----	----	----	----	----	----	**1040**
65	PN	10	210	800	--	----	149	---	----	---	----	----	----	---	----	---	54	----	--	----	----	----	--	----	79	----	----	**1292**
66	UUL	00	3611	5199	5193	875	1243	----	---	4	--	---	----	140	---	16	156	----	----	----	----	152	2	----	----	---	----	**16591**

Sr.No.	Institution	YoI	DT	MT	BT	TR	JA	AR	CA	J	PG	MSS	AV	B	M	CPr	CP	Pr-P	Po-P	NC	L	P	D	S/W	S	NA	H	Total
67	CUC	06	74	69	915	----	---	---	----	8	----	----	----	---	----	---	----	----	----	----	----	----	----	----	----	----	----	**1066**
68	VT	97	403	629	----	---	----	---	----	----	----	----	----	---	-----	---	—	----	----	----	----	----	----	----	----	----	----	**1032**
69	SSSHS	07	332	----	778	----	733	----	---	----	----	----	—	----	---	----	122	----	----	----	----	----	----	----	----	----	----	**1965**
70	BL*	09	70000	----	----	----	—	----	----	----	----	----	----	---	—	—	-----	—	—	----	----	----	----	----	----	----	----	**70000**
71	UN- Lincoln	06	12700	NC	----	400	45000	---	----	20	----	400	----	35	10	30	400	400	400	----	----	----	----	----	----	----	----	**59795**
72	UU	07	2000	1000	NA	NA	NA	NA	NA	NA	1000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4000**
73	CSIR-URDIP	09	950	----	----	----	----	---	----	----	----	----	----	----	—	---	—	----	----	----	----	----	----	----	----	----	----	**950**
74	CERN	00	3300	400	30	----	57300	--------	----	----	15000	----	3000	---	----	----	----	18000	----	35300	----	----	----	----	----	----	12	**132342**
75	LU	02	657	468	---	---	----	---	-----	—	—	----	----	—	-----	----	—	—	—	—	-----	—	----	----	----	----	----	**1125**
76	UdP	07	774	187	123	----	200	----	--	2	129	----	----	12	-----	----	121	----	----	----	64	-----	-----	----	----	----	----	**1612**
77	UJy	08	1802	10376	712	---	509	6	---	22	530	---	---	73	5822	160	---	---	500	---	---	---	1	---	---	----	----	**20513**
78	NWU	09	858	3254	----	----	----	----	----	----	--	—	----	—	----	----	–	----	----	----	----	----	----	----	—	----	----	**4112**
79	UW	98	2000	4000	----	----	----	----	----	----	----	----	----	----	----	----	—	----	----	----	----	----	----	----	----	----	----	**6000**
80	CoSU	10	762	1085	----	298	110	19	1	17	34907	45	28	6	410	65	35	90	20	49	3	----	2	-----	20	15	----	**37987**
81	RMITU	10	1013	635	----	----	347	----	----	----	----	----	38	10	----	----	361	----	---	----	----	----	----	----	----	----	----	**2404**
82	UoMichigan	06	429	668	---	---	---	---	----	----	----	----	----	----	----	---	----	----	----	----	---	---	---	---	---	---	---	**1097**
83	NCCR	06	50	15	----	50	1000	5	---	---	5	10	300	15	----	20	----	----	----	----	15	----	10	----	---	----	----	**1495**
84	DU	04	36	367	1049	314	103	---	---	----	----	3	---	6	---	1	163	----	---	----	----	----	--	----	----	----	---	**2042**
85	CQUA	07	265	568	221	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1054**
86	AUT	02	239	1176	----	--	1136	---	--	----	--	--	--	--	--	---	----	--	--	—	----	---	—	----	--	----	---	**2551**

Sr.No.	Institution	YoI	DT	MT	BT	TR	JA	AR	CA	J	PG	MSS	AV	B	M	C Pr	CP	Pr-P	Po-P	NC	L	P	D	S/ W	S	NA	H	Total
87	UBC	07	38000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**38000**
88	INPT	05	1031	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1031**
89	HSE	09	3	815	115	2000	3000	500	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	**6435**
90	OSU	05	8563	4238	---	500	1000	---	---	6	7000	---	1040	40	4000	3	---	1000	---	---	---	---	---	---	---	154869	--	**182259**
91	SIU	12	94	873	---	---	82	---	---	41	---	---	10	5	---	---	---	---	---	---	---	---	---	---	---	---	---	**1105**
92	IMTIAS	12	80	992	---	67	574	---	---	---	---	---	---	---	---	400	100	---	---	---	---	---	---	---	---	---	---	**2213**
93	HU	---	572	489	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1061**
94	NPPSA	11	11	657	312	51	20	---	---	---	---	---	1	49	---	7	7	---	---	---	1	---	---	---	---	---	---	**1116**
95	SNU	08	---	543	632	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**1175**
96	INFLIBNET	---	22118	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	**22118**
	TOTAL		**296300**	**144324**	**29744**	**63868**	**318665**	**1854**	**312**	**4444**	**198377**	**1207**	**33091**	**15971**	**18926**	**4038**	**39815**	**21436**	**1703**	**839671**	**9619**	**6907**	**6271**	**4**	**508**	**377959**	**64**	**2435078**

*British Library's ETHoS Repository has 70000+ full-text ETDs and 2,30,000 Metadata only records.

Abbreviations used:

YoI- Year of Establishment	DT-Doctoral Theses	MT-Master's Theses	BT-Bachelor's Theses
TR-Technical Reports	JA-Journal Articles	AR-Annual Reports	CA-Convocation Address
J-Journals	PG-Photographs	MSS-Manuscripts	AV-Audio Visual
B-Books	M-Maps	CPr-Conference Proceedings	
CP-Conference Paper	Pr P-Pre Prints	Po P-Post Prints	NC-Newspaper Clippings
L-Lectures, Assignments	P-Patents	D-Datasets	S/W-Software
S-Speeches	NA-Newspaper Articles	H-Habilitation	

(Refer Appendix-IV for Full Forms of Acronyms used for Institution)

by MIT (USA) with 38376 and The University of British Columbia (Canada) with 38000+ ETDs.

According to the data provided, Jawaharlal Nehru University (India) has the highest number of digital documents with a total collection of 8,18,000 followed by University of North Texas (USA) having 3,75,156 digital documents and Ecole Polytechnique Fédérale de Lausanne (Switzerland) having 1,17,384 digital documents.

JNU (India, 2013) is having 18000+ ETDs and huge collection of Newspaper Clippings (8 Lakhs). Newspaper Clippings (8,39,671), Newspaper Articles (3,77,983), ETDs (3,35,762) and Journal Articles (3,18,665) were the top-ranked digital documents included in IR. Software (4) is the least included digital document. Sawant (2009) in her study about institutional repositories in India found that there is a correlation between number of digital documents and age of IR. She found that IISc (Bangalore, India) being the oldest Indian IR set up in 2002 contains highest number of digital documents (6305). The present research also noticed the same trend in the IRs established after 2000 due to massive awareness drive of Open Access and its benefits conducted since 2000. The oldest established IR of Orebro University (Sweden, 1988) has a collection of 11,293.

Fifteen respondents did not mention the number of digital documents included in their IR.

Q 16. Which file format does your Institutional Repository support? (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	**PDF**	**100.0%**	**95**
2	Images (TIFF, GIF, JPEG etc.)	77.9%	74
3	Audio (WAV, MP3 etc.)	60.0%	57
4	Video (MPEG, AVI etc.)	57.9%	55
5	Datasets	35.8%	34
6	Computer Program	23.2%	22
7	Databases	15.8%	15
	Other (please specify)		**6**

Table 5.16: Supported File Formats

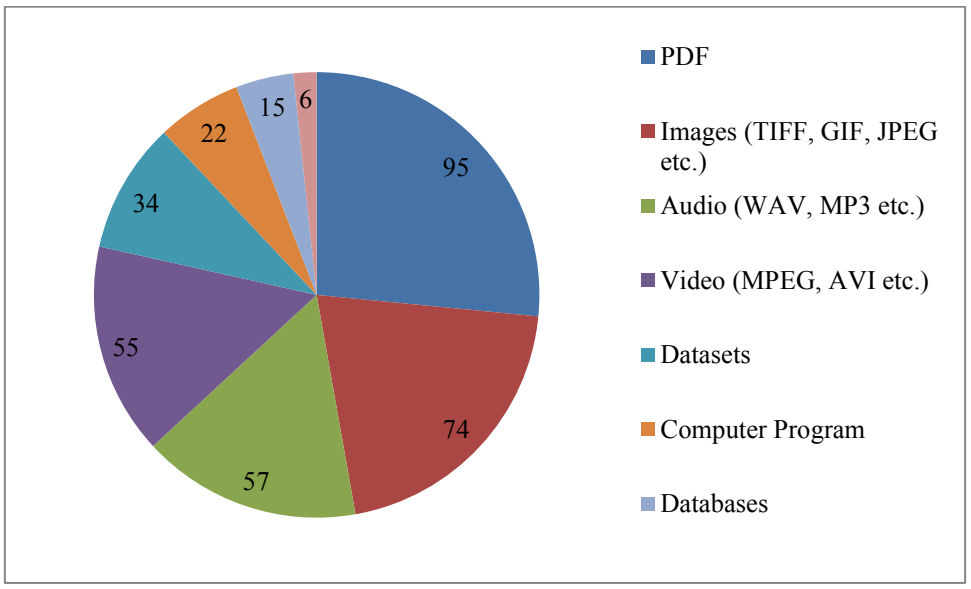

Fig. 5.4: Supported File Formats of ETDs

Q.16 asked the respondents to choose the file format supported by their institutional repository. Respondents were given the freedom to choose from the seven file formats listed as well as they were also given the option to mention some 'Other' file format not included in the list.

Table 5.16 shows that all the Institutional repositories supported PDF. 77.9% support Images (TIFF, GIF, JPEG etc.) followed by 60% which support Audio file formats (WAV, MP3 etc.).

‘Other’ responses received are:

Sr.No.	Answer Options	Response Count
1	All	04
2	Maps	01
3	Will probably accept others but we don't use them	01
	Total	**06**

Three institutions namely Stellenbosch University (South Africa), Virginia tech (USA), Rice University (USA) and University of South Florida (USA) support all file formats. Rice University clarified that although all files are acceptable as simple bitstreams, but text, images and moving images have enhanced support. California Institute of Technology (USA) mentioned ‘Maps’ as a file format supported by their repository. University of Nebraska-Lincoln (USA) most likely supported all file formats but was not sure of using them.

Study conducted by Park et.al. (2007)[34]explain the set-up of a protocol for electronic thesis and dissertation (ETD) submission for the electronic thesis initiative pilot project at McGill University in Montreal, Canada. The study mentioned that for full implementation, three major issues must be taken into strong consideration i.e. conversion; metadata; and file formats.

SECTION 4: HARDWARE & SOFTWARE

Q 17. Which Repository Software package have you implemented? (Please choose only one option)

Sr.No.	Answer Options	Pilot Tested	Implemented	Rating Count
1	**DSpace**	**18 (41.9%)**	**36 (83.7%)**	**43**
2	EPrints	10 (41.7%)	19 (79.2%)	24
3	DoKS	0 (0.0%)	0 (0.0%)	0
4	ETD-db	1 (25.0%)	3 (75.0%)	4
5	Greenstone	3 (75.0%)	2 (50.0%)	4
6	OPUS	0 (0.0%)	0 (0.0%)	0
7	Digital Commons	6 (54.5%)	6 (54.5%)	11
	Other (please specify)	28		

Table 5.17: Repository Software finally used for set-up of E-theses repository

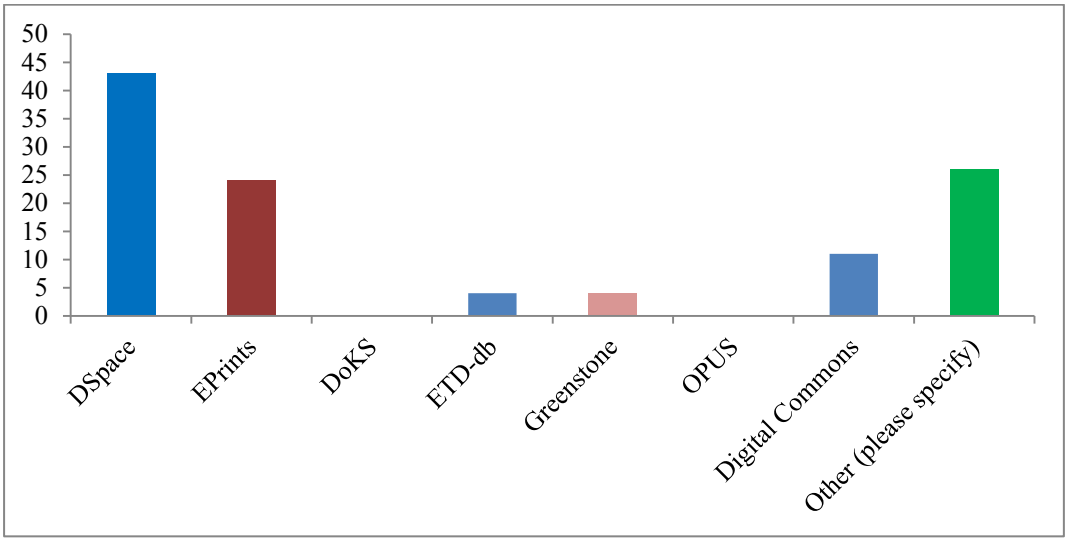

Fig. 5.5: Software Package used for building a repository

The Open Society Institute, New York has published 'A Guide to Institutional Repository Software v 3.0'[35] in order to help organisations in selecting a software system that best satisfies an institution's needs. Directory of Open Access Repositories (OpenDOAR)[36] provides a list of 144+ IR Software packages.

The present question asked the respondents to choose the IR software used for pilot testing (if done before implementation of IR) and finally implemented for IR. The questionnaire listed seven options and the respondents could also mention some other software used by them.

Seventy-four respondents answered the question. It was observed that 36 respondents implemented DSpace for their institutional repository. Out of these 36 Institutional Repositories, 18 first pilot tested with DSpace and then implemented it. EPrints used by 19 institutions, Digital Commons by 6, ETD-db by 3 and Greenstone by 2 were the other IR software implemented. DoKS and OPUS were not used by any of the institutional repositories who participated in the present research.There were some institutions which usedmore than one software for pilot testing and later finalised one or two softwarefor e.g. Stellenbosch University (South Africa) did pilot testing with DSpace, EPrints and ETD-db and finally implemented DSpace. Virginia Tech (USA) implemented DSpace and ETD-db for their institutional repository.

DSpace[37] is found to be the most favorable repository software used worldwide. The same is evident from the literature review done for the present research. Jones (2004)[38]evaluated two open source software packages to deliver E-theses functionality via a Web-based interface: ETD-db by Virginia Tech, and DSpace by Hewlett-Packard (HP) and the Massachusetts Institute of Technology (MIT). Jones found that DSpace was much ahead of ETD-db.

Mondoux & Shiri (2009)[39] found that 28 Canadian Post-Secondary Institutions use DSpacefor their repositories. Vijayakumar & Murthy (2004)[40]suggested DSpace software for Indian Universities to go about with creating their own Institutional Repositories of Theses and Dissertations and also highlighted the Formats, Software and copyright issues related to ETD archiving. Sutradhar (2006)[41] mentioned the selection of DSpace as the most suitable institutional repository software by IIT Kharagpur. Lihitkar et.al. (2009)[42]studied the Indian scenario in developing the institutional repositories and suggested that DSpace and Eprints are commonly used open source software for institutional repositories. Sawant (2011)[43] studied various issues concerning the institutional repository software involved in development of IRs in India. The research findings showed that 79% of IRs used DSpace Software.

Sawant also found that in India many institutions conduct workshops to train library professionals and non-professionals to develop IR using DSpace. ETD Preservation Survey conducted by McMillan (2008)[44] also proves that DSpace is the most preferred platform for collecting, disseminating and storing ETDs.

In order to find out reasons for 'Why DSpace is the most preferred Open Source Software used worldwide for building Institutional Repositories?', the researcher posted the question to NDLTD Listserv through which Repository Administrators from across the world will be able to give their justification for choosing DSpace.

Two Repository Administrators responded to the query in the following manner:

a) Carl Grant, Associate Dean, Knowledge Services & Chief Technology Officer University of Oklahoma Libraries.

"DSpace is typically preferred because:

1. It has the largest active user base. When adopting open source solutions, looking at the community behind the product is a strong (although not conclusive) indicator of how many people and/or organizations are contributing into the code base (committers) and helping to sustain the product in other ways (documentation, conferences, answering support questions, etc). A sustainable product, over time, is a key part of the decision making.
2. It's a complete solution that allows people to quickly and easily download the product and get it up and running. Other OSS repository solutions can require people to select an interface to use with the backend, acquire those separately, ensure versions selected between the various products will work together and install. DSpace makes this much easier.
3. DSpace is quite functionally capable of doing the majority of tasks that many people dealing with digital content need to do. Other products offer superior capabilities in other facets of operations, but when balanced against the most common needs of most institutions and the items listed above, DSpace becomes an easy choice for many."

(Carl Grant, personal communication, August 5, 2014)

b) Thomas Dowling, Director of Technologies, Z. Smith Reynolds Library Wake Forest University Vice President, Library and Information Technology Association.

"We use DSpace because it,

i) does what we need;

ii) is free, open source software; and

iii) has an active developer community. Other schools may tell you their criteria are ease of administration, an attractive UI, analytics, ability to handle massive collections; integration with the library's ILS, etc."

(Thomas Dowling, personal communication, August 5, 2014)

'Other' IR Software used:

Sr.No.	IR Software Specified	Response Count	Response Percent
1	Fedora	06	23.07%
2	DiVA	05	19.23%
3	INVENIO	03	11.53%
4	Local Solution	03	11.53%
5	DigiTool	02	7.69%
6	CONTENTdm	02	7.69%
7	pdf	01	3.84%
8	In house designed	01	3.84%
9	Scigloo	01	3.84%
10	Hydra	01	3.84%
11	VITAL (based on Fedora)	01	3.84%
12	Fez	01	3.84%
13	LUNA Insight	01	3.84%

Twenty-eight respondents specified 13 different institutional repository software package used by them. Rutgers University (USA), University of Hull (UK), London School of Economics & Political Science (UK), Northeastern University (USA), Delft University of Technology (Netherlands) and CQ University Australia use Fedora for their institutional repository. DiVA developed by Uppsala University Library is used by Swedish Institutions namely Orebro University, KTH Royal Institute of Technology, Uppsala University, Swedish School of Sports & Health Sciences and Dalarna University. CNUDST (Tunisia), Ecole Polytechnique Fédérale de Lausanne

(Switzerland) and CERN (Switzerland) implemented Invenio software for their repository. There are some institutions like Georgetown University (USA), Humboldt-Universitaetzu Berlin (Germany) and University of North Texas (USA) which have locally developed software for their institutional repository. Other institutions used Repository Software Packages like CONTENTdm, Digitool, Scigloo, PDF, Hydra, VITAL and LUNA Insight.

Q18.Please select the features of the chosen software (Choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Open source**	**78.9%**	**71**
2	Greater functionality	74.4%	67
3	Adequate support available	71.1%	64
4	Easy installation and maintenance	58.9%	53
5	User friendly	52.2%	47
6	Updates released frequently	46.7%	42
	Other (please specify)	11	

Table 5.18: Salient features of the selected repository software

Q.18 asked the respondents the reasons for choosing particular Institutional Repository Software (Q.17). The question had six options and the respondents could also mention other features. They were given the freedom to select all the features that applied. The feature of being 'Open Source' is the most important for choosing any software. 78.9% respondents chose 'Open Source' as the most important feature for IR software. It is followed by 'Greater functionality of the software' and 'Adequate support available' from the software developers. Features like 'Easy installation and maintenance', 'User friendliness' and 'Release of frequent updates' scored 4^{th}, 5^{th}& 6^{th} rank respectively.

'Other' features mentioned by respondents:

Sr.No.	Features mentioned of the chosen software	Response Count
1	Active community of developers, Scalable	1
2	Interoperability	1
3	Developing our own system makes us able to adapt to new requirements quickly, and interoperate with campus systems suchas personal database and CMS	1
4	Flexibility	1
5	We have chosen to use the services of Open Repository based in the UK	1
6	Benefit of membership in the Texas Digital Library	1
7	Large community support	1
8	development in close cooperation with the user community	1
9	Flexible storage of a wide range of content mime types and metadata schemas	1
10	Active user communities	1
11	We bought the solution form BIBSYS Brage.	1

Eleven respondents mentioned 11 different features for choosing particular software for their institutional repository. Stellenbosch University (South Africa) after pilot testing with DSPace, Eprints & ETD-db, finally implemented DSpace because of the 'Active Community of Developers and Scalable' features. Rice University (USA) also feels that DSpace has 'Large Community Support' compared to other software.

Chadragupt Institute of Management (Patna, India) repository is a 'Prototype' and for pilot testing, they are using DSpace since it supports the common 'Interoperability' standards used in the Institutional repository domain, such as Open Archives Initiative Protocol for Metadata Harvesting, SWORD, OpenSearch, and RSS. More recent versions of DSpace also support faceted search and browse functionality using ApacheSolr.

Chalmers University of Technology (Sweden) implemented 'Scigloo' repository software because they believe that developing their own system will enable to adapt

to new requirements quickly, and interoperate with campus systems such as personal database and Content Management System (CMS).

University of Hull (UK) chose Fedora/Hydra as the repository software because of its 'flexible' nature due to which it can change easily in response to different user and system requirements.

The Institute for Christian Studies (Canada) implemented DSpace because they have chosen to use the services of Open Repository based in the UK. Texas State University (USA) decided on DSpace in order to get benefit of membership in the Texas Digital Library.

Orebro University (Sweden) uses DiVA since it's developed by Swedish consortia and using it will help them in 'developing close cooperation with user community'. Monash University (Australia) used EPrints for pilot testing purpose by finally administered VITAL because it has 'flexible storage of a wide range of content mime types and metadata schemas.'

Virginia Tech (USA) uses DSpace and ETD-db as their repository software because of their 'Active user communities'. CORA Repository (Norway) uses DSpace but have no special reason for using it. The Repository Manager informed of buying the solution from BIBSYS Brage which is a supplier for library and information systems for all Norwegian Libraries.

Q 19. Server connectivity

Sr.No.	Answer Options	Response Percent	Response Count
1	Intranet	8.3%	8
2	Internet	91.7%	88
	Total	**100%**	**96**

Table 5.19: Server connectivity of the E-theses repository

The present question deals with server connectivity issues i.e. the respondents were asked whether their repository is accessible throughout the world via Internet or is it only campus accessible i.e. on Intranet. The response received was not unexpected as majority of institutions (91.7%) are having their repositories accessible on Internet. This proves that majority of the institutions want to share their institutional research work with the world.

The following eight institutional repositories can be accessed only on Intranet:

Sr.No.	Name of Institute	Country
1	Tata Institute of Social Sciences	India
2	Chandragupt Institute of Management	India
3	London School of Economics & Political Science	UK
4	Jawaharlal Nehru University	India
5	SISSA Digital Library	Italy
6	Claremont University Consortium	USA
7	University of Utah	USA
8	Central Queensland University	Australia

Q 20. The E-theses Repository server is:

Sr.No.	Answer Options	Response Percent	Response Count
1	Institution's server	84.3%	75
2	Cloud computing server	15.7%	14
	Other (Please specify)		07
	Total	**100%**	**96**

Table 5.20: Type of E-theses repository server

Q.20 asked the respondents the type of server which is hosting their E-thesis Repository. Respondents were given two options listed in the questionnaire and were also given the option to specify some other server that is hosting their repository. 84.3% (75) respondents have their repository on institution's server. 15.7% (14) opted for cloud computing server. Cloud computing provides infrastructure flexibility, faster deployment of applications and data, cost control, adaptation of cloud resources to real needs, improved productivity, etc.[45]Although it is gaining momentum but there are many institutions that prefer continuing with Institution's server.

GNU Project initiator Richard Stallman[46] and Oracle founder Larry Ellison warned that 'the whole concept of cloud computing is rife with privacy and ownership concerns and constitute merely a fad. There are several discouraging issues related to cloud computing like: reliability, legal issues, lack of standards, security, privacy issues etc.'

The following 14 Institution's host their repository on Cloud Computing Server:

Sr.No.	Name of Institute	Country
1	Saurashtra University	India
2	University de Thies	Senegal
3	Nnamdi Azikiwe University Awka	Nigeria
4	Social Science Baha	Nepal
5	University of Massachusetts Amherst	USA
6	Institute for Christian Studies	Canada
7	Boston University	USA
8	St. John Fisher College	USA
9	Dublin Institute of Technology	Ireland
10	Ecole Polytechnique Fédérale de Lausanne	Switzerland

11	Swedish School of Sports & Health Sciences	Sweden
12	University of Nebraska-Lincoln	USA
13	Auckland University of Technology	New Zealand
14	Health Service Executive	Ireland

'Other' Servers specified by respondents are:

Sr.No.	**Name of Institute**	**Country**
1	Bepress	02
2	Institution's server in the cloud	01
3	Servers in Uppsala university/ Central hosted server for the consortia	03
4	Outsourced server	01
	Total	**07**

Seven respondents specified different servers which are hosting their repository. University of South Florida (USA) and Northeastern University (USA) have their Institutional Repository server hosted by Bepress. The Berkeley Electronic Press or Bepress is an electronic publishing firm that is dedicated to producing products and services to aid open access, institutional repositories and working paper series. Boston University (USA) has its repository hosted on Institution's server which is in cloud. Three Swedish Institutes i.e. Dalarna University, Orebro University& KTH Royal Institute of Technologyhave their institutional repository's server in Uppsala University for consortia. RMIT University (Australia) has outsourced server for hosting their institutional repository.

SECTION 5: WAYS OF PROVIDING ACCESS TO ETDs

Q 21. Access level of ETDs is: (Choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	Full text only by Institution Members	22.6%	21
2	Full text only by subscribers of the database	0.0%	0
3	**Full text by anyone accessing the E-theses repository**	**81.7%**	**76**
4	Metadata only by non-institutional users	11.8%	11
5	Abstract only by non-institutional users	11.8%	11
6	Paid access to full text of ETDs	0.0%	0

Table 5.21: Accessibility provided

The above question provides information regarding the ways in which access is provided to the ETDs in the E-thesis Repositories across the world. It was a closed ended question with seven options. Respondents could select all the options applicable to them. 93 respondents answered the question. It was observed that 76 institutions (81.7%) provided 'Full text access to anyone accessing the E-theses Repository'. The reason for providing full-text access to anyone can be related to the results obtained in Q.7 of the present research wherein 75.5% respondents feel that the major reason for contributing ETDs in the repository is 'to provide maximal access to the research results' and 56.4 % respondents feel that contributors of their institutions will contribute E-thesis in their repository 'to encourage open access.'

Antelman (2004)[47] conducted a research to find out whether open access articles have a greater research impact. The research was conducted on mathematics, electrical and electronic engineering, political science, and philosophy. Antelman found that, across all four disciplines, freely available articles had great research impact. The same results can even be applied for ETDs since users prefer getting free full-text rather

than paying something for the information. More citation to institution's research work helps in raising the profile of the institution.

Twenty-one institutions (22.6%) provide 'full-text access only to Institution Members'. Such repositories provide Username and Password to their faculty members through which they can access the full-text ETD. Reasons for such restricted access can be related to Q.8 of the present study in which large number of contributor have expressed concern over Copyright/ IPR issues and plagiarism issues in open access. Equal number of institutions (11.8%) provides 'Access to metadata access or abstract only access to non-institutional users.'

None of the institutions who responded to the question provide 'Paid access to full-text of ETDs' or 'Full text access only to subscribers of the database.'

Q 22. The E-theses Repository provides access to:

Sr.No.	Answer Options	Response Percent	Response Count
1	**ETDs right from the inception of the Institution (i.e. the first Thesis or Dissertation submitted to the institute)**	**56.7%**	**42**
2	ETDs submitted during last ten years	35.1%	26
3	Only previous academic year ETDs	8.1%	6
	Other (please specify)		21

Table 5.22: Period covered of the ETDs

Q.22 provides information regarding the period since which ETDs are available in the repository. Three options were listed in the questionnaire and respondents could also specify some other answer not mentioned in the list. 56.7% institutions provide access to 'ETDs right from the inception of the institution'. Providing access since the first thesis or dissertation submitted to the institute helps in increasing citation count of the faculty members of the institute. 35.1% institutions include 'ETDs submitted during

last ten years of inception of the institutional repository' and 8.1% include 'Only previous academic year ETDs'.

'Other' answers given by the respondents:

Sr.No.	Name of Institute
1	From 2009 - 2013, but we digitise and submit on request
2	ETDs submitted since January 2011
3	Theses available since 1920
4	ETDs submitted since 2005 are accessible. Prior to 2005 are accessible through ProQuest ETD
5	2007-present
6	MA theses since 2008. Senior Honors Theses since 2013.
7	Most content from most recents years, but it varies since e-publishing is voluntary, and older theses are scanned and added afterwards.
8	All since 2008, sporadic coverage before this
9	Full coverage from 2011 to present. Historical print theses are digitised and added intermittently
10	Since ETD program introduced in 2008
11	Submissions since 2010
12	Current theses, plus right now we are digitizing theses from the inception of the institution
13	Slowly getting the archive scanned and posted
14	Students have been required to submit e-theses from session 2007-08 onwards but are adding content as far back as we can. We subscribe to EThOS.
15	last 15 years
16	different publications from many different years, all doctoral theses from 2003
17	since 2006 and earlier on-demand scans
18	All have been submitted electronically since 1997 and <10,000 scanned TDs
19	Student's theses 2005-, research publications complete 2010-
20	From 2007 - earlier on request

Twenty institutions responded in the 'other' category. Stellenbosch University Repository (South Africa) established in 2010, includes ETDs from 2009-2013, but they also digitise and submit other ETDs on request. Colorado State University Libraries (USA) implemented it's repository in 2007, but includes ETDs submitted

since January 2011. MIT (USA) provides access to ETDs since inception of the institution and also mentioned that it includes theses since 1920. Georgetown University (USA) executed it's repository in 2009 and provides access to ETDs submitted since 2005. ETDs submitted prior to 2005 are accessible through ProQuest ETD. Rutger's University (USA) established it's repository in 2007 and since then started including ETDs in their repository. Brandeis University (USA) implemented it's repository in 2008 and since then includes all the digitised MA theses whereas Senior Honors Theses (Bachelor's Theses) is included since 2013.

Chalmers University of Technology (Sweden) executed it's repository in 2004 and regarding the coverage period of ETDs commented that 'Most content from most recent years, but it varies since e-publishing is voluntary, and older theses are scanned and added afterwards.'

University of Hull (UK) implemented repository in 2008 and since then has included ETDs. They have also mentioned that the repository contains very few ETDs that were submitted before 2008 to the institute. The periodicity is irregular.

LSE Thesis Online (UK) was set up in 2010 and includes all ETDs from 2011. Historical print theses are digitised and added intermittently. It is not a continuous process. Northeastern University (USA) implemented institutional repository in 2008. The ETD Program was also started in 2008 and since then all the ETDs are accessible in the repository. Texas State University (USA) provides access to ETDs submitted since 2010 in their institutional repository. Theses and dissertations submitted prior to 2010 are not made available. Boston University (USA) started repository services in 2013 and presently includes only ETDs submitted in 2013. They are digitizing theses from the inception of the institution and will soon make them accessible.

St.John Fisher College (USA) established repository in 2012 and presently are in process of scanning the archival theses and dissertations and posting them in their repository. University of Glasgow (Scotland, UK) implemented repository in 2008 and students have been required to submit e-theses from session 2007-08 onwards. Archival theses and dissertations will also be scanned and added. The institute subscribes to EThOS.

KTH Royal Institute of Technology (Sweden) executed its repository in 2000 and include ETDs since 1998. Uppsala University (Sweden) set up the repository in 2000 and provides access to the digitised forms of different publications from different years. However, doctoral theses are accessible since 2003.

Claremont University Consortium (USA) started it's repository in 2006 and since then all ETDs are included. Earlier theses and dissertations are scanned and made available on demand. Virginia Tech (USA) implemented its repository in 1997 and since thenall has been submitting theses and dissertations electronically. The repository also contains less than 10,000 scanned Theses and Dissertations.

Swedish School of Sports & Health Sciences (Sweden) executed their repository in 2007 and provide access to Student's theses 2005 onwards and Completed research publications 2010 onwards. North-West University (South Africa) implemented their repository in 2009 and provides access to ETDs from 2007. Theses and Dissertations prior to 2007 are made available on demand.

Observing the trend, it can be concluded that E-thesis Repositories prefer including ETDs since the inception of the institution or repository thereby maximising the extent to which the research work of the institution reaches to the community. The institutions which are not providing access to archival theses and dissertations are soon planning to do so.

Q 23. Who are authorized contributors to your institution's E-theses Repository? (Choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count	Rank
1	Faculty	57.8%	52	3
2	Doctoral Students	22.2%	20	6
3	**Post Graduate Students**	**64.4%**	**58**	**1**
4	Undergraduate Students	25.6%	23	5
5	Research Scientists	47.8%	43	4
6	Librarians	63.3%	57	2
7	Computer Service Staff	13.3%	12	8
8	Academic Support Staff	25.6%	23	5
9	Administrative Staff	20.0%	18	7

10	External Contributors	6.7%	6	10
11	Archivists	8.9%	8	9
	Other (please specify)		11	

Table 5.23: Authorised contributors of the ETDs

Q 23 asked the respondents to choose the authorised contributors to their institution's E-theses repository. The question listed eleven options and the institutions could select more than one mention. They were also given the opportunity to mention other contributors.

The top most authorised contributors of ETDs are Post Graduate Students (64.4%), Librarians (63.3%), Faculty (57.8%) and Research Scientists (47.8%). External Contributors (6.7%), Archivists (8.9%) and Computer Service Staff (13.3%) are less likely authorised contributors of ETDs.

During literature search for the present research no reference was found directly related to authorised contributors of ETDs only in E-thesis Repositories. However, the researcher got reference of studies done on contributors of institutional repositories.

Markey et.al.(2007) in 'Census of Institutional Repositories in the United States' found that the top most authorised contributors are Librarians (79.2%), faculty (77.1%), graduate students (56.3%), research scientists (56.3%) and archivists (54.2%). Less likely authorised contributors were Academic Support Staff (37.5%), Institution's News Service (12.5%), Press (16.7%), Central Computer Services Staff (16.7%) and External Contributors (16.7%). Out of 2147 academic library directors and senior library administrators, 446 participated in the Census.

Markey's research results match the present research findings to some extent since for both Post Graduate Students and Librarians score 1st and 2nd ranks.

Sawant (2009) in her study of 'Institutional Repositories in India' found that the 1st ranked authorised contributors are Faculty Members (71.43%), followed by Research Scientists (64.29%0 and Library Staff (57.14%). In the present research Faculty members and Research Scientists score 3rd& 4th rank.

'Other' authorised contributors specified are:

Sr.No.	Categories
1	All USF affiliations
2	Visiting Faculty
3	Printing office staff (special access rights for a group of staff)
4	Medical Students
5	Technical Staff
6	The archive contains all student's theses and all research produced in all institutions/departments
7	We are starting a student repository for under-graduate items to be available only on the intranet
8	Everyone in the university community
9	EThOS is a national resource - contributors are all UK universities
10	Our dept. provides this service tofaculty and students
11	We have a variety of contributors from the health service and health agencies in the Republic of Ireland

Eleven institutions mentioned contributors other than the ones listed in the questionnaire. University of South Florida (USA) mentioned 'All USF Affiliations' as the authorised contributors of ETD in E-theses Repository. Chandragupt Institute of Management (India) includes 'Visiting faculty' as authorised contributor. Chalmers University of Technology (Sweden) reported having 'Printing Office Staff' as ETD contributors. The institute also provides special access rights for a group of staff. 'Medical Students' of Yale University (USA) are one of the authorised ETD contributors. Indian Institute of Astrophysics (India) mentioned 'Technical Staff' as one of the contributors.

Orebro University (Sweden) mentions that the archive contains all students' theses and all research produced in all institutions/departments. It does not specify any particular category of authorised contributor. Ounongo University (Nigeria) mentioned faculty, Post Graduate students, Librarians, Computer Service Staff, Academic Support Staff and Administrative Staff as the authorised contributors to E-theses Repository and also informed of starting a student repository for under-graduate items to be available only on the intranet.

Virginia Tech (USA) has all the university community members as its authorised contributor. Librarians & Administrative Staff are the authorised contributors of

British Library E-theses Repository (UK). It also has all UK universities as the contributors. Oklahoma State University (USA) did not specify any authorised contributor but informed providing E-theses Repository Services to faculty and students. Health Service Executive Ireland mentioned having variety of contributors from the health service and health agencies in the Republic of Ireland.

Q 24. Who are the major contributors to your institution's E-theses Repository? (Choose only one)

Sr.No.	Answer Options	Response Percent	Response Count
1	Faculty	12.8%	11
2	Doctoral Students	1.2%	1
3	**Post Graduate Students**	**50.0%**	**43**
4	Undergraduate Students	3.5%	3
5	Research Scientists	16.3%	14
6	Librarians	15.1%	13
7	Computer Service Staff	0.0%	0
8	Academic Support Staff	0.0%	0
9	Administrative Staff	2.3%	2
10	External Contributors	0.0%	0
11	Archivists	0.0%	0
	Other (please specify)		5

Table 5.24: Major contributors of ETDs

The above question asked the respondents to select the category of major contributors to their E-theses Repository. It was found that Post Graduate Students (50%) were the major contributors in the E-thesis Repositories throughout the world followed by Research Scientists (16.3%), Faculty (12.8%) and Librarians (15.1%). Only one institution mentioned 'Doctoral Students' as the major contributor of ETDs in the repository.

Categories of 'Computer Service Staff', 'Academic Support Staff', 'External Contributors' and 'Archivists' were not the major contributors for any institute. This response was not unexpected considering the information received in Q.23 wherein

few institutions have mentioned having these four categories as their authorised contributors.

As mentioned in previous question about unavailability of survey results of E-theses Repository, for the present question we can consider the institutional repository survey results.

Markey et.al. (2007) in their study found that faculty (33.3%), graduate students (20.5%) and Librarians (10.3%) are the major contributors in their institutional repositories. On the same lines, Sawant (2009) in her study found faculty (64.29%), Research Scientists (50%) and Library Staff (42.86%) as the major contributors in the institutional repositories.

Although the results of the present research do not completely match the previous studies done but it can be stated that Research Scientists, Faculty and Librarians constitute the categories of major contributors in Institutional/E-thesis Repositories.

'Other' Major contributors mentioned are:

Sr.No.	Categories
1	As we begin to populate the IR this will change to the Faculty
2	Medical Students
3	The largest number of contributions are collaborative -- usually librarians+students or librarians+faculty
4	University library (for paper) and repository (for digital)
5	Public Health Doctors & Psychologists

Five institutes specified major contributors other than the categories mentioned in the questionnaire.

Institute of Christian Studies (Canada) chose 'Post Graduate Students' as the major contributor of ETD but also mentioned that this category might change in future as they will keep adding more and more types of collection in their E-theses Repository. Yale University (USA) mentioned 'Medical Students' as the major contributors. Boston University (USA) informs about the largest number of contributions being

collaborative, usually of Librarians & Students or Librarians & Faculty. British Library (UK) have 'Librarians' as the major contributors but also specified that University Library is the major contributor 'for paper (print) information' whereas Repository Staff is the major contributor for 'digital information'. Health Service Executive Ireland acknowledged 'Public Health Doctors & Psychologists' as the major contributor of ETDs in the E-theses repository.

Q 25. Use of ETDs in the repository is monitored with the help of (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	Statistical count of number of views (Abstract Only)	25.8%	23
2	**Statistical count of number of views (Abstract + PDF/HTML)**	**57.3%**	**51**
3	Statistical count of number of views (Country wise)	46.1%	41
4	Statistical count of number of full-text downloads (Country wise)	53.9%	48
5	Tracking number of contributions	28.1%	25
6	Tracking number of searches	29.2%	26
7	Tracking number of users	29.2%	26
8	Tracking number of queries	18.0%	16
9	No monitoring method is employed	14.6%	13
	Other (please specify)		04

Table 5.25: Ways of monitoring the usage of ETDs

Q.25 investigated about the usage monitoring techniques used by the repositories. The questionnaire listed nine options and the respondents could select more than one option applied by them. Also, some other monitoring technique could also be mentioned.

It was found that 57.3% i.e. 51 respondents monitored the E-theses Repository usage by 'Statistical count of number of views (Abstract+PDF/HTML)' followed by 53.9%

taking into consideration the 'Statistical count of number of full-text downloads (country wise)'and 46.1% opting for 'Statistical count of number of views (country wise)'. Thirteen E-thesis repositories (14.6%) have not employed any monitoring method till date.

The present research result has similarity with Sawant's (2009) study wherein she also found highest number of respondents (57.14%) using 'Tracking number of views (Abstract +PDF/HTML)' for assessment of IR usage. However, she noticed 'Tracking number of views (Abstract only)' and 'Tracking number of users' as second most commonly implemented IR assessment system. The present research found 'Country wise full-text downloads' as second most important assessment technique.

'Other' monitoring techniques listed are:

Sr.No.	Categories
1	Advanced monitoring system is developed to keep track of hourly,daily,weekly and monthly visits. Also keeps track of duration for which the pages are visited, search engines used, web browsers,navigationtools,keywords used.
2	we are testing other measuring methods (our developer can see frequency of use/download etc.) But we do not publish the user statistics on the web
3	all data from awstats http://awstats.sourceforge.net/
4	We have recently upgraded to EPrints 3.10,and will be using IRstats

Four institutions have mentioned some additional monitoring techniques other than the ones listed in the questionnaire.

California Institute of Technology (USA) does the assessment of E-theses repository usage by 'Statistical count of number of views (Abstract Only)' and 'Statistical count of number of full-text downloads (Country wise)'. Other than these usage analysis methods, the institute has developed advanced monitoring system to keep track of hourly, daily, weekly and monthly visits. Also keeps track of duration for which the pages are visited, search engines used, web browsers, navigation tools, keywords used.

Chalmers University of Technology (Sweden) evaluates the E-theses repository usage by 'Tracking number of contributions'. However, they have also mentioned of testing other measuring methods (our developer can see frequency of use/download etc.) But, the institute does not publish user statistics on the web.

Orebro University (Sweden) applies all the eight methods mentioned in the questionnaire for monitoring the usage of E-theses repository. They have mentioned of getting all the usage statistics data from AWStats (http://awstats.sourceforge.net/) which is a free powerful and featureful tool that generates advanced web, streaming, ftp or mail server statistics, graphically.

University of Glasgow (UK) is presently not using any usage assessment method. They have recently upgraded to EPrints 3.10 and will be using IRStats which is a flexible statistics package which allows easy processing of accesses to full-text documents of eprints. It can be downloaded from the EPrints File repository

The above mentioned monitoring techniques shows that the institutions are in need of such statistics in order to see the popularity of their E-theses repository and to understand the extent of usage of the ETDs submitted in the repository by global users. These monitoring techniques also help the institutions to understand the various search terms used to retrieve information regarding the ETDs.

Q 26. ETDs found within your repository are used (Please select only one option)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Frequently**	**79.1%**	**72**
2	Occasionally	20.9%	19
3	Rarely	0.0%	0
4	Never	0.0%	0

Table 5.26: Frequency of use of ETDs

Q 26 deals with the perception of usageof the E-theses repository. As expected, 79.1% i.e. 72 institutions mentioned that ETDs found within their repository are used 'Frequently'. 20.9% i.e 19 institutions mention 'Occasional' usage of ETDs submitted in their repository. Ninety one institutions responded to the question, out of which

none of the institutions have the opinion that their E-theses repository is used ‘Rarely’ or is ‘Never’ used.

The findings of the present research are similar to Russell’s (2009) findings regarding usage of electronic resources and institutional repositories. She found that 53% respondents considered that their materials within the repository are used frequently, 25% stated occasional usage and 4% said rarely or never.

It is interesting to note that users across the world understand the importance and benefits of ETDs and are frequently using them.

SECTION 6: BUDGET CONSIDERATIONS

Q 27. What is the source of funding for implementation of ETD program? (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	Special grant provided by institution's administration	24.7%	20
2	Grant awarded by an external agency	7.4%	6
3	Costs covered in routing operating costs of your institution's computer services	16.0%	13
4	**Costs covered in routing operating costs of your institution's library**	**67.9%**	**55**
	Other (please specify)		10

Table 5.27: Source of funding of E-theses repository

Q 27 asked the respondents about the source of funding provided by their institution for implementation of ETD program. The questionnaire provided a list of four sources of funding and the respondents were also requested to mention some other funding source.

Table 5.27 reports that 67.9% institutions had the opinion that 'Costs covered in routing operating costs of institution's library' is the major source of funding for implementation of ETD program. 24.7% stated 'Provision of special grant by institution's administration'. 16% respondents feel that the major source of funding is 'Costs covered in routing operating costs of your institution's computer services' and 7.4% say that 'Grant is awarded by an external agency'. Sawant (2009) in her study also found 57.14% respondents agreed that the main source of funding for institutional repositories came from routing operating costs of your institution's library. However, unlike the present study wherein 24.7% institutions said that 'Special grant is provided by institution's administration' and 7.4% had an opinion

that 'External agency awards grant for implementation of ETD Program', in Sawant's study, none of the participating institutions selected these as the funding sources.

Bailey (2006) also found that out of the 87 respondents, majority did not have a dedicated budget for repositories. Markey et. al. (2007) also found that top ranked funding source for implementation of institutional repositories came from library.

'Other' funding sources mentioned are:

Sr.No.	Other funding sources
1	International Cooperation : European Project TEMPUS IV
2	do not know
3	Given more staff for this service now (in the beginning we had a grant from institution for a year)
4	Unsure, source of funding was set-up by previous staff.
5	Annual Subscription top sliced from the Institute
6	The British Library provides EThOS as a core service as part of its support for Higher Education research (government funding)
7	Graduate Studies Office
8	Component of external funds received for implementation of full institutional repository not just ETD repository.
9	Special grant provided by the Chamber of Veterinary Medicine
10	No funding

Ten institutions mentioned sources of funding other than the ones listed in the questionnaire. CNUDST (Tunisia) receives funding for implementation of E-theses repository through International co-operation under the European Project- TEMPUS IV. Brandeis University (USA) e-theses repository manager is not aware of funding source for repository implementation. Chalmers University of Technology (Sweden) believes that the main source of funding for implementation of E-theses Repository comes from institution's library and more staff has been allotted by the institution for the successful implementation of ETD Program. Repository Manager of London School of Economics and Political Science (UK) mentions of being unaware of source of funding since it was set up by the previous staff. Dublin Institute of Technology (Ireland) receives the funding as annual subscription from the Institute. British Library (UK) receives funding from the UK Government for the E-theses repository since it is regarded as a core service required for higher education and research. University of Waterloo (Canada) receives funding from multiple sources namely

institution's library, computer services and Graduate Studies Office. Central Queensland University (Australia) receives external funds for implementation of full institutional repository and not specifically ETD Repository. However, the institute did not mention the sources from where external funds are received. SzentIstvan University (Hungary) receives special grant from Chamber of Veterinary Medicine for implementation of E-theses Repository. KNUSTSpace (Ghana) does not have any special funding for ETD Program.

The responses received for the present question shows that majority of the institutions receive funding from the institution's library or from external sources. Hence, it can be said that funding is very important for proper implementation and functioning of ETD Program.

Q 28. Out of the funds available for E-theses Repository during 2012-2013, what percentage of amount is allocated to the following categories?

Sr.No.	Answer Options	Response Percent	Response Count
1	**Staff**	**84.4%**	**27**
2	Hardware Acquisition	53.1%	17
3	Hardware Maintenance	50.0%	16
4	Software Acquisition	53.1%	17
5	Software Maintenance and updates	68.8%	22
6	System backup	53.1%	17
7	Consultancy	46.9%	15

Table 5.28: Percentage of amount allocated for various categories of E-theses repository

The above question asked the institutions to provide percentage wise details of the allocation of funds under various categories during 2012-13. The respondents were asked to mention the percentage of the fund utilised of the total fund available. The question was close ended and provided seven options.

Out of the 33% i.e.32 institutions who responded for the question, it was found that 84.4% institutions mentioned that major percentage of grant is utilised for Staff.

Dublin City University (Ireland) utilises 100% of the special grant provided by the institution's administration for Staff. Rutgers University (USA) utilises highest percentage of allocated fund for staff i.e.95%, followed by Monash University (Australia) and CQUniversity (Australia) who utilise 90% fund for staff.

'Software maintenance and updates' is the second category for which higher percentage of funds are utilised. Auckland University of Technology (New Zealand) mentioned utilising 100% grants for software maintenance. Hardware Acquisition, Software Acquisition and System Backup share the third rank, followed by Hardware Maintenance. Only 46.9% i.e. 15 institutions mention that they utilise some percentage of the allotted grants for 'Consultancy'. Norwegian Prison and Probation Staff Academy (Norway) is the only institute which uses 50% for Consultancy. Remaining 50% amount is utilised for Staff by the institute.

Sawant (2009) for her research found that none of the institutions responded for the question on allocation of funds available for institutional repository. However, the analysis of the comments provided by some of the institutions show the absence of special allocation of funds for institutional repository under specific categories of staff, hardware and software maintenance etc. Markey et.al. (2007) found that 75% of the available grant is used for staff and vendor fees, followed by 10% for Hardware acquisition and 7% for Software acquisition.

The responses received for the present research approximately matches with Markey's research findings.

SECTION 7: HUMAN RESOURCE

Q 29. Who is heading E-theses repository implementation at your institution? (Please choose only one)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Librarian**	**43.4%**	**33**
2	Assistant Librarian	6.6%	5
3	Information Scientist	3.9%	3
4	Library Staff Member	13.2%	10
5	Head of the Information Centre	1.3%	1
6	Staff Member of Information Centre	0.0%	0
7	Library Director	10.5%	8
8	Assistant Library Director	7.9%	6
9	Head of the Information Division	1.3%	1
10	Staff Member of the Information Division	0.0%	0
11	Faculty Member	1.3%	1
12	Computer Service Staff Member	1.3%	1
13	System Administrator	9.2%	7
14	No Committee or Committee Chair has been appointed	0.0%	0
	Other (Please specify)		18

Table 5.29: Head of the E-theses Repository

Q. 29 required the respondents to inform about the designation who is heading the E-theses repository. The question had 14 designations listed and the respondents were requested to select only one option that is applicable to their repository. In case, some other designation was heading the repository then the respondents could specify the designation in the answer box provided.

43.4% i.e. 33 institutions have 'Librarians' as the Head of the E-theses repository followed by 13.2% E-theses repository headed by a 'Library Staff Member' and 6.6% headed by 'Assistant Librarian'. None of the E-theses repository had any staff

member of information centre or information division as the Head of the E-theses repository.

Kamraninia & Abrizah (2010)[48] conducted a study to find out the role of librarians in deployment and recruitment of institutional repositories in eight universities in Malaysia. They found that Librarians were heading most of the institutional repositories since they have professional training of creating metadata, content organisation, preservation of digital materials and self-archiving techniques.Burns et.al. (2013)[49] argued that academic librarians add value to the scholarly communication process when they establish institutional repository by creating proper metadata and providing permanent URI for the work. Librarians also have a better understanding of staffing needs and cost required for the complete project. Sawant (2009) in her study also found similar results wherein 42.86% institutions had 'Librarians' heading the institutional repository.

'Other' designations specified by the respondents are:

Other designations heading the E-theses Repository	No. of Responses
Team	2
Systems Librarian	2
Technical Officer	1
Program Manager, Scholarly Repository Services	3
Digital Services Librarian	2
Repository Collection Librarian	1
Digital Repositories Coordinating Librarian	1
Executive Director of Digital Scholarship Services (part of library)	1
Institutional Repository Librarian (IR Librarian)	1
Head of Subject & Research Services, Library	1
Dean of the Graduate School in 1995-1999	1
Head of Publishing Unit (Publishing Coordinator)	1
Coordinator of Scholarly Communication (who is a faculty member in the library)	1
Total	**18**

Eighteen E-thesis repositories mentioned 'Other' designations heading the implementation of E-theses repository at their institution.

Instead of having an individual person heading the E-theses repository, CNUDST (Tunisia) & Social Science Baha (Nepal) has a 'Team' involved in maintaining the repository. University of Nairobi (Kenya) and Health Service Executive (Ireland) are maintained by 'Systems Librarian'. National Metallurgical Laboratory's (NML, India) E-theses repository is maintained by Technical Officer. MIT (USA), Uppsala University Library (Sweden) and British Library (UK) are maintained by the E-theses Repository Program/Project Manager. Georgetown University (USA) and Auckland University of Technology (New Zealand) are under the leadership of Digital Services Librarian.

Rutgers University (USA) informed of having 'Repository Collection Librarian' for managing the E-theses repository. Two institutes of USA namely California Institute of Technology and University of Nebraska-Lincoln have Digital Repositories Co-ordinating Librarian for maintaining the repository. The Executive Director of Digital Scholarship Services who is a part of the Library manages the E-theses repository. KNUSTSpace (Ghana) repository is under the leadership of Institutional Repository Librarian.

Ounongo University (Nigeria) have two individuals maintaining the E-theses repository namely Librarian and Head of Subject & Research Services (Library). Virginia Tech (USA) E-theses repository is presently maintained by Librarian but during 1995-1999, Dean of the Graduate School was heading the implementation of the repository. University of Jyväskylä (Finland) repository is managed by the Head of Publishing Unit.

The answers received for the above question brings into notice different designations that maintain the E-theses repository worldwide.

Q 30. If a team or committee is involved with E-theses repositories, who are the members of the committee. (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Librarian**	**67.5%**	**52**
2	Assistant Librarian	20.8%	16
3	Information Scientist	10.4%	8
4	Library Staff Member	39.0%	30
5	Head of the Information Centre	7.8%	6
6	Staff Member of Information Centre	10.4%	8
7	Library Director	27.3%	21
8	Assistant Library Director	10.4%	8
9	Head of the Information Division	9.1%	7
10	Staff Member of the Information Division	5.2%	4
11	Faculty Member	16.9%	13
12	Computer Service Staff Member	26.0%	20
13	System Administrator	29.9%	23
14	No Committee or Committee Chair has been appointed	14.3%	11
	Other(please specify)		17

Table 5.30: Members of E-theses repository implementation committee

Q.30 aimed to identify the members involved in the committee for implementation of E-theses repository. The question provided fourteen options and members not designations not listed in the list can be mentioned in the separate Answer Box provided.

It was observed that, 67.5% (52) and 39% (30) institutions had Librarian and Library Staff Member as the E-theses repository committee members. 14.3% (11) institutions mentioned that no separate committee was formed for implementation of the repository. The responses received show that not only library staff members but

faculty members and IT professionals also actively participate in repository implementation committee.

'Other' members involved in the team or committee are:

'Other' Members involved in the team or committee	**Response Count**
Systems Librarian	1
director of the research management office	1
a few librarians with special skills and developers/programmers	1
Graduate Reader collaborate	1
Graduate School Manager	1
Graduate student assistant	1
Support staff in academic divisions	1
Graduate College staff	1
Graduate Studies personnel	2
theses coordinators in the library and graduate schools	1
IR Librarian	1
Representatives from all faculties but meetings are ad hoc	1
Dean of the Graduate School	1
Ethos has an external Board	1
External Technical Consultant	1
We have 2 teams, a project team made up of librarians and library staff & a working group made up of contributors - librarians, researchers from contributing organisations. I am setting up a 3rd group this year which will be an advisory group of managers.	1
Total	**17**

Seventeen institutions have mentioned that they have other institutional members in the E-theses repository implementation committee. University of Nairobi (Kenya) has System Librarian for managing E-theses repository. University of Arts London (UK) has Director of the Research Management Office along with Librarian, Library Staff Member, Library Director and Computer Service Staff Member as one of the

committee members. Chalmers University of Technology (Sweden) has Librarian as the Head of the committee for implementation of E-theses repository and few librarians with special skills and developers/programmers. University of North Texas (USA) E-theses repository is managed by Librarian and the Graduate Reader Collaborate.

Librarian and Graduate School Manager maintain the E-theses repository of University of Hull (UK). Institute for Christian Studies (Canada) has Graduate Student Assistant as one of their E-theses Repository Team Members. North Eastern University (USA) has diverse members in the repository team since Support staff of all academic divisions constitutes the Team members. Texas State University (USA) mentions of having Graduate College Staff as their repository team members. Rice University (USA) & University of Waterloo (Canada) have Graduate Studies Personnel as Team members. Boston University (USA) has theses coordinators in the library and graduate schools. These theses coordinators are part of the team for maintaining the E-theses repository.

KNUSTSpace (Ghana) is headed by Assistant Librarian but IR Librarian is one of the members in the team which manages the repository. Ounongo University (Namibia) E-theses repository is managed by the Librarian and Representatives from all faculties constitute the Repository implementation team. Virginia Tech (USA) has Librarian, Faculty member and Dean of the Graduate School as the Committee members for repository implementation.

The British Library (UK) has an External Board that takes into account all issues related to implementation and maintenance of E-theses repository. The University of British Columbia (Canada) also takes help of External Technical Consultant along with institutional staff for proper functioning of E-theses Repository. Lenus (Ireland) informed of havingtwo teams, a project team made up of librarians and library staff & a working group made up of contributors - librarians, researchers from contributing organisations. The Systems Librarian of Lenus is setting up a 3rd group in 2013, which will be an advisory group of managers.

The detailed review of members involved in the team or committee of managing the E-theses repository shows that, not only Librarians and Library Staff, but institutes also depend on External Support, Faculty Members, and Head of the Institutions etc. for the proper functioning of the repository. Librarian or Library Staff members are not the sole responsible members for repository management.

Q 31. For implementation of E-theses repository, has special staff been appointed? (Write total number of staff in respective text box)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Full Time**	**61.8%**	**42**
2	Part time	47.1%	32
3	Contract Basis	26.5%	18
4	No Special Staff was appointed	35.3%	24

Table 5.31: Appointment of Special Staff

Q.31 was framed to know whether special staff was appointed for implementation of E-theses repository. The question was close ended and respondents were allowed to select more than one option. Sixty eight institutions responded the question, out of which 61.8% (42) institutions appointed Full time staff, 47.1% (32) institutions appointed Part Time Staff and 26.5% (18) institutions appointed Contractual Staff for implementation of E-theses Repository. 35.3% (24) institutions said that No special staff was appointed for implementation purpose, regular institutional staff carriers out the implementation work along with their day-to-day duty.

Universiti Putra Malaysia (Malaysia) appointed 15, the highest number of Full Time Staff for E-theses repository implementation followed by Cranfield University (UK) and Nnamdi Azikiwe University Awka (Nigeria) who have appointed 8 Full Time staff. Rest of the institutions had range of one to six new appointments.

University of Minho (Portugal) appointed 6, the highest number of Part Time staff. Rest of the institutions had appointed three or one Part-time appointments. Saurashtra University (India) appointed 3 staff on Contractual Basis.

Sawant (2009) studied the institutional repositories in India and on enquiring about the special staff being appointed for implementation of institutional repository found that, none of the fourteen institutions which responded to her questionnaire, had appointed any Special Staff. All the work related to the successful implementation, development and management of the repository was carried out by the regular staff of the institution or the library.

The responses received for the above question suggest that maximum E-thesis repositories in foreign countries believe in more systematic implementation and development of the repository by appointing extra full-time or part-time or contractual staff as per the requirement. Regular institutional or library staff is not given extra workload. However, repositories in India are mostly set-up by the institutional/library staff and very rarely staff on contract-basis is appointed for development of the repository.

SECTION 8: METADATA STANDARDS & INTEROPERABILITY

Q 32. Metadata is created by:

Sr.No.	Answer Options	Response Percent	Response Count
1	Item contributors	13.2%	12
2	Repository administrator	37.4%	34
3	**Created by ETD contributor, verified by repository administrator**	**49.5%**	**45**
4	Other (please specify)		09

Table 5.32: Creator of metadata for ETD

The above question deals with creation of metadata. The question had three options and the respondents were allowed to mention any other metadata creator's designation in the answer box provided.

Metadata plays an important role in information management. It is structured information describing information resources/objects for a variety of purposes. Nicols et.al. (2008)[50]submitted a Working Paper on 'Metadata Tools for Institutional Repositories' wherein they have mentioned that creation of metadata needs to consider issues of completeness, accuracy, provenance, conformance to expectations, logical consistency and coherence, timeliness, and accessibility. This proves that creation of metadata is one of the most important things for setting up repository.

Table 5.32 shows that 49.5% i.e. 45 institutions said that the Metadata is created by ETD contributor and verified by the repository administrator. 37.4% i.e. 34 institutions mention creation of metadata by the Repository Administrator whereas 13.2% (12 institutions) said that the ETD contributor creates the Metadata.

The findings prove that the Creation of Metadata is finalised by the Repository Administrator. If we relate the findings of the present question with that of Q.29 then we can claim that Robertson's statement stands true wherein he states that

development of quality metadata is an important role of LIS professionals. Q.29 proves that LIS Professionals like Librarian/ Assistant Librarian head the E-thesis repositories as Repository Administrators.

'Other' metadata creators mentioned are:

Sr.No.	'Other' Metadata Creators
1	Librarian and library staff members
2	Cataloguer
3	some Information is added by the Repository Server Service Grouped (Librarian)
4	By many actually (authors, metadata Librarians, and cataloguers)
5	Both contributors and administrators, depending on submission type
6	All of these - some by the institution itself and some by British Library staff
7	Contributor and administrator are the same person
8	All above
9	Library's metadata staff

Nine institutions mentioned different metadata creators for the items deposited in their repository. Colorado State University (USA) mentioned that the metadata is created by the Item Contributor, Librarian and library staff members.

Rutgers University's (USA) metadata is created by the item depositor and verified by repository administrator but it is also sometimes created by the cataloguer. Humboldt-Universitaetzu Berlin (Germany) informs that although the metadata is verified by the repository administrator but some information is added by the Repository Server Service Grouped Librarian.

University of North Texas (USA) notifies the involvement of many metadata creators for ETDs deposited in the repository like authors, metadata librarians and cataloguers. St.John Fisher College (USA) mentions that metadata creator is finalised depending on the type of submission (however, further clarification is not given regarding the 'type of submission').

The British Library (UK) informs that both the ETD contributor as well as the Repository Administrator creates the metadata. Some of the EThOS metadata is

created by the institution itself and some by the British Library staff. University of Nebraska-Lincoln (USA) notifies that the ETD contributor and the repository administrator are the same person i.e. the Co-ordinator of the Scholarly Communication.

Dalarna University (Sweden) mentions that all the options listed in the above question are applicable for their E-theses repository. The University of British Columbia (Canada) informs that the metadata is created by the item depositors and library's metadata staff.

Q 33. The E-theses repository is OAI-PMH compliant

Sr.No.	Answer Options	Response Percent	Response Count
1	**Yes**	**95.6%**	**86**
2	No	4.4%	4

Table 5.33: Compliance of E-theses repository with OAI-PMH

Interoperability aims to provide effective and efficient exchange between computer systems. The Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) is a protocol developed by the Open Archives Initiative to facilitate efficient dissemination of repository metadata. It is used to harvest (or collect) the metadata descriptions of the records in an archive so that services can be built using metadata from many archives. It is a set of rules and standards that standardize the access to the content of repositories.Under this model, metadata is harvested (extracted) from Data Providers (Repositories) by Service Providers (Search Engines) (Singh, Pandita, & Dash, 2008)[51] .The immediate benefit to an institution of providing an interoperable standard compliant IR lies in visibility and impact.

Sawant (2009) mentions 'adoption of an interoperable standard/protocol is necessary to expose metadata associated with repository's collection to external systems and search engines.'

The above question deals with the interoperability standards of the E-theses repository. The question was close ended with only two options. It was found that 95.6% (86) E-theses repository is OAI-PMH compliant. Only 4.4% (4) institutions said that there repositories were not having OAI-PMH standards.

Similar findings were witnessed by Bailey et.al. (2006) where out of 37 respondents, 94% indicated that their institutional repository supports OAI-PMH. Sawant (2009) also received similar response where out of 14 respondents, 92.86% ensured that their IR supports OAI-PMH.

Apart from OAI-PMH there are other interoperability standards such as Resource Description Framework (RDF), SPARQL (**S**PARQL **P**rotocol **a**nd **R**DF **Q**uery **L**anguage),Metadata Encoding and Transmission Standard (METS) and OpenURL.

SECTION 9: PRESERVATION POLICY

Q 34.Do you have any digital preservation policy?

Sr.No.	Answer Options	Response Percent	Response Count
1	**Yes**	**60.4%**	**55**
2	No	39.6%	36

Table 5.34: Presence of Digital Preservation Policy

Q 34 asked the respondents about the presence of digital preservation policy. McMillan (2008) mentions 'Digital preservation is the systematic management of computerised information over an indefinite period of time. Effective preservation succeeds by replicating copies of digital content in secure, distributed locations over time because security reduces the likelihood that any single cache will be compromised and distribution reduces the likelihood that the loss of any single cache will lead to a loss of the preserved content.'91 institutions responded to the above question. Keeping into consideration the importance of ETDs, in order to make long time access possible, 60.4% i.e. 55 institutions informed of having digital preservation policy.

Q 35.If yes, which long term preservation strategy is employed? (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Bitstream Copying (making an exact duplicate of a digital object)**	**68.3%**	**28**
2	Refreshing (copy digital information from one long-term storage medium to another of the same type)	26.8%	11
3	Durable, Persistent Media (eg. CDs)	22.0%	9
4	Digital Archaeology (includes methods and procedures to rescue content from damaged media or from obsolete or damaged hardware and software environments)	4.9%	2

5	Analog Backups (combines the conversion of digital objects into analog form with the use of durable analog media)	12.2%	5
6	Migration (to copy data, or convert data, from one technology to another, whether hardware or software, preserving the essential characteristics of the data)	51.2%	21
7	Emulation (combines the original hardware and software environment of the digital object, and recreates it on a current machine)	7.3%	3
8	Encapsulation(may be seen as a technique of grouping together a digital object and metadata necessary to provide access to that object)	4.9%	2
	Other (please specify)		7

Table 5.35: Long term preservation strategy employed by the E-theses repository

The above question is an extension of Q.34 since it provides information about the long term digital preservation strategy employed by the institutions.The question provided eight options and respondents were allowed to provide multiple answers. In case the institution employs some other strategy, then they could mention it in the Answer box provided.

68.3% (28) institutions ensured of employing 'Bitstream Copying' digital preservation strategy followed by 51.2% (21) institutions which employed 'Migration' method and 26.8% (11) institutions using 'Refreshing' technique.

'Bitstream Copying'[52]is more commonly regarded as 'backing up your data' and refers to the process of making an exact duplicate of a digital object. Preserving the bitstream in original state means that the archive is able to maintain one version of the object which has not been subject to data loss.

Sawant (2009) in her study also found that majority of respondents opted for 'Bitstream Copying' followed by Persistent Media. In her research, none of the institutional repositories in India employed 'Emulation' strategy.

Policies regarding preservation of items from repository are mentioned in the 'FAQ' or 'Policies' section of the repository website.

'Other' digital preservation strategies employed are:

Sr.No.	'Other' Digital Preservation Strategies
1	Uses Bepress Platform
2	i don't know - the IT support does this
3	distributed digital preservation network: MetaArchive Cooperative
4	This is being planned now
5	Built into the Digital Commons system
6	We don't know. This is managed by the DiVA administration
7	Not sure, the repository is part of the Library's overall digital preservation strategy

Seven institutions mentioned their views regarding the Digital Preservation Policies employed for the E-theses repository. University of South Florida (USA) mentions of using Bepress platform. University of Arts (London) informed that the preservation policies and strategies are taken care by the IT department of the university due to which the Repository Administrator is not having any knowledge about the preservation strategy employed. Virginia Tech (USA) mentioned of having distributed digital preservation network for ETD preservation. The British Library (UK) is in the finalisation process of a proper digital preservation strategy.University of Nebraska-Lincoln (USA) mentions of adopting the digital preservation strategy built into the Digital Commons System. Dalarna University (Sweden) confirmed of having digital preservation policy but is not sure of the strategy used since it is taken care by the DiVA administration. University of British Columbia (Canada) mentioned that the E-theses repository is a part of the Library due to which it comes under library's overall digital preservation strategy.

Q 36. Do you allow items to be withdrawn from the repository?

Sr.No.	Answer Options	Response Percent	Response Count
1	**Yes**	**83.3%**	**75**
2	No	16.7%	15

Table 5.36: Withdrawal of items from the E-theses repository

The above question asked the respondents about the reservation policy. Sometimes the institution or the depositor feels that the ETD should not have been submitted in the repository, in such cases the ETD status is set to be 'Withdrawn'. Setting an ETD to 'Withdrawn' does not delete the ETD. It is simply another status that the ETD can exist in.

It can be seen in Table 36 that out of the 90 institutions who responded to the question, 83.3% (75) institutions informed that they allow withdrawal of items deposited in the repository. 16.7% (15) institutions do not allow withdrawal of ETDs once deposited in the repository.

Q 37. If yes, then the items are

Sr.No.	Answer Options	Response Percent	Response Count
1	Deleted permanently	24.7%	19
2	**Removed from public view**	**75.3%**	**58**

Table 5.37: Status of items withdrawn from the E-theses repository

Q.37 is linked to the Q.36 and it details the status of the withdrawn items from the repository. 77 institutions responded to the question. 75.3% i.e. 58 institutions informed that once the ETD is finalised to be withdrawn, it is 'Removed from public view'. It means that the ETD is not completely withdrawn from the repository. However, 24.7% i.e.19 institutions mentioned 'Permanent removal' of ETD from the repository.

Policies regarding withdrawal of items from repository are mentioned in the 'FAQ' or 'Policies' section of the repository website.

Q 38.Who has the authority of removing items from the repository?

Sr.No.	Answer Options	Response Percent	Response Count
1	Researcher	2.7%	2
2	**Repository Administrator**	**97.3%**	**73**
	Other (please specify)		4

Table 5.38: Authority of removing items from the E-theses repository

The above question required the respondents to inform about the person who has the authority of removing items from the repository. 97.3% i.e. 73 repositories informed that the Repository Administrator has the authority of removing items from the repository whereas only 2.7% i.e. 2 institutions mentioned that the authority of withdrawing items from the repository lies with the Researcher.

'Other' persons identified as having authority for removing items from the repository are:

Sr.No.	'Other' persons involved
1	Both of the above
2	In consultation with Research Degrees Subcommittee Chair
3	Researcher requests, Administrator removes.
4	University Librarian

Four E-thesis repositories informed of having different authorities having the authority to remove items from the repository. University of Arts (UK) informed that both Researcher and Repository Administrator can remove items from the repository. London School of Economics and Political Science (UK) mention that the authority to remove item from the repository remains with the researcher but he/she does it in consultation with Research Degrees Sub-committee Chair. St.John Fisher's College

(USA) informs that the withdrawal of items from repository is a joint effort where the researcher requests for withdrawal of ETD and the Repository Administrator removes it. Central Queensland University's (Australia) E-theses repository is managed by the Deputy Director but the authority to remove ETDs from public view lies with the University Librarian.

SECTION 10: COPYRIGHT/ IPR ISSUES

Q 39. Who is responsible for managing the ETD's IPR? (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	Contributors	41.7%	35
2	One chosen academic unit of institution	8.3%	7
3	One chosen service unit	1.2%	1
4	**E-theses Repository Staff**	**50.0%**	**42**
5	Library Staff	29.8%	25
	Other (please specify)		6

Table 5.39: Management of IPR issues of E-theses repository

Intellectual Property Rights (IPR) is the exclusive rights given to persons on their creations for a certain period of time. The RoMEO project (Rights Metadata for Open Archiving, 2002/03) investigated the intellectual property rights issues surrounding the self-archiving of research under the OAI-PMH. The project aimed at providing and maintaining a web accessible database that records a selection of publishers' copyright transfer agreements.

Every institution sets its own Copyright issues which is mentioned in the Repository website. Various researches are done globally to study the Copyright issues of Electronic theses and dissertations.

Vijayakumar et.al.(2005)[53]analysed the opinions of selected Ph.D researchers and guides from Indian universities on Copyright and IPR issues related to ETDs. They found that although electronic format of theses and dissertations was favoured but very few people opted for open accessibility to ETDs due to chances of plagiarism, copyright issues and poor quality of research.

The above question discusses about the persons responsible for managing IPR of ETDs submitted in the repository. 50% i.e. 42 repositories stated that IPR is managed by the E-theses repository staff, 41.7% i.e. 35 repositories informed that the 'Contributors' manage IPR of ETDs and 29.8% i.e. 25 institutions said that the 'Library Staff' takes care of the IPR issues.

Almost similar results were received by Sawant (2009) in her study of institutional repositories in India found that 64.28% of Contributors and Library Staff manage the IPR issues of institutional repositories and only 35.71% stated that IR Staff is responsible for managing the IPR issues of items deposited in the repository.

'Others' managing IPR of ETDs:

Sr.No.	'Others' Managing IPR of ETDs
1	Copyright and licensing librarian
2	Graduate School
3	Administrators and supervisors at the departments
4	The university which contributes the data/theses
5	Staff
6	Students must get permission for any copyrighted material included in their ETDs

Six repositories answered in the 'Others' category. Rutgers University (USA) IPR issues are managed by E-theses repository staff and Copyright & Licensing Librarian. University of North Texas (USA) E-theses repository's IPR issues are also managed by Graduate School along with the two categories mentioned in the questionnaire. KTH Royal Institute of technology (Sweden) mentioned that Contributors as well as the Administrators & supervisors at the departments manage IPR issues of ETDs. The British Library (UK) has both the Contributors as well as the University contributing the theses, managing the IPR of ETDs submitted in the EThOS repository. NCCR (India) informs that staff takes care of IPR issues. University of British Columbia's (Canada) IPR issues are managed by One chosen academic unit of the institution and has recommended that students must get permission for any copyrighted material included in their ETDs.

Q 40. Which of the following features does the repository have for copyright management? (Choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	Copyright Information	64.7%	55
2	Disclaimer regarding the content deposited	49.4%	42
3	**Declaration that the work is the intellectual property of the author**	**75.3%**	**64**

Table 5.40: Features of the repository for Copyright Management

The above question asked the respondents to mention the feature applied by the E-theses repository for managing copyright. Table 5.40 shows that 75.3% (64) institutions acknowledge providing declaration that the work is the intellectual property of the author. This proves that institutions mostly prefer giving the IPR and copyright to the author. 64.7% (55) institutions inform of providing Copyright information about the contents of the repository on the website and 49.4% (42) institutions provide a Disclaimer regarding the content deposited in the E-theses repository.

Q 41. Who owns the Copyright of the E-thesis after submitting to the repository? (Please select only one option)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Researcher**	**75.9%**	**66**
2	Institute	21.8%	19
3	Not yet decided	2.3%	2

Table 5.41: Copyright Ownership

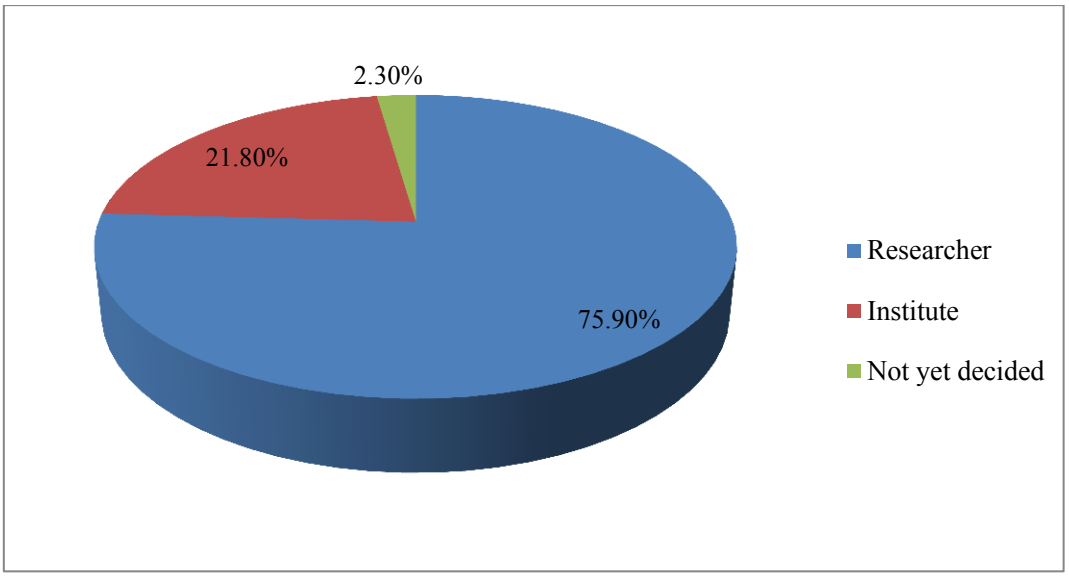

Fig. 5.6: Copyright Ownership of ETD after Submission

Q 41 can be considered as an extension to Q 40 as it required the participating institutions to provide information about the Copyright owner of the E-theses after submission of E-theses in the repository. The respondents were requested to select only one option. With reference to the findings received in Q 40, it is proved that institutions/E-thesis repositories don't prefer retaining the copyright of the submitted document with them. It was found that, 75.9% (66) repositories informed of Researcher having the copyright of E-thesis post submission to the repository. 21.8% (19) institutions mentioned of retaining the copyright of the items deposited in the repository. Only two institutions have not decided anything about copyright ownership.

Out of the 66 institutions which allow the researcher to retain the copyright of the e-thesis after submission, 07 institutions are from India namely TISS, Saurashtra University, CFTRI, Chandragupt Institute of Management, JNU, CSIR-URDIP & IIT Delhi. Only three institutions namely NAL, IIA and NCCR mentioned of retaining the copyright with the institution. CSIR-NML skipped the question.

Q 42. What measures are taken by the institute to protect copyright of E-thesis deposited in the repository?(Choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	Digital Watermarking	9.7%	6
2	Full-text of the ETD cannot be copied,edited,saved or printed	19.4%	12
3	Access is provided only to Metadata	17.7%	11
4	**Measures are not yet framed**	**64.5%**	**40**
	Other (please specify)		15

Table 5.42: Preventive measures taken to protect copyright

The above question required the respondents to inform about the measures employed by them to protect copyright of E-thesis deposited in the repository. 66 respondents answered the question out of which 64.5% (40) institutions did not frame any measures for protecting copyright. 19.4% (12) institutions applied

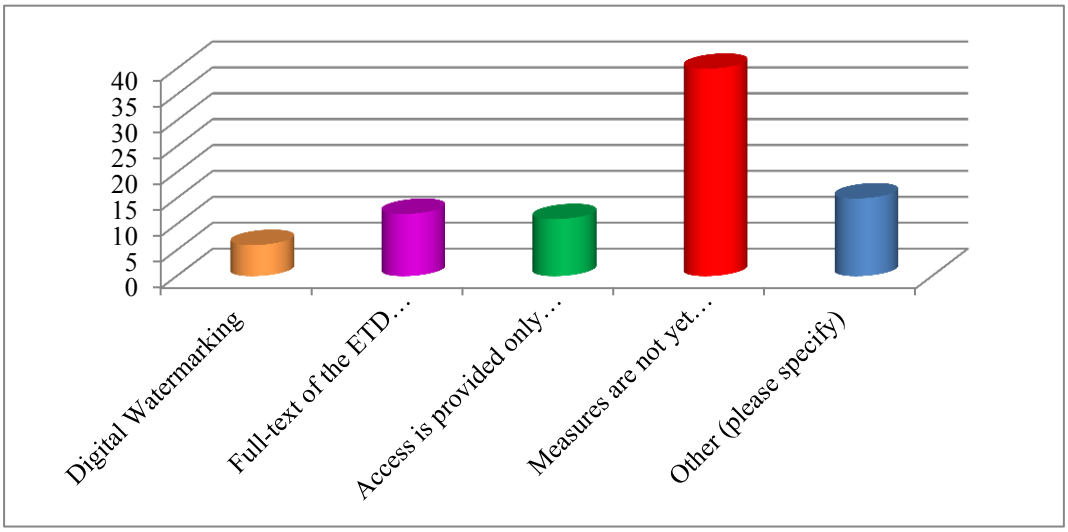

Fig. 5.7: Measures for Copyright Protection

techniques, through which full-text of the ETD cannot be copied, edited, save or printed. Such ETDs can only be viewed on screen. 17.7% (11) repositories took a precautionary measure by providing access only to metadata of E-theses. Only 9.7% (6) institutions employed digital watermarking technique for protecting copyright of E-thesis deposited in the repository. A digital watermark is a kind of marker embedded in a noise-tolerant signal such as audio or image dataand is prominently used for tracing copyright infringement.

While analysing the data received from the 11 Indian institutions who responded the web questionnaire, it was found that Saurashtra University, JNU, IIA, IIT Delhi and NCCR have not framed any measures to protect the copyright of the ETD submitted. CFTRI and Chandragupt Institute of Management informed of implementing two measures for copyright protection i.e. Full-text of ETD cannot be copied, edited, saved or printed and Access is provided only to Metadata. NAL and TISS prefer not providing the options of copying, editing, saving or printing to the Full-text of ETD available in Open Access. Two institutions under the aegis of CSIR namely NML and URDIP provide access only to metadata of the ETD submitted in order to protect copyright.

Responses received in Q 41 and Q 42 proves that Copyright protection/ IPR are one of the key issues and a major hindrance for all the institutions involved in ETD projects. Ghosh (2005)[54] mentioned that with the growing diversity of media and technologies for the production of ETDs, wide range of copyright and licensing issues need to be taken care of. Vijayakumar (2005) conducted a survey on Ph.D research scholars, Research Guides and Librarians of selected Indian Universities funded under UGC and found that although majority of participants expressed interest towards submission of ETDs and to provide them global access through internet but equal number of participants had expressed concern towards copyright issues, digital rights issue, preservation, metadata, access and distribution etc.

The researcher feels that Copyright protection is a major issue of concern regarding ETDs but individual institutions, Universities or national bodies like UGC should evolve stringent mechanisms for maintaining standards in publication, access and distribution of ETDs. All over the world and especially in India, each and every

institution tries to adopt some measure to protect the rights.Still dependence on Universities, especially national organisations like UGC are there. Techniques like Digital watermarking which was first coined in 1992[55] still show fewer acceptancesby the institutions for protecting the copyright. National policies should be framed in order to protect the rights of the authors and also to provide open access to the scholarly content without infringement of the rights.

'Other' measures employed:

Sr.No.	'Other' measures taken to protect copyright	Response Count
1	Full Text Preview Open to All. Full Printable Version is available for MIT Only	1
2	Declaration that the work is the intellectual property of the author	1
3	none – OpenAccess	2
4	Creative commons license	1
5	More than 80% of our ETDs are available for public or Open. Only less than 20% are restricted.	1
6	This has not been an issue for us. Instead all theses produced at our School are to be checked for not being plagiarism before exam.	1
7	metadata and copyright information declaration	1
8	Metadata captures date of ETD approval and submission. Bitstreams contain the deposit license.	1
9	PDF copy protected but may be printed	1
10	Rights statement in the metadata	1
11	Copyright is automatic and implied	1
12	applies to theses 1919-2007	1
13	Copyright disclaimer	1
	Total	**14**

Fourteen institutions responded in the answer box provided in the questionnaire. MIT (USA) provides access to full-text preview to all but full printable version is only for MIT users. Rutgers University (USA) in order to protect copyright declares that the

ETD is the intellectual property of the author. Humboldt-Universitaetzu Berlin (Germany) and Rice University (USA) did not employ any measure to protect copyright and provide open access to all the ETDs deposited in the repository. University of Arts (UK) employs Creative Commons License for protecting copyright of deposited ETD. University of North Texas (USA) informs that more than 80% of the ETDs are openly accessible and less than 20% are having restricted access. Chalmers University of Technology (Sweden) did not frame any measure for copyright protection because all the theses produced at their institute are checked for not being plagiarised before exam.

Institute for Christian Studies (Canada) provides access only to metadata and provide copyright information declaration. Texas State University (USA) provides access to metadata of ETD and the bitstreams contain the deposit license. Orebro University (Sweden) informs that the PDF of E-thesis are copyright protected but may be printed. Monash University (Australia) protects the copyright of submitted E-theses by providing rights statement in the metadata.

University of Nebraska-Lincoln (USA) mentioned that copyright is automatically implied on the E-theses submitted in the repository. The University of British Columbia (Canada) informs of having copyright protection employed only for theses submitted during 1919-2007. Lenus (Ireland) provides copyright disclaimer in order to prevent copyright infringement of the E-theses deposited in the repository.

The responses received prove that all the institutions employ some or the other way to protect copyright of the ETD deposited in the repository and to prevent the content of ETD from getting plagiarised to some extent.

SECTION 11: ADDITIONAL INFORMATION

Q 43. Based on your experience with E-theses Repository implementation, how would you rate your chosen system with regard to these capabilities? (Please choose all that apply)

Sr. No.	Answer Options	Very Adequate	Adequate	Somewhat Adequate	Least Adequate	Don't Know	Response Count
a	Browsing, Searching & retrieving digital content	**49 (53.84%)**	32 (35.16%)	7 (7.69%)	2 (2.19%)	1 (1.09%)	91
b	End-user Interface	**39 (43.82%)**	36 (40.44%)	11 (12.35%)	1 (1.12%)	2 (2.24%)	89
c	Digital preservation	**33 (38.82%)**	22 (25.88%)	14 (16.47%)	10 (11.76%)	6 (7.05%)	85
d	Multilingual support	**18 (22.22%)**	16 (19.75%)	17 (20.98%)	14 (17.28%)	16 (19.75%)	81
e	Supported file formats	**45 (50.0%)**	37 (41.11%)	5 (5.55%)	1 (1.11%)	2 (2.22%)	90
f	Adherence to open access standards	**60 (65.93%)**	24 (26.37%)	4 (4.39%)	1 (1.09%)	2 (2.19%)	91
g	Formulating metadata for ETDs	**44 (51.76%)**	34 (40.0%)	4 (4.7%)	1 (1.17%)	2 (2.35%)	85
h	Controlled vocabulary searching	20 (23.8%)	20 (23.8%)	**21 (25.0%)**	17 (20.23%)	6 (7.14%)	84
i	User authentication	**35 (42.16%)**	32 (38.55%)	6 (7.22%)	5 (6.02%)	5 (6.02%)	83
j	Authority control	**32 (36.78%)**	21 (24.13%)	15 (17.24%)	14 (16.09%)	5 (5.74%)	87
k	Technical support	**39 (43.33%)**	34 (37.77%)	8 (8.88%)	6 (6.66%)	3 (3.33%)	90
l	Technical documentation	27 (31.03%)	**32 (36.78%)**	16 (18.39%)	5 (5.74%)	7 (8.04%)	87
	Other (please specify)						0

Table 5.43: Ratings of chosen system of E-theses repository based on individual experiences

The above question attempts to summarise the overall experience of the repository administrators regarding the implementation, management and development of E-theses repository. The questionnaire identified twelve categories and the respondents

were also allowed to mention their views in the answer box provided. The respondents were required to select the most suitable answer from Very adequate, Adequate, Somewhat Adequate, Least Adequate and Don't Know.

a) Out of 91 respondents who answered the question, 53.84% (49) repositories feel that the Browsing and searching of E-theses in their repository is very adequate and users could easily retrieve the digital content from the repository website. 35.16% (32) repositories informed that they have adequate browsing, searching and retrieving facility for E-theses deposited in their repository. The response received shows that majority of institutions are satisfied with the browsing facilities provided by their repositories and the users can easily search and retrieve information from the repository website using criteria.

b) 89 respondents provided their views about the second category of 'End-user interface'. 43.82% (39) institutions said that they have very adequate End-user interface whereas 40.44% (36) institutions informed of having adequate end-user interface through which user can very easily interact with the computer. End-user interface mainly determines the way in which information is displayed on the screen. From the responses received for this category, it can be conveyed that on an average, 84.26% institutions have proper organisation of information on their repository website through which users can easily access information.

c) Proper digital preservation ensures that the digital information stored in the repository will remain accessible and usable over time. It involves planning, resource allocation, and application of preservation methods and technologies, and combines policies, strategies and actions to ensure access to reformatted and "born-digital" content, regardless of the any technological change.Considering the importance of digital preservation, majority of the E-thesis repositories have employed one or more than one digital preservation techniques (discussed in Q 34 & Q 35). 38.82% (33) and 25.88% (22) institutions informed of having 'Very Adequate' and 'Adequate' digital preservation techniques respectively.

d) The fourth category asked about the multilingual support provided by the repositories. As evident in Q 48 and 49, most of the E-thesis repositories contain

E-theses in English language. However, some also contain regional language E-theses. Out of the 81 respondents who answered for the question, 22.22% (18) institutions informed of providing Very Adequate multilingual support system and 19.75% (16) institutions have adequate multilingual support system. While browsing the E-theses repository websites, it was found that irrespective of the language of which maximum E-theses are found in the repository, most of the repository interface were available in English, Spanish, Portuguese and German languages.

e) Supporting various file formats is very important for any type of repository. It can be seen in the responses received for Q 16, where repositories mentioned of supporting variety of formats like textual, images, audio, video, datasets, computer programs etc. Out of the 90 respondents who answered this category, 50% (45) institutions mentioned of very adequate file formats. 41.11% (37) mentioned of supporting adequate types of files.

f) In present times, providing open access to ETDs is becoming a trend and is even made mandatory in various places of the world. Q 33 shows that 95.6% respondents adhere to OAI-PMH. These responses are proved in the present question wherein 65.93% (60) repositories ensure of adhering to open access standards very adequately. 26.37% (24) repositories also follow the standards adequately.

g) Metadata formulation is one of the most important tasks during setting up of E-theses repository. Findings of Q 32 prove that they are mostly supervised by the Repository Administrator since they help to retrieve information about ETDs in the Internet. 51.76% (44) repositories ensure of having very adequate metadata. 40% (34) repositories have adequate metadata.

h) Kappus[56] mentions 'Controlled vocabulary is a set of terms used by a database to categorize articles based on the content. It helps to improve search results'. Controlled vocabularies provide a way to organize knowledge for subsequent retrieval. The responses received for this category are not satisfactory since equal number of institutions said that they have very adequate or adequate controlled

vocabulary searching mechanism. Out of 84 respondents, 25% (21) institutions inform of having somewhat adequate controlled vocabulary searching mechanism. Considering the responses received it can be concluded that the E-thesis repositories must build up good mechanism for controlled vocabulary searching.

i) User authentication is a means of identifying the user and verifying that the user is allowed to access some restricted service. It is very important to identify the student or the faculty member who wants to deposit ETD in the repository. Also, it is important for the System Administrator to manage the repository. 83 institutions responded to the category. 42.16% (35) repositories ensured of having Very adequate User authentication mechanism. 38.55% (32) repositories mentioned of having adequate measures for authenticating the user who wants to access the ETDs available in their repository.

j) Authority control[57] is a process that organises bibliographic information by using a single, distinct name for each item. It helps researcher retrieve maximum useful information with less wasted effort. A well designed digital database enables a researcher to query a few words of an entry to display the already established term or phrases thereby improving accuracy and saving time. It also helps in reducing waste of time while searching information by catching the errors caused by typing or spelling mistakes. A customary way of enforcing authority control in a bibliographic catalogue is to set up a separate index of authority records, which relates to and governs the headings used in the main catalogue. This separate index is often referred to as an "authority file". ALCTS CCS Cataloging Norms Interest Group (2010)[58] stated that "digital repository is not a cataloguing tool and it doesn't provide authority control. So, when a change is made to a record in the Integrated Library System (ILS), the ILS gets updated but the record in the digital repository remains unchanged. In such cases, the locally developed editors like Archivists' Toolkit, VRA Core, ContentDM etc. provide some form of authority control and controlled vocabulary. These editors can send information regarding any changed record to the repository with the help of updated authority file registers."

In the present research, out of the 87 repositories who attempted the question, 36.78% (32) repositories informed of having very adequate authority control system. 24.13% (21) repositories have adequate authority control mechanism.

k) 43.33% (39) repositories informed of receiving very adequate technical support for managing the E-theses repository. 37.77% (34) repositories have adequate technical support system. The responses received prove that majority of the repositories have proper technical support system in their institution or from external agency since it is very important for problem free functioning of the repository.

l) Maintaining proper technical documentation of matters related to E-theses repository is very important. They cover concepts like submission policies, preservation policies, copyright issues etc. 36.78% (32) repositories ensure of having adequate technical documentation system whereas 31.03% (27) institutions mention of having very adequate technical documentation system.

None of the respondents mentioned any other category. The overall responses received for the above question shows that majority of the institutions are satisfied with the mechanisms or systems undertaken by them for implementation and development of E-theses repository.

Q 44. The E-theses repository is indexed by (Choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Search Engines**	**92.3%**	**84**
2	Online Database	35.2%	32
3	Registry of Open Access Repositories (ROAR)	69.2%	63
4	OpenDOAR	69.2%	63
5	Scirus	20.9%	19
	Other (please specify)		16

Table 5.44: Indexing of E-theses repository

Q 44 asked the respondents whether their E-theses repository is indexed or not. It is very important for any repository or website in general to get indexed in order to get maximum visibility or accessibility. The questionnaire provided five options like getting indexed by Search engines, Online database, Registry of Open Access Repositories (ROAR), Directory of Open Access Repositories (OpenDOAR) and Scirus. Respondents were allowed to choose more than one option and were also requested to provide information about other mechanisms/ ways through which they are indexed.

92.3% (84) repositories informed of getting indexed by Search engines which ensure maximum exposure. Equal number of respondents (69.2% i.e. 63 institutions) are indexed by ROAR &OpenDOAR which are authoritative directory of academic open access repositories. 35.2% (32) repositories are indexed by Online databases. 20.9% (19) repositories are indexed by Scirus (now known as ScienceDirect) which is a comprehensive science-specific search engine.

'Other' responses received are:

Sr.No.	Response received	Response count
1	OAIster	03
2	NDLTD	02
3	Base	02
4	CSIR Central	01
5	Open Access Theses and Dissertations (OATD) http://oatd.org	01
6	British library	01

7	CORE at Open University	01
8	Theses Canada Portal	01
9	CASSIR	01
10	Celestial	01
11	Driver, OpenAIRE portal, Europeana etc	01
12	NORA	01
13	SciELO	01
14	Google Scholar	01
15	DOAJ	01
16	Scientific Commons	01

Along with the options mentioned in the questionnaire, respondents identified sixteen other inventories which index the repositories. Three institutions namely University of Zimbabwe, National Metallurgical Laboratory (India) and Indian Institute of Astrophysics (India) informed of getting indexed by OAIster which is a union catalogue of millions of records representing open access resources that was built by harvesting from open access collections worldwide using the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH).Two institutions viz. University of Zimbabwe and North Eastern University (USA) are listed by NDLTD (Networked Digital Library of Theses and Dissertations) which is an international organization that, through leadership and innovation, promotes the adoption, creation, use, dissemination and preservation of electronic theses and dissertations.National Metallurgical Laboratory (India) and University of Hull (UK) are included in the directory of BASE (Bielefeld Academic Search Engine). BASE is one of the world's most voluminous search engines especially for academic open access web resources. BASE is operated by Bielefeld University Library (Germany).

Rest of the search engines identified where Google Scholar, DOAJ, SciELO, NORA, CASSIR, Scientific Commons etc.

Q 45. If your E-theses Repository is indexed by Search Engines, then which of the following search engines index your E-theses Repository? (Choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	**Google**	**100.0%**	**88**
2	Yahoo	39.8%	35
3	AltaVista	22.7%	20
4	Hot bot	22.7%	20
5	MSN	23.9%	21
6	Lycos	21.6%	19
	Other (please specify)		0

Table 5.45: List of Search Engines

Q 45 is an extension to Q 44 and seeking information about the search engines which index the E-theses repositories. Six options were provided and respondentscould choose all that applied. Institutions were also allowed to mention other search engines in the answer box provided.

The answers received were not unexpected. Eighty eight E-thesis repositories responded the question. Google proved to be the most popular search engine with 100% (88) repositories being indexed by it. Yahoo is the second most popular search engine which covers 39.8% (35) repositories followed by MSN which lists 23.9% (21) repositories. AltaVista and Hot Bot share an equal response by including 22.7% (20) repositories and Lycos indexes 21.6% (19) repositories.

According to the report published in the Search Engine Journal (August 2013)[59], Google's market share is 67%, Bing 17.9% and Yahoo (11.3%). The Search Engine List also rates Google as the top most popular Search Engine followed by Yahoo and Bing.

Q46. Does your E-theses repository provide links to other E-thesis Repositories of your country?

Sr.No.	Answer Options	Response Percent	Response Count
1	Yes	22.3%	21
2	**No**	**77.7%**	**73**

Table 5.46: Providing hyperlinks to E-thesis repositories of one's own country

The above question required the respondents to provide information regarding providing links to other E-thesis repositories of own country covering same subject repositories or general national repository directories for eg. ShodhGanga (India).

77.7% (73) institutions replied of not providing any type of information regarding other E-thesis repositories of the country. Only 22.3% (21) institutions replied of providing hyperlinks to other E-thesis repositories thereby facilitating more information required by the user related to his/her own search query. Providing links makes the user aware of the other institutions in one's own nation having required subject's E-thesis repositories.

Q 47. Does your E-theses Repository provide links to other E-thesis Repositories of International Level?

Sr.No.	Answer Options	Response Percent	Response Count
1	Yes	17.8%	16
2	**No**	**82.2%**	**74**

Table 5.47: Providing hyperlinks to E-thesis repositories of other countries

Q 47 is similar to Q 46 asking about provision of international repository web-links in E-theses repository website. 82.2% (74) institutions mentioned that no such facility is provided. Only 17.8% (16) institutions provide web-links to other international E-theses repositories/directories. Such linkages provide more exposure to the E-thesis repositories of general or specific subject and also user gets more information about other repositories of his/her subject interest or in general.

Q 48. Other than English, which language ETDs are included in the Repository. (Please choose all that apply)

Sr.No.	Answer Options	Response Percent	Response Count
1	Chinese	5.21%	5
2	Dutch	4.26%	4
3	**French**	**26.04%**	**25**
4	Portuguese	16.76%	16
5	German	12.50%	12
6	Greek	2.1%	2
7	Hindi	3.13%	3
8	Italian	9.48%	9
9	Japanese	4.26%	4
10	Russian	2.1%	2
11	Taiwanese	0.0%	0
12	Spanish	16.76%	16
13	Malay	2.1%	2
	Other (Please specify)		**24**

Table 5.48: Language of ETDs included in the repository

English being a universal language for scholarly communication is most commonly used by the research community for expressing their views and writing the research report. Using English language for research work maximizes the number of interested people who can understand our research work.

The above question deals with the language content of the E-thesis repositories. Respondents were requested to inform about the other languages in which ETDs are included in their repository. They were allowed to choose as many languages as they contain in the repositories.

The responses received are tabulated in Table 5.48 which reveal that 26.04% (25) institutions contain E-theses in French and 16.84% (16) repositories include higher percentage of E-theses in Portuguese& Spanish languages other than English language E-theses.

‘Other’ Languages in which ETDs are included in the repository are:

Sr.No.	Language	Response Count
1	Afrikaans	5
2	Norwegian	3
3	Swedish	3
4	not limited	3
5	Indonesian	2
6	Gujarati, Marathi, Bulgarian, Nepali, Sepedi, Korean, Flemish,Castilian,Western Frisian, Gaelic, Arabic, Maori, Hungarian, Irish	1

From the 'Other' languages identified by the respondents in which E-theses is included in the repository, it was found that the language 'Afrikaans' was commonly used by the researchers in South Africa and along with English language, Afrikaans was the widely used language for ETDs. Swedish and Norwegian were the two languages used by institutions in Norway and Sweden. Three institutions namely Ounongo University (Namibia), Virginia University (United States) and The British Library (UK) informed of having no limitation on the language content of the scholarly communication. Two institutions mentioned containing ETDs in Indonesian Language.

Thirteen other languages were also mentioned like Hungarian, Bulgarian, Nepali, Korean etc. It was found that the E-thesis repositories also contained ETDs in regional languages like Sepedi (South Africa), Moari (New Zealand), Gaelic (Scotland), Castilian (Spain), Western Frisian (Netherlands), Gujarati& Marathi (India).

Q 49.Database of ETDs is updated

Sr.No.	Answer Options	Response Percent	Response Count
1	**Monthly**	**73.5%**	**61**
2	Half Yearly	12.0%	10
3	Annually	12.0%	10
4	Never	2.4%	02

Table 5.49:Frequency of adding new ETDs in the repository

Q 49 asked the respondents regarding the frequency of updating the contents of the E-theses repository. The question was close ended with four options. Respondents were requested to select only one option. Eighty three institutes responded the question out of which 73.5% (61) repositories mentioned of updating information about newly deposited ETD on monthly manner. Ten different institutions mentioned of updating the information Half-yearly and annually. Only two institutions informed of not updating the E-theses repository ever.

5.2 Summary:

The responses received from the data collected from the Online Survey received from 43countries are presented and discussed in this chapter.

The analysis of the questionnaire has been divided into eleven sections similar to the online questionnaire dealing with personal information of the repository administrator, background information of the implementation of the repository, repository materials, budget, copyright issues etc.

The analysis of the data received show that the set-up of institutional repositories increased, after 2005 due to various national and international open access policies being framed during that period. Majority of the E-theses belong to scientific subjects and are set-up by institutions in developed countries like USA and UK. However, trend of implementing repositories can be seen in various developing countries due to the benefits of open access scholarly communication. Institutions implement E-theses repository for increasing access to ETDs. Although concern about copyright issues of ETDs will keep on hindering the submission of ETDs in the repository but contributors tend to submit them in order to provide maximal access to their research results.

The researcher found that there were very few institutions which contained only ETDs in their repositories. Majority of the institutions have ETDs as one of the digital documents in their repository. Journals were the most favored digital documents available in majority of the repositories. It was found that DSpace is the most preferred repository software package.

Post graduate students are the major contributors of ETDs and it is mostly seen that Librarians are the head of the E-theses repository due to their expertise and knowledge about the concept. The budgetary provisions for implementation and development of E-theses repository were made from routing library budget.

A large number of repositories have framed digital preservation policy in order to preserve the ETDs for longer period of time. However, it was seen that repositories were yet to frame stringent measures to protect the copyright of the ETDs submitted.

The repositories are indexed by one or more than one search engines or repository directories. Being a universal language, English was proved to be the most preferred language of research by having the highest percentage of ETDs in the participating institutions followed by languages like French and Portuguese.

The next chapter presents the findings, conclusions of the study.
Recommendations are also provided.

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CHAPTER 6

FINDINGS, CONCLUSIONS & SUGGESTIONS

The present research on 'E-thesis Repositories in the world: a critical analysis' brought in front various unexplored and interesting concepts related to the planning, development, implementation, pre-requisites, collection development, software, metadata issues, language compatibility, budget factor, staff required, contributors, usage statistics, copyright and preservation issues of electronic theses and dissertations.

In this chapter the research objectives will be verified with the findings of the data collection, conclusions will be drawn and appropriate suggestions will be given.The web survey questionnaire was designed according to the research objectives and divided into eleven sections. The findings and conclusions are also discussed in section wise and in some cases the sections are combined.

The chapter concludes with suggestions on future research topics that can be conducted in the field of E-theses repositories.

6.1 FINDINGS, CONCLUSIONS & SUGGESTIONS

Section A: Background Information of E-Theses Repository

1) **Objective 1: To identify time required for planning, pilot testing, final implementation of E-theses repository and to perform other pre-requisites prior to implementation of E-theses repository.**

1.1) ***Findings & Conclusions*:**

Out of the 96institutions, who participated in the present research, 81 institutions attempted the question and it was found that 84.4% institutions had done pilot testing before final implementation of the repository. The

period required for planning, pilot testing and final implementation varied from 0 to 48 months. Central Food Technology & Research Institute (India) and Dublin City University (Ireland) required zero months i.e. less than 30 days for planning, pilot testing of the repository before its final launch. Whereas two institutes from Netherlands i.e. Delft University of Technology and Wageningen University took maximum period of 48 months for final implementation of the repository. Majority of the institutions i.e. 24.21% required 12 months for the complete process. This proves that pilot testing is a very important stage for successful implementation of E-theses repository.

The E-theses repository of SISSA Digital Library (Italy) was found to be the oldest one to start submission and searching of digital content by its authorized users in January, 1988. The year-wise distribution of the launch of E-thesis repositories also shows that out of the 95 participating institutions, 70.52% were launched in from 2000 to 2010. The credit in the increase of number of E-thesis repositories goes to Open Access Initiatives like BOAI, ECHO, Berlin Declaration and several national and international open access policies and movements.

Majority of the participating institutions (86.4%) were fully operational. To study the importance of results of exploratory activities, Likert Scale method was used. It was found that knowledge of successful implementation of e-theses repository at some other institution and studying the available literature on ETDs was Very Important for the respondents. Analyzing the available literature on ETDs definitely provide in-depth knowledge about all the underlying concepts in ETD, problems encountered and probable solutions which help the repository administrator and his/her team to understand various concepts. Attending workshops, learning about availability of expertise and demonstrating e-thesis repositories ranked second in the order of importance.

1.2) ***Suggestions:***

a) Any institution must go for pilot testing stage before final implementation in order to understand and rectify any problems related to uploadingof data, software related problems and choice of most appropriate user friendly repository software.

b) National and International Policies need to be framed for promotion of digitization of grey literature like theses and dissertations.

2) Objective 2: To find out the reasons of contributing to E-thesis repositoriesand identify factors that act as barrier in setting up E-theses Repository.

2.1) ***Findings & Conclusions:***

75.5% respondents hold an opinion that contributing ETDs to e-thesis repositories provide maximum access to research results. 74.5% contribute their research since it is a mandatory policy of the institute. The overall response received shows the willingness of acceptance of open access by the research community due to its various benefits of improving the citation count, magnifying institutes prestige and appropriate solution of preserving institutes academic output.

It was found that 71.9% respondents feel that concern about copyright issues is one of the major barriers in implementation of ETD program. Plagiarism issues and illiteracy about benefits of ETD are equally responsible for creating hindrance in ETD contribution. 40.4% respondents believe that absence of stringent rules acts as barrier in setting up E-theses repository. It can therefore be concluded that although research scholars are willing to disseminate their research work through repositories but presence of such barriers slows down the growth of E-theses repository development.

2.2) ***Suggestions:***

a) All research institutes must motivate their employees and research scholars to submit their research work in the repository.

b) Along with making it a mandatory policy, some reward should be given to the contributor so that he/she will definitely submit the ETD in the repository.

c) Special lectures may be organized through which subject experts will explain the various benefits of open access to researcher and the institute. Repository administrators of fully operational and successful E-theses repositories may be invited in order to share their experiences and success stories in order to encourage the research scholars to contribute their research work through repositories and through open access.

d) In every country, organizations of national importance must frame standards and mandatory policies for institutions to submit the theses and dissertations in electronic format. Also, precise rules should be framed in order to prevent plagiarism and protect copyright. If such measures are taken, it will definitely help in increasing the number of ETDs deposited in the repositories as well as increase number of E-thesis repositories.

3) Objective 3: To determine the subject coverage and country wise distribution of E-theses repository.

3.1*) Findings & Conclusions:*

Out of the participating institutions in the present research, majority of the repositories (25%) were found to have E-theses deposited in the field of Engineering. 18.75% mentioned having E-theses repositories in Medical Sciences followed by Chemistry with 14.58%. Arts and Social Sciences had coverage of 11.45% among the participating E-theses repositories. Data received indicates that major amount of research is done in scientific areas and social science research needs a massive boost up to increase the research

output. The poor scenario of social science research is same in developed and developing countries.

Repositories whose web interface was not in English and which does not contain E-theses in English were not considered for the present research. The sample for data collection was finalised using 'Krejcie & Morgan Table for Determining Sample Size' and out of the total number of E-thesis repositories present in a country, only those were selected for the present research study which had a collection of >1000 ETDs.The web survey questionnaire was sent by e-mail to the repository administrators. USA gave an excellent response with 23 out of 27 responded the questionnaire. UK also gave positive response with 08 institutions replying to the web survey questionnaire out of 14.

Although many Indian E-thesis repositories were listed from repository directories, search engines, articles etc. only 27 Indian E-thesis repositories were found to be functional during sample selection stage and being the mother country the researcher mailed questionnaire to all. But the response received was not up to the mark with only 12 institutions responding to the questionnaire after sending three reminders through mail, personally calling up the repository administrators and sending e-mail to the personal mail addresses of the repository administrators. The results obtained shows that all over the world there is a growth of repositories containing ETDs in English language and all over the world the awareness of ETD benefits and growth of E-theses repositories have started. Developed countries show higher number of E-theses repositories compared to developing countries.

3.2) ***Suggestions:***

a) There should be an increase in Social Science, Arts & Humanities research.

b) Like developed countries, the developing countries should also establish more number of E-thesis repositories. Open access movements should be carried out in more effective manner in order to motivate people to do the research and submit their research work in electronic format.

4) Objective 4: To study the objectives for setting up an E-theses repository and ways of creating awareness amongst institutional members about E-theses repository.

4.1) ***Findings & Conclusions:***

74.5 % respondents feel that setting up e-theses repository is the best way to increase exposure to the institutes ETD since it helps in providing maximum access to research results followed by 70.2% who feel that it is one of the best ways of promoting data sharing and knowledge. Preservation of digital resources was chosen by 66.7% respondents as a highly relevant objective of setting up repository. 51.6% feel that setting up E-theses repository is one of the ways of promoting new modes of publication. This shows that institutions have variety of reasons for setting up E-theses repository out of which the most common objective is to maximize exposure to institutes research output.

80.4% respondents provide Links from Library website/Institutional website in order to create awareness about E-theses repository to the institution members. 60.9% created awareness by organising open access seminars/symposia. Three institutions mentioned use of social media (Facebook, blogs, twitter, mailing lists, LinkedIn) for promoting the benefits of ETDs and E-theses repository. This shows that institutes advertise their E-theses repository through variety of means in order to increase the usage as well as make the user community aware of the benefits of open access.

4.2) ***Suggestions:***

a) A lot of research carried out across the world gets unnoticed since they are published and submitted only in print format which gets submitted only in the respective institute. In this way, very useful research outcome remains in the library shelves only. If the institute or any national organization E-theses repository then such researches will have global access which in a way will help the researcher to increase his/her citation index.

b) Social networking sites should be used as one of the most powerful way of creating awareness about E-theses repository.

Section B: Repository Materials

5) Objective 5:Toidentify type of documents (other than ETDs) included in E-theses repository and discover the number of E-theses and other documents (if any) in the repository.

5.1) ***Findings &Conclusions:***

The data collected shows that 89.6% repositories contain documents other than ETDs. Only 10.4% respondents informed of containing only ETDs in their repositories. The researcher provided list of 22 types of documents in the web questionnaire from which the respondent was to select the type of document included in their repository. Since the question was open-ended the participants specified 16 more different types of documents which are available in their repository. 'Journal Articles' ranked first amongst the type of documents other than ETD to be included in the repository. 60% respondents informed of including peer-reviewed documents in their repository. This proves that although number of institutional repositories shows a positive growth but there is still a dearth of ETD only repositories. This category of grey literature is mostly included in the institutional repository as one of the scholarly document.

The collection details obtained from 84.4% respondents show a good number of ETDs and other documents in the E-theses repository. The findings show the presence of 4,70,368 ETDs (Doctoral Theses+ Master's Theses + Bachelor's Theses). 'Newspaper Clippings' topped the list with 8,39,671 clippings. This shows that institutes throughout the world believe in preserving and archiving documents through repositories and they include not only Journal articles, ETDs, Conference Proceedings etc. but also documents like Newspaper Clippings.

5.2) ***Suggestions:***

a) Benefits of ETD submission should be promoted in order to encourage the institutes in setting up ETD only repository.

b) The number of ETDs should increase in the future years. Theses database like INFLIBNET's Shodhganga (India) shows having MoU with various Indian Universities, Research Institutes, Colleges but the submission status of ETDs shows that various institutes are in MoU with INFLIBNET but have still not submitted a single ETD. University Grants Commission (UGC)[1], India has made it mandatory for every University to submit soft copy of M.Phil/Ph.D theses for hosting the same in INFLIBNET.Such initiatives will definitely help in improving the collection of ETDs in the repositories.

6) Objective 6:To know which file formats are supported by the repository.

6.1) ***Findings & Conclusions:***

100% respondents supported PDF. Images and Audio-Video were second most supported file formats. The results obtained determine that all institutions across the globe prefer Text format for presenting and disseminating their research work.

6.2) ***Suggestion:***

a) Text format is the most easily accessible format globally. Research organisations must set-up a protocol mentioning that ETDs must be submitted in Text format and other file formats can be submitted as additional files, if required.

Section C: Hardware & Software

7)Objective 7: To find out the software used for setting up E-theses repository, factors influencing the choice of repository software and server connectivity issues of E-theses repositories.

7.1) ***Findings &Conclusions:***

Choice of software is one the most important part in successful implementation of repository. Directory of Open Access Repositories lists more than 144 Institutional Repository software packages. DSpace (83.7%) was found to be the most preferable software followed by EPrints (79.2%).

Features such as open source, greater functionality, adequate support and regular updating are the most important ones that influence the selection of particular software.

Results obtained prove that institute's prefer selecting the best IR software for hassle free implementation of repository due to which pilot testing becomes very important. Software used during pilot testing if not found suitable, is changed before final implementation.

91.7% institutions have their repositories accessible on Internet in order to maximise the access of the ETDs and 84.3% host their repositories on Institution's server rather than going for Cloud Computing server due to issues related to privacy, reliability and security.

7.2) ***Suggestions:***

a) Institutions should analyse the successful implementation of fully operational E-thesis repositories, read the available literature regarding IR software packages, check out the support available and keep a track of the updates released before selection of software for the E-theses repository.

b) All institutions should have their repositories accessible on Internet for the benefit of the researchers as well as for the institute.

Section D: Ways of Providing Access to ETDs

8) Objective 8: To identify ways providing access to E-theses deposited in the repository and to find out the information regarding authorised contributors to the repository.

8.1) ***Findings & Conclusions:***

81.7% respondents informed of providing full-text access to anyone referring the E-theses repository. 22.6% mentioned of providing full-text access only to members of the institution. None of the participating institution provides paid access to full-text of ETDs. This proves that the institutions holding the E-theses repositories believe in promotion of open access and the various benefits it provides to the researcher and the institution like increase in citation count, increase in prestige of the institution etc.

56.7% institutions provide access to ETDs right from the inception of the Institution (i.e. the first Thesis or Dissertation submitted to the institute). 35.1% mentioned of providing access to ETDs produced during last ten years only. Some institutions were found to provide varying access period to ETDs depending upon the category of Doctoral theses, Master's theses and Bachelors theses. By providing access to the archival thesis and dissertations right from the establishment of the institution, the repository administrators help in increase the citation index of the institution and researchers affiliated to it.

Out of the 11 categories of contributors listed by the researcher, 'Post Graduate Students' were found to be the topmost contributor of ETD with 64.4% institutions opting for them. 'Librarians' (63.3%) and 'Faculty'

(57.8%) rank second and third respectively. Only six institutions mentioned of submission of ETDs by 'External Contributors'.

It can be concluded that due to the inclusion of Project component in Master's level across all the disciplines throughout the world the quantity of research has increased and since majority of students opt for Post-Graduate courses, the number of Project reports submitted is on a rise.

8.2) ***Suggestions:***

a) All the institutions should try to provide access to ETDs right from the establishment since it helps in improving the citation index of the author and institution.

b) Getting the old printed thesis and dissertation transformed into electronic format will also make them accessible for a longer period and will solve the issues related to preservation techniques to a greater extent.

9) Objective 9: To investigate the various monitoring techniques of use of ETDs and check the usage frequency of ETDs.

9.1) ***Findings & Conclusions:***

57.3% institutions monitor the use of ETDs by taking into account the'Statistical count of number of views (Abstract + PDF/HTML)'. 46.1% respondents depend on 'Statistical count of number of views (Country wise)'. Only 14.6% E-theses repositories have not employed any monitoring technique to measure the usage statistics of ETDs. The most advanced usage monitoring technique is found to be implemented by California Institute of Technology (USA) since they keep track of hourly,daily,weekly and monthly visits. They also maintain record of the duration for which the pages are visited, search engines used, web browsers,navigationtools,keywords used. This interprets that institutions depend on some or the other method of monitoring the use of ETD present in their repository since it helps them to understand the popularity of their repository and even makes them

understand the ways(use of keywords) in which the ETDs submitted in their repository is searched.

79.1% respondents informed of frequent use of ETDs submitted in their repository. 20.9% informed of occasional use of ETDs. None of the institutions mentioned that their E-theses repository is rarely or never used. This shows that users understand the importance of the content of ETDs and the authenticity of the research carried out.

9.2) ***Suggestion:***

a) All E-theses repositories must employ at least basic method of monitoring usage of items deposited in the repository.

Section E: Budget Consideration & Human Resource

10) Objective 10: To explore issues related to budget considerations and human resource management of the E-theses repository.

10.1) ***Findings & Conclusions*****:**

From the data obtained it can be interpreted that very few institutions allot special grant to the institute for setting up E-theses repository. Majority of the institutions (67.9%) set-up the repository from the annual budget allottedto the library. In spite of being an important initiative, not many external agencies provide grant to institutes for implementing e-theses repository. Developed countries like UK, USA, and Europe have provided government funds for development of ETD Projects. However the grants are not provided to all institutions and are very rarely seen in developing countries. This clearly proves the poor status of open access movement and lack of governmental initiatives to encourage open access to scholarly literature.

Only 33% institutions replied regarding the percentage of funds allocated under various heads of staff, hardware, software and consultancy. It was found that major share of the fund received is utilized for staff followed by software maintenance and updates. Dublin City University (Ireland) informed of spending 100% grant received for staff. 61.8% respondents informed of appointing special full-time staff for developing and maintaining e-theses repository. The response received for the question shows that, of all the components of an e-theses repository, staff holds the most important place since they are the main persons responsible for successful functioning of the E-theses repository.

Librarian was found to be the most preferable person to head the repository since he/she has professional training and special skills of managing, developing and archiving the digital materials.

10.2) ***Suggestions:***

a) Development of the status of E-theses repository depends on the Government of respective state or country which should devise special schemes and provide grants to research institutes of national and international repute.

b) Universities should make budgetary provision in their annual budget to fund the institutes having research centres in order to help them in setting up their own repository.

c) Central pool of research work should be established at university/state/national level in order to promote submission of ETDs in controlled budget expenditure.

Section F: Metadata & Interoperability Standards

11) Objective 11: To find out the metadata and interoperability standards of the repository.

11.1) ***Findings & Conclusions:***

49.5% respondents inform of getting the metadata created byETD contributor (researcher) and it is verified by the repository administrator which is mostly Librarian of the institution. 37.4% institutions opted for metadata creation by Repository administrator. Only 13.2% said that metadata is created by item distributors and there is no role of repository administrator in that. 95.6% institutions were OAI-PMH compliant. The overall response received proves that creation of metadata is an integral part of submission of ETD in repository which is mostly performed by Librarian or library staff in general. Almost all the institutions follow standards required for providing global access to the contents of the repositories.

11.2) ***Suggestions:***

a) Metadata being the most important part of submission of research work in repository must be prepared by Librarian or at least library staff members since metadata creation needs accuracy, completeness and should be accessible easily.

b) Considering the importance all the repositories must be OAI-PMH compliant.

Section G: Preservation Policy

12) Objective 12: To enquire about the long term preservation policy and withdrawal policies employed by the E-theses repository.

12.1) ***Findings & Conclusions:***

60.4% respondents informed of having employed long term preservation policy for their E-theses repository. Bitstream copying (making an exact duplicate of a digital object)was the most commonly used preservation technique with 68.3% opting for it.Considering the importance of the scholarly content in ETDs, repositories make use of some or the other popular techniques for long term preservation. However, it was also found that 39.6% E-thesis repositories did not make use of any preservation technique.

83.3% institutions have withdrawal policy of ETDs and 75.3% said that the ETDs under withdrawal are removed from public view. Only 24.7% mention of permanently deleting such ETDs. 97.3% informed that only Repository administrator have the authority of withdrawing items from the repository. It can be interpreted that institutions have well-defined withdrawal policy and the act is performed mostly by the Repository administrator who has all the authorities of adding or removing items from the repository.

12.2) ***Suggestions:***

a) Information contained in ETDs is of scholarly nature and can prove to be very important for long time access. Therefore, institutes must apply preservation technique to make the ETD accessible for long.

b) Withdrawal of items must be carried out under the supervision of the Repository Administrator and they should be removed only from public view. Proper reasons should be submitted by the researcher requesting for removal of items from the repository.

Section H: Copyright/IPR Issues of E-Theses

13) Objective 13: To explore issues related to Copyright protection/ IPR of E-theses.

13.1) *Findings & Conclusion*s:

50% participating institutions inform that the E-theses repository staff is responsible for managing IPR. 41.7% mention about Contributors managing the IPR of E-theses. The researcher listed three commonly used features for copyright management. 75.3% mentioned of declaringthat the work is the intellectual property of the author. 64.7% clearly mention the details of copyright ownership and 49.4% mention disclaimer regarding the content of the document.

75.9% institutes confirmed that the Researchers retain the copyright of the ETD post submission. Very few (21.8%) institutes retain the copyright after submission in repository.

However, when it came to identify the measures adopted by the institute for copyright protection of the submitted E-thesis, the results were shocking as 64.5% stated absence of measures for copyright protection. Handful of institutions opted for restricting access to full-text of ETD or copying, saving, printing options were not available for the full-text. Digital watermarking technique had a very poor response from the community of repository administrators. Various institutions mentioned different measures applied by them for copyright protection like Open access without restriction, full-text access was given to ETDs submitted during specific period.

Thus we can arrive at a conclusion that institutions are aware about the importance of copyright protection of ETDs and make use of some or the other feature for copyright management but hesitate in deploying a particular

copyright protection measure. Lack of initiative has been taken in national level to discuss copyright issues of documents in open access. Due to this problem researchers all over the world are worried about their work being plagiarised thereby resulting in decreasing submission of research work.

13.2) ***Suggestions:***

a) Standards and mandatory rules should be framed by the institutes at local level or by organisations of national importance like UGC (in India) to protect copyright of authors thereby promoting submission of research work and stopping plagiarism.

b) Instead of providing access only to metadata and limiting full-text access only to authorised institutional members, the repositories must use modern techniques of copyright protection and if necessary may charge nominal fees for the full-text access of the ETD. Proper reasons should be mentioned by a person who seeks permission to access some restricted ETD.

c) If required the institutions may fix an embargo period after which full-text access should be provided to the ETD.

d) Strict action should be taken if plagiarism takes place. Stringent acts should be framed at national level to discourage plagiarism.

Section I: Language Compatibility & Currency of Information

14) Objective 14: To find out language compatibility and frequency of updating the E-theses repository.

14.1) ***Findings & Conclusions:***

English being a universal language is the most preferred language for ETDs and 81.1% institutions have mentioned of having major percentage of English language ETDs in their repositories. Other language ETDs which

cover a good share are French and Portuguese. The researcher could discover various national and regional languages in which ETDs are submitted across the world.

73.5% institutes informed of updating the collection of ETDs in their repository frequently as and when it is submitted to the institute. 12% mentioned half-yearly and annual updating and only 2.4% stated that they have never updated the E-theses repository. This shows that majority of institutes are willing to provide global access to the ETDs as soon as they are submitted to the repository.

14.2) ***Suggestion:***

a) Considering the importance of knowledge content in an ETD, special efforts must be taken to update the E-theses repository frequently in order to maintain the currency of information disseminated.

6.2 Prospective Areas of Research:

1) Explore reasons of slow growth of E-thesis repositories.
2) In-depth study of repository software package most suitable for ETD.
3) Criteria for evaluation of E-theses repository.
4) Role of Librarian in each stage of development of E-theses repository.
5) Copyright Protection techniques of ETDs.
6) Impact of ETDs on the research community.
7) Case study of any particular E-theses (only) repository to discover various concepts involved in the development and management of the repository.
8) Comparative study of E-thesis repositories in a particular country.
9) Preservation strategies of ETDs.

Conclusion:

The overall conclusion that can be derived from the present research work is that setting up only E-theses repositories is not a common practice in institutions across

the world. E-thesis is one of the types of various other types of documents included in the Institutional Repository. Various organizations and advocates of open access are working hard in spreading awareness about the importance and benefits of E-theses repositories and submission of their research work in electronic format. The progress has still a long way to go.

Government must take efforts to promote dissemination of scholarly communication through open access. They should also frame standards and stringent rules in order to prevent plagiarism.

In India, National Knowledge Commission (NKC) has plans to promote open access and digitize doctoral theses. NKC in its 'Report of the Working Group on Open Access and Open Educational Resources-2007'[2] mentioned that research conducted in third world countries representing 80% of world's population is largely invisible to the research community due to financial and governmental restraints' .INFLIBNET's Shodhganga introduced ShodhGangotri which is a database of research in progress.[3]

With the efforts being taken all over the world it can be said that in the coming years the benefits of open access will definitely spread its umbrella to majority of institutions and more and more E-theses Repositories will be successfully set up by organizations in various countries providing full-text access to Electronic theses and dissertations.

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Appendix-I

Sub: Request to fill up E-thesis Repository web survey questionnaire

Dear Sir/ Madam,

I, Ms. ShantashreeSengupta, doctoral student of Department of Library & Information Science, University of Pune (India), am currently doing research on 'E-thesis Repositories in the World : A Critical Analysis', under the guidance of Dr. S.K.Patil. As part of the research study, we are conducting a survey of E-thesis Repositories in the world.

Repository is a network accessible server used to store digital content. Institutional repositories are the best way through which institutes store scholarly publication of their faculty members in digitized form. These repositories contain pre-prints/ post-prints of research articles, research reports, conference papers, teaching materials, project reports, doctoral theses and dissertations, datasets resulting from research projects, committee papers, computer software, works of art, photographs, audio/ video recordings, patents, standards etc.

E-theses repositories is one of the most important types since it enables the user to know the variety of research topics in which research has been conducted all over the world. These repositories are now being developed throughout the world by institutions/ universities in order to provide worldwide access to the most up-to-date research generated by masters and doctoral students.

Therefore, I request you to spare some time from your busy schedule to answer the questions related to your Institute's E-theses Repository in the web survey questionnaire. The answers provided by you will remain completely confidential and will be used only for research purpose. They will help me in my research work.

I would like to express my gratitude in anticipation for providing me valuable information required for the research work. If you have any questions about the survey, please contact me at shantashrees@gmail.com.

Thanking you,

ShantashreeSengupta.

QUESTIONNAIRE:

E-THESES REPOSITORYDEVELOPMENT & MANAGEMENT

1) Please provide the following information:
   a) Salutation (Dr/ Mr/ Msetc.):
   b) Name:
   c) Job Position:
   d) Name of Institution:
   e) Repository name:
   f) URL of E-theses Repository:
   g) Subject Coverage of E-theses Repository:
   h) Country:

SECTION 2: BACKGROUND INFORMATION

Q2.How much time was required for implementation of E-theses Repository includingplanning and pilot testing? (Please type number of months)

Q3. When did your E-theses Repository become operational i.e. available to authorizedusers for submission and searching of digital content?

Q4. How would you classify your repository in terms of development? (Choose only one option)

Sr.No.	Answer Options
1	Prototype (A preliminary model from which other forms are developed)
2	Recently Launched
3	Fully Operational Repository
4	I don't Know

Q 5.How important were the results of the following exploratory activities in terms of influencing your institutions decision about implementing an E-theses Repository? (Please choose all that apply)

Sr. No.	Answer Options	Very Important	Important	Somewhat Important	Least Important	Don't Know	N/A	Response Count
1	An analysis of literature review of Electronic Thesis & Dissertations (ETDs)							
2	Attending Open Source Software Implementation training &workshops							
3	Learning about available expertise and assistance							
4	Learning about successful implementation at other institutions							
5	Demonstrating operational E-theses repositories to institutions decision makers							

Q 6.Rate the relevance of the following objectives in setting up E-theses Repository

Sr. No.	Answer Options	Highly Relevant	Relevant	Slightly Relevant	Not Relevant	Don't Know	Response Count
1	Enhanced exposure to ETDs						
2	Promote data sharing & knowledge						
3	Promote new modes of publication						
4	Preservation of digital resources						

Q7. Why do you think contributors of your institutions will submit their Thesis &Dissertations in your E-theses Repository? (Please choose all that apply)

Sr.No.	Answer Options
1	To provide maximal access to the research results
2	Mandatory policy of the institute
3	To encourage open access
4	Increase institution's prestige
5	Increase in citation counts to your institution's intellectual output.
6	Solution to the problem of preserving your institutions intellectual output
7	An increase in your library's role in facilitating research work
8	Reduction in the amount of time between discovery and dissemination of research findings to scholarly communities
9	Solves the space problem which otherwise gets created in order to maintain printed copies of Thesis & Dissertations
10	To reduce traditional channels of dissemination of information
	Others (Please Specify)

Q 8. Which of the following acted as barriers in implementing ETD program? (Please choose all that apply)

Sr.No.	Answer Options
1	Concern about Copyright/ IPR issues of ETDs
2	Faculty had no knowledge on what an ETD is and what are its benefits.
3	Plagiarism Issues
4	Absence of stringent rules regarding mandatory contribution of ETDs.
5	Tendency to prefer traditional format of thesis & dissertations
6	Time consuming submission procedures
7	Lack of on campus technical expertise
8	Lack of support from Administrative Authorities of the Institution
9	Lack of Information &Communication Technology (ICT) trained contributors
10	Training for use of software to create Repository
11	Difficulties in long term preservation of digital files
12	Lack of financial support
13	Inability of contributors to formulate quality metadata
14	Equipment availability
	Other (please specify)

Q 9. Have you ever attended an ETD Symposium/Conference/Workshop?

Sr.No.	Answer Options
1	Yes
2	No

Q 10. If yes, then attending ETD Symposium/Conference/Workshop makes you aware of:(Please choose all that apply)

Sr.No.	Answer Options
1	Importance of networking with others around the world
2	Common problems faced during implementation of ETD program
3	Requirements for successful set up and operation of ETD program
4	Probable solutions to problems encountered

Q 11. How do you create awareness about E-theses Repository and its advantagesamongst members of your institutions? (Please choose all that apply)

Sr.No.	Answer Options
1	Links from Library website/Institutional website
2	Conducting Open Access Seminar/ Symposiums
3	Framing mandatory rules for faculty members to contribute their ETDs
4	Presentations about the benefits of ETDs at faculty meetings
5	Promotional brochure
6	Writing articles in the institutions newsletter
7	No special effort is taken to promote the E-theses Repository
	Others (please specify)

SECTION 3: REPOSITORY MATERIALS

Q 12.Does your repository contain digital documents other than ETDs?

Sr.No.	Answer Options
1	Yes
2	No

Q 13.If yes, select the type of the digital documents other than ETDs that your Institutional Repository contains.

Sr.No.	Answer Options	Peer-Reviewed	Non Peer-Reviewed	Don't Know
1	Journal Articles			
2	Conference/ Seminar Papers			
3	Conference Proceedings			
4	Post-Prints			
5	Journals			
6	Books			
7	Technical Reports			
8	Pre-Prints			
9	Annual Reports			
10	Manuscripts			
11	Speeches			
12	Datasets			
13	Audio Visual Material/ Multimedia			
14	Lectures, Assignments, papers and projects prepared			

	by students			
15	Photographs			
16	Newspaper Articles			
17	Habilitation			
18	Convocation Address			
19	Patents			
20	Maps			
21	Software			
22	Newspaper Clippings			
	Other (Please Specify)			

Q 14.The ETDs included in your repository are:

Sr.No.	Answer Options
1	**Peer-reviewed**
2	Non Peer-reviewed
3	Don't know

Q 15.Mention the number of digital documents that your repository contains.

Sr.No.	Digital Documents
1	Doctoral Theses
2	Master's Theses
3	Bachelor's Theses
4	Technical Reports
5	Journal Articles
6	Annual Reports
7	Convocation Address
8	Journals
9	Photographs

10	Manuscripts
11	Audio Visual Material
12	Books
13	Maps
14	Conference Proceedings
15	Conference Papers
16	Pre-Prints
17	Post-Prints
18	Newspaper Clippings
19	Lectures, Assignments, papers and projects prepared by students
20	Patents
21	Datasets
22	Software
23	Speeches
24	Newspaper Articles
25	Habilitation

Q 16. Which file format does your Institutional Repository support? (Please choose all that apply)

Sr.No.	**Answer Options**
1	PDF
2	Images (TIFF, GIF, JPEG etc.)
3	Audio (WAV, MP3 etc.)
4	Video (MPEG, AVI etc.)
5	Datasets
6	Computer Program
7	Databases
	Other (please specify)

SECTION 4: HARDWARE & SOFTWARE

Q 17. Which Repository Software package have you implemented? (Please choose only one option)

Sr.No.	Answer Options	Pilot Tested	Implemented
1	DSpace		
2	EPrints		
3	DoKS		
4	ETD-db		
5	Greenstone		
6	OPUS		
7	Digital Commons		
	Other (Please Specify)		

Q18.Please select the features of the chosen software (Choose all that apply)

Sr.No.	Answer Options
1	Open source
2	Greater functionality
3	Adequate support available
4	Easy installation and maintenance
5	User friendly
6	Updates released frequently
	Other (please specify)

Q 19. Server connectivity

Sr.No.	Answer Options
1	Intranet
2	Internet

Q 20.The E-theses Repository server is:

Sr.No.	Answer Options
1	Institution's server
2	Cloud computing server
	Other (Please specify)

SECTION 5: WAYS OF PROVIDING ACCESS TO ETDs

Q 21. Access level of ETDs is: (Choose all that apply)

Sr.No.	Answer Options
1	Full text only by Institution Members
2	Full text only by subscribers of the database
3	Full text by anyone accessing the E-theses repository
4	Metadata only by non-institutional users
5	Abstract only by non-institutional users
6	Paid access to full text of ETDs

Q 22. The E-theses Repository provides access to:

Sr.No.	Answer Options
1	ETDs right from the inception of the Institution (i.e. the first Thesis or Dissertation submitted to the institute)
2	ETDs submitted during last ten years
3	Only previous academic year ETDs
	Other (please specify)

Q 23. Who are authorized contributors to your institution's E-theses Repository? (choose all that apply)

Sr.No.	Answer Options
1	Faculty
2	Doctoral Students
3	Post Graduate Students
4	Undergraduate Students
5	Research Scientists
6	Librarians
7	Computer Service Staff
8	Academic Support Staff
9	Administrative Staff
10	External Contributors
11	Archivists
	Other (please specify)

Q 24. Who are the major contributors to your institution's E-theses Repository? (Choose only one)

Sr.No.	Answer Options
1	Faculty
2	Doctoral Students
3	Post Graduate Students
4	Undergraduate Students
5	Research Scientists
6	Librarians
7	Computer Service Staff
8	Academic Support Staff
9	Administrative Staff
10	External Contributors
11	Archivists
	Other (please specify)

Q 25. Use of ETDs in the repository is monitored with the help of (Please choose all that apply)

Sr.No.	Answer Options
1	Statistical count of number of views (Abstract Only)
2	**Statistical count of number of views (Abstract + PDF/HTML)**
3	Statistical count of number of views (Country wise)
4	Statistical count of number of full-text downloads (Country wise)
5	Tracking number of contributions
6	Tracking number of searches
7	Tracking number of users
8	Tracking number of queries
9	No monitoring method is employed
	Other (please specify)

Q 26. ETDs found within your repository are used (Please select only one option)

Sr.No.	Answer Options
1	Frequently
2	Occasionally
3	Rarely
4	Never

SECTION 6: BUDGET CONSIDERATIONS

Q 27. What is the source of funding for implementation of ETD program? (Please choose all that apply)

Sr.No.	Answer Options
1	Special grant provided by institution's administration
2	Grant awarded by an external agency
3	Costs covered in routing operating costs of your institution's computer services
4	Costs covered in routing operating costs of your institution's library
	Other (please specify)

Q 28. Out of the funds available for E-theses Repository during 2012-2013, what percentage of amount is allocated to the following categories?

Sr.No.	Answer Options
1	Staff
2	Hardware Acquisition
3	Hardware Maintenance
4	Software Acquisition
5	Software Maintenance and updates
6	System backup
7	Consultancy

SECTION 7: HUMAN RESOURCE

Q 29. Who is heading E-theses repository implementation at your institution? (Please choose only one)

Sr.No.	Answer Options
1	Librarian
2	Assistant Librarian
3	Information Scientist
4	Library Staff Member
5	Head of the Information Centre
6	Staff Member of Information Centre
7	Library Director
8	Assistant Library Director
9	Head of the Information Division
10	Staff Member of the Information Division
11	Faculty Member
12	Computer Service Staff Member
13	System Administrator
14	No Committee or Committee Chair has been appointed
	Other (Please specify)

Q 30.If a team or committee is involved with E-theses repositories, who are the members of the committee. (Please choose all that apply)

Sr.No.	Answer Options
1	Librarian
2	Assistant Librarian
3	Information Scientist
4	Library Staff Member
5	Head of the Information Centre
6	Staff Member of Information Centre

7	Library Director
8	Assistant Library Director
9	Head of the Information Division
10	Staff Member of the Information Division
11	Faculty Member
12	Computer Service Staff Member
13	System Administrator
14	No Committee or Committee Chair has been appointed
	Other(please specify)

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Q 31. For implementation of E-theses repository, has special staff been appointed? (Write total number of staff in respective text box)

Sr.No.	**Answer Options**
1	Full Time
2	Part time
3	Contract Basis
4	No Special Staff was appointed

SECTION 8: METADATA STANDARDS & INTEROPERABILITY

Q 32. Metadata is created by:

Sr.No.	Answer Options
1	Item contributors
2	Repository administrator
3	Created by ETD contributor, verified by repository administrator
4	Other (please specify)

Q 33. The E-theses repository is OAI-PMH compliant

Sr.No.	Answer Options
1	Yes
2	No

SECTION 9: PRESERVATION POLICY

Q 34.Do you have any digital preservation policy?

Sr.No.	Answer Options
1	Yes
2	No

Q 35.If yes, which long term preservation strategy is employed? (Please choose all that apply)

Sr.No.	Answer Options
1	Bitstream Copying (making an exact duplicate of a digital object)
2	Refreshing (copy digital information from one long-term storage medium to another of the same type)
3	Durable, Persistent Media (eg. CDs)
4	Digital Archaeology (includes methods and procedures to rescue content from damaged media or from obsolete or damaged hardware and software environments)
5	Analog Backups (combines the conversion of digital objects into analog form with the use of durable analog media)
6	Migration (to copy data, or convert data, from one technology to another, whether hardware or software, preserving the essential characteristics of the data)
7	Emulation (combines the original hardware and software environment of the digital object, and recreates it on a current machine)
8	Encapsulation(may be seen as a technique of grouping together a digital object and metadata necessary to provide access to that object)
	Other (please specify)

Q 36. Do you allow items to be withdrawn from the repository?

Sr.No.	Answer Options
1	Yes
2	No

Q 37. If yes, then the items are

Sr.No.	Answer Options
1	Deleted permanently
2	Removed from public view

Q 38.Who has the authority of removing items from the repository?

Sr.No.	Answer Options
1	Researcher
2	Repository Administrator
	Other (please specify)

SECTION 10: COPYRIGHT/ IPR ISSUES

Q 39. Who is responsible for managing the ETD's IPR? (Please choose all that apply)

Sr.No.	Answer Options
1	Contributors
2	One chosen academic unit of institution
3	One chosen service unit
4	**E-theses Repository Staff**
5	Library Staff
	Other (please specify)

Q 40. Which of the following features does the repository have for copyright management?(Choose all that apply)

Sr.No.	Answer Options
1	Copyright Information
2	Disclaimer regarding the content deposited
3	Declaration that the work is the intellectual property of the author

Q 41.Who owns the Copyright of the E-thesis after submitting to the repository? (Please select only one option)

Sr.No.	Answer Options
1	Researcher
2	Institute
3	Not yet decided

Q 42. What measures are taken by the institute to protect copyright of E-thesis deposited in the repository?(Choose all that apply)

Sr.No.	Answer Options
1	Digital Watermarking
2	Full-text of the ETD cannot be copied,edited,saved or printed
3	Access is provided only to Metadata
4	Measures are not yet framed
	Other (please specify)

SECTION 11: ADDITIONAL INFORMATION

Q 43. Based on your experience with E-theses Repository implementation, how would you rate your chosen system with regard to these capabilities? (Please choose all that apply)

Sr. No.	Answer Options	Very Adequate	Adequate	Somewhat Adequate	Least Adequate	Don't Know	Response Count
1	Browsing, Searching & retrieving digital content						
2	End-user Interface						
3	Digital preservation						
4	Multilingual support						
5	Supported file formats						
6	Adherence to open access standards						
7	Formulating metadata for ETDs						
8	Controlled vocabulary searching						
9	User authentication						
10	Authority control						
11	Technical support						
12	Technical documentation						
	Other (please specify)						

Q 44. The E-theses repository is indexed by (Choose all that apply)

Sr.No.	Answer Options
1	Search Engines
2	Online Database
3	Registry of Open Access Repositories (ROAR)
4	OpenDOAR
5	Scirus
	Other (please specify)

Q 45. If your E-theses Repository is indexed by Search Engines, then which of the following search engines index your E-theses Repository? (Choose all that apply)

Sr.No.	Answer Options
1	Google
2	Yahoo
3	AltaVista
4	Hot bot
5	MSN
6	Lycos
	Other (please specify)

Q 46.Does your E-theses repository provide links to other E-thesis Repositories of your country?

Sr.No.	Answer Options
1	Yes
2	No

Q 47. Does your E-theses Repository provide links to other E-thesis Repositories of International Level?

Sr.No.	Answer Options
1	Yes
2	No

Q 48.Other than English, which language ETDs are included in the Repository. (Please choose all that apply)

Sr.No.	Answer Options
1	Chinese
2	Dutch
3	English
4	French
5	German
6	Greek
7	Hindi
8	Italian
9	Japanese
10	Russian
11	Taiwanese
12	Spanish
13	Malay
	Other (Please specify)

Q 49.Database of ETDs is updated

Sr.No.	Answer Options
1	Monthly
2	Half Yearly
3	Annually
4	Never

Appendix-II

COUNTRY WISE DISTRIBUTION OF E-THESIS REPOSITORIES

Sr.No.	Country	Name of the Institution	Name of the Repository
1	**The United States of America (USA)**	Colorado State University Libraries	Digital Collections of Colorado
2		Massachusetts Institute of Technology	DSpace@MIT
3		Georgetown University	DigitalGeorgetown
4		Rutgers University	RUcore
5		SOUTHERN ILLINOIS UNIVERSITY CARBONDALE	PROQUEST - ETD ADMINISTRATOR
6		University of Massachusetts Amherst	ScholarWorks@UMassAmherst
7		University of North Texas	UNT Digital Library
8		Brandeis University	Brandeis Institutional Repository
9		California Institute of Technology	CODA
10		Northeastern University	IRis
11		Texas State University	Digital Collections
12		Rice University	Rice University Digital Scholarship Archive
13		Yale University	Yale Medicine Thesis Digital Library
14		Boston University	OpenBU
15		St. John Fisher College	Fisher Digital Publications
16		University of South Florida	Scholar Commons
17		Claremont University Consortium	Scholarship@Claremont
18		Virginia Tech	VTechWorks
19		University of Nebraska-Lincoln	DigitalCommons@University of Nebraska-Lincoln
20		University of Utah	USpace
21		Colorado State University (Agricultural Sciences)	Digital Collections of Colorado

22		University of Michigan, Ann Arbor	Deep Blue
23		Oklahoma State University	e-Archive
	India		
24		IIT Delhi	eprint@IITDelhi
25		National Aerospace Laboratories	NAL-IR
26		Tata Institute of Social Sciences	Digital Repository, Sir Dorabji Tata Memorial Library
27		Saurashtra University	Etheses - A Saurashtra University Library Service
28		CSIR-National Metallurgical Laboratory	Eprints@NML
29		Central Food Technological Research Institute	eprints@CFTRI
30		Chadragupt Institute of Management Patna	Bodhi
31		Jawaharlal Nehru University	JNU ETD Archive
32		Indian Institute of Astrophysics	Indian Institute of Astrophysics Digital Repository
33		CSIR-URDIP	CSIR EXPLORATIONS
34		National Centre for Catalysis Research, IITM	catalysis database
	United Kingdom (UK)		
35		Cranfield University	Cranfield CERES
36		Robert Gordon University	OpenAir
37		University of the Arts London	UAL Research Online
38		University of Hull	Hydra
39		London School of Economics and Political Science	LSE Theses Online
40		University of Birmingham	University of Birmingham Research Archive, E-theses Repository
41		University of Glasgow	University of Glasgow Theses Service
42		The British Library	EThOS E-Theses Online Service
	Sweden		
43		Chalmers University of Technology	CPL (Chalmers Publication Library)

44		Orebro University	DiVA [Academic Archibe On-Line]
45		KTH Royal Institute of Technology	DiVA
46		Uppsala University Library	DiVA - Academic Archive Online
47		Swedish School of Sport and Health Sciences, GIH	DiVA
48		Dalarna University	DiVA
	Australia		
49		Monash University	Monash University Research Repository
50		University of Tasmania	ePrints
51		RMIT University	RMIT Research Repository
52		CQUniversity Australia	ACQUIRE
	Canada		
53		University of Ottawa	RechercheuO Research
54		Institute for Christian Studies	Institutional Repository
55		University of Waterloo	UWSpace
56		The University of British Columbia	cIRcle
	Ireland		
57		Dublin Institute of Technology	Arrow@DIT
58		National University of Ireland Maynooth	NUI MaynoothePrints and eTheses Archive
59		Dublin City University	DORAS
60		Health Service Executive Ireland	Lenus the Irish Health Repository
	South Africa		
61		Stellenbosch University	SUNScholar
62		University of Johannesburg	UJDigispace
63		Univeristy of Pretoria	UPetd
64		North-West University	Boloka - in the process of changing to NWU IR
	Italy		
65		SISSA	SISSA Digital Library
66		Universita' di Parma	DSpaceUnipr
67		IMT Institute for advanced studies	IMT E-Theses

	Netherlands		
68		TU Delft (Delft University of Technology)	TU Delft Repository
69		Wageningen University	Wageningen Yield
70		Leiden University	Leiden Repository
	Malaysia		
71		Universiti Utara Malaysia	UUM ETD
72		Universiti Putra Malaysia	UPM IR
	Norway		
73		University of Agder	Agder University Research Archive (AURA)
74		Norwegian Prison and probation staff academy	CORA (Correctional Open Research Archive)
	Switzerla nd		
75		EcolePolytechniqueFédéra le de Lausanne	Infoscience
76		CERN	CERN Document Server
	Belgium		
77		Hasselt University	Document Server@UHasselt
	Bulgaria		
78		Central Medical Library at Medical University – Sofia	Electronic Repository - Central Medical Library - MU, Sofia
	Finland		
79		University of Jyväskylä	JYX
	France		
80		INP Toulouse	Les thèses en ligne de l'INP
	Germany		
81		Humboldt-Universitaetzu Berlin	edoc-Server
	Ghana		
82		KNUST	KNUSTSpace
	Hungary		
83		SzentIstvan University, Veterinary Science Library, Archives and Museum	HuVetA (Hungarian Veterinary Archive)

	Indonesia		
84		University of Surabaya	University of Surabaya Repository
	Kenya		
85		University of Nairobi	UoN Digital Repository
	Namibia		
86		Polytechnic of Namibia	Ounongo Repository
	Nepal		
87		Social Science Baha	Central Open Access Repository in Nepal
	New Zealand		
88		Auckland University of Technology	Scholarly Commons
	Nigeria		
89		NnamdiAzikiwe University Awka Nigeria	NnamdiAzikiwe Digital Library
	Portugal		
90		University of Minho	RepositóriUM
	Senegal		
91		Universite de Thies	SIST-SIST, SENEGAL, BEEP(Bibliothèqueélectronique en partenariat)
	Spain		
92		UniversdiadComplutense de Madrid	E-Prints Complutense
	Tunisia		
93		CNUDST	AOUT
	Zimbabwe		
94		University of Zimbabwe Library	University of Zimbabwe Institutional Repository
	South Korea		
95		Seoul National University	S-Space

Appendix-III

WEBSITE ADDRESSES OF E-THESIS REPOSITOIRES CONSIDERED FOR RESEARCH STUDY

- ***UNITED STATES***

1. Claremont Colleges Digital Library (CCDL)(http://ccdl.libraries.claremont.edu/cdm/)
2. Colorado State University Libraries Digital Repository (http://digitool.library.colostate.edu)
3. Deep Blue at the University of Michigan (http://deepblue.lib.umich.edu/)
4. Digital Collections (http://www.library.okstate.edu/digital/index.htm)
5. DigitalCommons@University of Nebraska(DigitalCommons@UNL) http://digitalcommons.unl.edu/)
6. DSpace at Rice University (http://scholarship.rice.edu/)
7. DSpace@MIT (http://dspace.mit.edu/)
8. USpace (University of Utah Institutional Repository) (http://uspace.utah.edu/)
9. Virginia Tech (http://vtechworks.lib.vt.edu/)
10. University of South Florida (scholarcommons@usf.edu) (http://scholarsommons.usf.edu/etd)
11. St. John Fisher College (http://fisherpub.sjfc.edu)
12. Boston University (http://open.bu.edu/)
13. Yale University (http://cushing.med.yale.edu/greenstone/cgi-bin/library.cgi?site=localhost&a=p&p=about&c=ymtdl&l=en&w=utf-8)
14. Texas State University (https://digital.library.txstate.edu/)
15. North Eastern University (http://iris.lib.neu.edu)
16. California Institute of Technology (http://thesis.library.caltech.edu/)
17. Brandeis University (http://bir.brandeis.edu)
18. Southern Illinois University Carbondale (http://www.etdadmin.com/cgi-bin/school?siteId=48)
19. University of North Texas (http://digital.library.unt.edu/explore/collections/UNTETD/browse/)
20. University of Massachusetts Amherst (http://scholarworks.umass.edu/)

21. Georgetown University (http://www.library.georgetown.edu/digitalgeorgetown)
22. Rutgers University (http://rucore.libraries.rutgers.edu/)
23. Colorado State University Libraries (http://digitool.library.colostate.edu/R/VKUHEHUXE6PR424PBGTEGFE2I8TXJCLPTF1UQCC3NN2QPX8HA2-01011?func=collections&collection_id=1048&local_base=GEN01-CSU)
24. Combined Arms Research Library Digital Library (http://cgsc.contentdm.oclc.org/cdm/)
25. OhioLINK Electronic Thesis and Dissertation Center (http://etd.ohiolink.edu/)
26. Scholarly Materials And Research @ Georgia Tech (SMARTech) (https://smartech.gatech.edu/)
27. SPARK (Scholarship at Parkland) (http://spark.parkland.edu/)

- ***INDIA***

28. Catalysis Database (ePrints@NCCR) (http://catalysis.eprints.iitm.ac.in/)
29. Eprint@NML(http://eprints.nmlindia.org/)
30. EPrints@IITD(http://eprint.iitd.ac.in/dspace/)
31. Etheses - A Saurashtra University Library Service(http://etheses.saurashtrauniversity.edu/)
32. Indian Institute of Astrophysics Repository (DSpace@IIA) (http://prints.iiap.res.in/)
33. National Aerospace Laboratories Institutional Repository (NAL Repository) (http://nal-ir.nal.res.in/)
34. Open Access Repository of Indian ThesesCSIR Unit for Research and Development of Information Products, Pune(http://eprints.csirexplorations.com/)
35. DSpace@TISS, India (http://library.tiss.edu/dspace.html)
36. Jawaharlal Nehru University (http://www.jnu.ac.in/Library/)
37. EPrints@CFTRI(http://ir.cftri.com/)
38. CMFRI Digital Repository (Eprints@CMFRI) (http://eprints.cmfri.org.in/)

39. Dyuthi (Digital repository of Cochin University of Science & Technology) (http://dyuthi.cusat.ac.in/)
40. DRS at National Institute of Oceanography (http://drs.nio.org/drs/index.jsp)
41. DSpace @ GGSIPU(http://14.139.60.216:8080/xmlui/)
42. DSpace at Indian Institute of Management Kozhikode (DSpace@IIMK) (http://dspace.iimk.ac.in/)
43. DSpace at NCRA(http://ncralib1.ncra.tifr.res.in:8080/jspui/)
44. DSpace at Vidyanidhi(http://dspace.vidyanidhi.org.in:8080/dspace/)
45. Dspace@NITR(http://dspace.nitrkl.ac.in/dspace/)
46. DSpace@TU(http://dspace.thapar.edu:8080/dspace/)
47. Electronic Theses and Dissertations at Indian Institute of Science (edt@IISc)(http://etd.ncsi.iisc.ernet.in/)
48. Kautilya Digital Repository at IGIDR (Kautilya@igidr) (http://oii.igidr.ac.in:8080/jspui/)
49. Knowledge Repository Open Network (KNoor) (http://dspaces.uok.edu.in:8080/jspui/)
50. Mahatma Gandhi University Theses Online(http://www.mgutheses.org/)
51. ShodhGanga: A resevior of Indian Theses (http://shodhganga.inflibnet.ac.in/)
52. KrishiPrabha, India (http://202.141.47.8:8080/equestthesis/)
53. Electronic Theses and Dissertations of UAS Dharwad- University of Agricultural Sciences, Dharwad(http://etd.uasd.edu/)
54. Vidyanidhi-Indian Digital Repository of Electronic Theses (http://eprints.uni-mysore.ac.in/4778/)

- ***UNITED KINGDOM***

55. EThOS: E-Theses Online (http://ethos.bl.uk/)
56. University of Glasgow Theses Service (http://theses.gla.ac.uk/)
57. University of Birmingham Research Archive, E-theses Repository(http://etheses.bham.ac.uk/)
58. LSE Theses Online (http://etheses.lse.ac.uk/)

59. University of Hull (http://hydra.hull.ac.uk)
60. University of the Arts London (http://ualresearchonline.arts.ac.uk)
61. Cranfield University (https://dspace.lib.cranfield.ac.uk/index.jsp)
62. Robert Gordon university (https://openair.rgu.ac.uk/)
63. DSpace @ Cambridge (http://www.dspace.cam.ac.uk/)
64. Nottingham eTheses (http://etheses.nottingham.ac.uk/)
65. Oxford University Research Archive (ORA) (http://ora.ox.ac.uk/)
66. Online Repository of Birkbeck Institutional Theses (ORBIT) (http://bbktheses.da.ulcc.ac.uk/)
67. DSpace at UWIC (http://repository.uwic.ac.uk/dspace/)
68. Wolverhampton Intellectual Repository and E-theses (WIRE) (http://wlv.openrepository.com/wlv/)

- ***SWEDEN (EUROPE)***

69. Dalarna University College Electronic Archive (DALEA) (http://du.diva-portal.org/smash/search.jsf)
69. PublikationerfrånÖrebrouniversitet (http://oru.diva-portal.org/smash/search.jsf)
71. Publikationerfrån KTH (http://kth.diva-portal.org/smash/search.jsf?rvn=1)
72. Publikationerfrån Uppsala Universitet (http://uu.diva-portal.org/smash/search.jsf)
73. Swedish School of Sport and Health Sciences (http://gih.diva-portal.org/smash/search.jsf)
74. Chalmers University of Technology (www.chalmers.se/en/)

- ***AUSTRALIA***

75. Monash University ARROW Repository(http://arrow.monash.edu.au)
76. Australasian Digital Theses Program - University of Tasmania - (e.prints@utas.edu.au) (http://eprints.utas.edu.au/)
77. Australian Digital Theses Program (ADT) - Central Queensland University(http://acquire.cqu.edu.au)
78. RMIT Research Repository(http://researchbank.rmit.edu.au/)

79. Australian Digital Theses Program (ADT) - Australian Catholic University(http://dlibrary.acu.edu.au/digitaltheses/public/)

- ***CANADA***

80. cIRcle (University of British Columbia's Information Repository) (https://circle.ubc.ca/)
81. UWSpace(http://uwspace.uwaterloo.ca/)
82. Institute for Christian Studies (www.icscanada.edu/)
83. University of Ottawa (www.uottawa.ca/en)

- ***IRELAND***

84. ARROW@DIT(http://arrow.dit.ie/)
85. DCU Online Research Access Service (DORAS) (http://doras.dcu.ie/)
86. LENUS (Irish Health Repository) (http://www.lenus.ie/hse/)
87. NUI MaynoothEprint Archives (http://eprints.nuim.ie/)

- ***SOUTH AFRICA (AFRICA)***

88. Stellenbosch University SUNScholar Repository (http://scholar.sun.ac.za/)
89. North-West University Institutional Repository (Boloka) (http://dspace.nwu.ac.za/)
90. University of Johannesburg UJDigispace (https://ujdigispace.uj.ac.za/)
91. University of Pretoria Electronic Theses and Dissertations (UPeTD) (http://upetd.up.ac.za/)

- ***ITALY (EUROPE)***

92. DSpace a Parma(DSpasce@unipr)(http://dspace-unipr.cilea.it/)
93. IMT E-Theses(http://e-theses.imtlucca.it/)
94. SISSA Digital Library (https://digitallibrary.sissa.it/)
95. OpenstarTs(http://www.openstarts.units.it/dspace/)
96. Repository of Open Access Documents (ROAD) (http://road.unimol.it/)
97. JIIA Eprints Repository(http://eprints.jiia.it:8080)
98. Earth-prints Repository(http://www.earth-prints.org/)

99. Unitn-eprints PhD(http://eprints-phd.biblio.unitn.it/)

100. Cadmus (DSpace at the EUI) (http://cadmus.eui.eu/)

101. E-LIS(http://eprints.rclis.org/)

- ***NETHERLANDS (EUROPE)***

102. DSpace at University Leiden (https://openaccess.leidenuniv.nl/)

103. Wageningen Yield (WaY) (http://library.wur.nl/way/)

104. TU Delft Repository (http://repository.tudelft.nl/)

105. IMISCOE Online Library (International Migration, Integration and Social Cohesion online publications) (http://library.imiscoe.org/)

106. KNAW Repository (http://depot.knaw.nl/)

- ***MALAYSIA (ASIA)***

107. Universiti Putra Malaysia Institutional Repository (PSAS IR) (http://psasir.upm.edu.my/)

108. UUM IRepository(http://eprints.uum.edu.my/)

109. ePrints@USM(http://eprints.usm.my/)

- ***NORWAY (EUROPE)***

110. CORA (http://brage.bibsys.no/krus/)

111. University of Agder (NDLTD) (http://www.uia.no/en)

112. BrageHiM (http://brage.bibsys.no/hsm/)

- ***SWITZERLAND (EUROPE)***

113. CERN Document Server (CDS) (http://cds.cern.ch/)

114. Infoscience–ÉcolePolytechniquefédérale de Lausanne (Infoscience) (http://infoscience.epfl.ch/)

115. edoc (http://edoc.unibas.ch/)

- ***BELGIUM (EUROPE)***

  116.Document Server@UHasselt (https://doclib.uhasselt.be/dspace/)

  117. Biblio at UGent (Academic Bibliography and Institutional Archive of Ghent University) (https://biblio.ugent.be/)

  118. DoKS@ KatholiekeHogeschool, Limburg (https://doks.khlim.be/)

- ***BULGARIA (EUROPE)***

  119. Central medical Library at Medical University-Sofia (http://nt-cmb.medun.acad.bg:8080/jspui/)

- ***FINLAND (EUROPE)***

  120. JyX (Jyväskylä University Digital Archive) (https://jyx.jyu.fi/dspace/)

  121. Institutional Repository TKKDOC (http://www.otalib.fi/tkk/edoc/search.html)

- ***FRANCE (EUROPE)***

  122. Institut National Polytechnique de Toulouse Theses (INP Toulouse Theses) (http://ethesis.inp-toulouse.fr/)

  123. OpenGrey Repository (http://www.opengrey.eu/)

  124. Toulouse1 Capitole Publications (http://publications.univ-tlse1.fr/)

- ***GERMANY (EUROPE)***

  125. Humboldt-Universitaetzu Berlin (NDLTD)(https://www.hu-berlin.de/)

  126. ePIC (Electronic Publication Information Center)(http://epic.awi.de/)

  127.tuprints (http://tuprints.ulb.tu-darmstadt.de/)

- ***GHANA (AFRICA)***

  128. knustspace (http://dspace.knust.edu.gh:8080/jspui/)

- ***HUNGARY***

129. SzentIstvan University, Veterinary Science Library, Archives and Museum (Hungarian Veterinary Archive) (http://huveta.hu/)

130. Electronic Theses and Dissertations (ETDs) (http://www.library.ceu.hu/ETD.html)

- ***INDONESIA (ASIA)***

131. Ubaya Repository (University of Surabaya Institutional Repository) (http://repository.ubaya.ac.id/)

132. Binus University Repository (http://eprints.binus.ac.id/)

- ***KENYA (AFRICA)***

133. University of Nairobi Digital Repository (http://erepository.uonbi.ac.ke/)

134. Mahider (http://mahider.ilri.org/handle/10568/1)

135. SU+ Digital Repository (http://ir.library.strathmore.edu/home.action)

- ***NAMIBIA (AFRICA)***

136. Ounongo Repository (http://ir.polytechnic.edu.na/)

- ***NEPAL (ASIA)***

137. Social Science Baha(http://www.soscbaha.org/)

- ***NEW ZEALAND***

138. Scholarly Commons @ AUT University(http://aut.researchgateway.ac.nz/)

139. Lincoln University Research Archive(http://researcharchive.lincoln.ac.nz/dspace/)

140. OUR Archive (Otago University Research Archive) (http://otago.ourarchive.ac.nz/)

141. ResearchSpace@Auckland (https://researchspace.auckland.ac.nz/)

- ***NIGERIA (AFRICA)***

  142.NnamdiAzikiwe University Awka Nigeria
  (http://www.naulibrary.org/repository.html)

- ***PORTUGAL (EUROPE)***

  143.University of Minho (http://www.uminho.pt/en)

- ***SENEGAL(EUROPE)***

  144. Universite de Thies(www.univ-thies.sn/)

- ***SPAIN***

  145. UniversdiadComplutense de Madrid (https://www.ucm.es/)

- ***TUNISIA (AFRICA)***

  146. CNUDST (http://www.cnudst.rnrt.tn/)

- ***ZIMBABWE (EUROPE)***

  147. University of Zimbabwe(http://www.uz.ac.zw/)

- ***REPUBLIC OF KOREA (ASIA)***

  148. S-Space (SNU Open Repository and Archive) (http://s-space.snu.ac.kr/)

- ***TANZANIA (AFRICA)***

  149. MUHAS Institutional Repository (http://ir.muhas.ac.tz:8080/jspui/)

- ***BANGLADESH (ASIA)***

  150. BRAC University Institutional Repository (http://dspace.bracu.ac.bd/)

- ***KYRGYZSTAN (ASIA)***

  151. AUCA Open Electronic Library(http://elibrary.auca.kg:8080/dspace/)

- ***LEBANON (ASIA)***

  152. LAU eCommons(https://ecommons.lau.edu.lb:8443/xmlui/)

- ***PAKISTAN (ASIA)***

  153. Pakistan Research Repository (http://eprints.hec.gov.pk/)

- ***PHILLIPINES (ASIA)***

  154. DSpace at IRRI (http://dspace.irri.org:8080/dspace/)

- ***SAUDI ARABIA (ASIA)***

  155. KAUST Digital Archive **(**http://archive.kaust.edu.sa/kaust/**)**

  156. KFUPM ePrints (http://eprints.kfupm.edu.sa/)

- ***SRI LANKA (ASIA)***

  157. UOC e-Repository(http://archive.cmb.ac.lk/research/)

- ***TURKEY (ASIA)***

  158. Sabanci University Research Database (http://research.sabanciuniv.edu/)

- ***LITHUANIA (EUROPE)***

  159. VGTU repository(http://dspace.vgtu.lt/)

- ***SLOVENIA (EUROPE)***

  160. PeFprints(http://pefprints.pef.uni-lj.si/)

APPENDIX-IV

FULL FORMS OF ACRONYMS USED FOR INSTITUTIONS (in Q.15)

Sr.No.	Name of the Institution	Acronyms Used
1.	IIT Delhi	I IT-D
2.	National Aerospace Laboratories	NAL
3.	Tata Institute of Social Sciences	TISS
4.	Saurashtra University	SU
5.	University of Minho	UoM
6.	Cranfield University	CU
7.	Robert Gordon University	RGU
8.	University of Agder	UoA
9.	Universite de Thies	UT
10.	University of Zimbabwe Library	UZ
11.	NnamdiAzikiwe University Awka Nigeria	NAUA
12.	Stellenbosch University	St U
13.	CNUDST	CNUDST
14.	Central Medical Library at Medical University - Sofia	MU-S
15.	Social Science Baha	SSB
16.	University of Nairobi	UN
17.	Colorado State University Libraries	CSU
18.	CSIR-National Metallurgical Laboratory	NML
19.	Central Food Technological Research Institute	CFTRI
20.	Massachusetts Institute of Technology	MIT
21.	Georgetown University	GU
22.	Rutgers University	RU
23.	SOUTHERN ILLINOIS UNIVERSITY CARBONDALE	SIU
24.	Chadragupt Institute of Management Patna	CIM
25.	Humboldt-Universitaetzu Berlin	HU
26.	University of the Arts London	UoAL
27.	UniversdiadComplutense de Madrid	UCM
28.	University of Massachusetts Amherst	UMA
29.	University of North Texas	UNT
30.	University of Ottawa	UO
31.	University of Hull	UH
32.	London School of Economics and Political Science	LSEPS
33.	Brandeis University	BU
34.	Chalmers University of Technology	CUT
35.	Institute for Christian Studies	ICS
36.	California Institute of Technology	CIT
37.	Northeastern University	NU
38.	Texas State University	TS U
39.	Rice University	RU
40.	Yale University	YU

41.	Boston University	Boston U
42.	St. John Fisher College	St JFC
43.	University of South Florida	USF
44.	Jawaharlal Nehru University	JNU
45.	Universiti Utara Malaysia	UUM
46.	Dublin Institute of Technology	DIT
47.	University of Johannesburg	UJ
48.	Indian Institute of Astrophysics	IIA
49.	Universiti Putra Malaysia	UPM
50.	SISSA	SISSA
51.	University of Birmingham	UB
52.	TU Delft (Delft University of Technology)	TU Delft
53.	National University of Ireland Maynooth	NUIM
54.	KNUST	KNUST
55.	Univeristy of Pretoria	UP
56.	Ecole Polytechnique Fédérale de Lausanne	EPFL
57.	Orebro University	OU
58.	University of Glasgow	UG
59.	Monash University	MU
60.	Dublin City University	DCU
61.	University of Surabaya	US
62.	Wageningen University	WU
63.	KTH Royal Institute of Technology	KTHRIT
64.	University of Tasmania	UT
65.	Polytechnic of Namibia	PN
66.	Uppsala University Library	UUL
67.	Claremont University Consortium	CUC
68.	Virginia Tech	VT
69.	Swedish School of Sport and Health Sciences, GIH	SSSHS
70.	The British Library	BL
71.	University of Nebraska-Lincoln	UN- Lincoln
72.	University of Utah	UU
73.	CSIR-URDIP	CSIR- URDIP
74.	CERN	CERN
75.	Leiden University	LU
76.	Universita' di Parma	UdP
77.	University of Jyväskylä	UJy
78.	North-West University	N WU
79.	University of Waterloo	UW
80.	Colorado State University	CoSU
81.	RMIT University	R MIT U
82.	University of Michigan, Ann Arbor	UoMichigan
83.	National Centre for Catalysis Research, IITM	NCCR
84.	Dalarna University	DU
85.	CQUniversity Australia	CQUA
86.	Auckland University of Technology	AUT

87.	The University of British Columbia	UBC
88.	INP Toulouse	INPT
89.	Health Service Executive Ireland	HSE
90.	Oklahoma State University	OSU
91.	SzentIstvan University, Veterinary Science Library, Archives and Museum	SIU
92.	IMT Institute for advanced studies	IMTIAS
93.	Hasselt University	HU
94.	Norwegian prison and probation staff academy	NPPSA
95.	Seoul National University	SNU
96.	Information & Library Network	INFLIBNET