

E-Serials Collection **Management** *Transitions, Trends, and Technicalities*

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Editor



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Chapter 10

Open Access and Retrieval: Liberating the Scholarly Literature

Gerry McKiernan

An old tradition and a new technology have converged to make possible an unprecedented public good.¹

BUDAPEST OPEN ACCESS INITIATIVE

On February 14, 2002, the Budapest Open Access Initiative (BOAI) was formally launched.² The BOAI is a public statement and plan of action that calls for “open access to peer-reviewed research articles in all academic fields and the preprints that might precede them.”³ The initiative is the outcome of an international conference held in Budapest, Hungary, in early December 2001 convened by the Open Society Institute (OSI).⁴ The BOAI was authored by representatives affiliated with the university research community, for-profit and nonprofit publishing, and the philanthropic sector. Among the members were Michael Eisen, the Public Library of Science; Rick Johnson, director, Scholarly Public and Academic Coalition (SPARC); Peter Suber, professor of philosophy, Earlham College, and editor of *The Free On-*

We are grateful to the following individuals and organizations for their permission to reproduce selective screen prints from their respective project Web sites: Figure 10.1: eprints.org; Figure 10.2: Dr. Stevan Harnad, Professor, Intelligence, Agents, Multimedia Group Department of Electronics and Computer Science, University of Southampton, United Kingdom; Figure 10.3: Dr. Kurt Maly, Kaufman Professor and Chair, Department of Computer Science, Old Dominion University, Norfolk, Virginia; Figure 10.4: Timothy D. Brody, postgraduate student and researcher, Intelligence, Agents, Multimedia Group, Department of Electronic and Computer Science, University of Southampton, United Kingdom.

line Scholarship Newsletter; and Stevan Harnad, professor of cognitive science, University of Southampton (United Kingdom) and a noted proponent of author self-archiving. Other authors included Leslie Chan, Bioline; Fred Friend, director scholarly communication, University College London; István Rév, Open Society Institute; and Jan Velterop, publisher, BioMed Central.⁵

The authors characterize *open access* as the free availability on the public Internet of peer-reviewed journal articles, as well as nonreviewed preprints of potential interest to the scholarly community, that permit users to:

read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.⁶

Although focused on peer-reviewed journal articles and preprints, BOAI could be extended to include scholarly monographs on specialized topics, conference proceedings, theses and dissertations, government reports, and other writing for which an author does not expect payment.⁷

The BOAI endorses two strategies for achieving the overall goal: (1) the establishment of “a new generation of journals” and (2) authors self-archiving and commitment to offering open access to their full content.⁸ The first strategy calls for the founding of new research journals that do not charge for a subscription or impose access fees, and the second advocates that authors deposit a digital copy of their publications or prepublications in a publicly accessible Web site.⁹

In that it also advocates the creation of open access electronic journals, the BOAI is similar to the vision of the Public Library of Science (PLoS) initiative.¹⁰ However, although similar in this and other respects, the BOAI differs significantly from the PLoS in the breadth of the literature to be included and the nature and scope of access. Unlike PLoS, BOAI encourages open access to the peer-reviewed literature for all academic fields, not just the sciences, and, perhaps most

important, BOAI seeks to promote author self-archiving, thus providing immediate access to current research results in contrast to the months postponement accepted by PLoS.¹¹

NEW GENERATION JOURNALS

In an effort to provide and promote open and wide dissemination of articles, the BOAI journal model proposes that new journals no longer invoke copyright to restrict access or use of journal content. Copyright and other tools are instead recognized as a system for ensuring permanent open access to published articles. As price is an inherent barrier to access, such alternative journals would not charge a subscription or access fee. To cover the necessary costs of production and access, the BOAI advocates other funding strategies, including organizational and institutional support, endowments, gifts, page charges, or use of monies that would be made available by the demise or cancellation of journals charging traditional subscription or access fees. Significant savings can be expected for open-access journals by publishing only online and by dispensing with the costs associated with managing subscriptions of authorized and unauthorized access.¹²

Among the titles and organizations cited as exemplary alternative journals or publishers are *Algebraic & Geometric Topology* (<<http://www.maths.warwick.ac.uk/agt/>>), BioMed Central (<<http://www.biomedcentral.com/>>), *Geometry & Topology* (<<http://www.maths.warwick.ac.uk/gt/>>), HighWire Press (<<http://highwire.stanford.edu/lists/freeart.dtl>>), *Journal of Insect Science* (<<http://www.insectscience.org/>>), *Journal of Machine Learning Research* (JMLR) (<<http://www.jmlr.org/>>), *Living Reviews in Relativity* (<<http://www.livingreviews.org/>>), *New Journal of Physics* (<<http://www.njp.org/>>), and *Psycology* (<<http://psycprints.ecs.soton.ac.uk/>>).¹³

Free or affordable software for electronic journal publishing would also reduce the cost and expedite the production of open-access journals.¹⁴ Among the available commercial and noncommercial packages and vendors are AllenTrack (<<http://www.allentrack.net/>>) from Allen Press, EdiKit (<<http://www.bepress.com/services.html>>) from Berkeley Electronic Press, ESPERE (<<http://www.espere.org/>>), BenchPress (<<http://benchpress.highwire.org/>>) from HighWire Press, International Consortium for Alternative Academic Publication (ICAAP)

(<<http://www.icaap.org/services.html>>), PaperCutter (<<http://www.miracd.com/>>) from Mira Digital Publishing, and Manuscript Central from ScholarOne (<<http://www.ScholarOne.com/>>).¹⁵

Although BOAI advocates the establishment of alternative online-only journals, it does not advocate that peer review—the core strength of the scholarly journal—be abandoned. For BOAI, open-access journals “do not differ from toll-access journals in their commitment to peer review or their way of conducting it, but only in their cost-recovery model. . . .”¹⁶ For the BOAI, “peer review is medium-independent, as necessary for online journals as for print journals, and no more difficult.”¹⁷ Indeed, it emphasizes that:

the quality of scholarly journals is a function of the quality of their editors, editorial boards, and referees, which in turn affect the quality of the authors who submit articles to them. Open-access journals can have exactly the same quality controls working for them that traditional journals have. The main reason is that the people involved in the editorial process, and the standards they use, do not depend on the medium (print or electronic) or the cost (priced or free) of the publication.¹⁸

In addition to promoting and supporting open access for peer-reviewed literature, BOAI also endorses open access for the electronic preprints, preliminary versions of publications that are “put online prior to peer review but which are intended for peer-reviewed journals at a later stage in their evolution.” Self-publishing on the Internet that bypasses peer review, however, is not endorsed by the BOAI.¹⁹

SELF-ARCHIVING

Preprints

A variety of studies²⁰ have documented preprints as a predominant source of information and medium of communication. As summarized by Kramer:

[T]he role of the preprint in the informal information exchange among scientists is a major one. It may well be the most vital

link that the scientist has on a worldwide basis to keep up-to-date on current progress in any field.²¹

Although there are various interpretations on the nature of the preprint,²² it is perhaps described best as “a record of research distributed among scientists prior to formal publication.”²³

EPRINTS

Electronic mail was the first formal method by which preprints were distributed electronically. The inherent limitations of this distribution method, however, led Paul Ginsparg, a particle physicist then at the Los Alamos National Laboratory, New Mexico, to develop a more efficient system for storing and providing access to electronic preprints from a central location. Ginsparg wrote software that automated the process by which authors could submit electronic preprints on a central server and enabled them and others to search and retrieve the full text of this document collection.²⁴

Since its implementation more than a decade ago, the Los Alamos National Laboratory (LANL) eprint service (<<http://arXiv.org/>>) has revolutionized scholarly communication within many scholarly communities.²⁵ The success of the LANL eprint service has also inspired others to advocate the adoption of author self-archiving as a viable and beneficial publishing option in other academic fields²⁶ and led others to develop improved software to facilitate the establishment and creation of institutional archives.²⁷

EPrints is a free software package developed at the Electronic and Computer Science Department of the University of Southampton, United Kingdom, that facilitates the creation of an electronic archive of departmental or institutional publications (see Figure 10.1). The first version of EPrints (EPrints 1) has been available since the end of 2000. To coincide with the launch of BOAI, a new version of the eprints.org self-archiving software, EPrints 2, was released in February 2002.²⁸

The EPrints software is made available through eprints.org, a Web site that is part of the Open Citation Project, a DLI2 International Digital Libraries Project funded by the Joint Information Systems Committee (JISC) of the Higher Education Funding Councils, in collaboration with the National Science Foundation. eprints.org was



Figure 10.1. eprints.org Logo

previously supported by CogPrints, itself funded by JISC as part of the Electronic Libraries (eLib) Programme (UK).²⁹

Software Features and Functionalities

EPrints 2 offers a variety of user-friendly features and functionalities,³⁰ including:

- An installation script that automates much of the installation process
- Storage of individual research papers (or eprints) in one or more than one document format
- Organization of eprints in a “configurable, extendible” subject hierarchy that can be used to view and search the archive collection
- Submission of documents using a simple Web-based interface; documents can be uploaded as files, in compressed file format (e.g., zip), or mirrored from an existing Web site by specifying a URL
- Inclusion of associated metadata for authors
- Web-based or e-mail subscription as author or reader
- Web-based moderation option for administrative review and approval

- Automatic data integrity checks without administrator intervention
- Web-based system maintenance

An EPrint archive can use any metadata schema. Through a systematic process, an archive administrator selects the metadata fields and the level of access. Activities include the selection of metadata fields (e.g., authors, title, journal, etc.), determination of eprint type (e.g., refereed journal article, technical report, unpublished preprint, etc.), and designation of interoperability with open archives search engines.³¹ Although the system is preconfigured to operate as an institutional eprint archive, it can be reconfigured with different metadata fields.³²

Software and Hardware Requirements

A major objective of eprints.org is to offer a highly functional system at minimum cost. The major expense of managing an EPrints archive could be limited to hardware purchase. The following software and hardware are required for establishing an EPrints service:³³

- a Unix computer platform
- a Unix (<<http://www.bell-labs.com/history/unix/>>) operating system
- Linux (<<http://www.linux.org/>>), the advanced and free Unix implementation, was the development platform and is highly functional
- an Apache WWW server (<<http://www.apache.org/>>), a professional-quality free software product, often included with commercial Linux, such as Red Hat (<<http://www.redhat.com/>>)
- the Perl programming language (<<http://www.perl.com/>>)
- mod_perl module for Apache (<<http://perl.apache.org/>>), which significantly increases the performance of Perl scripts
- the MySQL database software (<<http://www.mysql.com/>>), a database system that is free for noncommercial use
- the EPrints software itself

Special software such as wget, tar, gunzip and unzip that allow users to upload documents in compressed file formats (e.g., tar, gz, or zip), or to capture them from a URL, are also required.³⁴

Once the prerequisite software has been loaded, the installation of the EPrints software is simply a matter of editing configuration files and activating an installation script. The software can then be modified to suit the needs of the local institution.³⁵ EPrints 2 is strictly internationalized with all metadata being stored as Unicode,³⁶ in accordance with the Unicode Standard, the “character coding system designed to support the worldwide interchange, processing, and display of the written texts of . . . diverse languages.”³⁷

EPrints 2 was developed under the GNU General Public License (GPL)³⁸ and is made available free of charge subject to the GPL.^{39, 40} EPrints 2 was developed by Christopher Gutteridge, system administrator with the Systems Group, Department of Electronics and Computer Science, University of Southampton with the assistance of Mike Jewell. EPrints 1.0 was designed and implemented by Robert Tansley with enhancements and corrections by Christopher Gutteridge.⁴¹

In late 2002, a new version of EPrints (2.2.1) with additional configuration options and corrections was released.⁴²

EPrints Sites

Many archival collections, in a variety of disciplines, have been established using versions of the EPrints software,⁴³ and include:

- AKT Prints <<http://eprints.aktors.org/>> (EPrints 2)
The AKT project is an interdisciplinary research collaboration funded by the Engineering and Physical Sciences Research Council (United Kingdom) that seeks “to develop and extend a range of technologies to provide integrated methods and services through the knowledge life cycle of capture, modeling, reuse, publishing and maintenance; services taking knowledge.”
- Arquivos Abertos da Sociedade Brasileira de Genética, Instituto Brasileiro de Informação em Ciência e Tecnologia (IBICT) (Brazil) <<http://www.sbg.ibict.br/>> (EPrints 1)
- Behavioral and Brain Sciences (BBSPrints) <<http://www.bbsonline.org/bbsprints.html>> (EPrints 1)
An interactive archive for the journal *Behavioral and Brain Sciences*. Registered users can submit papers, commentaries, responses, and edit user registration information.

- Caltech Computer Science Technical Reports <<http://caltechcstr.library.caltech.edu/>> (EPrints 1)
- Caltech Library System Papers and Publications <<http://caltechlib.library.caltech.edu/>> (EPrints 1)
- CogPrints Cognitive Science Eprint Archive <<http://cogprints.soton.ac.uk/>> (EPrints 2)
CogPrints is an electronic archive of papers in various areas of psychology, neuroscience, and linguistics, and many areas of computer science (e.g., artificial intelligence, robotics, vision, learning, speech, neural networks), philosophy (e.g., mind, language, knowledge, science, logic), biology (e.g., ethology, behavioral ecology, sociobiology, behavior genetics, evolutionary theory), medicine (e.g., psychiatry, neurology, human genetics, imaging), anthropology (e.g., primatology, cognitive ethnology, archaeology, paleontology), as well as any other portions of the physical, social, and mathematical sciences that are pertinent to the study of cognition (see Figure 10.2).
- DLIST (Digital Library of Information Science and Technology) <<http://dlist.sir.arizona.edu/>>
The objective of DLIST is to serve as a repository of electronic resources in the domains of library and information science (LIS) and information technology (IT). Creators of materials in all areas of LIS and IT are encouraged to deposit their materials, regardless of format. Although all subject areas are encouraged to deposit materials there are two initial areas of emphasis: information literacy and informetrics. At this time, DLIST is able to accept only materials in English.
- CAV 2001: Fourth International Symposium on Cavitation <<http://cav2001.library.caltech.edu/>> (EPrints 1)
The conference papers presented at CAV2001, the Fourth International Symposium on Cavitation held at the California Institute of Technology on June 20-23, 2001. The symposium proceedings includes invited lectures and papers presented by engineers and scientists addressing the state of the art, new developments, and new ideas in the basic and applied fields of cavitation.
- Iowa State University Computer Science Technical Reports <<http://archives.cs.iastate.edu/>> (EPrints 1)
- PhilSci Archive <<http://philsci-archive.pitt.edu/>> (EPrints 1)

An electronic archive for preprints in the philosophy of science offered as a free service to the philosophy of science community to promote communication in the field by the rapid dissemination of new work.

- Sammelpunkt. Elektronisch archivierte Theorie <<http://sammelpunkt.philo.at:8080/>> (EPrints 2)
- E-prints Prototype Archive (Università degli studi di Firenze) <<http://biblio.unifi.it/indexeng.html>> (EPrints 1)

OPEN ARCHIVES INITIATIVE

Mission

The Open Archives Initiative (OAI) seeks to develop and promote interoperability standards to facilitate the efficient dissemination of

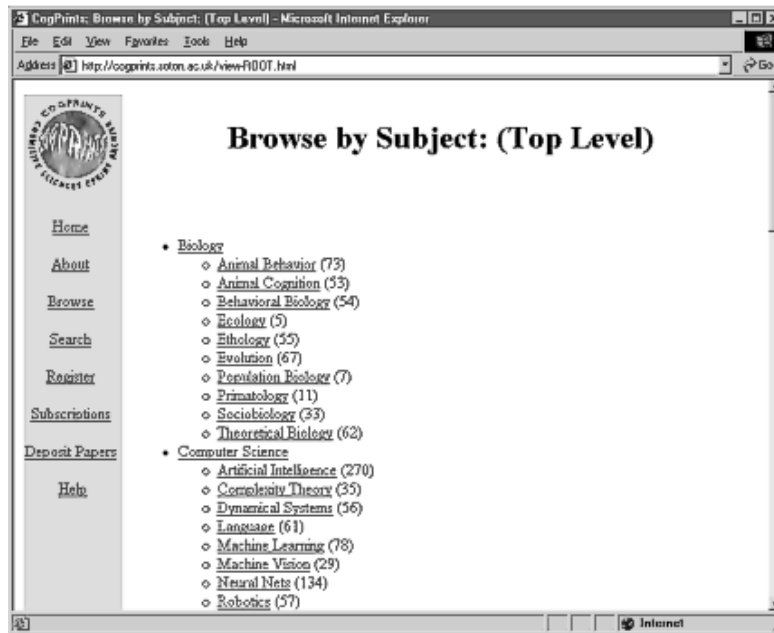


Figure 10.2. Selected Top and Subordinate Level Subject Categories in the CogPrints EPrint Service

digital content. OAI is based on efforts to enhance access to eprint archives as a cost-effective means of facilitating and increasing the availability of scholarly research, and the support of this activity remains a cornerstone of the open archives movement.⁴⁴ Within the eprints community, the term *archive* refers to a repository for stored information,⁴⁵ and the term *open* is used in an architectural sense for “defining and promoting machine interfaces that facilitate the availability of content from a variety of providers.”⁴⁶ Although the initial work in the OAI has been focused on interoperability for eprint collections, the conceptual foundation of the OAI interoperability framework has applications beyond the eprint community, and the OAI has adopted a broader mission statement to open access to a range of other digital materials.⁴⁷

Participation

The OAI invites participation in its interoperability framework at two levels: as *data provider* and/or *service provider*. Data providers can support the initiative by using the OAI protocol and registering their archive through the OAI data provider registration Web page;⁴⁸ service providers, which develop and offer services that harvest metadata from data providers that utilize the OAI protocol to build value-added services, can register via the service provider registration page.⁴⁹ In each case, both providers publicize their collections or services. As the OAI protocol provides a “mechanism for exposing metadata in multiple forms” via Internet and the Web, it offers unprecedented opportunities for knowledge sharing and publishing alternatives. As the service framework is implemented and adopted, it is hoped that over time content will become more visible and accessible to a broader community.⁵⁰

Support for Open Archives Initiative activities is provided by the Digital Library Federation and the Coalition for Networked Information; additional funding has been provided by the National Science Foundation (Grant No. IIS-9817416) and the Defense Advanced Projects Agency (Grant No. N66001-98-1-8908).⁵¹

OPEN ARCHIVES INITIATIVE PROTOCOL FOR METADATA HARVESTING

The generic version of the EPrints software is fully interoperable with all eprint archives that have implemented the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). Using this protocol, documents in registered OAI-compliant archives can be “harvested” into a global *virtual archive* by open archive services providers.⁵² The OAI protocol provides access to metadata from OAI-compliant repositories; a *repository* is defined as a network-accessible server to which OAI protocol requests can be submitted.⁵³

The current OAI technical infrastructure that specifies the OAI-PMH defines a mechanism for data providers to expose their metadata through an HTTP-based protocol. Although the OAI mission is not limited to the use of metadata, it is guided by the goal “to define a low-barrier and widely applicable framework for cross-repository interoperability,” and strongly promotes the use of metadata as a “plausible route to such a goal.” In the future, it plans to explore and define other mechanisms for interoperability.⁵⁴

Dublin Core

The OAI-PMH defines a mechanism for harvesting records containing metadata from repositories. However, the protocol does not mandate the means of association between that metadata and related content. As some providers may wish to access the content associated with harvested metadata, data providers may want to link metadata to content. The Dublin Core format⁵⁵ offers the “identifier” element that can be used to associate metadata and content.⁵⁶ As the Dublin Core has become a de facto standard for simple cross-discipline metadata, it is considered an appropriate choice for a common metadata set.⁵⁷ The OAI-PMH is not limited, however, to the use of the Dublin Core; the protocol also supports parallel metadata sets, allowing research communities to use formats that are specific and most appropriate to their applications and domains. The OAI technical framework does not limit the nature of such parallel sets, other than that the metadata records be structured as XML data.^{58,59}

The OAI-PMH was extensively tested prior to its public release in January 2001. It was subsequently upgraded to accommodate XML

Schema changes made in May 2001 (version 1.1). A new version of the protocol (v. 2.0) was publicly released on June 14, 2002.⁶⁰

Data Providers

In addition to the various EPrints archives, there are several dozen other OAI registered data providers. These collections cover a variety of subjects and formats ⁶¹ and include:

- arXiv (Los Alamos National Laboratory)
- Chemistry Preprint Server (ChemWeb)
- CIMI Metadata Harvesting Working Group Demonstration Repository (CIMI Consortium)
- Comparative Bantu Online Dictionary (CBOLD) (University of California at Berkeley)
- ConoZe: *intelligere ut credas, credere ut intelligas* (<<http://conoZe.com/>>)
- Elektronisches Dokumenten-, Archivierungs-, und Retrievalsystem der Universität Dortmund
- Ethnologue: Languages of the World (SIL International)
- Hong Kong University Thesis Online
- Library of Congress Open Archive Initiative Repository
- Mathematics Preprint Server (Elsevier Science)
- NACA Technical Reports (National Advisory Committee for Aeronautics)
- OCLC Online Computer Library Center Theses and Dissertations Repository
- Open Video Project (University of North Carolina at Chapel Hill)
- Resource Discovery Network (RDN) (United Kingdom)
- Schoenberg Center for Electronic Text and Image (University of Pennsylvania)
- Universidad de las Américas (University of the Americas), Puebla (Mexico) Tesis Digitales project
- University of Michigan Library Digital Library Production Service
- Uppsala (Sweden) University Digital Archive
- Virginia Polytechnic and State University Thesis and Dissertation Collection

Service Providers

Although there are fewer service providers than data providers, the current registered service providers offer a range of retrieval options and functionalities⁶² and presently include:

- Arc (Old Dominion University): A federated search service based on metadata harvested from several OAI-compliant repositories
- Citebase (Southampton University): A search service provides users with the ability to search across multiple archives with results ranked by a variety of criteria, such as citation impact
- DP9 (Old Dominion University): An open source gateway service that allows general Internet search engines such as Google (<<http://www.google.com/>>) to index OAI-compliant archives
- Networked Computer Science Technical Reference Library (NCSTRL) (Old Dominion University, University of Virginia, Virginia Polytechnic Institute and State University): An OAI-based implementation of the NCSTRL project that provides unified access to technical reports and eprints from computer science departments
- Repository Explorer (Virginia Polytechnic Institute and State University): An interactive Web-based tool to test repositories for compliance with the Open Archives Initiative Protocol (versions 1.0 or 1.1)
- Torii (International School for Advanced Studies, Trieste, Italy): A service that provides unified access to various open archives in physics and computer science that offers filtering, personalization, and other advanced features

Among the most comprehensive service providers is Arc (<<http://arc.cs.odu.edu/>>), a cross-archive searching service developed by faculty associated with the Department of Computer Science at Old Dominion University, Norfolk, Virginia. The search interface supports both simple and advanced search functionalities, as well as results sorting by date stamp, relevance ranking, and archive. The simple search option allows the user to search free text across the search archives, while its advanced search feature permits the user to search in specific metadata fields. Users can also search or browse specific archives and/or archive partition (see Figure 10.3).⁶³

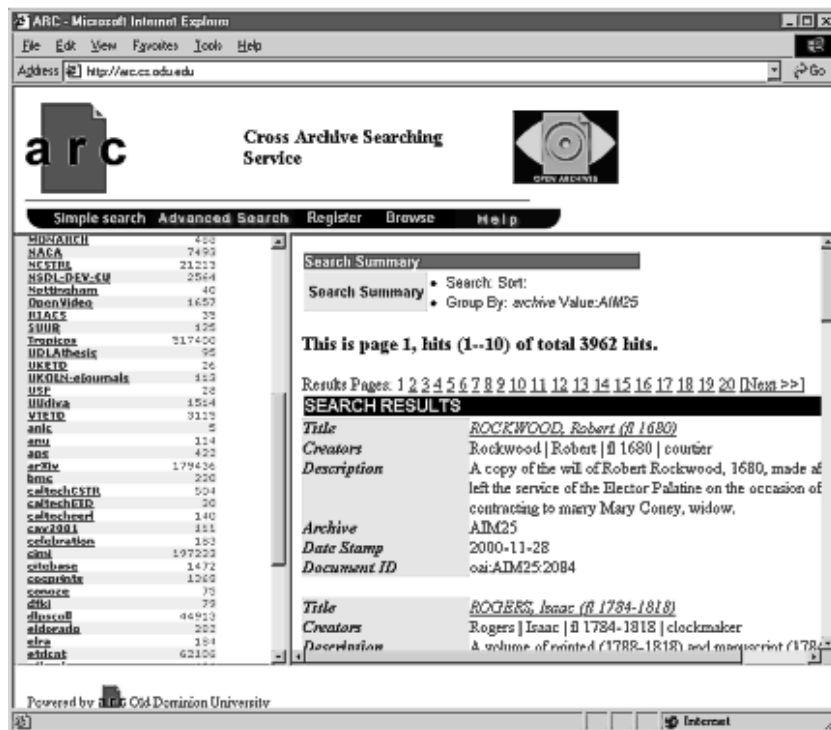


Figure 10.3. The Arc Cross-Archive Searching Service Browse Interface Screen

Another service provider, Citebase (<<http://citebase.eprints.org>>), offers cross-archive searching for two major OAI-compliant eprint archives: arXiv.org and CogPrints. Search results can be ranked according to various criteria, notably citation impact. Citebase is a prototype intended to demonstrate open access citation linking and harvesting and was created and is maintained by Timothy D. Brody, a postgraduate student and researcher with the Intelligence, Agents, Multimedia Group of the Electronic and Computer Science Department at the University of Southampton (United Kingdom).⁶⁴ Citation data has been extracted computationally from the arXiv.org collection using software developed under the Open Citation (OpCit) Project, an international cooperative project based at the University of Southampton (United Kingdom) directed by Stevan Harnad (see Figure 10.4).⁶⁵



Figure 10.4. Citebase Search Page with Pull-Down Menu Listing Rank Display Options

ROLES AND RESPONSIBILITIES OF SELF-ARCHIVING

In a major review on self-archiving and its associated implications and ramifications, Harnad outlines the roles and responsibilities that stakeholders should have in the liberation of the research literature.⁶⁶

Researchers

For Harnad, “the freeing of their present and future refereed research from all access- and impact-barriers forever is now entirely in the hands of researchers.” From his point of view, distributed, institution-based self-archiving is “a powerful and natural complement to central, discipline-based self-archiving” that will “broaden and accelerate the self-archiving initiative.”

Universities

Harnad advocates that “universities should create institutional eprint archives . . . for all their researchers” and mandate that their faculty adopt this publication option. As he observes,

it is already becoming normal practice for faculty to keep and update their institutional CVs online on the Web; it should be made standard practice that all CV entries for refereed journal articles are linked to their archived full-text version in the university’s Eprint Archive.

For researchers “who profess to be too busy, tired, old, or inexpert to self-archive their papers for themselves,” Harnad proposes “a modest start-up budget to pay library experts or students to do it for them.” For him such an investment “. . . will only be needed to get the first wave over the top; from then on, the momentum from the enhanced access and impact will maintain itself, and self-archiving will become as standard a practice as e-mail.”

Libraries

For Harnad, “[l]ibraries are the most natural allies of researchers in the self-archiving initiative to free the refereed journal literature” as they have been affected most by the ever-increasing costs of institutional journal subscriptions in the past two decades. He believes the self-archiving paradigm offers librarians and libraries an opportunity “to establish a new digital niche for themselves” by “facilitating the all-important start-up wave of self-archiving” and maintaining the eprint archives. Through such initiatives as SPARC (<<http://www.arl.org/sparc>>) and “their collective, consortial power,” Harnad believes that “libraries can also facilitate a stable transition” by leveraging support for publishers who are prepared to provide open access and offer the key feature of formal publication, the peer-review service.

Students

Harnad advises students “to keep doing what they do naturally: favor material that is freely accessible on the Web.”

Publishers

Harnad believes that “publishers should concede graciously on self-archiving as the American Physical Society (APS) has . . . and not try to use copyright or embargo policy to prevent or retard” its adoption. From his point of view, “such measures are in direct conflict with the interests of research and researchers, . . . are destined to fail, . . . can already be legally circumvented, and . . . only make publishers look bad.” For Harnad, a better policy would be for publishers “to concede on the optimal and inevitable for research,” and plan to separate their quality control and certification functions from the access and needless “added-value” features.

Government and Society

As much of research and its associated publication has been supported by public funding, Harnad strongly believes that public archiving of public research worldwide should be mandated:

Government and society should support the self-archiving initiative, reminding themselves that most of this giveaway research has been supported by public funds, with the support explicitly conditional on making the research findings public.

The beneficiaries will not just be research and researchers, but society itself, inasmuch as research is supported because of its potential benefits to society.

Researchers in developing countries and at the less affluent universities and research institutions of developed countries will benefit even more from barrier-free access to the research literature than will the better-off institutions, but it is instructive to remind ourselves that even the most affluent institutional libraries cannot afford most of the refereed journals!

. . . And on the other side of barrier-free access to the work of others, all researchers, even the most affluent, will benefit from the barrier-free impact of their own work on the work of others.

Furthermore, Harnad believes that “a freed, interoperable, digital research literature will not only radically enhance access, navigation, . . . and impact, [but] will also spawn new ways of monitoring and measuring . . . [the] impact, productivity and quality [of research].”

Foundations and Funding Agencies

Among the alternative funding options proposed for the establishment of open-access journals are subsidies from foundations and other granting agencies.⁶⁷ To accelerate the adoption and use of institution-based self-archiving, as well as the establishment of open-access electronic journals, the Open Society Institute (OSI) provided a multimillion-dollar grant to launch the Budapest Open Access Initiative in February 2002.⁶⁸ The OSI is the private granting agency “established . . . to promote the development and maintenance of open societies around the world”⁶⁹ and is one of several that form the Soros Foundations Network, the private operating and grant-making organization established by George Soros, the billionaire philanthropist.⁷⁰ Although other donors have been approached, to date the OSI remains the major benefactor, committing one million dollars per year for three years. As the costs of establishing an institutional eprint archive or alternative electronic journal are low (\$10,000 and \$50,000 respectively), this grant is expected to assist in the establishment of a significant number of archives and “new generation” journals.⁷¹

“THE FUTURE OF IDEAS”

The desire of Harnad and others to liberate the research literature by utilizing the potential of the Internet and associated technologies is representative of many current open-access movements, from the collaborative development and use of open source software to the widespread adoption of peer-to-peer networking for exchanging music files and other media. A recent review of *The Future of Ideas: The Fate of the Commons in a Connected World*⁷² by Lawrence Lessig, professor of law, Stanford Law School, clearly articulates the inherent benefits of the Internet for creativity and innovation:

The explosion of innovation we have seen in the environment of the Internet was not conjured from some new, previously unimagined technological magic; instead, it came from an ideal as old as the nation. Creativity flourished there because the Internet protected an innovation commons. The Internet's very design built a neutral platform upon which the widest range of creators could experiment.

The legal architecture surrounding it protected this free space so that culture and information—the ideas of our era—could flow freely and inspire an unprecedented breadth of expression.⁷³

Although Lessig focuses on a disturbing trend that seeks to extend and apply restrictive copyright and patent protection, his overall concern is not unlike that of Harnad and his colleagues who seek barrier-free access to the research literature; each recognizes the detrimental effects of stringent copyright and restrictive access on the open exchange of ideas. For Lessig, aggressive copyright protection “has allowed the media and software giants . . . to monopolize our cultural, intellectual, and political life,”⁷⁴ while for Harnad, barriers to author research imposed by the prevalent publishing model are both paradoxical and unwarranted.

In June 1995, the Association of Research Libraries (ARL), Office of Scientific and Academic Publishing, published an edited volume of “an Internet discussion about scientific and scholarly journals and their future” that ensued in response to a “subversive proposal for electronic publishing” made in June 1994 by Harnad, then at Princeton University. The volume provides a synthesis of views, with relevant commentary, on the future of scholarly publishing in the Internet era by various proponents and opponents of alternative publishing models such as the eprints service established by Ginsparg in 1991.⁷⁵

In their conclusion, the volume editors, Ann Shumelda Okerson and James O'Donnell, make several observations that are as valid now as they were then for those considering participation in open access and retrieval initiatives:

Ideas can change the world. Will these? The uncertainties are many. The model that Paul Ginsparg has already brought to life is one that clearly can work, at least under specific conditions.

Where a well-defined group of users, all acclimated to the same kind of discourse and even familiar with standard software packages that transmit well by network, concentrate on producing rigorously analytical material, the relatively unobtrusive preprint server can be a powerful tool. Does it scale up?⁷⁶

Although limited at this time, use of the generic EPrints software by a range of institutions for a variety of subject collections indicates that self-archiving can indeed enhance and broaden access to the research literature. Whether the self-archiving model becomes the new paradigm for scholarly publishing as envisioned by its proponents will depend not only on improved archiving and retrieval software and systems but also, and more importantly, on the degree to which all stakeholders endorse and embrace its potential as a viable and sustainable publishing alternative.

As of late March 2002, nearly 3,000 individuals and organizations, representing major universities and fields of research, have signed the Budapest Open Access Initiative; others who wish to endorse the initiative can do so by signing a Web-based petition⁷⁷ and by engaging in activities that support its philosophy and vision.⁷⁸

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