European Science Foundation Policy Briefing

Open access:

Restoring scientific communication to its rightful owners

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The European Science Foundation acts as a catalyst for the development of science by bringing together leading scientists and funding agencies to debate, plan and implement pan-European initiatives.

Foreword

Developments in information and communications technology (ICT) have had and are having a profound effect on the way in which research is conducted. The development of high speed broadband networking capabilities now allows for the remote use of equipment and data gathering to produce real time integration with databases and models. At the same time, the way in which we communicate both with our colleagues in the research system and with society at large is also changing and must reflect the new possibilities opened up by technological advances.

The European Science Foundation, having a responsibility as the "European voice of science" has to be concerned and involved in such developments and it is for this reason that it was pleased to help support the two major workshops on the Open Archives Initiative held at CERN in 2001 and 2002, resulting in this report.

It is very important that the report generates both a wider understanding of the issues involved and an ongoing debate about the future of scientific communications and publishing. Whatever eventually emerges – and this is a rapidly evolving activity – the key aspect for ESF has to be the maintenance of scientific quality control, based on peer review. This has to be the touchstone for acceptability of the Open Archive Initiative within the wider scientific community, including the agencies funding research.

The aim of ESF in publishing this report is to stimulate and encourage a wide and full debate within the scientific community at large at a time of rapid change.

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ESF Secretary General

Introduction

At the initiative of the Ligue des Bibliothèques Européennes de Recherche (LIBER), the organisation of European Research Libraries, two important workshops have taken place during the last two years. Both were held at CERN in Geneva. The meetings were organised by the Access Division of LIBER. The first, a workshop on the Open Archives Initiative (OAI) and Peer Review Journals in Europe, was held at CERN, Geneva (Switzerland), 22–24 March 2001 *(http://doc.cern.ch/age?a01193)*. The second workshop addressed the OAI issue of "Gaining independence with e-prints archives and OAI", was held at CERN, Geneva (Switzerland), 17–19 October 2002, *(http://doc.cern.ch/age?a02333)*. Sponsorship was provided by the Scholarly Publishing and Academic Resources Coalition (SPARC), the Joint Information Systems Committee (JISC), the Open Society Institute (OSI), the CERN Library and the European Science Foundation (ESF). Under the terms of ESF's sponsorship, the organisers were asked to submit this report. The organisers believe that the issues discussed at the workshop have great relevance to research funding, that research funding directly impacts on scholarly communication, and that the future of science itself may be at stake.

This report represents only the views of its authors as listed at the end. It is not a policy document of LIBER or the ESF.

Background

Three recent historical developments converged to create momentum behind the OAI meetings. The first development is known as the "serials pricing crisis". This term refers to the rapid and steep increase of the subscription costs of scientific journals. For example, the average subscription price of an STM (science, technology and medical) journal – even corrected for inflation – has increased by 471% between 1970 and 1995. It is estimated that only half of this

increase is due to the growth in scientific output. The price increases have sharply reduced subscriptions by academic institutions as well as by individual academics. At academic institutions, journal purchasing is done by libraries. Thus the buyers of scientific materials are not the ultimate users. Librarians have long tried to shield scientists and scholars from the rising prices of commercial scientific publications in order to maintain the level of quality and service that academics have become accustomed to. Ironically, the efforts deployed by librarians to serve their users have helped commercial publishers get away with price increases without having to face radical reductions in the subscription base that would lead to an undesirable impact on publishers' bottom line.

More recently, the advent of publishers' licensing schemes has negatively transformed access to research. Publishers heavily promote multi-journal "packages" that commit libraries to more journals than they would otherwise subscribe to, ultimately at a higher total cost to the institution. Once committed, libraries cannot withdraw from package deals, either because of length-of-contract reasons or because their users will not accept it. Publishers can then freely increase prices, which can often only be met through cancellations of (sometimes very important) journals from small publishing houses. These new package deals have severely limited ownership, access and permissible forms of use. But scientists have remained largely unaware of these new threats to scholarship. Digital technologies have made desktop accessibility to scientific journals a reality; this is what end users have most enthusiastically embraced, while remaining largely oblivious or indifferent to the costs.

The second development behind the OAI meetings is the Internet. The World Wide Web (WWW) has made digital publishing available at low entry costs, with distribution costs that are virtually zero. Some pioneers have predicted and demonstrated that digital technology can and will lead scholars to make their work available over the WWW, through their home page or through some more formal institutional or discipline-based archives. The idea behind this movement is that wide dissemination is an important contributing factor to rewards in the scholarly world – and indeed, distribution of research is the raison d'être behind most scientific careers.

For those scholarly journals currently available through subscription fees, no-cost open access dissemination of author-copyrighted documents may become the norm in the future, following the example of Ginsparg's arXiv in physics. However, we are far from this scenario at present. The question of quality certification of these documents, as well as their ephemeral nature, needs to be addressed.

The third background development is more recent. Since 1999, the Open Archives Initiative (OAI, see *http://www.openarchives.org*) has developed and promoted interoperability standards that aim to facilitate the efficient dissemination of content. It began as an effort to enhance access to e-print archives (arXiv at *http://arXiv.org*, RePEc at *http://repec.org*, and others), as a means of promoting the electronic preprint concept and support its spread across academic communities. The OAI Protocol for Metadata Harvesting defines a generic mechanism for harvesting XML-formatted metadata from repositories. It is a technical standard to share data across platforms. As such, it has broad relevance in opening up access to a range of digital material.

Support for e-prints initiatives remains a cornerstone of the work of the OAI. The protocol has already been taken up enthusiastically by many institutions. As a result, a distributed infrastructure of open access digital archives is now being built as a new instrument for scholarly communication. Already three different systems have become available as freeware and are OAI-compliant at the moment: "e-prints" from the University of Southampton *(http://eprints.org)*, "Dspace" from MIT *(http://www.dspace.org/)* and CDSware from CERN *(http://cdsware.cern.ch)*. They provide software that opens access to the research literature online through author-driven and institutional archiving. In this way a global digital library of scientific information is being constructed.

With these background developments in mind, the Open Access movement is well-positioned as a potential solution to the scientific communications crisis. The Open Access movement, already proven workable and efficient across a variety of formats, countries and disciplines, assures that publicly funded research will remain publicly available.

The open access movement

Open access to scientific articles means online access without access-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. It means that, for the sake of accelerating research and sharing knowledge, publishers, institutions and independent initiatives will need to recoup their costs from other sources.

Among publishers, BioMed Central *(http://www.biomedcentral.com/)* has already instituted an alternative model that guarantees open access. BioMed Central offers open-access online journals that are fully peer reviewed. Cost recovery occurs through author charges, some advertising, and institutional support from universities and grant making bodies.

Among grant institutions, the Open Society Institute/Soros Foundations has pledged to support researchers from the developing world who publish in open access journals. The Open Society Institute convened a meeting in Budapest late 2001 in order to accelerate progress in the international effort to make research articles in all academic fields freely available on the Internet. Participants explored how separate initiatives could work together to achieve success, how to aid the transition to open access and how to make open access publishing economically self-sustaining. The resulting Budapest Open Access Initiative *(http://www.soros.org/openaccess/ read.shtml)* is a statement of principle, strategy, and commitment that has been signed by 2 490 individuals and 178 organisations.

SPARC (the Scholarly Publishing and Academic Resources Coalition), a worldwide organisation of research libraries that facilitates competition in scholarly publishing, was one of the creators of the Budapest Open Access Initiative. Among many other activities furthering its mission, SPARC has established itself as a resource for editorial boards and publishers who would like to move into the open access realm – specifically through the establishment of institutional repositories.

To this end, SPARC has published "The Case for Institutional Repositories: A SPARC Position Paper" and the "Institutional Repository Checklist and Guide" *(http://www.arl.org/sparc/IR/ir.html and http://www.arl.org/sparc/IR/IR_Guide_v1.pdf).*

These documents examine the strategic roles institutional repositories serve for universities and provide practical, tested guidance for the implementation and maintenance of an institutional repository. SPARC asserts that institutional repositories – digital collections that capture and preserve the intellectual output of university communities – answer two challenges currently facing the research and academic community. First, institutional repositories reform scholarly communication by stimulating innovation in a disaggregated publishing structure. Second, they serve as tangible indicators of an institution's quality – its brand – thus increasing its visibility, prestige, and public value. Because an institutional repository brands an institution, ESF's support of this concept could help close the research branding gap between the US and Europe.

Workshop on the Open Archives Initiative (OAI) and peer review journals in Europe

The aim of the first workshop was to reflect on the possibility to deploy a network of preprint repositories that could become nodes in the envisioned electronic scholarly communication system. Since scientific evaluation by peer review is such an essential ingredient of the process of scholarly communication, this workshop focused specifically on the question of how peer review can be combined with open access repositories in order to arrive at a fully validated scientific information system. The workshop was attended by some 65 participants, mostly librarians and scientists from the academic community.

During this workshop several possible mechanisms were given for establishing high-quality scientific evaluation within the framework of Open Access repositories:

- The most simple example is that of a straightforward electronic journal with either the traditional peer review process (e.g.: *Documenta Mathematica*), or with a more conversational open peer review (e.g.: *Journal of Interactive Media in Education*)

- Another procedure, more in line with the OAI business model, is to separate the peer review from the publication. On the basis of articles deposited in different archives, an editor can provide reviews, reputation, indexing, etc. This leads to the concept of virtual "overlay journals" on the basis of links to one or more archives. Such overlay journals already exist for the arXiv.org collection of preprints in physics and related disciplines.

- While waiting for such mechanisms to become established on a broader scale, one can continue to rely on the editorial boards of the traditional journals and at the same time make the publications available through Open Access archives. Following the example of the American Institute of Physics, more and more publishers accept this double track mechanism.

Recommendations of the 1st Workshop

- The participants were unanimous in their belief that the certification of scholarly work remains a fundamental part of a system for scholarly communication. It was generally believed that the electronic environment allows for novel approaches to accord a stamp of quality to scholarly works. Examples of new metrics that can be extracted from a fully electronic communication system are: usage counts of a work; automatically extracted citation information with a scope beyond the ISI-core journals; amount of discussion generated by a paper submitted in a system with open peer review and peer comment, etc.

- The organisation of the peer review process will become the most important cost element of e-journals. There seemed to be consensus among participants that the author of the uncertified work (or his institution) should cover these peer-reviewing costs. Arguments in favour of such an approach are:
  - It is the author who obtains the professional reward for the publication;
  - Covering the expenses should make the author more aware of the publication cost;
  - The dissemination of scholarly work should be considered as being an essential part of the process of publicly-funded research.

- Within the framework of OAI, there is a need for a new protocol for certification. There was strong support for the extension of the usage of the OAI protocol beyond discovery-related metadata. Given the focus of the workshop on peer review, concrete actions were suggested to address the exchange of certification-related metadata using the OAI protocol in a trusted environment.

- The learned societies should be convinced that they should take up their responsibility regarding peer review, e.g. through the organisation of virtual overlay journals.

- Funding should be provided for experiments in the area of certification of works in an electronic environment.

2nd Workshop on the Open Archives Initiative (OAI): Gaining independence with e-prints archives and OAI

Following the success of the first workshop, interest in the second workshop was extremely high. Participation was capped at 130. Attendees represented 20 countries. The workshop discussions moved from technical matters to economic, cultural/sociological and legal issues involved in transforming scholarly communication. The meeting also revealed a shift towards the development of added-value services on top of and across open access data repositories. This confirms the conjecture of the OAI work that once data providers are available, service providers will emerge. The workshop revealed that enormous momentum has been gained in efforts to transform scholarly communication, not only through thinking and talking but, more importantly, through an abundance of concrete, successful projects. For reasons of space, this report does not list all these projects here, and neither does it want to be selective by mentioning some projects at the expense of leaving out others. Therefore we refer the reader to the workshop presentations. They are freely available online at *http://doc.cern.ch/age?a02333.*

Recommendations of the 2nd Workshop

Participants unanimously agreed to the following statement:

Publicly funded research should be made publicly available through the open access channel most appropriate, allowing for variation in format, country, and discipline.

In addition, participants offered the following recommendations to discrete groups of stakeholders:

For funding agencies:

- Publicly funded refereed research results should be publicly available via open-access channels.
- In their assessment of research groups and individual researchers, funding agencies should give credit for efforts to publish in new open-access media. Even with very strict peer review, such new e-journals cannot immediately attain the same high "impact parameters" as traditional journals. Researchers who opt for the wide distribution of their quality work through these new media should not be unduly penalised.
- The funding agencies should partner with researchers, universities, and library organisations such as LIBER to make open access a formal, viable solution.
- Funding agencies should realise that the dissemination phase of research is an integral part of the scientific process, which may require special funding. In the allocation of grants, the costs related to the distribution of the research results (e.g., for paying the peer review process) should be taken into account.

For universities:

- Universities should codify funds for open-access dissemination into each dissertation project and establish that PhD theses are a starting point for filling an open archive. Participation in the Networked Digital Library of Theses and Dissertations (NDLTD) is specifically recommended.
- Universities should examine alternative business models such as BioMed Central, and their medical faculties should consider the possibility of a membership agreement with this publisher.

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- Universities should be supportive of their library's effort for building an institutional repository (see below); such repositories increase the visibility of their research output.
- Institutions should adopt a strategy of populating their institutional repository by adopting a specific strategy according to the nature of the document: i.e., documents posted on personal websites and dissertations and working papers would be uploaded first, since identifying these sources requires less effort.

For learned societies:

Too often they have followed the profit-making example of commercial publishers.

- They should return to their historical role in the dissemination process of scientific results and in safeguarding its quality, as a service to their community.
- They should study the new business models in order to verify that open-access journals with (author-paid) peer review may constitute an economically healthy process.
- They should adopt an electronic toolbox for starting a new journal and establish it as the organisation's publication standard.

For editorial board members, peer reviewers and researchers:

- Researchers should post publications in an open access archive.
- Scientists should refuse to referee for high-cost journals; editorial board members should evaluate whether they are really serving their scientific community. If not, they should consider resigning from the editorial board.
- Editorial boards and individual researchers interested in learning more about how to better serve their research community should refer to the following SPARC resources:

⇒ Create Change
http://www.createchange.org
⇒ Declaring Independence
http://www.arl.org/sparc/DI
⇒ Gaining Independence
http://www.arl.org/sparc/GI

For OAI developers and service providers:

- OAI data and service providers should work to create Value-Added Aggregators (VAA) which would perform many of the services associated with the traditional abstracting and indexing services, including cross-referencing citations. The RePEc project at *http://repec.org* provides an example.

For libraries:

- Libraries should take the initiative for building an institutional repository at their home institution; they should guard the quality of its metadata and make arrangements for archival stability. With regard to their users, they should sponsor discussions and presentations about the advantage of depositing publications in such a repository. (For resources and a sample presentation, see *http://www.arl.org/sparc/core/index.asp?page=m0*.)
- Libraries should show scholars the benefits of exposure through open-access means, including rapid dissemination and increased citation of articles. They should introduce new system tools such as counting the number of downloads, the number of times an article is quoted, or its validation status.
- Libraries should coordinate programmes to help make scholars aware of their rights to keep their copyright and to negotiate the right to self-archive.

Conclusions

The world of scholarly publishing is undergoing a profound transformation. Nobody can predict the outcome of this revolution, but it is of great relevance for the future of scientific research. The Internet has made possible the no-cost dissemination of scientific information through a variety of mechanisms. We encourage experimentation with these new mechanisms because they promise a publication process with improved global access to research results. Importantly, this move forward can also bring a reduced financial burden for libraries. Experimentation with these new publishing and distribution tools can be accomplished without compromising the high standards enforced by the traditional publication process – both with respect to scientific quality (through peer review) and to stability of access (through paper or digital archiving).

In the meantime, ESF should look with an open mind towards these new initiatives. Special actions that could be undertaken or stimulated include the following:

- **The organisation of seminars for educating researchers and helping them explore opportunities in open access publishing.**
- **Offering moral support to OAI by convincing the national funding agencies in Europe of the positive impact that in the long run such an initiative may have on the development of scientific research.**

It is especially with this last idea in mind that the present Policy Briefing has been published.

Bibliography

- Case, Mary M. and Prudence S. Adler. *Promoting Open Access: Developing New Strategies for Managing Copyright and Intellectual Property*, ARL Bimonthly Report on Research
- *Library Issues and Actions*, No. 220, February 2002 *http://www.arl.org/newsltr/220/access.html*
- *Eprints Forum. Self-Archiving FAQ*, University of Southampton. *http://www.eprints.org/self-faq/*
- Fox, Peter. *Archiving of electronic publications – some thoughts on cost.* Learned Publishing, Vol.15, No.1, 2002, pp. 3-5. *http://zaccaria.catchword.com/vl=1470538/cl=67/nw=1/rpsv/cgibin/linker?ini=alpsp&reqidx=/catchword/alpsp/09531513/v15n1/s1/p3*
- Greenstein, Daniel, and Suzanne Thorin. *The Digital Library: A Biography.* Washington, DC: Digital Library Federation and Council on Library and Information Resources, 2002 *http://www.clir.org/pubs/reports/pub109/pub109.pdf*
- Guédon, Jean-Claude. *In Oldenburg's Long Shadow: Librarians, Research Scientists, Publishers, and the Control of Scientific Publishing*. ARL Proceedings 138. *http://www.arl.org/arl/proceedings/138/guedon.html.*
- Harnad, S. *A Subversive Proposal.* In: Ann Okerson and James O'Donnell (Eds.) Scholarly Journals at the Crossroads; A Subversive Proposal for Electronic Publishing. Washington, DC., Association of Research Libraries, June 1995. *http://www.cogsci.soton.ac.uk/~harnad/subvert.html* *http://www.arl.org/scomm/subversive/toc.html*
- Hitchcock, Steve. *Revealing a New Dynamic: Interaction in an Open Access Archive*. Presented at the First Workshop of the Open Archives Forum, Pisa, May 2002. (Powerpoint presentation) *http://opcit.eprints.org/talks/oaf/oaf-pisa.ppt*

- Hunter, Philip. *An e-prints revolution?* Ariadne, No. 31, April 2002. *http://www.ariadne.ac.uk/issue31/editorial/intro.html*
- Johnson, Richard K. *Institutional Repositories: Partnering with Faculty to Enhance Scholarly Communication*. D-Lib Magazine 8, no. 11 (Nov. 2002), *http://www.dlib.org/dlib/november02/johnson/11johnson.html.*
- Lagoze, Carl; Van de Sompel, Herbert; Nelson, Michael and Warner, Simeon, editors: *The Open Archives Protocol for Metadata Harvesting*, v.2.0(beta), Simeon Warner, 2002.
- Lynch, Cliff: *http://www.arl.org/newsltr/217/mhp.html*
- Odlysko, Andrew. *The Rapid Evolution of Scholarly Communication*. Learned Publishing, Vol.15, No.1, 2002, pp. 7-19. *http://zaccaria.catchword.com/vl=1470538/cl=67/nw=1/rpsv/cgi-bin/linker?ini=alpsp&reqidx=/catchword/alpsp/09531513/v15n1/s2/p7*
- Rauner, Max. *Wissenschaft im Cyberspace: Das Internet als Alternative für Fachzeitschriften.* Neue Zücher Zeitung, August 2, 2002. *http://www.nzz.ch/2002/08/02/em/page-article88LHN.html*
- Suber, Peter. *Budapest Open Access Initiative*: Frequently Asked Questions. *http://www.earlham.edu/~peters/fos/boaifaq.htm*
- Suber, Peter. *Where Does the Free Online Scholarship Movement Stand Today?* ARL Bimonthly Report on Research Library Issues and Actions No.220, February 2002. *http://www.arl.org/newsltr/220/scholar.html*
- Suber, Peter. *Open Access to the Scientific Journal Literature.* Journal of Biology, 1, 1 (June 2002). *http://www.earlham.edu/~peters/writing/jbiol.htm.*
- Suber, Peter. *Momentum for Eprint Archiving FOS Newsletter*, August 8, 2002. *http://www.topica.com/lists/suber-fos/read/message.html?mid=1607391538&sort=d&start=14*
- Tennant, Roy. *Institutional Repositories.* Library Journal, 15 September 2002. *http://libraryjournal.reviewsnews.com/index.asp?layout=article&articleid=CA242297&display=Digital+LibrariesNews&industry=Digital+Libraries&industryid=3760&verticalid=151*
- Van de Sompel, Herbert and Carl Lagoze. *Notes from the Interoperability Front: A Progress Report on the Open Archives Initiative*. 2002. 6th European Conference on Research and Advanced Technology for Digital Libraries, Rome, September 2002. *http://www.openarchives.org/documents/ecdl-oai.pdf*

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