

Open Access Initiatives and E-LIS Archive in Library and Information Science

—Dr. R. Raman Nair

Introduction

Open Access (OA) is document or literature, which is digital, online, free of charge, and free of most copyright and other restrictions. The Internet and the permission of the author make OA possible. OA Initiative (OAI) now becoming popular at academic and research institutions worldwide is attempt to build a low-barrier interoperability framework for open archives or institutional repositories containing research papers and other documents in digital form. It is also called digital libraries. It allows Information Service Providers to harvest metadata from various data providers. This metadata is used to provide value-added services, often by combining different databases. Initially, OAI concentrated in the development of a technological framework and interoperability standards specifically for enhancing access to digital archives, in order to increase the availability of scholarly communication. OAI is, also related to the OA publishing movement. The technology and standards developed for OA are applicable in a wide area than scholarly publishing.

Meaning of OA

OA is free, immediate, permanent, full-text, online access, for any user, from anywhere at any time over the web, to digital scientific and scholarly material, primarily research articles published in peer-reviewed journals. OA means that any individual user, anywhere, who has access to the Internet, may link, read, download, store, print-off, use, and data-mine the digital content of that article. An OA article is free of restrictions for copying and distribution for academic purposes.

OAI is very important development in the world of scholarly communication. Its aim is to make the recorded output of research, most of which is publicly funded, freely available to all over the Web. Now most part of this information is not accessible to many due to subscription costs and is limited to scientists associated to institutions acquiring such journals/publications.

History of OA Movement

The beginning of the scholarly journal was a way of expanding access to scholarly findings. Many anticipated the OA concept even before the technology made it possible. Common knowledge was an attempt to share information for the good of all, the brainchild of Brower Murphy.

The modern OA movement springs from the potential unleashed by the electronic medium, and the WWW. It is now possible to publish a scholarly article and also make it instantly accessible anywhere in the world where there is Internet connection.

The possibility emerged at a time when the tradition, print-based scholarly journal system was in a crisis. The number of articles published in journals has been increasing at an explosive rate. The average cost per

journal has also been rising every year for decades. But the budgets of academic libraries have remained static. The result was decreased access when technology has made unlimited access a real possibility. Libraries were the systems, which firstly became aware of this crisis. They are also the first to think about consortia for journal subscriptions as well as OA and have played an important part in the OA. The Association of Research Libraries developed the Scholarly Publishing and Academic Resources Coalition (SPARC), in 1997, an alliance of academic and research libraries and other organizations, to address the crisis and develop and promote alternatives, such as OA.

The first online-only, free-access journals later called OA journals began appearing in late 1980's. Among them were *Bryn Mawr Classical Review*, *Postmodern Culture* and *Psychology*. The first free scientific online archive was arXiv.org, started in 1991, initially a preprint service for physicists, initiated by Paul Ginsparg. Self-archiving has become the norm in physics. Steven Harnad first formally proposed OA self-archiving in 1994. But self-archiving was initiated earlier by computer scientists in their local FTP archives in the '80s itself. Physicists have been self-archiving their papers centrally from 1991 onwards.

The inventors of the Internet and the Web-computer scientists had been self-archiving on their own FTP sites and websites earlier than the physicists. The 1994 Subversive Proposal was to extend self-archiving to all other disciplines. From this in 1997 arose CogPrints and eventually the OAI-compliant generic GNU EPrints software in 2000.

In 1997, the U.S. National Library of Medicine (NLM) made Medline, the most comprehensive index to medical literature on the planet, freely available in the form of PubMed. Usage of this database increased a hundredfold when it became free, strongly suggesting that prior limits

on usage were due to lack of access. Indexes are not the main focus of the open access movement. But free Medline is important because it opened up a whole new form of use of scientific literature-by the public, not just professionals.

In 1988, the American Scientist OA Forum was launched. The Journal of Medical Internet Research, one of the first OA journals in medicine, was created in 1998.

In 1999, Harold Varmus of the NIH proposed a journal called E-biomed, intended as an OA electronic publishing platform combining a preprint server with peer-reviewed articles. It later became PubMed Central, a post-print archive. In the same year OAI and OAI-PMH protocol for metadata harvesting was launched in order to make online archived interoperable.

In 2000, BioMed Central, a for-profit open access publisher, was launched by the then Current Science Group the founder of the Current Opinion series, now known as the Science Navigation Group. BioMed Central now publishes over 170 journals.

In 2001, 34,000 scholars around the world signed an Open Letter to Scientific Publishers called for the establishment of an online public library that would provide the full contents of the published record of research and scholarly discourse in medicine and the life sciences in a freely accessible, fully searchable, interlined form. Scientists signing the letter also pledged not to publish in or peer-review for non-OA journals. This led to the establishment of the Public Library of Science (PloS) an advocacy organization. But most scientists continued to publish and review for non-OA journals. PLoS decided to become an OA publisher aiming to compete at the high quality end of the scientific spectrum with commercial publishers and other OA journals, which were beginning to flourish.

In 2002, the Open Society Institute launched the Budapest OAI. It was the first major international statement on OA. It provided a definition of OA. The Bethesda Statement on OA Publishing came in June 2003. In the same year the Berlin declaration on OA to knowledge in the Sciences and Humanities was drafted and the World Summit on the Information Society included OA in its Declaration of Principles and Plan of Action.

The idea of mandating self-archiving was mooted at least as early as 1998. Since 2003 efforts have been focused on OA mandating by the funders of research: governments, research funding agencies, and universities. The publishers have opposed these efforts. But many countries, funders, universities and organizations have now either made commitments to OA, or are in the process of reviewing their policies and procedures, with a view to opening up access to results of the research they are responsible for.

Presently OA is an important subject of discussion amongst researchers, academics, librarians, university administrators, funding agencies, government officials, commercial publishers, and society publishers. Even though all agree to the concept of OA there is differences of opinion on the economics of funding peer review in OA publishing, and the reliability and economic effects of self-archiving.

Types of OA

OA has now two main streams; OA publishing and author self-archiving in repositories. The first consists of OA Journals and the second includes institution-based and subject-based repositories. E-LIS, dList etc are subject-based repositories.

OA journals perform peer review and then make the approved contents freely available over the web. Their

expenses consist of peer review, manuscript preparation, and server space. Philanthropists or organizations with an interest in disseminating the content pay the production costs upfront so that access can be free of charge for everyone with Internet connection. Some journals have financial support from the hosting university or professional society. Some journals charge a processing fee on accepted articles, to be paid by the author or the author's sponsor.

OA archives or repositories do not perform peer review, but simply make their contents freely available to the world. They may contain unrefereed preprints, refereed post prints, or both. Archives may belong to institutions, such as universities, or disciplines, such as physics and economics. Authors may archive their preprints without anyone else's permission, and a majority of journals already permit authors to archive their post prints also. When archives comply with the metadata harvesting protocol of the OAI, then they are interoperable and users can find their contents without knowing which archives exist, where they are located, or what they contain. There is now open-source software like EPrints for building and maintaining OAI-complaint archives.

Now there are two main currents in the OA movement. In one stream of OA self-archiving authors publish in subscription journal, but in addition deposit them in either an institutional repository or in a OA repository to make their articles freely accessible online. This deposit can be in the form of a peer-reviewed post print or a non-peer-reviewed preprint.

In another stream of OA publishing, the authors publish in OA journals that make their articles freely accessible online immediately upon publication. Examples of OA publishers are BioMed Central and the Public Library of Science.

All disciplines taken together there are approximately 25,000 peer-reviewed journals. Of these OA journals comes to about 4000. Among the 10,000 and more peer-reviewed non-OA journals most of them endorse some form of author self-archiving. About a half of them endorse self-archiving the author's final peer-reviewed draft or post print.

Benefits to Authors

Authors make their articles openly accessible to maximize their research impact. An OA article is more likely to be used and cited than one in priced journal. A recent study found that articles published as immediate open access were cited three times more than non-open access papers.

Scientists are paid by research funders and or their universities to do research. The published article is the report of the work they have done, rather than an item for commercial gain. The more the article is used, cited, applied and built upon, it will be the better for research as well as for the researcher's career.

Authors who wish to make their work openly accessible have two options. One is to publish in an OA journal. The other option is author self-archiving. The authors can check the publishers' copyright policies and self-archiving list on the SHERPA, RoMEO web sites to find out if a specific publisher or journal permits author self-archiving. There is also a self-archiving FAQ designed to help faculty understand and start doing self-archiving which can be found in the EPrints OA site.

The idea of open content is related to OA. However, open content is usually defined to include the general permission to modify a given work. OA refers only to free and unrestricted availability without any further implications. In scientific publishing it is usual to keep

an article's content static and to associate it with a fixed author.

While OA is currently focused on scholarly research articles, any content creator can share work openly, and decide how to make their content available. Creative commons provides a number of licenses with which authors may easily indicate which uses are allowed.

Users of OA Archives

Generally the direct users of research articles are other researchers. OA helps researchers by opening up access to articles that their libraries do not have. One of the great beneficiaries of OA is users from developing countries where many universities have low budget for journal subscriptions. All researchers benefit from OA as no library can afford to subscribe to every scientific journal and most can only afford a small fraction of them.

OA extends the reach of research beyond its immediate academic circle. An OA article can be read by anyone—a professional in the field, a researcher in another field, a journalist, a politician or civil servant, or an interested hobbyist.

The following screen from E-LIS the major OA repository in LIS provides the statistics related to the usage from different countries of the world of an article on *Creating Digital Document Archives with WINISIS & Genlsisweb Software* by K Rajasekaran.

The following screen from E-LIS site provides the statistics related to the monthly view and downloading of an article on research methodology by an Indian author Dr. M.S Sridhar archived in that repository.

A good place for anyone interested in exploring the world of scholarly research, to start his search is the Directory of OA Journals (DOAJ). In this we can browse

a number of peer-reviewed, fully OA journals, or search for articles in many of the journals. Open J-Gate is another index of articles published in English language OA journals, which was launched in 2006. About 4500 journals indexed by Open J-Gate, more than half, are peer-reviewed. OA articles can also often be found with a web search, using any general search engine or those specialized for the scholarly/scientific literature, such as ScientificCommons.org, and Google Scholar. Papers retrieved may include preprints that have not yet been peer reviewed, or gray literature that will remain unreviewed.

Research Funding Policy

Now a days research funding agencies and universities want to ensure that the research they fund and support in various ways has the greatest possible research impact. Research funders are beginning to expect OA to the research they support. Many organizations of advanced countries insist that all articles arising from research funded by them must be submitted to OA depositors upon acceptance for publication. They want their scientists to self-archive in major repositories rather than in the author's own institutional repository. They also provide grant holders with additional funding, through their institutions, to cover OA charges, where appropriate. For enabling this EPrints maintains a Registry of OA Repository Material Archiving Policies.

In May 2005, 16 major Dutch universities jointly launched DAREnet, the Digital Academic Repositories, and making over 47,000 research papers available to anyone with Internet access. The repository now holds in excess of 75000 articles. In April 2006, the European Commission recommended that research-funding agencies should establish a European policy mandate to ensure research to be available after a given time period

in OA archives. This recommendation has later been updated and strengthened by the European Research Advisory Board.

Developing Countries

In developing nations, OA archiving and publishing becomes very important. Scientists, health care professionals, and institutions in developing nations often do not have the capital necessary to access scholarly literature. OA to scholarly research is important to the public also for a number of reasons. One of the arguments for public access to the scholarly literature is that most of it is paid for by taxpayers, who have a right to access the results of what they have funded. Even those who do not read scholarly articles benefit indirectly from OA. For example, patients benefit when their doctor and other health care professionals have access to the latest medical science research. OA speeds up research progress, productivity, and knowledge transmission. Every researcher in the world can read an article, even if their library cannot afford to purchase the journal in which it appeared. Faster discoveries benefit everyone.

Due to the benefits of OA, many governments are considering whether to mandate OA to publicly funded research. Many OA projects involve international collaboration. For example the Scientific Electronic Library Online is a comprehensive approach to full OA journal publishing involving a number of Latin American countries. HINARI the Health InterNetwork Access to Research Initiative is sponsored by the World Health Organization. Bioline International, a not-for-profit organization dedicated to helping publishers in developing countries, Research Papers in Economics, is a collaborative effort of over 100 volunteers in 45 countries. The Public Knowledge Project in Canada developed the open source publishing software Open

Journal Systems (OJS), which is now in use around the world.

Library Services and OA

Most librarians are advocates of OA. They believe that OA promises to remove both the price barriers and the permission barriers that undermine library efforts to provide access to the journal literature. Library associations worldwide have either signed major OA declarations, or created their own.

At some universities, the library houses the Institutional Repository, which provides free access to scholarly work of the university's faculty. Those who support OA believe that institutional repositories will play a very important role in responding to OA mandates from funders.

Publisher's View

Opposition to OA has largely been from commercial journal publishers, whose business model depends upon providing access to research only to those who will pay for journal subscriptions. Major international publishers, feel that OA mandates by research funding agencies are an unwarranted governmental intrusion in the sphere of publishing. Publishers are lobbying against the increasing trend amongst funding organizations to require OA, describing it as government interference and a threat to peer review. There are also many who think that OA is unnecessary or even harmful. Some argue that there is no need for those outside major academic institutions to have access to primary publications, at least in some fields.

The OA movement started as a reaction to the market power of publishers and rising costs of subscriptions, and the resulting inefficiency of resources, inequity and

unfairness to the taxpayers funding both research and largely funding library subscriptions, and the unfairness and loss of effectiveness of the research world in general when access is limited globally. The solution, provided by the opportunity of the Internet, has been online OA with no fees to access material directly from the web.

The mandate of pure OA based on the discussions going on the net can be stated as follows:

- Readers should not be charged to read donated academic research articles.
- Authors should not be charged by publishers or other to donate their work.
- All research published by journals are to be archived digitally for storage and retrieval in a place other than that journal. This should be hosted by public research organizations. So even small journals without access to expertise and technology can publish. If their site goes down, they have to put their articles in an archive in order to be recognized as a journal in the first place.
- Publishers of the journals have to organize peer-review, and publish and organize their editions on web, and they can print the journal to recover the costs of publication without placing restrictions on on-line content. Print-only journals also have to send a copy to the archive.

The Expense Factor

The cost of OA is related to software, staff, peer review etc. Journals publishers have to bear high technical costs. But they can use open-source journal software and content management systems like OAJ, EPrints, GenISIS etc that non-programmes can learn and use easily to update and catalogue content. Peer reviewers usually have faculty appointments at university or research

institutions. Universities should recognize peer-review duties as part of academic workload. Peer-review need not require payment from journals to peer-reviewers whether it is part of the academic workload or volunteered time. As far as the archiving is concerned, this seems a completely natural role for university libraries for it is their responsibility archive knowledge. All journals should be mandated to deposit every article they publish in a secure and open archive. This will ensure no loss of knowledge from independent journals.

Copyright deregulation for the basic research sector is another essential step. Basic research's dynamic efficiency comes largely from patronage-government funding or private donors. Authors donate their work. They do not receive remuneration per article sold. They have absolutely no need for copyright, in fact that more their work is copied the better. It is absurd and exploitative to donate an academician's work to a publisher who then owns exclusivity rights to it, makes money off it, limits its readership by charging, and doesn't give the author any remuneration.

Since the entire academic publishing world works on non-remuneration to the author per copy sold, copyright should be de-regulated. The copyright concerns of the research author are completely non-financial and are to do with credit, plagiarism and misattribution of author's content. Therefore, the notion of 'authorized use' should be abolished. This would make it legal to access and copy the entire material published prior under closed-access models.

E-LIS Open Archives

E-LIS is the best example of OA that we can consider in the context of discussion on OAI. E-LIS is an international OA archive for scientific or technical documents, published or unpublished, on Librarianship,

Information Science and Technology, and related areas. It uses OAI protocol and tools to facilitate interoperability between repository servers. E-LIS began in 2003. At present E-LIS is the biggest repository in Library and Information Science (LIS). Within five years of its launching its collection has reached almost 8000 documents.

E-LIS relies on the voluntary work of individuals from a wide range of backgrounds and is non-commercial. It is community-owned and community-driven. It has an enthusiastic and competent staff and team of editors with LIS educational backgrounds volunteering from many countries of the world. Imam Subirats Coll acts as the Coordinator of the Editors.

As per the objective states in its home page E-LIS serves Library and Information Science (LIS) researchers by facilitating their self-archiving, ensuring the long-term preservation of their documents and by providing worldwide easy access to their papers.

It is hosted by the Italian Consorzio Interuniversitario Lombardo per Elaborazione Automatica (CILEA), an Interuniversity Consortium, a non-profit organization consisting of nine universities of Italy. It provides ICT based services and advice to universities and related organizations, public organizations and enterprises. E-LIS acts as a repository for LIS documents from outside the United States. A separate repository, dLIST, collects LIS material from the United States.

.....

Figure 3: Homepage of E-LIS

ELIS covers all fields of LIS from the theoretical to the highly practical, from school libraries to national libraries, from rate books to ebooks. This wide coverage is reflected in its excellent classified subject index.

ELIS Coverage

E-LIS covers documents of a wide variety of formats and types. It accepts content of all types though most of the submissions are journal articles. But it includes books, book chapters, conference posters, datasets, library instructional materials, and newspaper articles, among many others. The preferred format for submissions is PDF-but other formats are also accepted by E-LIS.

ELIS has international coverage in terms of the language and country of residence of the authors. There is a strong presence of Indian language documents like Malayalam and Kannada. It is not merely a sign of the productivity of researchers from India but a blessing for those whose English is not strong enough to publish. The strongest part of ELIS is its browsing feature, and it stands out with the number of indexes that can not only be searched but also browsed by subject, country, journal name, Title of the paper/book, author/editor name, and publication year.

In the LIS community most published papers traditionally came from the US, UK and Europe, but in E-LIS, where OA encourages a wider audience, it has been noted that high quality papers now come not only from the countries believed most innovative, but also from developing countries, such as India, and others in Africa, Asia, Eastern Europe, the Russian States and also Central and South America. This has been a very welcome, if unforeseen, development. The countries with maximum papers archived as on June 2008 is listed below:

Spain	1525	Italy	919
India	521	Cuba	519
United States	479	Greece	337
UK	332		

The highest number of papers in E-LIS are archived by Dr. M S Sridhar. His papers comes to 110 as on June 2008. In the archive there are 22 papers in Malayalam a regional language of India. In Kannada another regional language of India there are 26 papers archived in E-LIS. In Hindi also there is one paper.

EPrint Software

E-LIS based on GNU EPrint software, which is the brainchild of Stevan Harnad, the key figure of the open access movement. It was developed at the Electronics and Computer Science. Department of Southampton University in the UK by Christopher Gutteridge, in collaboration with Mike Jewell and Robert Tansley. EPrints is the most flexible platform for building high quality, high value repositories and is recognized as the easiest and fastest way to set up repositories of research literature, scientific data, student theses, project reports, multimedia artifacts, teaching materials, scholarly collections, digitized records, exhibitions and performances. According to Christopher Gutteridge EPrints is both a practical tool and the crystallization of a philosophy. It enables research to be accessible to all, the provides the foundation for all academic institutions to create their own research repositories. EPrints is the most commonly installed and the most widely distributed of any of the repository software systems and is free GNU open-source software. E-LIS and dLIST, using EPrints are very important for preventing open access articles from disappearing into the abyss..

Objectives of E-LIS

The purpose of the E-LIS archive like any OAI is to make full-text documents visible, accessible, harvestable, searchable and usable by any potential user with access to the Internet. It also aims to support individuals who

wish to publish or make their papers available worldwide and LIS communities in any country can use it. Works can be deposited in any language and format by authors.

E-print repositories like E-LIS are complementary to, rather than a replacement for, scholarly journals. The peer-review process provided by journals is of critical importance to scholarship. But such repositories could influence the increase of number of journals moving from paid access to OA. According to Imma Subirats the LIS is highly integrated with the areas of computing science and technology and the discipline can surely set an example to other communities by providing a state-of-the-art model for the OA movement and digital libraries, particularly in relation to the open archive model, within which E-LIS is a disciplinary repository. For librarians as authors, archiving their work in E-LIS gives them an increased understanding of the process of self-archiving. The E-LIS archive ensures data preservation and a wide data visibility in addition to facilitating active participation in the international librarian community.

E-LIS defined OA as a property of individual works and it adheres to the Bethesda Statement. Accordingly the depositing author(s) and copyright holder(s) grant(s) to all users a free, irrevocable, worldwide, perpetual right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use.

E-LIS Organization

Authors who contribute to an e-print like E-LIS archive are participating in a global effort by universities, researchers, libraries, publishers, editors, and readers, to redefine the mechanisms of scholarly communication.

E-LIS makes LIS research more visible and accessible, which in turn increases its status and public value.

E-LIS has three sections. Of this the administrative section deals with strategic issues including the future direction of the initiative, its policies and their impact on the user community, and its connection with other scientific communities. The editorial section is devoted to metadata quality and guidelines. The technical section concentrates on the software-its implementation, enhancement, development, added-value functionality, and its operation within the OAI framework. This is the structure within which the E-LIS functions.

For the users contents are organized under two structure both having two sub levels. The first classification sub divided into main subject divisions and subdivisions; the second is a geographical ordering based on continent and country. Users can navigate these structures to retrieve the required information. They can also view documents by browsing by author or year. Information can also be accessed via the search interface through a basic or an advanced search. In order to improve the search mechanisms, E-LIS has enhanced the full-text search furnished by the e-prints software it uses.

The author who submits a document has to assign subjects and keywords form the E-LIS classification scheme. There is also another level browse-by-country view, which has many sub-sections. The classification scheme used is not a comprehensive scheme, but it facilitates document retrieval through the archive's browsing facility. It is divided into twelve blocks categorized alphabetically from A-L which have been created around the three implicit (virtual) areas: theory and generalities (general level); user-oriented, directional, and management functions; and objects, pragmatic issues and technicalities.

In E-LIS, papers can be viewed on an individual country basis, which highlights the internationality of the project, in addition to facilitating user access.

E-LIS Policies and Information Retrieval systems

E-LIS is driven and directed by its policies, which determine its identity, quality and direction. The principal policy concerns discussed and democratically agreed upon by ELIS are on Mission: its aims and objectives; submission policies, copyright, and organizational model.

Library professionals from any country can deposit papers in E-LIS. Submission of low quality papers will lead to judging the author on a virtual basis by a very wide community of peers. Submission requirement is that authors who wish to submit a document have to register in ELIS and obtain a user ID, which is also the basis for obtaining author-view browsing.

E-LIS accepts any scientific or technical document, published or unpublished, on librarianship, information science and technology or related activities. In this context, categories for different types of materials have been created with respective sets of metadata. The criteria for acceptance are that the e-prints are relevant to research in LIS fields, and that they have the form of a finished document ready to be entered into a process of communication. Publications may include preprints, post prints, conference papers, conference posters, presentations, books, book chapters, technical reports/departmental working papers, theses, and newspaper and magazine articles. Documents submitted by authors are kept in the submission buffer for approval or rejection by editors from concerned country to ensure that they conform to E-LIS policy. They make changes in the metadata if essential to ensure its quality. A paper becomes publicly accessible within a week in E-LIS.

E-LIS supports all languages used in the world. But if a document is in a language other than English, an English abstract and English keywords is also included. Most of the popular document formats are accepted in E-LIS.

E-LIS encourages OA. But if there are restrictions for the authors from the publishers in regard to the copyright, authors can restrict access to their papers. Access can also be restricted to the group of registered users, or only to the depositor and ELIS staff.

Documents kept in E-LIS server remains the property of the author. The author holds the copyright for the pre-refereed preprint and therefore, it can be self-archived without any other permission being sought. Authors submitting to the repository are responsible for ensuring that there is no copyright violation.

E-LIS's metadata policy permits third parties to collect metadata from the archive via mechanisms that create end-user services to support the discovery and presentation of the archive content. The general policy is to allow harvesting of metadata but not the harvesting of full content.

Information retrieval from E-LIS service is facilitated through two ways. First, a search engine can be used to search across the bibliographic descriptions (metadata). Search screens are available for quick, simple or advanced searching. Of these the simple and advanced searches can search within the full-text of documents. Another way to search is browsing through the views of the documents. Users can browse by author/editor name, book/journal title, subject, year or country. Items deposited in the previous week can be viewed in the latest additions section. From the search result users can then view the metadata associated with a document. From the metadata screen users can download or open a copy of the document.

CONCLUSION

E-LIS and research papers on library science, information science, computer science etc from India archived in E-LIS should infuse interest in researchers from other subject areas in India to self-archive their research works in OA repositories. Now it is time for all to think about adopting full OA for publications from publicly funded research. The importance of access to the world's research information for the development of a strong economy and a vibrant research capability is widely acknowledged. But the financial barriers limit access by developing countries to the research information they need. Equally, the unique research carried out in countries representing majority of the world's population is largely 'invisible' to international science because of economic or other constraints. The solution to many of the world's problems, such as emerging infectious diseases, environmental disasters, or climate change, cannot be achieved without incorporation of the research from developing countries into the global knowledge pool.

Open Access to the world's publicly funded research literature can provide equal opportunities for the communication of all research information, eliminating financial barriers. Also papers made available electronically on an OA archive will be used more often than articles in priced journals. So OA can ensure the greatest possible benefit both to the authors, to the investment of funding agencies and to scientific progress. Now researchers and organizations worldwide have recognized this. Hence universities and research institutions from India also should encourage our researchers to archive their papers in concerned OA subject repositories. Our research institutions can also start Institutional Repositories. This can surely improve the quality and integrity of our research.

REFERENCES

- Antonella De Robbio and Imma Subirats Coll. (2005) E-LIS: an International Open Archive towards building Open Digital Libraries. High Energy Physics Libraries Webzine, issue 11, August 2005. URL: <http://library.cern.ch/HEPLW/11/papers/1/>
- Imma Subirats Coll, and Arencibia Jorge, Ricardo and De Robbio, Antonella (2004) E-prints for Library and Information Science (E-LIS): la tecnologia al servicio de la bibliotecologia y las ciencias de la informacin. ACIMED 12(6). (Cuba), 2004. URL: <http://eprints.rclis.org/archive/00002849/>
- Lewandowski, Drik. (2004) E-LIS. E-prints in Library and Information Science. In Proceedings Internationales Symposium fur Informationswissenschaft (ISI), 2004, URL: <http://eprints.rclis.org/archive/00002532/>
- Stevan Harnad. (2001) The Self-archiving initiative: freeing the refereed research literature online. Nature 410, 26 April 2001. URL: <http://www.ecs.soton.ac.uk/~harnad/Tp/nature4.htm>
- Suber, Peter and Arunachalam, Subbiah. (2005). Open Access to Science in the Developing World (with), World-Information City, October 17, 2005.
- Suber, Peter (2006). Creating an Intellectual Commons through Open Access, In: Charlotee Hess and Elinor Ostrom (eds.), Understanding knowledge as a Commons: From Theory to Practice, MIT Press.
- Suber, Peter (2005). Helping scholars and helping libraries, SPARC Open Access Newsletter, April 2, 2005.
- Suber, Peter, (2006) Open access and quality, SPARC Open Access Newsletter, October 2, 2006.
- Suber, Peter (2003) Removing the Barriers to Research: An Introduction to Open Access for Librarians, College & Research Libraries News, 64 (February), pp. 92-94, 113.
- Suber, Peter, (2003). The opening of science and scholarship, an essay for the Publius Project of Harvard's Berkman Center for Internet and Society, June 4, 2003.
- Suber, Peter (2008). Three principles for university open access policies, SPARC Open Access Newsletter, April 2

Suber, Peter, (2007), Trends favoring open access, SPARC Open Access Newsletter, May 2

Suber, Peter, (2006). Unbinding knowledge: a proposal for providing open access to past research articles, starting with the most important, in Glandomenico Sica (ed.), *Open Access, Open Problems*, Milan: Polimetrica, October 20, 2006, pp. 43-58.

Suber, Peter, (2008). What we don't know about open access, SPARC Open Access Newsletter, May 2, 2008.