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Open access and institutional repositories – a developing country perspective: a case study of India

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ABSTRACT

In the recent years much discussions and initiatives are taken in the area of open access. Open access, a philosophy facilitates availability and distribution of scholarly communication freely, as a means to solve the problem of inaccessibility primarily due to financial constraint particularly in the context of developing countries. Many scholarly literature are freely accessible now without any hindrance. Open access endeavours to reduce barriers to scholarly communication. The open access literature available in various forms like open access archives, institutional repositories, open access journals and off late open courseware. The availability of open source software has accelerated this development. In India, various open access initiatives have been undertaken and are operational. Some more are in developmental stage. This paper discusses various such initiatives in India. Some initiatives have also been taken in the area of metadata harvesting services. Gradually, there has been a realization of the usefulness of the open access by various institutions particularly, the public funded ones. The future of open access in India is dependent upon a proper policy and a framework. In the implementation of open access LIS professionals should play a pro-active role in the growth of collection in the

institutional repositories. The paper provides information about the present state of open access Literature by various institutions of the country.

INTRODUCTION

The desire for publishing the results of research particularly in science and technology is an age-old tradition. Thus, over the years, the number of journals has increased both in volume and variety. This, on one hand, has led to the exponential growth of scholarly literature, on the other hand, it has put severe hindrance on their accessibility. The libraries, particularly in developing countries, are vexed with the problems of escalating cost and shrinking fund to provide access to literature and act as a true partner of research. Though the scientists and scholars are communicating the fruits of their research through scholarly journals, all are not available to many, if not all. There is a growing concern now to make the public funded research available to wider cross sections of people so that its benefits reach to the society in general. To augment the accessibility of information, an array of initiatives have been taken by Libraries through resource sharing of literature in the form of library consortium, library networks, and so on. But all those initiatives could only bring the limited access of literature to the researchers. The access to printed literature in libraries is slowly becoming non-attractive.

The development of technology (Internet) has brought enormous opportunity to bring the results of research primarily to all through digital communication – anyone, anywhere and any time. The impact of convergence of tradition and technology brings the facility of accessing information conveniently and instantaneously. Lawrence says, “Scientists now have almost instant access to large and rapidly increasing amount of information that previously trips to the library, inter-library loan delay or substantial effort in locating the source” [7]. Although it is now possible to have free access to significant amount of literature on the Web, still significant amount of research is not available freely. The reasons may be many – the non availability of all high impact journals on the web freely, at the same time – the researchers’ preference to publish in high impact (peer reviewed) journal, the impediment of subscription price to have access to journals by individuals etc. Here comes the importance of open access, where onus of making available is more on the individuals and institutions in contrast to the earlier model of the dissemination through formal publishing channel.

Open access literatures are available in open access journals, institutional repositories, subject repositories, digital archives, and so on. Another service has gained momentum after establishment of different institutional repositories or open access archives is the metadata harvester. Metadata harvester indexes or harvests metadata from different open access archives and open access journals. The open access idea has now expanded to the area of learning resources - Open Courseware (OCW).

For the developing world, open access movement has come as a boon. The developed world consists of information rich countries, enterprises and organizations. These enterprises control over the valuable information resources. For example, most top ranked peer reviewed journals in STM (science, technology and medicine) areas are published by the publishers of developed world. Major secondary database publishers also belong to developed countries. The developing world is at the critical junctions where the development of technologies, economics and

humanity largely depends on access to relevant and adequate information resources. The developing world consist of information poor least-developed countries, where the research institutions cannot afford to subscribe wide array of primary literature due to resources crunch or limited budgetary provisions. In this situation, the open access movement gains worldwide support as an alternative and sustainable model of scholarly communications and accessing research literature.

OPEN ACCESS – A PHILOSOPHY AND A FACILITY

The concept of open access came during 1991 due to the necessity of facilitating scientific scholarly communication. If we look at the definitions of open access and various initiatives it is apparent that, though different modes of open accessibility are developed, the philosophy remains the same. Berlin declaration of open access defines it “as a comprehensive source of human knowledge and cultural heritage that has been approved by the scientific community” [2]. The Budapest Initiative definition is somewhat elaborate which states “its free availability on 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” [3]. Peter Suber says, “Open access to scientific article means online access without charge to readers or libraries. Committing to open access means dispensing with the financial technical and legal barriers that are designed to limit access to scientific research articles to paying customers” [13, 14]. The American Research Libraries Association (ARL) Task Force defines “Open access is a cost effective way to disseminate and use information. It is an alternative to the traditional subscription-based publishing modal possible by new digital technologies and networked communication” [1].

Though the philosophy of open access emerged in the context of scholarly publishing and communication, over the time the onus has come to the authors wherein the emphasis has been given on the firm commitment of individuals to make the open access successful. The development of open source is to fulfill this commitment. Various forms of open access have been evolved. The e-print archives and self archiving institutional repositories are all the initiatives towards open access. E-prints are electronic copies of academic research papers which may be in the form of pre-prints (papers before referring) and post prints (papers after referring). E-prints archive is simply an online repository of materials, freely available on the web for widest possible dissemination of knowledge [11].

Institutional initiatives to promote open access to the research work carried out by them is witnessed through establishing Institutional Repositories. These are “digital archives of intellectual products created by the faculty, staff and students of an institution accessible to end users both within and without the institution. The IR may hold various kinds of publications, such as, pre-prints and post-prints of journal articles, conference papers, research reports, theses, dissertations, seminar presentations, working papers and other scholarly items. This way, intellectual contributions of researchers are shown to the whole community of researchers across the world. Such institution may not independently or within a state or a regional consortium” [1]. Similarly repositories may be possible for certain academic discipline to facilitate communication of research results (some sort of Invisible Colleges!).

Thus, the open access which was evolved out of the necessity of wider access to scholarly publication relies on the initiatives of individuals (self archives), institutions. It is more of a philosophy of facilitating wider communication, feedback and use. The philosophy is extended to other areas also such as making available the courseware, developed by academic institutions, available for the benefit of others. Massachusetts Institute of Technology (MIT)'s Open Courseware (OCW) is a major successful project that provides free access to around two thousand courses. Its philosophy is to bring MIT education at the doorsteps of a learners who are not fortunate enough to earn a degree from MIT, but they will get access to MIT's qualitative educational resources, inclusive of study notes, assignments, exercises, presentations, audio recordings, video recordings of live sessions, etc. In the context of open and distance education, open courseware plays a significant role. The U.K. Open University has already decided to open its courseware from this year. In the context of developing countries, all these developments are very significant where access is hindered by economic constraints. The development of open source such as D-space, E-prints is facilitating access of all kinds of material irrespective of scholarly publication. A number of open access archives have been developed.

Thus, open access may be defined as a philosophy to achieve the goal of accessing and making available the digital material free of charge which may or may not be free from copyright and licensing restrictions.

OPEN ACCESS JOURNALS

Open access journals provide access to full-text contents of scholarly, peer-reviewed journals. There are two types of open access journals - the one, available in electronic version only and the other, available in both electronic as well as print versions viz., Current Science. In the first type, the journals are published in regular intervals on the Internet that do not have any print-on-paper counterpart. In the second type, the journals are published in print-on-paper format and distributed to the subscribers. The same contents of print-on-paper are available to the scholars free of charge in electronic form.

OVERVIEW OF EXISTING INDIAN SCENARIO

India is in the forefront of developing world as well as in South Asian region both in terms of economic growth and scientific productivity. Research and development (R&D) institutions and higher learning institutions in India are engaged in advanced studies, leading to development of new applications, new techniques, new products and new technologies. The R&D organizations have also developed expertise in their respective areas that are now recognized worldwide. Such institutions are now collaborating with world's leading institutions with varying degree of partnerships. Leading Indian scientific research institutions, such as Indian Institute of Science (IISc), Indian Institutes of Technology (IITs), Indian Statistical Institute (ISI), institutions under the Council of Scientific and Industrial Research (CSIR) and Indian Council of Medical Research (ICMR), now have considerably greater in-flows of sponsored research, supported by industries, enterprises, as well as international and national funding agencies. Technology transfers, technology incubations from these institutions to the enterprises and consultancy services for the national development are also very significant. That is why cash inflows to research institutions of this segment (i.e., institutions of national importance) are comparatively higher than other segments (i.e., non-elite institutions and universities).

While the elite institutions have reasonably good information provision facilities that support scholarly communications, the not-so-elite institutions are struggling to achieve the same. The associated problem is mainly related to the accessibility of literature. The reason is primarily shrinking budget. There is paucity of funds for the primary literature, i.e. subscription based scholarly journals. The subscriptions of scholarly periodicals, especially the high impact journals, are also increasing very rapidly, at the same time, library budgets almost remained the same. The scholar's preference to publish in high impact journals for recognition in the elite world demands the necessity of acquiring such literature in the library. Here open access literature can play a vital role, both in terms of research communication and access, provided, of course, the benefits in terms of economic and social recognition are assured by this system. The ICT infrastructure necessary to take advantage of the open access is not adequate in developing countries, as are apparent in many cases. Considering the position in India, the situation has improved to a considerable extent. In March, 1998 the number of Internet subscribers were 140,000 which went up to 280,000 in March, 1999 and 3,000,000 in March, 2001 (Garai). The NASSCOM and UNDP study shows that India has about 3.5 million Internet users as on 31st March, 2003 [8]. The total International Bandwidth available currently stands at approximately 12 Gbps [6].

Libraries and information centres in India attached to various types of institutions are now taking part in open access movement, by establishing institutional repositories, digital repositories to provide worldwide access to their research documents.

METHODOLOGY OF PRESENT STUDY

The institutional repositories, open access scholarly journals, open access archives in India have been selected from the secondary sources, metadata harvesting services, directories, etc. The data related to the institutional repositories, journals have been collected from their respective websites, institutions' websites and other secondary sources. Case study method is also followed for in depth study. These data is analyzed based on certain parameters, such as number of documents, software used, growth of collection, accessibility statistics, etc.

INSTITUTIONAL REPOSITORIES IN INDIA

In India, some institutions, like Indian Institute of Science; Indian Institute of Management, Kozhikode; Indian Statistical Institute, Bangalore; Indian Institute of Technology, Delhi; National Institute of Technology, Rourkela; National Aerospace Laboratories, Bangalore; National Chemical Laboratory, Pune; Information and Library Network (INFLIBNET), Ahmedabad; National Institute of Oceanography, Goa; Raman Research Institute, Bangalore; etc. have established open access institutional repositories (IRs) that disseminate research outputs of respective institution. Sometimes, these are self-archived. Otherwise, administrator of the repositories collects the research documents from different sources and submits the documents to the IR on behalf of the persons concerned [12].

Another band of digital repositories also exist in India that store and provide access to subject specific collections of documents. These repositories accept scholarly publications from any professional or researcher who belongs to the respective subject. *Librarian's Digital Library*

(LDL) of Documentation Research and Training Centre (DRTC), Bangalore is an example of subject-specific repository for the library and information professionals. Another subject-specific repository established in India is *OpenMed@NIC*, maintained by National Informatics Centre, New Delhi. OpenMed@NIC stores and provides access to biomedical literature.

Other kind of digital repositories existing in India stores and provides access to document type specific collections. Vidyanidhi of University of Mysore is an example of document type specific collection that stores and provides access to theses and dissertations. Vidyanidhi accepts any thesis or dissertation from any researcher or student that is accepted in any of the Indian universities or institutions.

Now some open access archives in India also offer RSS (Really Simple Syndication or Rich Site Summary) feeds to the registered users. In this facility, the registered users get notification on addition of new items in regular intervals. The OpenMed@NIC has started providing RSS feeds. Table 1 shows an indicative list of established institutional repositories and subject repositories in India. These repositories follow self-archiving model and have initiated using two most popular open source software` – DSpace and GNU EPrints. Some institutions have customized certain interfaces at the time of installation or upgradation such as Openmed of NIC and e-Prints of Indian Institute of Science. Among them, some repositories are growing very rapidly and reaching worldwide. Search engines and metadata harvesters index many of the operational repositories of India. Table 1 also indicates that maximum number of institutional repositories belong to scientific and technological (S&T) areas than humanities and social sciences areas. In *Appendix I*, screenshots of some well recognized institutional repositories of India are given.

Table 1: Institutional Repositories in India

Name	Host Institution	URL	No. of Items (as on 01/03/2006)	Types of Documents	Software Used
Librarian's Digital Library (LDL)	Documentation Research & Training Centre (DRTC)	https://drtc.isibang.ac.in/	236	Research Papers, Articles, Reports, etc.	DSpace
DSpace at GBPUAT University	G.B. Pant University of Agriculture & Technology	http://202.141.116.205/dspace/	82	Research Papers, Articles, Reports, Thesis, etc.	DSpace
IIA Repository	Indian Institute of Astrophysics	http://prints.iiap.res.in/	725	Research Papers, Articles, Reports, Thesis, etc.	DSpace
EPrints@IIITA	Indian Institute of Information Technology, Allahabad	http://eprints.iiita.ac.in/	22	Research Papers, Articles, Reports, etc.	EPrints
DSpace@IIMK	Indian Institute of Management, Kozhikode (IIMK)	http://dspace.iimk.ac.in/	133	Research Papers, Articles, Reports, etc.	DSpace
EPrints@IIMK	Indian Institute of Management, Kozhikode (IIMK)	http://eprints.iimk.ac.in/	25	Research Papers, Articles, Reports, etc.	EPrints
EPrints@IISC	Indian Institute of Science (IISC)	http://eprints.iisc.ernet.in/	3645	Research Papers, Articles, Reports, etc.	EPrints
ETD@IISc	Indian Institute of Science (IISC)	http://etd.ncsi.iisc.ernet.in/	153	Theses & Dissertations	DSpace
EPrints@IITD	Indian Institute of Technology, Delhi (IITD)	http://eprint.iitd.ac.in/dspace/	1296	Research Papers, Articles, Reports, etc.	DSpace
DSpace at INSA	Indian National Science Academy (INSA)	http://61.16.154.195/dspace/	818	Conference Papers, Articles, Reports, etc. (Metadata only)	DSpace
ISI Library, Bangalore	Indian Statistical Institute, Bangalore	http://library.isibang.ac.in:8080/dspace/	10	Research Papers, Articles, Reports, etc.	DSpace
DSpace at INFLIBNET	INFLIBNET	http://dspace.inflibnet.ac.in	428	Research Papers, Articles, Reports, etc.	DSpace
NAL Institutional Repository	National Aerospace Laboratories (NAL)	http://nal-ir.nal.res.in/	418	Research Papers, Articles, Reports, etc.	EPrints
DSpace at NCRA	National Centre for Radio Astrophysics	http://ncralib.ncra.tifr.res.in/dspace/	22	Research Papers, Articles, Reports, Thesis, etc.	DSpace
EPrints at NCL	National Chemical Laboratory (NCL)	http://dspace.ncl.res.in/	290	Theses, Research Papers, Articles, Reports, etc.	DSpace
OpenMED@NIC	National Informatics Centre (NIC)	http://openmed.nic.in/	1035	Research Papers, Articles, Reports, etc.	EPrints
Digital Repository Service of NIO	National Institute of Oceanography	http://drs.nio.org/drs/	55	Journal articles, conference proceeding articles, Technical reports, thesis, dissertations, etc	DSpace
Dspace@NITR	National Institute of Technology, Rourkela	http://dspace.nitrkl.ac.in/dspace/	223	Theses, Research Papers, Articles, Reports, etc.	DSpace
Digital Repository of RRI	Raman Research Institute	http://dspace.rri.res.in/	1064	Research Papers, Articles, Reports, Thesis, etc.	DSpace
Vidyanidhi	University of Mysore	http://www.vidyanidhi.org.in/	1835	Theses & Dissertations	DSpace

OPEN ACCESS JOURNALS IN INDIA

A number of scholarly journals are published from India covering wide spectrum of subjects. Many of these journals are peer reviewed and indexed and abstracted in premier indexing and abstracting periodicals. But availability of these journals outside India and SAARC region is very limited, due to absence of strong distribution channels in other regions. Open access movement makes it possible to Indian journals to reach the target audience of the world's research communities. Now, more than hundred research periodicals of India provide free access to full-text contents. Publishers of these journals publish print-on-paper journal issues, and provide online access to the same contents of the issues. Some of the journals have browsing facilities without user's registration, whereas some journals insist user's registration (free), such as INSA journals for accessing full-text contents of the journals. A very few publishers in India started electronic only journals. Metadata harvesters, journal indexing services, and search engines harvest and index metadata of these open access journals. But some journals do not maintain structured metadata as required by metadata harvesters. They simply upload the new issues of journals in their respective websites such as the journals published by Kamla-Raj Enterprises. That creates another major problem for the metadata harvesters and search engines. National Centre for Science Information (NCSI) at IISc, Bangalore has initiated a project called "Scientific Journal Publishing in India", sponsored by Asian Media Information and Communication Centre, Singapore (a division of IDRC, Canada). Through this project, NCSI campaigns to the open access journal publishers of India for early adaptation OAI-compliant architecture using Open Journal System (OJS) or similar software [16].

The open access journals in India are mainly initiated by six journal publishers, namely, Indian Academy of Sciences, Indian National Science Academy, Indian Medlars Centre of National Informatics Centre, Medknow Publications, indianjournals.com and Kamla-Raj Enterprises. These publishers have many titles in their credit. The publishers, with one or two open access journal titles are not covered in this study. Examples of such publishers are Indian Statistical Institute publishing *Sankhya* (<http://sankhya.isical.ac.in>), Sameeksha Trust's journal *Economic and Political Weekly* (<http://www.epw.org.in/>). They have developed their own interface. Table 2 shows an indicative list of the open access journals publishers in India. Some journals require user registration and user login to access contents of the journals. Some journals have search facilities from the journal gateways, to search on various parameters, like, name of authors, keywords, titles of articles. Table 2 also indicates whether user login is required to access contents of the journals and whether search facility is available there.

Table 2: Major Publishers of Indian Open Access Journals

Name of Publisher/ Host Organization	No. of Journals	URL	Whether User Registration Required	Whether Search Facility Available	Subject Areas
Indian National Science Academy	4	http://www.insa.ac.in/	Yes	Yes	S&T
Indian Academy of Sciences	11	www.ias.ac.in/pubs/journals/	No	Yes	S&T
Indian Medlars Centre, National Informatics Centre	38	http://medind.nic.in/	No	Yes	Medicine
Medknow Publications	28	www.medknow.com/journals.asp	Yes	Yes	Medicine
Indianjournals.com	8	http://www.indianjournals.com	Yes	Yes	S&T, Medicine
Kamla-Raj Enterprises	5	www.krepublishers.com/KRE-New-J/	No	No	Social Sciences and Humanities

JOURNALS FROM THE INDIAN ACADEMY OF SCIENCES

Indian Academy of Sciences (IAS) is a scientific academy funded by Government of India. It was established in 1934. IAS publishes 11 journals. All journals are 'open access' and full-text is available as PDF files on each journal's website. All of the articles of current issues of these journals are born-digital. The articles, which are not born-digital, have digitized through a government-supported project. IAS has already archived all the articles of some journals from the first volume. Table 3 shows list of IAS published open access journals.

Table 3: IAS Published Open Access Journals

Sr. No.	Journal Name	Full-text Availability from Year and Volume No.
1	Current Science	1932 (V.1)
2	Journal of Chemical Sciences	1977 (V.86)
3	Proceedings - Mathematical Sciences	1978 (V.87)
4	Journal of Earth System Science	1978 (V.87)
5	Sadhana (Proceedings In Engineering Sciences)	1978 (V.1)
6	Pramana - Journal of Physics	1973 (V.1)
7	Journal of Biosciences	1979 (V.1)
8	Bulletin of Materials Science	1979 (V.1)
9	Journal of Astrophysics And Astronomy	1980 (V.1)
10	Journal of Genetics	1999 (V.78)
11	Resonance - Journal of Science Education	1996 (V.1)

JOURNALS FROM THE INDIAN NATIONAL SCIENCE ACADEMY

Indian National Science Academy (INSA) is another scientific academy funded by Government of India. It was established in 1935. INSA publishes 4 journals, organizes scientific discussions and brings out proceedings and monographs. All journals of INSA are 'open access' and full-text is available as PDF files from the common journal gateway. The common journal gateway is freely accessible if the users register their names in the website. The articles from the back volumes of the journals have digitized through a government-supported project. Table 4 shows list of INSA published open access journals.

Table 4: INSA Published Open Access Journals

Sr. No.	Journal Name	Full-text Availability from Year and Volume No.
1	Indian Journal of Pure And Applied Mathematics	1970 (v.1)
2	Proceeding of INSA - A Physical Sciences	1955 (v.21)
3	Proceeding of INSA - B Biological Sciences	1995 (v.21)
4	Indian Journal Of History of Science	1998 (v.33)

MEDIND@NIC: BIOMEDICAL JOURNALS FROM INDIA

Indian MEDLARS Centre at National Informatics Centre has initiated two unique projects with the support from Indian Council of Medical Research. First one is INDMED@NIC that indexes 77 Indian biomedical peer reviewed journals since 1985 onwards. This bibliographic database is online accessible. Another project, MEDIND@NIC (<http://medind.nic.in>) is a recent one that provides open access to full-text contents of 38 Indian biomedical journals. Different publishers, mainly by the learned societies in the respective specialized areas, publish these journals in print-on-paper format. Initially, MEDIND@NIC started digitization contents of back volumes of the journals. But now they are getting born-digital contents of current issues from the respective publishers. Some journal publishers also have their own websites and provide full-text access separately from their respective websites as well. The metadata of these journal articles are also maintained and searchable in the INDMED database. Current issues of all journals are available from this single gateway. Appendix I shows the MEDIND@NIC web interface through which browsing and searching of journal contents are possible. Table 5 shows list of MEDIND hosted open access journals.

Table 5: MEDIND@NIC Hosted Open Access Journals

Sr. No.	Journal Name	Full-text Availability from Year
1	Annals of Cardiac Anaesthesia	2005
2	Endodontology	2000
3	Health Administrator	2000
4	Indian Journal of Aerospace Medicine	2000
5	Indian Journal of Allergy Asthma and Immunology	2000
6	Indian Journal of Anaesthesia	2002
7	Indian Journal of Chest Diseases and Allied Sciences	2003
8	Indian Journal of Clinical Biochemistry	2002
9	Indian Journal of Community Medicine	2000
10	Indian Journal of Gastroenterology	2004
11	Indian Journal of Medical & Paediatric Oncology	2001
12	Indian Journal of Medical Microbiology	2001
13	Indian Journal of Medical Research	2004
14	Indian Journal of Nephrology	2001
15	Indian Journal of Nuclear Medicine	2002
16	Indian Journal of Occupational and Environmental Medicine	2003
17	Indian Journal of Occupational Therapy	2002
18	Indian Journal of Otolaryngology and Head and Neck Surgery	2001
19	Indian Journal of Pediatrics	2005
20	Indian Journal of Pharmacology	2000
21	Indian Journal of Preventive and Social Medicine	2003
22	Indian Journal of Radiology and Imaging	2004
23	Indian Journal of Sexually Transmitted Diseases	2004
24	Indian Journal of Thoracic and Cardiovascular Surgery	2003
25	Indian Journal of Tuberculosis	2000
26	Indian Pediatrics	2004
27	J.K. Practitioner	2001
28	Journal, Indian Academy of Clinical Medicine	2000
29	Journal of Family Welfare	2000
30	Journal of Indian Academy of Forensic Medicine	2004
31	Journal of Indian Rheumatology Association	2002
32	Journal of Obstetrics and Gynecology of India	2005
33	Journal of The Anatomical Society of India	2001
34	Journal of Indian Association of Pediatrics Surgeons	2002
35	Journal of Indian Society of Pedodontics and Preventive Dentistry	2000
36	Medical Journal Armed Forces India	2000
37	NTI Bulletin	2000
38	Trends in Biomaterials and Artificial Organs	2001

JOURNALS FROM MEDKNOW PUBLICATIONS

Medknow Publications is an open access journal publisher of India that publishes, maintains and hosts peer-reviewed scholarly journals mainly in the biomedical subject areas. This publisher collaboratively publishes the electronic versions of some existing journals of learned societies and institutions in India. These journals also accept online submission of manuscripts through their respective websites. These journals are OAI-compliant. Metadata harvesters, search engines

and indexing services index and harvest metadata of current issues of the respective journals. The publisher will include more access peer reviewed journals in near future. Table 6 shows list of Medknow Publications hosted and maintained open access journals.

Table 6: Medknow Publications Hosted Open Access Journals

Sr. No.	Journal Name	URL	Full-text Availability from Year
1	Journal of Postgraduate Medicine	www.jpjgmonline.com	1980
2	Indian Journal of Medical Sciences	www.indianjmedsci.org	2003
3	Neurology India	www.neurologyindia.com	1999
4	Indian Journal of Cancer	www.bioline.org.br/cn	2002
5	Indian Journal of Ophthalmology	www.ijo.in	2002
6	Indian Journal of Pharmacology	www.ijp-online.com	1969
7	Indian Journal of Critical Care Medicine	www.ijccm.org	2003
8	Indian Journal of Dermatology, Venereology, and Leprology	www.ijdvl.com	2001
9	Indian Journal of Plastic Surgery	www.ijps.org	2003
10	Indian Journal of Surgery	www.indianjsurg.com	2003
11	Indian Journal of Human Genetics	www.ijhg.com	2002
12	Journal of Minimal Access Surgery	www.journalofmas.com	2005
13	Indian Journal of Occupational and Environmental Medicine	www.ijoem.com	2003
14	Indian Journal of Medical Microbiology	www.ijmm.org	2001
15	The Journal of Indian Prosthodontic Society	www.jprosthodont.com	2004
16	Indian Journal of Palliative Care	www.jpalliativecare.com	2004
17	Journal of Cancer Research and Therapeutics	www.cancerjournal.net	2005
18	Journal of Indian Association of Pediatric Surgeons	www.jiaps.com	2003
19	Indian Journal of Otolaryngology and Head and Neck Surgery	www.ijohns.com	2005
20	Journal of Indian Society of Pedodontics and Preventive Dentistry	www.jisppd.com	2003
21	Journal of Pediatric Neurosciences	www.pediatricneurosciences.com	2006
22	Indian Journal of Urology	www.indianjurol.com	2005
23	Indian Journal of Dermatology	www.e-ijd.org	2005
24	Journal of Medical Physics	www.jmp.org.in	2006
25	Annals of Indian Academy of Neurology	www.annalsofian.org	2006
26	Annals of Thoracic Medicine	www.thoracicmedicine.org	2006
27	International Journal of Diabetes in Developing Countries	www.ijddc.com	2004

JOURNALS FROM INDIANJOURNALS.COM

IndianJournals.com provides single window access to multidisciplinary Indian journals published by different Indian societies and institutions. *IndianJournals.com* provides access to eight open access journals and twenty-six subscription-based journals and periodicals. These eight open access scholarly journals mainly belong to STM areas. These journals are OAI-

compliant. These journals also accept online submission of manuscripts through their respective websites. This common journal gateway is freely accessible if the users register their names in the website. These journals are searchable from the main page of the gateway. It also maintains archive of back volumes. Table 7 shows list of *IndianJournals.com* hosted open access journals.

Table 7: IndianJournals.com Hosted Open Access Journals

Sr. No.	Journal Name	Journal Publisher	Full-text Availability from Year
1	Anil Aggrawal's Internet Journal of Forensic Medicine and Toxicology	Professor Anil Aggrawal	2000
2	Fire Engineering	Institution of Engineers (India)	2004
3	Indian Journal of Community Medicine	Indian Association of Preventive and Social Medicine	2005
4	Indian Journal of Medical and Pediatric Oncology	Indian Society of Medical and Pediatric Oncology	2005
5	Journal of Neonatology	National Neonatology Forum	2003
6	Journal of Research, SKUAST-J	Sher-e-Kashmir University of Agricultural Sciences and Technology–Jammu	2005
7	Kanch	All India Glass Manufacturers Federation	2004
8	The Journal of Bombay Veterinary College	Bombay Veterinary College Alumni Association	2004

JOURNALS FROM KAMLA-RAJ ENTERPRISES

Kamla-Raj Enterprises is a Delhi-based publisher and in existence since 1933. Kamla-Raj publishes five print-based as well as open access scholarly journals mainly in the social sciences areas. These journals are OAI-compliant. Table 8 shows list of Kamla-Raj published and hosted open access journals. The publisher of these open access journals maintains archive starting from volume one.

Table 8: Kamla-Raj Enterprises Hosted Open Access Journals

Sr. No.	Journal Name	URL	Full-text Availability from Year
1	International Journal of Human Genetics	www.krepublishers.com/KRE-New-J/	2001
2	Journal of Human Ecology	www.krepublishers.com/KRE-New-J/	1990
3	Journal of Social Sciences	www.krepublishers.com/KRE-New-J/	1997
4	Studies of Tribes and Tribals	www.krepublishers.com/KRE-New-J/	2003
5	The Anthropologist	www.krepublishers.com/KRE-New-J/	1999

METADATA HARVESTING SERVICES IN INDIA

A metadata harvesting service harvests or indexes metadata from OAI-compliant archives or repositories through harvesting software that supports a protocol known as OAI-PMH (Open

Access Initiative Protocol for Metadata Harvesting). Some Indian institutions have been experimenting with metadata harvesting services and installed metadata harvesters. Search Digital Libraries (SDL) of Documentation Training and Research Centre (DRTC) is one such metadata harvesting service, which harvests library and information science subject-specific open access archives and repositories. SDL is a popular service amongst Indian and international library and information professionals. Another metadata harvesting service, namely 'Knowledge Harvester@INSA', is an experimental initiative from Indian National Science Academy that harvests metadata from 3 archives. "SJPI Cross Journal Search Service" is a recent initiative from NCSI at IISc that harvests metadata from 13 Indian open access journals. Indian Institute of Technology, Delhi has initiated a metadata harvesting service called SEED, that indexes 4 archives. All these 4 metadata harvesters in India use a harvesting system, that is, PKP Harvester, developed by Public Knowledge Project (PKP) from Canada.

Open J-Gate is a recently launched open access journals indexing service initiated by Informatics India Private Limited. It covers above 3,000 open access academic, research and industry journals. More than 1,500 of them are peer-reviewed scholarly journals. About 0.3 million new articles added every year in open access journals, and these articles are indexed in this online service. In this service, full-text links are regularly validated. Table 9 shows an indicative list of Indian initiatives in metadata harvesting services.

Table 9: Metadata Harvesting Services in India

Name	URL	Description
Search Digital Libraries (SDL) <i>Host:</i> DRTC <i>Software used:</i> PKP System	http://drtc.isibang.ac.in/sdl/	The SDL currently has 6,816 papers from 13 archives indexed. It indexes Australian Library and Information Science Association (ALIA); CALTECHLIB; CCSD: Sciences de l'Information et de la Communication, France; CNR Bologna Research Library, Italy; Diálogo Científico utiliza, Brazil; DLIST, University of Arizona; DSPACE inra Avignon; E-LIS: E-Prints in Library and Information Science; LDL; OCLC Research Publications; Subject Gateway of Library and Information Services (LIS); University of North Carolina, USA; WWW Conference Archive EPrint servers.
Knowledge Harvester@INSA <i>Host:</i> INSA <i>Software used:</i> PKP System	http://61.16.154.195/harvester/	The INSA Harvester currently has 2,011 papers from 3 archives indexed. It indexes African Journals Online, European Integration, INSA Digital Library.
SJPI Cross Journal Search Service <i>Host:</i> NCSI, IISC <i>Software used:</i> PKP System	http://144.16.72.144/harvester/	The SJPI Harvester currently has 1,047 papers from 13 journals indexed. It indexes Bulletin of Materials Science; Current Science; Journal of Astrophysics and Astronomy; Journal of Biosciences; Journal of Chemical Sciences; Journal of Genetics; Journal of the Indian Institute of Science; Pramana - Journal of Physics; Proceedings Earth Planetary Sciences; Proceedings Mathematical Sciences; Resonance; Sadhana; SRELS Journal of Information Management.
SEED	http://eprint.iitd.ac.in/seed/	The Seed currently has 5,019 papers from 4 archives indexed. It indexes Dspace@NITR; Earthquake

<i>Host:</i> IIT Delhi <i>Software used:</i> PKP System		Engineering; Eprints@IISC; Eprints@IIT Delhi.
Open J-Gate <i>Host:</i> Informatics (India) Ltd.	www.openj-gate.com/	Covers 3,000+ open access academic, research and industry journals. Out of them 1,500+ are peer-reviewed scholarly journals.

OPEN COURSEWARES IN INDIA

Very recently, the Open CourseWare (OCW) movement in India has gained momentum with the announcements of availability of learning resources on the Internet by two important national level organizations, namely IGNOU and NCERT. Indira Gandhi National Open University (IGNOU) is a mega open university of India that provides distance education to the millions of learners in India and other countries. IGNOU produces self-instructional study materials for various programmes, also hosts a number of educational broadcasting channels. IGNOU has initiated establishment of a National Digital Repository of OCW. The Vice Chancellor of IGNOU says, “To keep pace with the emerging changes and cater to the requirements of tele-education, the University has taken up a major initiative in developing a National Digital Repository of learning resources. The repository would support seamless aggregation and integration of learning resources in different formats, viz. self-instructional material, audio-video programmes, archive of live sessions, etc. The repository would facilitate just in-time access to its collections 24X7X365 offering interoperability and federated searching facility. The decentralised model of the repository supports multiple submission points facilitating submission of contents from remote locations. The collection can be searched and browsed by subject, title, author, etc.”[5].

The National Council of Educational Research and Training (NCERT) is an apex resource organization set up by the Government of India to assist and advise the Central and State Governments on academic matters related to school level education. NCERT publishes school textbooks, mainly in the languages of English, Hindi and Urdu. NCERT has initiated a step towards making school textbooks freely available on the Internet for students and teachers through its website (www.ncert.nic.in). Some institutional repositories, like, *Librarian’s Digital Library*, *IIMK Digital Library*, also provide access to a number of educational materials, viz., lecture notes, tutorials, etc.

The recently formed National Knowledge Commission of India, NASSCOM (National Association of Software and Service Companies of India) along with other organizations supporting the cause of open courseware (OCW) movement in India for the greater deployment of the knowledge resources [9, 15].

INITIATIVES FOR OPEN SOURCE SOFTWARE

For the development of Open Access literature mostly, the available Open Source Software are being used. In this area an initiative has been taken with the establishment of Open Source Software Resource Centre (OSSRC). This is established with a joint agreement of IBM India, C-DAC and Indian Institute of Technology. “The objective of OSSRC is to foster significant OSS development in India by establishing a developmental portal and initiating and spearheading

significant proof of concept projects. The centre would undertake activities to increase understanding of OSS model as well as to foster development of good quality public domain content and courseware in various areas of education and general awareness by offering OSS-based authorizing tools and mark languages, teacher training and setting up a content repository in order to develop workforce of relevance in the national context with OSS skills, and a faculty to impart them”[10].

FUTURE OF OPEN ACCESS MOVEMENT IN INDIA

The open access statements, declared by many international communities, have been the points of discussion to Indian researchers, Indian research funding agencies and policy makers. Indian research communities are aware of the benefits of open access journals and archives, likely, increasing visibility, getting higher citations, getting new knowledge applied to the society. Right to Information Act is enacted in India that also has indirect impact on public funded research. If the research is being conducted from the public fund, the common citizens have right to know the results of the research and what social goods the research can deliver. On the other hand, the funding agencies also expect that the research objectives of the public funded research be fulfilled. Like Wellcome Trust of UK, Indian research funding agencies, apex bodies are going in support of open and unrestricted access to published research [17]. Council of Scientific and Industrial Research (CSIR), University Grants Commission (UGC), All India Council of Technical Education (AICTE), Indian Council of Medical Research (ICMR) and other funding agencies in India support research in Indian institutions and universities. They would like to make research publications available to the research communities through open access journals, open access archives and institutional repositories. The CSIR, UGC, AICTE, ICMR and other agencies also support doctoral studies through research fellowship. They also asked the candidates to submit copies of their theses in electronic format to their respective institutions. Now, respective institutions would make these theses available at the Electronic Theses and Dissertations (ETD) repositories, either at the institutional level or at the national level.

Similarly, research reports generated from the funded research would be available at the institutional repositories and open access archives at the national level. The funding agencies would also bear cost of publishing of research articles in open access journals, if those journals follow authors pay model. An open access statement is likely to be ready by this year (2006-2007). The CSIR also has a plan to setup a national digital repository of research literature. This repository would consist of theses and dissertations of CSIR research scholars, research reports of CSIR-funded research projects (both intramural and extramural), etc. National Knowledge Commission is also formulating similar open access policies and guidelines for the higher education and R&D sectors to improve access to research literature and to disseminate research literature to the global communities [9]. If the policy makers adopt such open access statements, that will definitely enhance scientific productivity of research institutions. Thus, Indian researchers will get more visibility, high quality research output can be anticipated, and duplication of research efforts of similar or identical studies will be restricted.

The open access movement in India is acknowledged worldwide. Nascent open access literatures from India have been generated in last one decade. Open access movement in India is started modestly from a few institutions and now spreads all over as a number of institutions have joined together. The public-private partnership in this movement is also growing, as the private

agencies are experimenting with new models of revenue earning while providing free access to research literature. This movement also brings funding agencies together to make open access statement and to support open access initiatives. The open access movement will bring qualitative research output from the research communities in India, as research literature is being accessed and evaluated worldwide. The institutions like, National Centre for Science Information, Indian National Science Academy, INFLIBNET, have been conducting workshops for the editors of the open access journals and administrators of institutional repositories on how to implement OAI-compliant architecture so that metadata harvesters and search engines can index their respective journals and repositories. Now, various library networks, library consortiums, library associations also encourage their member institutions to establish institutional repositories or open access archives. Library and Information Science Professionals are also concerned with open access issues. Library associations of the country are holding conferences, seminars and workshops at national level to provide a platform of discussions on the issues of open access movement. To mention, Indian Association of Special Libraries and Information Centres (IASLIC) will be holding a national seminar on the *Open source movement: an Asian perspective* in the month of December 2006. In near future, we would see a sustainable growth of open access initiatives, open access literature and open courseware from India.

CONCLUSION

The developing countries are facing barriers of accessing scholarly literature, as the cost of accessing peer-reviewed journals have increased manifold over the time. India is no exception, and high impact factor scholarly literature available to the research communities is limited to the elite institutions. Also research publications from developing countries, published in periodicals of developing countries also do not get much attention in international community, as distribution channels of such periodicals in developed nations are very limited. Open access movement makes the dramatic changes in accessibility. As many funding agencies and universities in developed countries support publishing in open access journals and archiving in open access repositories, research literature become easily accessible to the research communities of the world. The importance and usefulness of open access literature have been realized throughout the world. Various nations are taking up the issue seriously. Different open access statements and declarations have been made in various countries in this decade. Some sort of declaration and statement is necessary in India as well, which will be a framework for developing open access literature.

In India, there are a number of open access initiatives in many forms, such as open access journals, archives of back volumes of journals, institutional repositories, subject-specific repositories, document-specific repositories, open courseware, etc.. In India, some other related initiatives also make available cultural heritage literature to the world. All these things are available in open access mode only, where costs of accessing scholarly materials reduced drastically. Providing global access to local research is another challenge of open access initiatives in India. Some studies and usage statistics of some repositories show that the researchers of developed nations are accessing the Indian literatures available in the open access journals and archives [4]. India is not only leading open access movement of the developing countries, but also making developed countries aware of qualitative scholarly literature originated from developing countries.

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Appendix I

Some Screenshots of Indian Institutional Repositories and Open Access Journals

Fig. 1: ePrints@IISc

Home | About | Browse | Search | Register | Deposit | Contact | Help

ePrints@IISc
Open Access Repository of IISc Research Publications
April 23, 2006

QUICK SEARCH
Titles, Abstracts, Keywords:
Full text:
Submit

Search: Simple Advanced

Browse
- By Subject (Dept/Center)
- By Year
- By Author
- By e-Print Type
- By Keyword
- By Latest Additions

Search Services that index ePrints@IISc
>> OAIster: Search worldwide

Welcome to ePrints@IISc
Number of publications in the repository: 4124

Recent Submissions

- [Structural and magnetic properties of \$Sr_2Fe_{1+x}Mo_{1-x}O_6\$ \(\$1 \leq x \leq 0.25\$ \) \(2006\)](#)
[Deposited 27 April 2006]
- [Single-crystal piezoceramic actuation for dynamic stall suppression \(2006\)](#)
[Deposited 27 April 2006]
- [Do Current-Density Nonlinearities Cut Off the Glass Transition? \(2006\)](#)
[Deposited 27 April 2006]
- [Hoogsteen base-pairing revisited: Resolving a role in normal biological processes and human diseases \(2006\)](#)
[Deposited 27 April 2006]
- [Intermolecular potential for methane in zeolite A and Y: Adsorption isotherm and related properties \(2006\)](#)
[Deposited 27 April 2006]
- [Comparative high pressure Raman study of boron](#)
[Deposited 27 April 2006]

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- [New user? Register](#)
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ACCESS STATISTICS
- [Top 100 Accesses](#)
- [Country-wise Access](#)
- [Monthly Access](#)

OTHER SERVICES
- [etd@IISc: Repository of IISc research theses](#)

Fig. 2: OpenMED@NIC

OpenMED@NIC - - Microsoft Internet Explorer
Address: http://openmed.nic.in/

openMED@NIC HOME ABOUT BROWSE SEARCH REGISTER USER AREA HELP

OpenMED@NIC is an open access archive for Medical and Allied Sciences. Here authors / owners can self-archive their scientific and technical documents. For this they need to register once in order to obtain a user id in OpenMED system. However no registration is required for searching the archive or viewing the documents.

OpenMED is a discipline based International Archive. It accepts [Revised policy - dated 28th March 2006] peer-reviewed documents having relevance to research in Medical and Allied Sciences including Bio-Medical, Medical Informatics, Dental, Nursing and Pharmaceutical Sciences. These could be peer-reviewed preprints, postprints (refereed journal paper) and accepted theses. In case of non-English documents, descriptive data [Author, Title, Source etc.], abstract and keywords must be in English. Submitted documents will be placed into the submission buffer and would become part of OpenMED archive on their acceptance.

The aim of OpenMED is to provide free service to academics, researchers, and students working in the area of Medical and Allied Sciences. We expect it to promote self-archiving and open access to papers / scholarly publications in these fields. Authors who wish to post papers to the Archive should first consult the [Submission Policy](#). Inclusion in OpenMED Archive gives no assurance of any kind regarding the correctness or quality of the information / software. Users must read [Disclaimer](#) before using this site.

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- ▶ [Simple Search](#)
- ▶ [Advanced Search](#)
- ▶ [Browse by Year](#)
- ▶ [Browse by Subjects](#)
- ▶ [Self Help Tutorial](#)

Users

- ▶ [Sign In](#)
- ▶ [Register](#)

Related Links

- ▶ [IndMED Forum](#)
- ▶ [Self-Archiving F.A.Q.](#)

Fig. 3: Librarian's Digital Library

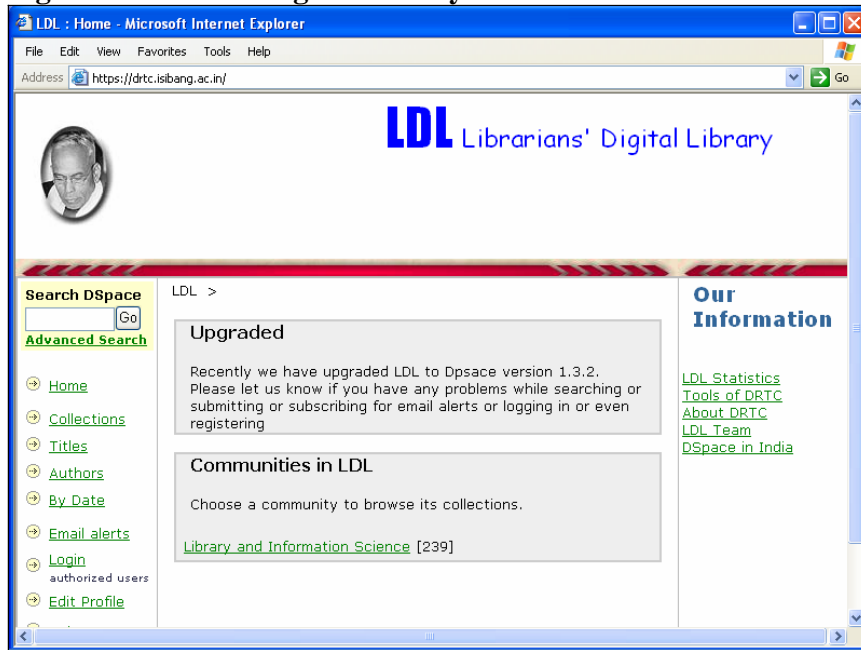


Fig. 4: eJournals@INSA



Fig. 5: medIND@NIC



Fig. 6: Search Digital Libraries

