Accessing Scholarly Information in Networked Environment through Institutional Repositories

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Abstract

The archival collection of libraries is increasingly-being converted into digital format. Institutional Repositories are the result of such programmes which make available the archival collections over networks to its users. In addition, they also provide direct output of an institution or organization's research contribution in digital format for quick access of the users.

Keywords: Institutional repositories, Digital collection, Open source software and scholarly communication.

Introduction

Institutional Repositories may be defined as the organized collection of the intellectual output of the academic institutions in the digital formats. It is an obligation of academics and the academic institution to make accessible the works of their scholarship to their clientele.

Wikipedia (www.wikipedia.com) defines Institutional Repository as `an online locus for collecting and preserving in digital – the intellectual output of an institution, particularly a research institution. For a university, this would include material such as research journal articles before and after undergoing peer review, and digital versions of these and dissertation, but it might also include other digital assets generated by normal academic

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life, such as administration document, course notes or learning objects.

Lynch (2003) states that in a university environment, an 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. Though, the institutional repository may be located anywhere and may be managed by anybody, but it should have collaboration among librarians, information technologists, archives and records managers, faculty and university administrators and policymakers. Barton and Waters (2004) defines Institutional Repositories as a database with set of services to capture, store, index, preserve and redistribute a university's scholarly research in digital formats. SPARC (Scholarly Publishing and Academic Resource Coalition) defines an institutional repository as a digital archive of the intellectual product created by faculty, research staff and students of an institution, with few if any barriers to access.

So IRs (Institutional Repositories) are the digital collections, capturing and preserving the intellectual output of any academic institution be it a university or a research organization and they have the potential to promote useful and significant change in scholarly publishing (Gaur, Mujo-Munshi and Murthy, 2004).

Objectives and Uses of Institutional Repositories

The major objectives in establishing an institutional repository are:

- to provide open access to institutional research output by self – archiving, and

- to store and preserve other digital assets of the institution, including unpublished literature, like the theses or technical reports etc.

The Institutional Repositories are used in following ways (Institutional Repository, 2006):

- for scholarly communication;
- for storing learning materials and courseware;
- for electronic publishing;
- for managing collections of research documents;
- for preservation of digital materials for the long use;
- for leadership role of the library;
- for encouraging open access to scholarly communication;
- for housing digitized collections.

Benefits of Institutional Repositories

Mahemei and Koganuramath (2006) have listed some important benefits of the IRs as under:

- They enhance the professional visibility of the faculty and raise the prestige of an institution.

- Open access repositories lower access barriers and offer the widest possible dissemination of a scholarly communication.

- As open access articles have appreciably higher citation rate than traditionally published articles, Institutional Repositories help in increasing the citation rates of a particular article.

- They serve to establish priority of ideas and intellectual property, i.e., registering the work with a date stamp and identifier.

- The centralized system of Institutional Repositories manages and present the research output of the university or the institution in an organized form and fashion.

- They serve to demonstrate the breadth and depth of research output.

- Students and users can easily access faculty papers or the contributions of researchers through the open access repositories.

- They preserve and provide long-term access to the scholar's outputs; and

- OAI and the Google – searching of research-publication in IRs can be immediately found in global indexing and search services.

Institutional Repository Software

Software is the key element in the construction of an institutional repository. Two types of software are available- the subscribed and the free or open source software. An open source software is the one which makes the source code of the programs available for anyone to change and redistribute provided they abide by the accompanying license terms. In the open source world, each programmer builds on the previous work done by others before him, thus, this brings down the cost of their development. Most commonly used open-software are listed below:

CDsWare: It is acronym for CERN Document Server Software, which is developed by CERN Document Server. It is available at http://cdsware.cern.ch/. It is compatible to electronic preprint server, online library catalogue or a document system on the web. It complies with the open archives initiative metadata harvesting protocol (OAI-PMH) and uses MARC-21 as its underlying

bibliographic standard. It is free software issued under GNU-GPL license.

DSpace: DSpace is developed as a joint research project of the MIT Libraries and Hewlett-Packard (HP) through invent@MIT, the HP-MIT Alliance and is available at http://www.dspace.org/. It was developed in response to expressed faculty needs for an easy-to-use, dependable repository that accommodates a broad range of formats. It is intended to provide a solid foundation for the collection of digital material from and around the Institute. MIT Libraries hold a non-exclusive license to distribute and preserve items but do not own the DSpace content. It is incumbent upon libraries to develop strategic and economic plans for the preservation and usability of those resources over time.

E-prints: It is the product of university of Southampton and is available at http://www.software.eprints.org/. It is intended to create a highly configurable web-based archive. The primarily goal of e-prints seems to be set up as an open archive for research papers, but it could be easily used for other things such as images, research data, audio archives etc. It works on Linux and needs MYSQL, Perl modules and Apache web server.

Fedora: It is developed by Cornell university and the university of Virginia. It is available at http://www.fedora.info/. It is based on the Flexible Extensible Digital Object and Repository Architecture (FEDORA). It is an open software licensed under Mozilla Public License. It requires Sun Java Software Development Kit v1.4. It works both on windows and Unix operating systems.

Greenstone: The Greenstone Digital Library Software is developed by university of Wailkato and is freely available for download on http:// www. greenstone. org/cglbin/library. It is a software suite for building and distributing digital library collections. It provides new ways of organizing information and publishing it on the Internet or on CD-ROMs. It is available for both Windows and Linux operating systems. It requires Perl software for building collections.

i-Tor: i-Tor is an IT-section of NIWI-KNAW product, which is available at http://www.i-Tor.org/en/. It is an open-source software that enables you to create websites. They may be straightforward web pages, or information from a database, an Open Archive, or some other file. i-Tor can also be used to make modifications: the creator of a web page can manage it directly on the site, either alone or in collaboration with others. Users can search all of the information that is linked to i-Tor. No special actions are required to make content such as web texts, PDF documents, database records, etc., full-text searchable. And users can simply click on links in these documents; everything is accessible through the site.

Ivia: It is an INGOMINE, LOOK, MEL and Virtual reference Library product, which can be accessed through http://www.ivia/via.php.

Phronesis: It the product of CONALYT, and ITESM and is available at http://www.coppernico.mty.itesm.mx.

Roads: This software was originally developed as part of the UK Electronic Libraries Programme (eLib) by a consortium including the Institute of Learning and Research Technology at the University of Bristol, and the UK Office of Library and Information Networking at the University of Bath. It is available on http:// www.roads.sourceforge.net/. This software is suite of programs intended to aid in the setting up and day-to-day running of www based catalogues of online resources. Although designed specifically to meet the requirements of the eLib subject gateways, ROADS software may be useful in a variety of other purposes. It works on a variant of the Unix operating system with HTTP Apache web server and Perl languages.

SiteSearch: The OCLC Sitesearch software provides a comprehensive solution for managing distributed library information resources in www environment. It offers tools that integrate electronic resources under one web interface, and provide flexible access to resources and build text images databases locally. It works both on digital Unix and Windows NT operating systems. Its details are available at http://www.oclc.org.

Open source software, however, are not always stable. Because of not being marketed by any vendor, online support or any help is not available in case some difficulties arise during their working. So the ultimate solution is subscribed or commercial software. Various commercial software are available in the market for building the Institutional Repositories. Technical support, online help and offsite backup facilities etc. are also available for these software.

The following two are the most commonly used commercial software for creating and maintaining the Institutional Repositories.

Bepress: This software is developed by Berkeley Electronic Press, which builds and hosts their customers' repositories. The cost includes software, custom implementation, infrastructure, hosting, offsite backup, technical support and software upgradation. Its details are available at http://www.bepress.com.

Vital: This software is a product of VTLS. Vital is an institutional repository solution designed for universities, libraries, museums, archives and information centers. It is designed to simplify the development of digital object repositories and to provide seamless online search and retrieval of information for administrative staff, contributing faculty and the end-users. Its details are available at http://www.vtls.com/products.

Eight-Cs for Institutional Repositories

The success of institutional repository depends upon the culture of the organizations where collaboration and trust exists. For some institutions, community-based repositories will work well, whereas for large and complex institutions it will need consensus on key issues and technical standards. But 8-Cs are essential for successfully building a institutional repository (Infotoday, 2004). These are:

Comprehension: It implies that all members of the team must share a common vision and understanding of the purpose and scope of the repository.

Collaboration: It involves thinking and working together, with different people contributing their different talents, working with others to solve problems and making important decisions.

Context: Each person has a unique mind-set based on background, education and experience. The context implies each person's view and working environment. Thinking and working together in a non-threatening atmosphere helps people to integrate other people's contexts into their own thinking.

Change: The change is the way in which repositories are disseminated, preserved and published. This change requires people of the institutions to deposit their research results, datasets and other materials in the repository. In corporations, management may require staff to deposit items, such as strategic plan, marketing plan and working papers.

Caring: It is the motivation of the desire to share research results and joint scholarly endeavors, preserve history and provide knowledge and information needed for future generations to learn.

Commitment : The commitment is the understanding of the higher authorities that the repositories will grow and require support and funding in perpetuity.

Creativit: The creativity involves imagination and the ability to visualize a new way of doing things.

Competence: This is to the knowing how to make the repository work for all its constituents. Librarians and archivists need to demonstrate their competencies by knowing about the software, hardware, networking and the standards need to make the repository serve every one.

In addition, policies, system architecture, and other elements also affect the institutional context, scope, purposes and success of the repository. To control, management and access of this content requires appropriate policies and mechanisms, including content management and document version control system (Genoni, 2004).

The repository policy framework and technical infrastructure must provide institutional manager the flexibility to control who can contribute, approve, access and update the digital content coming from a variety of institutional communities and interest groups including academic departments, libraries, research centers and labs and individual authors. Besides, librarians should take leadership role in planning and building these repositories, fulfilling their roles as experts in collecting, describing, preserving and providing stewardship for documents and digital information.

Some Important Institutional Repositories

A number of open access research repositories exist including discipline oriented repositories like: Citeseer (Computer Science) and RePEc (Research Papers in Economics) and document-type based repositories like: NDLTD (theses) and NCSTRL (Computer Science Technical Reports) etc. According to an estimate, there are more than three hundred Institutional Repositories are operational today across the world (Van and Lynch, 2005).

In Pakistan, the United Nations Digital Library, Islamabad, Pakistan, at URL: http://library.un.org.pk/gsdl/cgi-bin/library.exe, is the first example of an Institutional Repository. The United Nations Digital Library Islamabad, is an Open-Access, online searchable repository containing full-text of documents, reports, publications and other public information items produced by the country offices of United Nations Organizations, Programmes and Funds in Pakistan.

In India, institutions like IISc; IIT (Delhi & Kharagpur); National Institute of Technology (NIT), Rourkela; National Aerospace Laboratories, Bangalore; National Chemical Laboratory, Pune; INFLIBNET, Ahemdabad; National Institute of Oceanography, Goa; Raman Research Institute, Bangalore etc. have established *Open Access Institutional Repositories* (Singh, Prasad, Kumar, Prakash and Jha 2006), which are disseminating research outputs of their respective institutions. Otherwise administrators of institutions collect the research documents from different sources and submit them to the *Institutional Repositories* on behalf of the persons concerned.

There are repositories, which accept scholarly publications from any professional or the researcher who is working in the respective field or subject area. *Librarian's Digital Library* (LDL) of DRTC, Bangalore is such a subject – specific repository for the library and information professionals. *OpenMEd@NIC* is maintained by National Informatics Centre, New Delhi and it provides access to biomedical literature. Other kinds of digital repositories existing in India, store and provide access to document type specific collections. *Vidyanidhi* of University of Mysore is the example of document type specific collection repository, which store and provide access to theses and dissertation collection. It accepts any thesis or dissertation from any researcher or the student, accepted by Indian Universities or the institutions. Some of the important Institutional Repositories available in India are depicted in Table 1(Bist and Mohanty, 2006; Singh, Khan and Chauhan, 2006):

Table 1. Important institutional repositories available in India.

Institutional Repository	Contents
Bioinformation (http://www.bioinformation.net/)	Original research articles in all aspects of Biological knowledge discovery through mathematical and computational analysis of biological data.
G B Pant University of Agriculture and Technology, Pantnagar (http://202.141.116.205/dspace)	Articles and conference proceedings etc.
INFLIBNET Centre (http://dspace.inflibnet.ac.in/)	Pre-prints, post-prints, news clippings, conference articles, training material and other scholarly publications.
Indian Institute of Astrophysics (http://prints.iiap.res.in/)	Research papers, reports, Ph.D. thesis, newspaper clippings, photographs etc.
Indian Institute of Management, Kozikode (http://eprints.iimk.ac.in/)	Pre-prints, post-prints and other scholarly publications.
Indian Institute of Science, Bangalore (http://etd.ncsi.iisc.ernet.in/)	Thesis and dissertations contributed by the IISc, Bangalore.
Indian Statistical Institute, Bangalore (http://library.isibang.ac.in:8080/dspace/)	Information on mathematics, quality management and the information on S.R. Ranganathan apart from news clippings.
Indian National Science Academy (http://61.16.154.195/dspace)	Member publications, events and images etc.
Librarians' Digital Archival Library (http://drtc.isibang.ac.in/index.jsp)	Scholarly publications on library and information science.
National Informatics Centre, India (http://openmed.nic.in/)	Articles on medical and allied science. One of its features is that the authors themselves can archive their own scientific and technical documents.

National Aerospace Laboratories (http://nal-ir.nal.res.in/)	Journal articles, conference papers, technical reports, presentations, lectures, preprints, thesis and images etc. of its own research scientists.
National Chemical Laboratory, Pune (http://dspace.ncl.res.in/)	Pre-prints, post-prints, and other scholarly publications of NCL research community.
National Centre for Radio Physics (http://ncra.lib.ncra.tifr.res.in/dspace)	Proceedings and conference papers etc.
National Institute of Technology, Rourkela (http://dspace.nitrkl.ac.in/dspace)	Journal articles, pre-prints and conference papers authored by NITR researchers.
National Oceanography Institute, Goa (http://drs.nio.org/)	Journal articles, conference proceeding articles, technical reports, thesis, dissertations etc. of its own community as well as of others.
One World South Asia's Open Archive Initiative (http://open.ekduniya.net/)	Sharing of development thoughts for peer review using open archiving software.
Rajiv Gandhi Centre for Biotechnology, Trivendrum (http://www.rgcb.res.in/)	E-journals and e-publications.
Raman Research Institute, Bangalore (http://dspace.rri.res.in/)	Publications of faculty and students of own institute. It also contains RRI annual reports and news clippings from the Raman archives.
University of Delhi (http://eprints.du.ac.in/)	Journal articles, pre-prints and conference papers etc.
University of Hyderabad (http://202..41.85.207.8080/dspace/index.jsp	Research reports, various research publications, general articles etc.
Vidyanidhi National e-theses repository of University of Mysore (http://www.vidyanidhi.org.in)	Multidisciplinary collection of theses.

Conclusion

Institutional Repositories are needed to overcome the challenges of scholarly communication and to have a significant degree of control on the issue. Earlier, the traditional documents i.e., the printed versions of the knowledge repositories were the major means of resource sharing but with the advancement of technology came electronic publications like CDs and DVDs etc. (Dhiman, 2002 & 2003) and the consortium-purchasing as the means of resource sharing and for accessing information in networked environment (Dhiman and Rani, 2007). But as stated by Chan (2004), scholarly communication and publishing are increasingly taking place in the electronic environment. With a growing proposition of the scholarly records now as they are existing only in digital format, serious and pressing issues regarding access and preservation are being raised that are centre to the future scholarship. Now with the help of advanced computer and communication technologies, the library world has become able to keep bibliographic control over the exponential growth of the literature and to develop new means of resource sharing and the access of information in the form of IRs.

Thus, we see Institutional Repositories are offering a strategic response both to the opportunities of the digital networked environment and the systemic problems in the today's scholarly communication. This response can be applied immediately, reaping both short-term and on-going benefits for universities and their faculty, other institution's and R & D organization's contribution and in advancing the transformation of their research programmes over the long term.

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