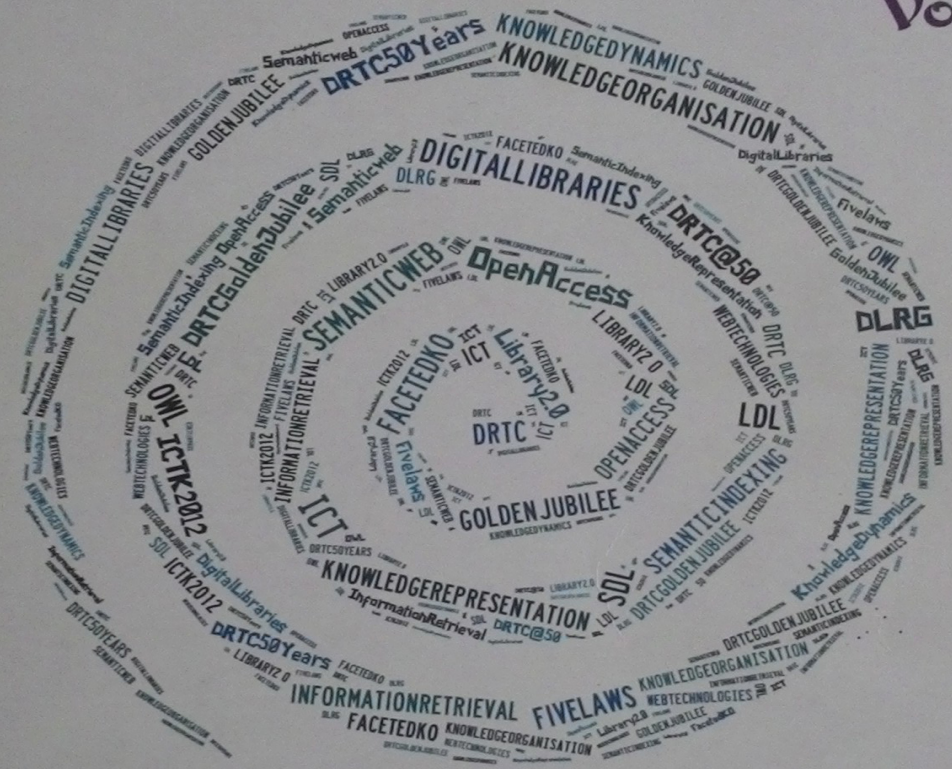
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Building Institutional Repositories in Science and Technology with Open Source Software: A Comparative Study

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Abstract. Recent development in information communication technology and web technologies has changed the landscape of information handling and dissemination. This paper discusses the concept of open access and initiatives of institutional repositories in the field of science and technology in India. In India open access movement is getting momentum to overcome the barriers to scholarly information. The paper also attempts to provide a comparative account of the features of D-Space and Eprints.

Keywords: Open Access, Institutional Repository, EPrints, DSpace, ICT

1. Introduction

Information revolution and increasing demand for exact and consolidated information has changed the concept of traditional library. Now digital library and electronic library concepts are being popular. Old methods followed by the libraries are being replaced by such new technologies these days. These technologies revolutionized the library services by digital information collection, repackaging and online distribution. Now-a-days libraries are not just a storehouse of printed books and documents but also a centre of digital information. The development of Information Technology and its application in the libraries has changed the traditional scenario of the libraries. Now with the development of ICT, all the library collection and services are available globally. Although it is now possible to have free access to exhaustive information on the web but still significant information is not available freely. The information explosion, dwindling budget of the libraries, space problem, high information demand, increasing fees of journals have forced the libraries to seek other ways by which it can collect store and disseminate information among the users. To solve

these types of problems, the concepts of Institutional Repositories (IR) are started by the academic institutions in India. Now the academic institutions have started to build their own repositories.

2. Open Access

Open access (OA) means that a reader of a scientific publication can read it over the Internet, print it out and even further distribute it for non-commercial purposes without any payments or restrictions. The past two decades have seen the emergence of a movement that seeks to restore the knowledge commons back to the knowledge creators through open access. Although the open access movement began before the advent of the Internet, it would not be an exaggeration to say that it would not have grown but for the emergence and widespread use of the Internet (Arunachalam, 2008). One of the important contributions of web technology has been the creation of open access archives or repositories containing the full text and data of any published research article, available free of charge to anyone, anywhere in the world.

3. Institutional Repositories

An institutional repository is a set of services that an institution 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 (Lynch, 2003). An Institutional repository is an online locus for collecting, preserving, and disseminating, in digital form, the intellectual output of an institution, particularly a research institution. For a university, this would include materials such as research journal articles, before (preprints) and after (post prints) undergoing peer review, and digital versions of theses and dissertations, but it might also include other digital assets generated by normal academic life, such as administrative documents, course notes, or learning objects.[3] The main objectives for having institutional repositories are:

- Scholarly communication
- Storing learning materials and courseware
- Electronic publishing

- Managing collections of research documents
- Preserving digital materials for the long term
- Adding to the university's prestige by showcasing its academic research
- Institutional leadership role for the library
- Knowledge management
- Research assessment
- Encouraging open access to scholarly research
- Housing digitized collections

3.1 Software for Institutional Repositories

For building institutional repositories many open source software are available on public domain. The most widely used are: GSDL (Green Stone Digital Library), Eprints, DSpace, Fedora, Ganesha, ETD-db (Electronic Theses and Dissertations database), CDSware and many more. Different software has different features for building the institutional repositories. To build intuitional repository the institution have to select the software according to their need and purpose. The Table 1 provides an overview of the two most widely used software along with their salient features.

Features	Eprints	DSpace
Developed By	University of Southampton, U.K	DSpace Foundation, Massachusetts, USA (MIT/HP)
URL	www.eprints.org	www.dspace.org
Initial Release	2000	2002
License	GPL General Public License	BSD License
Latest Version	3.3.7 (Apr. 2011)	1.8.1 (Dec. 2011)
Size	2.8 MB	7.4 MB
Downloaded From	http://files.eprints.org/713/	http://sourceforge.net/projects/dspace/
Open Source and Free	Yes	Yes
Subscription	Yes	Yes
Database	MySQL	PostgreSQL
Metadata Format	Dublin Core	Qualified Dublin Core

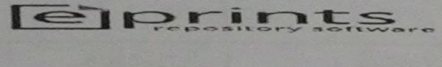
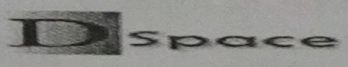
Operating System	UNIX	UNIX or LINUX, Windows
Programming Language	PERL	JAVA
Supported File formats	PDF, MSWord, HTML, JPEG, GIF	MSWord, PDF, PPTs, JPEG, GIF
Type	Institutional repository software	Institutional repository software
Emblem		
Contact Information	info@services.eprints.org	sales@dspace.com.au

Table 1. Comparative Study of EPrints and DSpace

3.2 Institutional Repositories in Science and Technology in India

The Indian Institute of Science (IISc) was the first in the country to set up an interoperable institutional archive known as ePrints@IISc. The institutional repositories in India is gaining popularity and majority of the S&T libraries and information centers are involved in developing such services. The given table represents the data related to major India's S&T centers which has developed IR using the DSpace and Eprints.

Name of IR Institution	Subjects	Contents	Software Used
Catalysis Database, National Centre for Catalysis Research (NCCR), India http://www.eprints.iitm.ac.in	Chemistry and Chemical Technology	Articles; Conferences; Theses	EPrints
Dhananjayarao Gadigil Library, Gokhale Institute of Politics and Economics, Pune, India http://library.gipe.ac.in/jspui/	Multidisciplinary	Unpublished; Books; Multimedia	DSpace
CMFRI Digital Repository, Central Marine Fisheries Research Institute (CMFRI), India http://eprints.cmfri.org.in	Agriculture, Food and Veterinary; Biology and Biochemistry; Ecology and Environment;	Articles; Conferences; Theses; Unpublished; Books; Patents	EPrints

Name of IR Institution	Subjects	Contents	Software Used
/	Health and Medicine		
Delhi College of Engineering Repository, Delhi College of Engineering, Delhi, India http://202.141.12.109/dspace	Science General; Technology General	Articles; Unpublished; Learning Objects; Multimedia; Special	DSpace
Digital Knowledge Repository, Central Drug Research Institute (CDRI), India http://dkr.cdri.res.in:8080	Biology and Biochemistry; Health and Medicine	Articles	DSpace
Digital Library, ISI, India http://www.isibang.ac.in/~library/	Mathematics and Statistics	Articles	DSpace
Dyuthi, Cochin University of Science & Technology (CUSAT), India http://dyuthi.cusat.ac.in	Multidisciplinary	Articles; Theses; Learning Objects	DSpace
DRS, National Institute Of Oceanography (NIO), India http://drs.nio.org	Science General; Technology General; Arts and Humanities General	Articles; Conference Theses	DSpace
DSpace @ GGSIPU, Guru Gobind Singh Indraprastha University, Delhi, India http://14.139.60.216:8080	Multidisciplinary	Articles; Theses; Learning Objects	DSpace
dspace@sdmcet, SDM College Of Engineering and Technology Dharwad, India http://210.212.198.149:8080/jspui	Chemistry and Chemical Technology; Technology General; Civil Engineering; Computers and IT; Electrical and Electronic Engineering; Mechanical	References; Theses; Unpublished; Books; Learning Objects	DSpace

Name of IR Institution	Subjects	Contents	Software Used
	Engineering and Materials; Library and Information Science		
DSpace@IBSA, ICFAI Business School, Ahmedabad India http://202.131.96.59:8080	Mathematics and Statistics; Business and Economics; Library and Information Science; Management and Planning	Articles; Conferences;Unpublished; Books; Special	DSpace
DSpace@IITB, Indian Institute of Technology, Bombay (IITB), India http://dspace.library.iitb.ac.in	Multidisciplinary	Articles; Conferences	DSpace
DSpace@IMSC http://www.imsc.res.in/xmlui/	Mathematics and Statistics	Conferences; Learning Objects	DSpace
Dspace@NITR National Institute of Technology, Rourkela (NITR), India http://dspace.library.iitb.ac.in/dspace-oai/request	Chemistry and Chemical Technology; Physics and Astronomy; Mechanical Engineering and Materials	Articles; Conferences; Theses; Books	Dspace
eGyankosh IGNOU http://www.egyankosh.ac.in/	Multidisciplinary	Learning Objects	DSpace
etd@IISc Indian Institute of Science, Bangalore (IISc), India http://etd.ncsi.iisc.ernet.in	Multidisciplinary	Theses	Dspace
Eprint@NML, National Metallurgical Laboratory, India http://eprints.nmlindia.org/	Chemistry and Chemical Technology; Technology General	Articles; Conferences; Theses; Books; Patents	EPrints
Eprints@IARI, Indian Agricultural Research Institute, India	Agriculture, Food and Veterinary	Articles; Conferences; Theses; Unpublished	EPrints

Name of IR Institution	Subjects	Contents	Software Used
http://eprints.iari.res.in/			
E-Repository@IIHR, ICAR, Bengaluru http://www.erepo.iihr.ernet.in/	Multidisciplinary	References; Unpublished;Special	DSpace
EPrints@IITD, Indian Institute of Technology, Delhi (IITD), India http://eprint.iitd.ac.in/dspace-oai/request	Multidisciplinary	Articles; Theses	DSpace
ePrints@NII, National Institute of Immunology http://eprints.nii.res.in	Biology and Biochemistry	Articles; Unpublished	EPrints
Eprints@SBT MKU, School of Biotechnology & Madurai Kamaraj University, India http://eprints.bicmku.in	Biology and Biochemistry	Articles	EPrints
ICRISAT Open Access RepositoryInternational Crops Research Institute for the Semi Arid Tropics, India http://ring.ciard.net/icrisat-open-access-repository	Multidisciplinary	Articles; Conferences; Learning Objects; Multimedia	DSpace
Bhagirathi, IIT Roorkee Repository http://bhagirathi.iitr.ac.in/dspace/	Multidisciplinary	Articles; Conferences; Multimedia	DSpace
Indian Academy of Sciences, India http://repository.ias.ac.in	Science General; Health and Medicine; Technology General	Articles	EPrints
DSpace@IIA, Indian Institute of Astrophysics, India http://prints.iiap.res.in	Physics and Astronomy	Articles; Theses; Multimedia; Special	DSpace
Indian Institute of Petroleum, Dehradun, India http://library.iip.res.in:8080/dspace	Science General; Biology and Biochemistry; Chemistry and Chemical	Articles	DSpace

Name of IR Institution	Subjects	Contents	Software Used
	Technology; Technology General; Civil Engineering; Computers and IT; Electrical and Electronic Engineering; Mechanical Engineering and Materials; Library and Information Science		
KNoor, Department of Library and Information Science, University of Kashmir http://dspaces.uok.edu.in:8080/dspace/	Science General; Agriculture, Food and Veterinary; Health and Medicine; Technology General	Articles; Conferences; Theses	DSpace
NAL Repository, Information Centre for Aerospace Science and Technology (ICAST), India http://nal-ir.nal.res.in	Mathematics and Statistics; Technology General; Mechanical Engineering and Materials	Articles; Conferences; Theses; Unpublished; Learning Objects; Multimedia; Patents	EPrints
National Science Digital Library NISCAIR India http://nsdl.niscair.res.in/	Science General	Books	DSpace
NOPR, NISCAIR http://nopr.niscair.res.in/	Multidisciplinary	Articles; References	DSpace
ePrints@iisc, Indian Institute of Science, Bangalore, India http://eprints.iisc.ernet.in	Chemistry and Chemical Technology; Mathematics and Statistics; Physics and Astronomy	Articles; References; Conferences; Unpublished; Books; Patents; Special	EPrints
OpenMED@NIC http://openmed.nic.in	Health and Medicine	Articles	EPrints
RRI Digital Repository Raman Research Institute, India http://dspace.rri.res.in	Physics and Astronomy	Articles; Unpublished; Learning Objects	DSpace

Name of IR Institution	Subjects	Contents	Software Used
ePrints@SVNIT, Sardar Vallabhbai National Institute of Technology, Indiahttp://eprints.svnit.ac.in	Technology General	Articles; Conferences	EPrints
DU Eprint Archive, University of Delhi, India http://eprints.du.ac.in	Multidisciplinary	Articles; Conferences; Theses; Books; Patents	EPrints
DSpace at IUCAA, Inter-University Centre for Astronomy and Astrophysics, Pune http://www.iucaa.ernet.in:8080/jspui/	Chemistry and Chemical Technology; Earth and Planetary Sciences	Articles; Conferences	DSpace
Kautilya@igidr, Indira Gandhi Institute of Development Research, Mumbai, India http://oii.igidr.ac.in:8080/dspace	Multidisciplinary	Conferences; Theses; Unpublished	DSpace
DSpace@INFLIBNET, Ahmedabad . http://ir.inflibnet.ac.in	Multidisciplinary	Conferences; Learning Objects; Special	DSpace
Shodh Ganga: A resevior of Indian Theses INFLIBNET http://shodhganga.inflibnet.ac.in/	Multidisciplinary	Theses	DSpace
DSpace@MDI, Gurgaon http://dspace.mdi.ac.in/dspace	Multidisciplinary	Articles; Conferences; Books; Special	DSpace
Etheses - A Saurashtra University Library Service, Rajkot, Gujrat http://etheses.saurashtrauniversity.edu/	Multidisciplinary	Articles; References; Theses	EPrints
DSpace@vidyanidhi University of Mysore http://dspace.vidyanidhi.org.in:8080	Multidisciplinary	Theses	DSpace
Vidya Prasarak Mandal, Thane	Multidisciplinary	Articles; Conferences; Learning Objects;	DSpace

Name of IR Institution	Subjects	Contents	Software Used
http://dspace.vpmthane.org:8080/jspui/		Multimedia	

Table 2. Institutional Repositories in Science & Technology in India listed by DOAR

Software	No. of repositories use DSpace/EPrints	%	Rank
DSpace	31	70.46	1
EPrints	13	29.54	2
Total	44	100	

Table 3. Distribution of Repositories in India

Table 3 represents the repositories use DSpace and EPrint software. The total repositories are 44 as listed in Table 3. Out of 44 repositories, 32 (70.46%) use DSpace and 13 (29.54%) use EPrint. Hence, it can be concluded from the table that DSpace ranks 1 in comparison to EPrint.

Software	No. of S&T repositories use Dspace/Eprints	%	Rank
Dspace	23	67.65	1
Eprints	11	32.35	2
Total	**34**	**100**	

Table 4. Distribution of S&T repositories use DSpace/EPrints

Table 4 shows the S&T repositories use DSpace and EPrints. There are 44 repositories in total and among them 34 are S&T repositories. 23 (67.65%) S&T repositories use DSpcae and 11 (32.35%) S&T repositories use EPrints. So here also DSpace used more comparison to EPrints.

Software	No. of academic repositories use DSpace/EPrints	%	Rank
DSpace	8	80	1
EPrints	2	20	2
Total	**10**	**100**	

Table 5. Distribution of academic repositories use DSpace/EPrints

Table 5 indicates the percentage of academic repositories use DSpace and EPrints. 8 (80%) use DSpace and 2 (20%) use EPrinst. So it can be

concluded from this table also that DSpace is maximum in use in comparison to EPrints.

4. Findings and Conclusion

The present study is based on a comparison between DSpace and EPrints use by Indian S&T repositories. There are 44 repositories listed in the Table 2 which were taken from DOAR. On the basis of that the following findings are drawn:

- Total 44 repositories are considered in the study;
- Out of 44 repositories 31 repositories use DSpace and only 13 use EPrints;
- The number of S&T repositories are 34, out of them 23 use DSpace and 11 use EPrints;
- The number of academic repositories are 10, in which 8 use DSpace and only 2 use EPrints;
- So it is the major finding of the study that DSpace is widely used software by the repositories in India.

Institutional repositories are one of the most powerful developments that utilize the new web based technologies to provide the efficient services among the community of institutions. It is playing important role in preservation and making accessible the digital objects, datasets and other research tools that exist outside traditional scholarly communication system. In India, there are very few institutions, especially in science and technology, providing fully open access to their publications. Now a days there are various open source software are available but Dspace and Eprints are the most widely used institutional repository software and the study found that DSpace software is more widely used software in Indian repositories.

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http://www.eprints.org

http://www.dspace.org