



United Nations
Educational, Scientific and
Cultural Organization



Policy Guidelines

FOR THE DEVELOPMENT AND PROMOTION OF

OPEN ACCESS





United Nations
Educational, Scientific and
Cultural Organization

Communication and
Information Sector

Policy Guidelines

FOR THE DEVELOPMENT AND PROMOTION OF

OPEN ACCESS

by Alma Swan

Open Guidelines Series

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About the Author: Dr. Alma Swan, a leading expert in scholarly communication and Open Access, is Director of Key Perspectives Ltd, United Kingdom.

The author is responsible for the choice and the presentation of the facts contained in this book and for the opinions expressed therein, which are not necessarily those of UNESCO and does not commit the Organization.

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2. The texts related to Wellcome Trust Open Access Policy in Appendix 1, Page 62
3. The texts related to NIH Policy in Appendix 1, Page 62-63
4. The texts related to University of Leige policy in Appendix 1, Pages 64-65
5. The texts related to University of Pretoria policy in Appendix 1, Page 65
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FOREWORD



As stated in its Constitution, UNESCO is dedicated to 'maintain, increase and diffuse knowledge'. Therefore, part of its mission is to build knowledge societies by fostering universal access to information and knowledge through information and communication technologies (ICTs). The Knowledge Societies Division of the Communication and Information Sector is engaged in promoting multilingualism in cyberspace, access to information for people with disabilities, developing national policies for the information society, preservation of documentary heritage, and use of ICTs in education, science and culture, including Open Access to scientific information and research. Open Access is at the heart of the overall effort by the Organization to build peace in the minds of men and women.

Through Open Access, researchers and students from around the world gain increased access to knowledge, publications receive greater visibility and readership, and the potential impact of research is heightened. Increased access to, and sharing of knowledge leads to opportunities for equitable economic and social development, intercultural dialogue, and has the potential to spark innovation. The UNESCO Open Access strategy approved by the Executive Board in its 187th session and further adopted by the 36th General Conference identified up-stream policy advice to Member States in the field of Open Access as the core priority area amongst others. These policy guidelines are the result of an iterative process undertaken by the UNESCO Secretariat and Dr. Alma Swan, a leading expert in the field of Open Access, to revise the preliminary report based on the online consultation undertaken in the Open Access Community of the WSIS Knowledge Communities for peer review in September 2011.

I believe that this comprehensive document will be broadly useful to decision- and policy-makers at the national and international levels. However, it should be stressed that they are meant to be strictly advisory; they are not intended as a prescriptive or normative instrument. Further, I hope that this publication will also serve as a reference point for all stakeholders to clarify basic doubts in the field of Open Access. I encourage you to provide us your feedback and comments based on your experience of applying the ideas covered in this publication to further improve it in future editions.

Jānis Kārklīņš
Assistant Director-General
for Communication and Information,
UNESCO

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INTRODUCTION

Open Access to Scientific Information and Research

Scientific information is both a researcher's greatest output and technological innovation's most important resource. Open Access (OA) is the provision of free access to peer-reviewed, scholarly and research information to all. It requires that the rights holder grants worldwide irrevocable right of access to copy, use, distribute, transmit, and make derivative works in any format for any lawful activities with proper attribution to the original author. Open Access uses Information and Communication Technology (ICT) to increase and enhance the dissemination of scholarship. OA is about Freedom, Flexibility and Fairness.

The rising cost of journal subscription is a major force behind the emergence of the OA movement. The emergence of digitisation and Internet has increased the possibility of making information available to anyone, anywhere, anytime, and in any format. Through Open Access, researchers and students from around the world gain increased access to knowledge, publications receive greater visibility and readership, and the potential impact of research is heightened. Increased access to and sharing of knowledge leads to opportunities for equitable economic and social development, intercultural dialogue, and has the potential to spark innovation. Open Access is at the heart of UNESCO's goal to provide universal access to information and knowledge, focussing particularly on two global priorities: Africa and Gender equality. In all the work UNESCO does in the field of OA, the overarching goal is to foster an enabling environment for OA in the Member States so that the benefits of research are accessible to everyone through the public Internet.

UNESCO and Open Access

The Constitution of United Nations Educational, Scientific and Cultural Organization (UNESCO) in Article I, Clause 2 states one of the purposes and functions of the Organisation as:

(c) Maintain, increase and diffuse knowledge: By assuring the conservation and protection of the world's inheritance of books, works of art and monuments of history and science, and recommending to the nations concerned the necessary international conventions;

By encouraging cooperation among the nations in all branches of intellectual activity, including the international exchange of persons active in the fields of education, science and culture and the exchange of publications, objects of artistic and scientific interest and other materials of information;

By initiating methods of international cooperation calculated to give the people of all countries access to the printed and published materials produced by any of them.

While UNESCO's mission is to contribute to the building of peace, the eradication of poverty, sustainable development and intercultural dialogue through education, the sciences, culture, communication and information, the Organisation has the following five overarching objectives:

- Attaining quality education for all and lifelong learning
- Mobilising science knowledge and policy for sustainable development
- Addressing emerging social and ethical challenges
- Fostering cultural diversity, intercultural dialogue and a culture of peace
- Building inclusive knowledge societies through information and communication

The organisation also has two global priorities – Africa and Gender Equality within its overall mandate, as areas of focus. Thus, in the areas of its competence, UNESCO's role is to improve access to information and knowledge for the Member States through appropriate use of information and communication technologies. While the programme sectors engage in the specific area of UNESCO's competence, the Communication and Information sector,



especially the Knowledge Societies Division (KSD) engages in creating an enabling environment in Member States to facilitate access to information and knowledge in order to build inclusive knowledge societies. Open Access to scientific information and research is one of the many programmes on which the KSD works to increase access to information and knowledge. Some of the other related areas where UNESCO works are:

Free and Open Source Software (FOSS)

In the area of Free and Open Source Software (FOSS), UNESCO fulfils its basic functions of a laboratory of ideas and a standard-setter to forge universal agreements on emerging ethical issues by supporting the development and use of open, interoperable, non-discriminatory standards for information handling and access as important elements in developing effective infostructures that contribute to democratic practices, accountability and good governance. Recognising that software plays a crucial role in access to information and knowledge, UNESCO supported the development and distribution of software such as the Micro CDS/ISIS¹ (information storage and retrieval software) and Greenstone² (digital library software). FOSS is the engine for the growth and development of Open Access, and UNESCO encourages community approaches to software development.

Preservation of Digital Heritage

Preservation of digital cultural heritage, including digital information is a priority area for UNESCO. Digital preservation consists of the processes aimed at ensuring the continued accessibility of digital materials. Making information that are preserved accessible to citizens is facilitated through the appropriate use of a combination of software and hardware tools. UNESCO's Charter on the Preservation of the Digital Heritage (2003) states that

“the purpose of preserving the digital heritage is to ensure that it remains accessible to the public. Accordingly, access to digital heritage materials, especially those in the public domain, should be free of unreasonable restrictions. At the same time, sensitive and personal information should be protected from any form of intrusion”.

UNESCO's Memory of the World (MoW) programme aims at preserving world's documentary heritage by making it permanently accessible to all without hindrance. The mission of the Memory of the World Programme is:

- To facilitate preservation, by the most appropriate techniques, of the world's documentary heritage.
- To assist universal access to documentary heritage.
- To increase awareness worldwide of the existence and significance of documentary heritage.

Open Educational Resources

Access to high quality education is key to the building of peace, sustainable social and economic development, and intercultural dialogue. Open Educational Resources (OER) provide a strategic opportunity to improve access to quality education at all levels, and increase dialogue, knowledge sharing and capacity building. In the education and research ecosystem, OER and OA forms two important interventions that works in an integrated fashion to promote the quality of learning and generate new knowledge. The term OER was coined at UNESCO in the 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries.

Information for All Programme (IFAP)

KSD also hosts the intergovernmental programme – Information for All Programme (IFAP) that is engaged in reducing the gap between information have and have not in North and South. The IFAP seeks to:

- promote international reflection and debate on the ethical, legal and societal challenges of the information society;
- promote and widen access to information in the public domain through the organisation, digitisation and preservation of information;
- support training, continuing education and lifelong learning in the fields of communication, information and informatics;
- support the production of local content and foster the availability of indigenous knowledge through basic literacy and ICT literacy training;
- promote the use of international standards and best practices in communication, information and informatics in UNESCO's fields of competence; and
- promote information and knowledge networking at local, national, regional and international levels.

1 <http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/free-and-open-source-software-foss/cdsisis/>

2 <http://www.greenstone.org/>



World Summit on the Information Society

The World Summit on the Information Society³ (WSIS), Geneva (2003) declared that “the ability for all to access and contribute information, ideas and knowledge is essential in an inclusive Information Society”. It further emphasised that sharing of global knowledge for development can be enhanced by removing barriers to equitable access to information. While a rich public domain is an essential element for the growth of the Information Society, preservation of documentary records and free and equitable access to scientific information is necessary for innovation, creating new business opportunities and provide access to collective memory of the civilizations.

In the context of Open Access, the Summit proclaimed:

28. We strive to promote universal access with equal opportunities for all to scientific knowledge and the creation and dissemination of scientific and technical information, including open access initiatives for scientific publishing.

Two of the Action Lines of the WSIS (Action Line 3: Access to information and knowledge and Action Line 7: E-Science) have been involved in promoting Open Access to peer-reviewed information and research data through their interventions and engagements with the stakeholders.

Objective of this Document

The overall objective of the *Policy Guidelines* is to promote Open Access in Member States by facilitating understanding of all relevant issues related to Open Access. Specifically, it is expected that the document shall:

- Enable Member State institutions to review their position on access to scientific information in the light of the *Policy Guidelines*;
- Assist in the choice of appropriate OA policy in the specific contexts of Member States; and
- Facilitate adoption of OA policy in research funding bodies and institutions by integrating relevant issues in the national research systems.

Thus, the *Policy Guidelines* are not prescriptive in nature, but are suggestive to facilitate knowledge-based decision-making to adopt OA policies and strengthen national research systems.

Organisation of the Contents

The content of the *Policy Guidelines* is organized in to nine sections:

- **Section 1:** *The Development of Open Access to Scientific Information and Research*, gives an overview of the definitions used, and the history of the OA movement – Budapest–Bethesda–Berlin.
- **Section 2:** *Approaches to Open Access*, enumerates the ‘green’ and ‘gold’ routes to OA.
- **Section 3:** *The Importance of Open Access*, explains how OA is important for scholars, research institutions and for developing knowledge societies.
- **Section 4:** *The Benefits of Open Access*, emphasizes that OA enhances research process, improves visibility and usage of research works, and therefore, the impact of research works is also increased through citations and impact outside the academia.
- **Section 5:** *Business Models*, analyses the traditional business models in scientific communications and describes the new emerging models in the context of OA.
- **Section 6:** *Copyright and Licensing*, provides an overview of the legal issues in a non-legal language to explain that copyright is at the heart of OA. Copyright owners consent is essential to make OA happen, and authors and creators can retain rights to increase use of their works through different mechanisms, including Creative Commons licensing.
- **Section 7:** *Strategies to Promote Open Access*, describes policy- focused, advocacy-based and infrastructural approaches to OA. While all the approaches are important, it also lists a number of organizations engaged in promoting OA.
- **Section 8:** *Policy Framework for Open Access*, presents an overview of the growth of policies, and a critical appraisal of the issues affecting OA policies. It also presents a typology of OA policies to explain the difference in different types of policies adopted around the world. The chapter should be seen along-with the examples in Appendix-1.
- **Section 9:** *Summary Policy Guidelines*, is the key section of this document and explain the various components that a standard policy should consider, and suggests the best policy decision to be included. This section should also be seen along-with the templates in Appendix-2.

³ <http://www.itu.int/wsis/docs/geneva/official/dop.html>



The *Policy Guidelines* also gives a detailed bibliography and glossary of terms and abbreviations used at the end. An executive summary is also there in the beginning to provide an overview of the document to help a quick understanding, though it is recommended that you read the sections for detail.

Using the *Policy Guidelines*

The *Policy Guidelines* can be used by individuals as a basic text on Open Access and related policies. While we recommend that beginners to the world of Open Access should read it from cover to cover, people having some understanding of OA may like to start reading from any of the sections. Decision-makers, administrators and research managers should focus on Sections 8 and 9 that capture all relevant issues of OA policy development. At the end of this document, you will find examples of different types of OA policies (Appendix 1), and three policy templates (Appendix 2) to choose and adopt. While every institution may have their unique process of policy adoption, we recommend a more democratic, consultative and open approach to adopt Open Access policy, as success of the policy implementation will depend on the ownership of the stakeholders to deposit their work and/or publish in OA journals. We are sure that the *Policy Guidelines* will be useful to you, and we are interested in listening to your experiences and feedback. Please fill the attached feedback form at page 75-76 and return it to us to help improve the *Policy Guidelines* and also share your experiences with others.

Dr. Sanjaya Mishra
Programme Specialist
(ICT in Education, Science and Culture)
Knowledge Societies Division
Communication and Information Sector
United Nations Educational,
Scientific and Cultural Organization



EXECUTIVE SUMMARY

These Guidelines provide an account of the development of Open Access, why it is important and desirable, how to attain it, and the design and effectiveness of policies.

Open Access is a new way of disseminating research information, made possible because of the World Wide Web. The **development of the concept** is summarised as follows:

- The Web offers new opportunities to build an optimal system for communicating science – a fully linked, fully interoperable, fully-exploitable scientific research database available to all
- Scientists are using these opportunities both to develop Open Access routes for the formal literature and for informal types of communication
- For the growing body of Open Access information, preservation in the long-term is a key issue
- Essential for the acceptance and use of the Open Access literature are new services that provide for the needs of scientists and research managers
- There are already good, workable, proven-in-use definitions of Open Access that can be used to underpin policy
- There is also a distinction made between two types of Open Access – *gratis* and *libre* – and this distinction also has policy implications
- Two practical routes to Open Access ('green' and 'gold') have been formally endorsed by the research community
- The primary, and original, target for Open Access was the journal literature (including peer-reviewed conference proceedings). Masters and doctoral theses are also welcome additions to this list and the concept is now being widened to include research data and books

There is already considerable infrastructure in place to enable Open Access although in some disciplines this is much further advanced than others. In these cases,

cultural norms have changed to support Open Access.

Open Access is achieved by two main routes:

- Open Access journals, the 'gold' route to Open Access, are a particularly successful model in some disciplines, and especially in some geographical communities
- The 'green' route, via repositories can capture more material, faster, if the right policies are put in place

Additionally, 'hybrid' Open Access is offered by many publishers: this is where a fee can be paid to make a single article Open Access in an otherwise subscription-based journal. In some cases, the publisher will reduce the subscription cost in line with the new revenue coming in from Open Access charges, but in most cases this is not offered. The practice of accruing new revenue from Open Access charges without reducing the subscription price is known as 'double dipping'.

There are a number of issues that contribute to the **importance of Open Access:**

- There is a problem of accessibility to scientific information everywhere
- Levels of Open Access vary by discipline, and some disciplines lag behind considerably, making the effort to achieve Open Access even more urgent
- Access problems are accentuated in developing, emerging and transition countries
- There are some schemes to alleviate access problems in the poorest countries but although these provide access, they do not provide Open Access: they are not permanent, they provide access only to a proportion of the literature, and they do not make the literature open to all but only to specific institutions
- Open Access is now joined by other concepts in a broader 'open' agenda that encompasses issues such as Open Educational Resources, Open Science, Open Innovation and Open Data
- Some initiatives aimed at improving access are *not* Open Access and should be clearly differentiated as something different



The **benefits of Open Access** are summarised as follows:

- Open Access improves the speed, efficiency and efficacy of research
- Open Access is an enabling factor in interdisciplinary research
- Open Access enables computation upon the research literature
- Open Access increases the visibility, usage and impact of research
- Open Access allows the professional, practitioner and business communities, and the interested public, to benefit from research

As Open Access has grown, new **business models** have been developed – for journal publishing, for Open Access repositories, book publishing and services built to provide for new needs, processes and systems associated with the new methods of dissemination.

The dissemination of research depends upon the copyright holder's consent and this can be used to enhance or hamper Open Access. **Copyright** is a bundle of rights: authors of journal articles normally sign the whole bundle of rights over to the publisher, though this is not normally necessary.

Authors (or their employers or funders) can retain the rights they need to make the work Open Access, assigning to the journal publisher the right to publish the work (and to have the exclusive right to do this, if required). Such premeditated retention of sufficient rights to enable Open Access is the preferable course of action rather than seeking permission post-publication.

Formally licensing scientific works is good practice because it makes clear to the user – whether human or machine – what can be done with the work and by that can encourage use. Only a minor part of the Open Access literature is formally licensed at present: this is the case even for Open Access journal content.

Creative Commons licensing is best practice because the system is well-understood, provides a suite of licences that cover all needs, and the licences are machine-readable. In the absence of such a licence, legal amendments to copyright law will be necessary in most jurisdictions to enable text-mining and data-mining research material.

Policy development is still a relatively new activity with respect to research dissemination. Policies may request and encourage provision of Open Access, or they may

require it. Evidence shows that only the latter, mandatory, type accumulate high levels of material. Evidence also shows that researchers are happy to be mandated on this issue.

The issues that an Open Access policy should address are as follows:

- **Open Access routes:** policies can require 'green' Open Access by self-archiving but to preserve authors' freedom to publish where they choose policies should only *encourage* 'gold' Open Access through publication in Open Access journals
- **Deposit locus:** deposit may be required either in institutional or central repositories. Institutional policies naturally specify the former: funder policies may also do this, or may in some cases specify a particular central repository
- **Content types covered:** all policies cover journal articles: policies should also encourage Open Access for books: funder policies are increasingly covering research data outputs
- **Embargoes:** Policies should specify the maximum embargo length permitted and in science this should be 6 months at most: policies should require deposit at the time of publication with the full-text of the item remaining in the repository, but closed, until the end of the embargo period
- **Permissions:** Open Access depends on the permission of the copyright holder, making it vulnerable to publisher interests. To ensure that Open Access can be achieved without problem, sufficient rights to enable that should be retained by the author or employer and publishers assigned a 'Licence To Publish'. Where copyright is handed to the publisher, Open Access will always depend upon publisher permission and policies must acknowledge this by accommodating a 'loophole' for publishers to exploit
- **Compliance with policies:** compliance levels vary according to the strength of the policy and the on-going support that a policy is given: compliance can be improved by effective advocacy and, where necessary, sanctions
- **Advocacy to support a policy:** there are proven advocacy practices in support of an Open Access policy: policymakers should ensure these are known, understood, and appropriate ones implemented
- **Sanctions to support a policy:** both institutions and funders have sanctions that can be used in support of



an Open Access policy: policymakers should ensure that these are identified, understood and appropriate ones implemented where other efforts fail to produce the desired outcome

- **Waivers:** where a policy is mandatory authors may not always be able to comply. A waiver clause is necessary in such policies to accommodate this
- **'Gold' Open Access:** where a funder or institution has a specific commitment with respect to paying 'gold' article-processing fees, this should be stated in the policy

SECTION 1. The Development of Open Access to Scientific Information and Research

1.1 The development of scientific communication

The primary purposes of a formal publishing system through journals or books are so that scholars may establish their right to the intellectual property contained in the articles, so that authors can lay claim to be the first to conduct the work and present its findings, and to operate a quality control system through peer review that endeavours to guarantee that the work published is bona fide, original and properly conducted.

The beginning of the modern era of scientific communication can be traced back to the publication in 1665 of the first issues of both the *Journal des Sçavans* in Paris and the *Philosophical Transactions of the Royal Society* (of London). The number of scholarly journals grew very slowly at first, with 100 extant titles in the mid 1800s and approximately linear growth until the latter half of the 20th century when numbers grew very rapidly, reflecting massive investment in science that increased project funding and researcher numbers.

The number of peer-reviewed journals currently in publication is generally agreed to be around 25,000⁴: there are probably many more local and regional peer-reviewed publications in addition to this, as well as publications that do not undertake formal peer review.

Over three centuries there was little change in the system apart from in intensity of activity, but in the mid-20th century computing developments offered opportunities for new ways of communicating about research. By the 1970s, scientists at Bell Laboratories were posting their findings on electronic archives that offered file transfer protocol (ftp) access for other scientists. This may seem

insignificant, but represents a major shift: now, scientists were permitting access to their own files on remote computers and accessing those of other scientists in the same way. The age of digital scientific communication had begun, though it remained largely the domain of computer scientists until the advent of the World Wide Web in the late 1980s⁵. The development of graphical Web browsers subsequently enabled anyone with a computer and online access to communicate with anyone else with a computer and online access.

Now, with the only limiting factors being the technological limits of bandwidth and computer power, scientists can take advantage of instant communication. They are doing so in increasingly diverse ways through informal, self- or community-regulated networks utilising tools such as blogs, wikis, discussion groups, podcasts, webcasts, virtual conferences and instant messaging systems. These developments are changing both the character of science communication in many ways and scientists' expectations of a science communication system. We can expect continuing evolution in this area.

At the same time, the formal components of the scientific publishing system have moved to the Web and while some scientific journals are still published in print to accompany the electronic version, new journals are mostly born electronic. At the moment, at least, journals still represent the formal record of science. To improve their functionality, over the past decade or so an array of new features have been added to such journals, such as extensive hyper-linking within the text to other articles, graphics and datasets. In addition, some of the early worries of librarians (and some scientists) about the long-term preservation of electronic journals have been at least partly allayed by arrangements between (some) publishers

4 This is the number indexed by *Ulrich's Periodicals Directory*

5 Developed by Berners-Lee (1989) see full reference in bibliography.



and national libraries and by international developments such as CLOCKSS⁶.

Alongside the move to the Web of journals there has been the development of specialised Web-based search-and-discovery tools to enable scientists to identify and locate articles of relevance to their work. Some of these tools are electronic versions of previous, paper-based services, others are new services altogether, such as Web search engines (for example, Google Scholar).

1.2 The development of Open Access to scientific information

The early use of the Internet by computer scientists was the forerunner of true Open Access. They made their findings freely available for other computer scientists to use and build on. But theirs was a comparatively rudimentary system and was open only to a discrete community. The Web, however, offered the possibility for scientists to make their work available to all who might wish to use it, and though academic research might be viewed as being primarily of use to academic scientists, there are other constituencies that benefit from it as well – independent researchers, the professional and practitioner communities, industry and commerce.

In 1991, the high-energy physics preprint server, arXiv⁷ (preprints are the pre-peer review version of journal articles) was established and the practice of self-archiving (depositing in an Open Access archive) of scientific articles took root in that community. Later in that decade, Citeseer⁸, a citation-linked index of the computer science literature was developed to harvest articles from websites and repositories where they were being self-archived by the computer science community. These two rapidly-growing collections⁹ of openly-available material demonstrated the demand for access to that literature – usage is extremely high – and showed the way for the rest of the scientific disciplines.

While many disciplines did not follow suit, there was subsequent development of Open Access collections in biomedicine in the form of PubMed Central¹⁰ and in economics (RePEC¹¹ and similar services). These services are all excellent examples of opening up the literature in specific disciplines, but there remains a great deal of science not covered by them and so much work to be done in extending Open Access to these areas.

At the same time as repositories were developing as locations for Open Access material, the alternative type of Open Access dissemination vehicle was also on the rise – Open Access journals. These are journals of a new type: they make their contents freely available online (though they may still charge subscriptions for printed versions) and employ a variety of business models to cover their costs. There are currently nearly 7,000 journals listed in the Directory of Open Access Journals, a service that is compiling a verified, searchable index of this type of publication. Some of these journals head their categories in the impact factor rankings published by Thomson Reuters¹².

In some cases, books are also available as Open Access publications and in fact one of the earliest experiments in Open Access was by the National Academies Press which, in 1994, began making its books freely available online while selling print copies (a model it still uses though with some refinements). Recent developments in this area have been extensive: of note are the many advances by university presses to find a sustainable model for producing their outputs in Open Access form¹³, the establishment of a shared production platform and Open Access digital library for publishers of books in the humanities in Europe¹⁴, and with commercial publishers entering the scene¹⁵.

With these developments, the need to advocate a clear message to the whole scientific community led to the development of a formal definition of Open Access.

6 Controlled LOCKSS (Lots of Copies Keep Stuff Safe), a community-governed initiative to preserve scholarly material in a sustainable, geographically-distributed, dark archive: <http://www.clockss.org/clockss/Home>

7 The server was initially hosted at the Los Alamos Laboratory in the USA, and moved to Cornell University in 2001: www.arxiv.org It contains around 750,000 full-text documents and 75,000 new submissions each year. It serves approximately 1 million full-text downloads to around 400,000 individual users each week: <http://www.nature.com/nature/journal/v476/n7359/full/476145a.html>

8 <http://citeseerx.ist.psu.edu/>

9 CiteSeer contains more than 750,000 documents and fulfils 1.5 million viewing requests per day. arXiv contains nearly 700,000 documents and sees over a million visits per day.

10 <http://www.ncbi.nlm.nih.gov/pmc/> There are also national versions of PubMed Central (such as UK PubMed Central: <http://ukpmc.ac.uk/>)

11 <http://repec.org/>

12 Web of Knowledge Journal Citation Reports: http://wokinfo.com/products_tools/analytical/jcr/

13 OASIS (Open Access Scholarly Information Sourcebook): University presses and Open Access Publishing: http://www.openoasis.org/index.php?option=com_content&view=article&id=557&Itemid=385

14 OAPEN (Open Access publishing in European Networks): <http://www.oapen.org/home>

15 For example, Bloomsbury Academic: <http://www.bloomsburyacademic.com/>

1.3 Defining Open Access

• • • 1.3.1 The Budapest Open Access Initiative

Although there have been several different attempts at formally defining Open Access, the working definition used by most people remains that of the **Budapest Open Access Initiative** (BOAI, 2002¹⁶) which was released following a meeting in Budapest in December 2001. The Initiative is worded as follows:

An old tradition and a new technology have converged to make possible an unprecedented public good. The old tradition is the willingness of scientists and scholars to publish the fruits of their research in scholarly journals without payment, for the sake of inquiry and knowledge. The new technology is the internet. The public good they make possible is the world-wide electronic distribution of the peer-reviewed journal literature and completely free and unrestricted access to it by all scientists, scholars, teachers, students, and other curious minds. Removing access barriers to this literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge.

*For various reasons, this kind of free and unrestricted online availability, which we will call **open access**, has so far been limited to small portions of the journal literature. But even in these limited collections, many different initiatives have shown that open access is economically feasible, that it gives readers extraordinary power to find and make use of relevant literature, and that it gives authors and their works vast and measurable new visibility, readership, and impact. To secure these benefits for all, we call on all interested institutions and individuals to help open up access to the rest of this literature and remove the barriers, especially the price barriers, that stand in the way. The more who join the effort to advance this cause, the sooner we will all enjoy the benefits of open access.*

The literature that should be freely accessible online is that which scholars give to the world without expectation of payment. Primarily, this category encompasses their peer-reviewed journal articles, but it also includes any as-yet un-reviewed preprints that they might wish to put

online for comment or to alert colleagues to important research findings. There are many degrees and kinds of wider and easier access to this literature. By "open access" to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. 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.

While the peer-reviewed journal literature should be accessible online without cost to readers, it is not costless to produce. However, experiments show that the overall costs of providing open access to this literature are far lower than the costs of traditional forms of dissemination. With such an opportunity to save money and expand the scope of dissemination at the same time, there is today a strong incentive for professional associations, universities, libraries, foundations, and others to embrace open access as a means of advancing their missions. Achieving open access will require new cost recovery models and financing mechanisms, but the significantly lower overall cost of dissemination is a reason to be confident that the goal is attainable and not merely preferable or utopian.

To achieve open access to scholarly journal literature, we recommend two complementary strategies.

I. Self-Archiving: *First, scholars need the tools and assistance to deposit their refereed journal articles in open electronic archives, a practice commonly called, self-archiving. When these archives conform to standards created by the Open Archives Initiative, then search engines and other tools can treat the separate archives as one. Users then need not know which archives exist or where they are located in order to find and make use of their contents.*

II. Open-access Journals: *Second, scholars need the means to launch a new generation of journals committed to open access, and to help existing journals that elect to make the transition to open access. Because journal articles should be disseminated as widely as possible, these new journals will no longer invoke copyright to restrict access to and use of the material they publish. Instead they will use copyright and other tools to ensure permanent open access to all the articles they publish. Because price is a barrier to access, these new journals will not charge subscription or access fees, and will turn to*

16 <http://www.soros.org/openaccess>



other methods for covering their expenses. There are many alternative sources of funds for this purpose, including the foundations and governments that fund research, the universities and laboratories that employ researchers, endowments set up by discipline or institution, friends of the cause of open access, profits from the sale of add-ons to the basic texts, funds freed up by the demise or cancellation of journals charging traditional subscription or access fees, or even contributions from the researchers themselves. There is no need to favor one of these solutions over the others for all disciplines or nations, and no need to stop looking for other, creative alternatives.

*Open access to peer-reviewed journal literature is the goal. **Self-archiving (I.)** and a new generation of **open-access journals (II.)** are the ways to attain this goal. They are not only direct and effective means to this end, they are within the reach of scholars themselves, immediately, and need not wait on changes brought about by markets or legislation. While we endorse the two strategies just outlined, we also encourage experimentation with further ways to make the transition from the present methods of dissemination to open access. Flexibility, experimentation, and adaptation to local circumstances are the best ways to assure that progress in diverse settings will be rapid, secure, and long-lived.*

The Open Society Institute, the foundation network founded by philanthropist George Soros, is committed to providing initial help and funding to realize this goal. It will use its resources and influence to extend and promote institutional self-archiving, to launch new open-access journals, and to help an open-access journal system become economically self-sustaining. While the Open Society Institute's commitment and resources are substantial, this initiative is very much in need of other organizations to lend their effort and resources.

We invite governments, universities, libraries, journal editors, publishers, foundations, learned societies, professional associations, and individual scholars who share our vision to join us in the task of removing the barriers to open access and building a future in which research and education in every part of the world are that much more free to flourish.

The BOAI addresses a number of issues that are important and need to be highlighted.

First, it acknowledges that the reason Open Access is now possible is because the Web offers a means for free dissemination of goods. In the days of print-on-paper, free dissemination was not possible because each copy had an identifiable cost associated with it in terms of printing

and distribution. Second, and related to the first, the BOAI acknowledges that there are costs to producing the peer-reviewed literature, even though peer review services are provided for free by scientists, as is the raw material, of course.

Third, the BOAI describes two ways in which work can be made Open Access: by self-archiving, that is by depositing copies of papers in Open Access archives (commonly called the 'green route'); and by publishing in Open Access journals, publications that make their content freely available on the Web at the time of publication (referred to as the 'gold route').

Fourth, the BOAI details the kinds of access barriers that are non-permissible in an Open Access world – financial, technical and legal. Implicit in the definition is also the removal of a temporal barrier, meaning that research findings should be immediately available to would-be users once in publishable form, and thereafter available permanently. It is helpful to think of this also in terms of 'price barriers' (for example, subscription costs or pay-per-view charges) and 'permission barriers' (onerous copyright or licensing restrictions on use)¹⁷.

Finally, the Initiative addresses the issue of *use* of the Open Access literature which, it says, should be available 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*. This may seem like an unnecessarily detailed list, but the Initiative was setting in place the conditions needed for digital science in the 21st century, where computational methods will dominate as science becomes more data-intensive and machines need to access the literature to create knowledge. In other words, being able to *read* an article for free will not be enough.

This has led to an extension of the definition of Open Access, distinguishing between free-to-read and free-to-do more types of access. These are explained in the section below.

• • • 1.3.2 Gratis and Libre Open Access

From the viewpoint of policy development, this issue is important. Policies may explicitly acknowledge it, requiring material to be made Open Access with provision for re-use in ways over and above simply reading. This most liberal definition of Open Access has been called, by agreement within the Open Access advocacy community, 'libre' Open

¹⁷ From 'Overview of Open Access (2010) by Peter Suber. See bibliography for full reference.

Access. The other variant, where material is free to read but does not explicitly permit further types of re-use, is called ‘gratis’ Open Access.

The difference between the two may seem subtle, but the implications are rather profound. In terms of scientists’ behaviour in respect of their own interests, all scientists want their work to be read and built upon by others. That is precisely why they publish: unless they work in industry or in another private capacity, contributing to the general knowledge base is the purpose of their employment as public servants. Gratis Open Access thus presents no conflict with the normal aims of scientists to make their findings available and to have as much impact as possible. The argument goes that they may not, however, be so clear about the issue of liberal re-use rights for their work. Making their articles available for other scientists to read is one thing, it is said, but allowing more may be a step too far.

It is worth examining here what is implicated. There are two fundamental types of re-use. First, what we might term ‘human re-use’, by which is meant that scientists may use an article in ways other than just reading it to find out what its messages are. We can imagine a number of possibilities.

A scientist might:

- extract a component of the article (a graph or table, photograph or list) and carry out further analysis or modification for the purpose of research
- use one of these components alongside others like it to form a public collection
- use one or other of those components in presentations or teaching materials that are made widely available
- use a component in an article for publication
- extract large chunks of text for use in other articles

But fellow scientists are not the only potential users. There may be people who could make commercial use of material in the article, too.

Second, there is what we can term ‘machine re-use’, by which is meant that computers can also use what is in the literature. Computation upon the scientific literature is in its early days, but technologies are being developed and refined because of the huge potential they have for creating new knowledge that can be beneficial¹⁸. For

example, text-mining of the biomedical literature¹⁹ has the potential to identify avenues to discovering new drugs and other therapies²⁰. It is worth noting that these technologies do not work well on texts in PDF format, which unfortunately is the format that most Open Access articles are available in at the moment. The preferred format is XML (Extensible Markup Language). This may seem a trivial point, but in policy terms it is rather significant. In the future, as this area develops, policies are likely to discourage PDF and insist on a format that is either XML or can be easily converted to it.

• • • 1.3.3 Other formal definitions of Open Access

Subsequent definitions of Open Access have been offered. The **Bethesda Statement on Open Access Publishing**²¹ built upon the BOAI by specifying in detail the ways in which Open Access material can be used. In particular, it specifies what an Open Access publication is and which rights the owners or creators of the work grant to users through the attachment of particular licences. It says, an Open Access Publication is one that meets the following two conditions:

1. *The 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.*
2. *A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in a suitable standard electronic format is deposited immediately upon initial publication in at least one online repository that is supported by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving (for the biomedical sciences, PubMed Central is such a repository).*

The Bethesda Statement therefore reinforces the emphasis on barrier-free dissemination of scientific works and

18 For an overview of open computation, see Lynch (2006): full reference in the bibliography.

19 For an explanation of the technologies, see Rodriguez-Esteban (2009): full reference in the bibliography.

20 For an example of how the technologies work, the UK’s National Centre for Text Mining (NaCTeM) and the European Bioinformatics Institute are collaborating with UK PubMed Central on text-mining the biomedical literature: <http://www.nactem.ac.uk/ukpmc/>

21 <http://www.earlham.edu/~peters/fos/bethesda.htm>



expressly details the types of re-use that Open Access permits, including the making of derivative works, and the rights/licensing conditions that apply.

Finally, the **Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities** was published in 2003²². This is essentially the same as the Bethesda Statement but at the third of the annual Berlin Conferences on Open Access (which are held in different cities each year) the conference agreed to an additional recommendation for research institutions, as follows:

In order to implement the Berlin Declaration institutions should implement a policy to:

1. **require** their researchers to deposit a copy of all their published articles in an open access repository
- and
2. **encourage** their researchers to publish their research articles in open access journals where a suitable journal exists (and provide the support to enable that to happen).

Although there have been further attempts to define Open Access, these three (Budapest, Bethesda and Berlin), usually used together and referred to as the 'BBB definition of Open Access', have become established as the working definition.

This account of the definition of Open Access has been thorough because the issue is critically important to policy development, whether by research funders, institutions or other bodies. It is easy for policies to specify too little – in which case what results is not a true Open Access body of literature; or too much – in which case there are too many hurdles to clear to achieve Open Access satisfactorily.

Reflection on the definitions above makes it clear that there are three main issues to deal with in policy development:

- what should be covered by a policy
- what should be specified with regard to timing, costs, and how Open Access should be provided
- and what conditions should be applied with respect to copyright and licensing

These issues are further discussed in section 8.

1.4 Target content for Open Access

Central to making policy on Open Access is what types of research outputs are to be covered. The general term that is used to describe the target of Open Access is 'the peer-reviewed research literature'. In broadest terms, this would cover journals, peer-reviewed conference proceedings (the primary dissemination route in some disciplines, such as engineering) and books. Using this general term 'literature', though, brings the need for some caveats.

First, there is the issue of how to deal with scholarly books. Journals are simple: scientists write articles for publication in journals and do not expect payment for this. Indeed, their purpose in writing for journals is to gain reputational capital and benefit personally in the currency of academic research – citations. Book authors, however, do sometimes expect a financial reward as well as reputational capital to come to them from writing books. The financial reward is certainly very small in the vast majority of cases, and most authors in the humanities (which is the discipline most affected since books are the primary dissemination tool) acknowledge that their expectations of financial reward are hardly high²³, but the fact that the potential for financial payoff exists means that what can be required in policy terms with respect to journal articles cannot be the same for books. Nonetheless, policies usually do mention books (and book chapters), complete with caveat (see section 8 for further discussion on this).

Second, there is another category of research output that is increasingly becoming a focus for policy, and that is research data. Science is now data-intensive and becoming ever more so. In some disciplines (but not all) there is an acknowledged need to share data in order to effect progress. Science is simply too big in some fields to move forward without collaborative intent. The Human Genome Project illustrates this point: thousands of scientists around the world worked on the effort to sequence the whole human DNA complement and the principles of data sharing were agreed at the now-famous Bermuda meeting in 1996²⁴. There is excellent provision of public data storage and preservation facilities for scientists

23 Anecdotally, most cheerfully agree that reputational capital far outweighs financial reward as the main hoped-for benefit from publishing their work in book form.

24 1st International Strategy Meeting on Human Genome Sequencing: This included a principle that no-one would claim intellectual property rights over genome data and that data would be made publicly-available within 24 hours of being produced: http://www.ornl.gov/sci/techresources/Human_Genome/research/bermuda.shtml#1

22 <http://oa.mpg.de/lang/en-uk/berlin-prozess/berliner-erklarung/>

in biomedical research²⁵, as there is in some other data-intensive disciplines.

As well as the significant policy and infrastructure developments to support Open Data seen in some disciplines there is a more general awakening of interest in this topic. Research funders, keen to optimise conditions for scientific progress, are also working on policy support to ensure that research data are made accessible by the scientists they fund. Many research funders around the world now have Open Data policies in place, some of them backed by particular infrastructural arrangements to enable the practicalities of complying with them²⁶. Some researchers use their institution's digital repository for depositing datasets for sharing, or place datasets on open websites. Publishers also make space available on their own websites for datasets supporting journal articles and in some cases journals require data to be made openly available as a condition of publication²⁷. It must be emphasised, however, that data sharing is by no means ubiquitous and data management practices and norms vary considerably from one discipline to another, as many studies have demonstrated²⁸. There is, however, growing organisation and formalisation of this field and the recently-developed Pantan Principles define the aims and principles of Open Data concept²⁹.

Third, there are other types of research literature for which openness is considered desirable. These are theses (masters and doctoral) and the 'grey' literature (the research literature not destined for peer-reviewed journals such as working papers, pamphlets, etc). Whilst these are not covered by the formal definition of Open Access, they are second-tier targets and it should be noted that in some disciplines this tier of outputs is of very considerable significance.

Finally, though this is still very much in its infancy, there is a move towards developing an Open Bibliography of science. The premise here is that scientific information would be much more easily findable were there to be a properly constructed, fully-open bibliographic service (currently, the most comprehensive bibliographic services are paid-for services produced by commercial publishing companies). Though this issue is nowhere approaching

the stage where policy development can take place, the groundwork is being done to build an Open Bibliography system³⁰.

Summary points on the development of Open Access

- ▶ The Web offers new opportunities to build an optimal system for communicating science – a fully linked, fully interoperable, fully-exploitable scientific research database available to all
- ▶ Scientists are using these opportunities both to develop Open Access routes for the formal literature and for informal types of communication
- ▶ For the growing body of Open Access information, preservation in the long-term is a key issue
- ▶ Essential for the acceptance and use of the Open Access literature are new services that provide for the needs of scientists and research managers
- ▶ There are already good, workable, proven-in-use definitions of Open Access that can be used to underpin policy
- ▶ There is also a distinction made between two types of Open Access – *gratis* and *libre* – and this distinction also has policy implications
- ▶ Two practical routes to Open Access ('green' and 'gold') have been formally endorsed by the research community
- ▶ The primary, and original, target for Open Access was the journal literature (including peer-reviewed conference proceedings). Masters and doctoral theses are also welcome additions to this list and the concept is now being widened to include research data and books

25 For example, see the databases maintained by the National Centre for Biotechnology Information: <http://www.ncbi.nlm.nih.gov/> and the European Bioinformatics Institute: <http://www.ebi.ac.uk/>

26 As an example, see the Natural Environment Research Council's data centre network in the UK: <http://www.nerc.ac.uk/research/sites/data/>

27 The journal *Nature*, for example, has a clause in its conditions of publishing that stipulates that authors must make supporting data available for others to see and use.

28 See: Ruusalepp (2008), Brown & Swan (2009) and Swan & Brown (2008): full references in the bibliography.

29 <http://pantonprinciples.org/>

30 See the new principles on open metadata promoted by the Joint Information Systems Committee in the UK: <http://www.jisc.ac.uk/news/stories/2011/07/openmetadata.aspx> and the Open Knowledge Foundation's Working Group on Open Bibliographic Data <http://wiki.okfn.org/Wg/bibliography>

SECTION 2. Approaches to Open Access

Any form of scientific output can be made openly available, simply by being posted onto a website. This can and does happen for journal articles, book chapters and whole books, datasets of all types (including graphics, photographs, audio and video files) and software. The term Open Access, however, tends to be used about information made available in one of two structured ways.

2.1 Open Access repositories: the 'green' route to Open Access

Open Access repositories house collections of scientific papers and other research outputs and make them available to all on the Web. Because repositories can collect *all* the outputs from an institution, and because all institutions can build a repository, the potential for capturing high levels of material is excellent, though this potential is only realised if a proper policy is put in place.

Repositories mostly run on open source software³¹ and all adhere to the same basic set of technical rules³² that govern the way they structure, classify, label and expose their content to Web search engines. Because they all abide by these basic rules they are interoperable: that is, they form a network and, through that network, create between them one large Open Access database, albeit distributed across the world. They are all indexed by Google, Google Scholar and other search engines, so discovering what is in this distributed database is a simple matter of searching by keyword using one of these tools. It can also be done using one of the more specialised discovery tools that index *only* repository content

rather than the whole Web³³. The current distribution of repositories is shown in Figure 1.

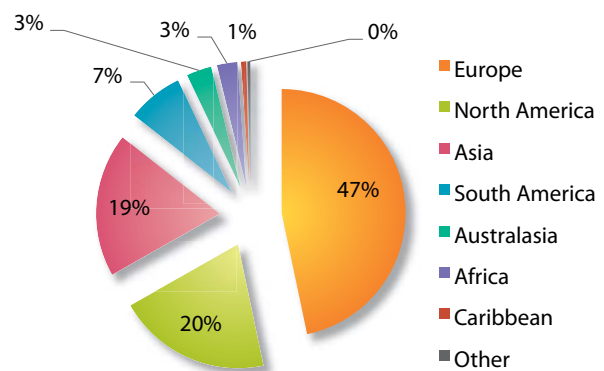


Figure 1: Distribution of repositories
(source: OpenDOAR, July 2011)

2.1.1 Centralised, subject-specific repositories

The earliest type of repository was the subject-specific, centralised type and there are some outstandingly successful examples. One such is the repository for high-energy physics and allied fields, called arXiv (see section 1.2). Subject-specific repositories may be created by authors directly depositing their work into the repository (like arXiv), or by 'harvesting' content from other collections (e.g. university repositories) to create a central service. The economics Open Access repository, RePEc, is created in this way. The success of the 'harvesting' type of repository is dependent upon there being sufficient suitable content in the university or research institute repositories that can be harvested. The success of direct-deposit repositories is dependent either upon community norms where the expectations are that authors will share their findings, or upon policy support that establishes this behaviour where the culture of sharing does not pre-exist.

31 The most common ones are EPrints (www.eprints.org) and DSpace (<http://www.duraspace.org/>)

32 OAI-PMH (Open Archives Initiative - Protocol for Metadata Harvesting): <http://www.openarchives.org/OAI/openarchivesprotocol.html>

33 For example, the Bielefeld Academic Search Engine: <http://base.ub.uni-bielefeld.de/en/index.php> or OAIster: <http://oaister.worldcat.org/>

This is therefore an important policy issue, and is discussed further in section 8.

Another successful subject-specific example is PubMed Central (PMC), the repository that houses the Open Access outputs of the National Institutes of Health amongst other things. It was established in the US in the year 2000, with the contents of just two journals. Within two years it covered 55 journals and numbers have been growing steadily to the present day, when it collects the contents of 600 journals as well as manuscripts deposited by authors. The database currently has around 2 million full-text journal articles, though while all are free to access and read, only about 11% fall under the strictest definition of Open Access by being distributed under a licence that permits more liberal re-use (see section 1.3). The general intention in this biomedical sciences field appears to be to build a network of national or regional PMCs to complement and mirror the US-based one. The first international PMC (PMCI) was established in the UK in 2007 by a consortium of other research funders. A Canadian site has been announced, with discussion of additional sites in other regions, including the possibility of transforming the UK site into a European PMC.

• • • 2.1.2 Institutional and other broad-scope repositories

In other fields and disciplines there is no centralised service like PMC or arXiv nor, yet, an established set of cultural practices around Open Access. There is, however, a growing network of institutional repositories, plus a handful of central, broad-scope ones such as OpenDepot³⁴ that serve large communities. These repositories complement the centralised, subject-based repositories. Ultimately, a network in which all research-based universities and research institutes have a repository has the potential to provide virtually 100% Open Access for the scholarly literature.

The first institutional repository was built in the School of Electronics & Computer Science at the University of Southampton, United Kingdom, in 2000³⁵. The software that it runs on, EPrints³⁶, is open source and after its release other institutions began to build their own repositories to provide Open Access to their research outputs. Growth has been rapid: within a decade there were 1800 repositories

in institutions worldwide and the number continues to increase³⁷ as universities and research institutions see the value of the additional visibility and impact a repository provides.

Research policy in some countries has also encouraged the establishment of repositories. In the UK, for example, the periodic national Research Assessment Exercise (RAE; in future to be called the Research Excellence Framework, REF³⁸) has required universities to gather information about research activities and outputs. Because a repository provides a structure for such an exercise almost all British universities now have institutional repositories, many with formal policies underpinning them. In Australia, a similar national research assessment exercise³⁹ actually required Australian universities to have a repository to collect research articles for submission to the assessment exercise.

The relative numbers of types of repository are shown in Figure 2.

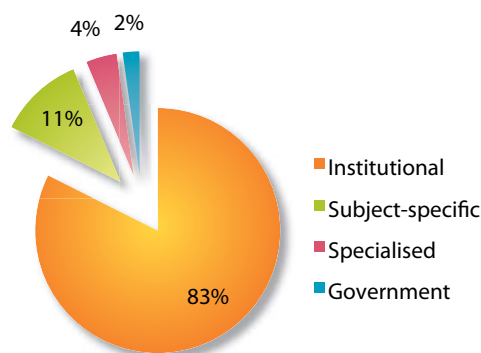


Figure 2: Repository types⁴⁰
(Source: OpenDOAR, July 2011)

34 OpenDepot is a central, Open Access repository operated by the University of Edinburgh, UK. It offers a deposit location for researchers whose own institution does not yet have a repository and re-directs articles to the home institution repository when one is established: <http://opendepot.org/>

35 <http://eprints.ecs.soton.ac.uk/>

36 <http://www.eprints.org/software/>

37 At the time of writing there are well over 2000 repositories globally. Two directories track the numbers and types of repositories: the Directory of Open Access Repositories (ROAR): <http://roar.eprints.org/> and OpenDOAR: <http://www.opendoar.org/index.html>

38 <http://www.hefce.ac.uk/research/ref/>

39 At the time called the Research Quality Framework (RQF); now called the Excellence in Research for Australia Initiative (ERA) <http://www.arc.gov.au/era/>

40 Specialised repositories may collect material on a particular topic from a number of sources, or may focus on one type of content, such as theses.

2.2 Open Access journals: the 'gold' route to Open Access

• • • 2.2.1 The Open Access publishing arena

Open Access journals also contribute to the corpus of openly available literature. There are around 7,000 of these at the moment, altogether offering over 600,000 articles⁴¹. Again, community norms play a role in determining whether such journals are welcomed and supported by researchers. In some disciplines there are many, highly successful Open Access journals, such as in biomedicine; and in some geographical communities there is also an organised approach to Open Access publishing, exemplified by the Latin American service SciELO (Scientific Electronic Library Online)⁴². The potential for capturing high levels of Open Access material by this route is good, but is limited by the willingness of publishers to forego their subscription-based revenue model and switch to one that delivers Open Access (see section 5 for a discussion of business models).

The Open Access publishing scene is very varied: there are some large publishing operations and thousands of small or one-journal operations. And just as for the subscription-access literature, quality ranges from excellent to poor. The Open Access journal literature is no different in that respect.

The earliest sizeable Open Access publisher to show that Open Access can be consistent with commercial aims was BioMed Central⁴³ (now part of the Springer science publishing organisation). BioMed Central currently publishes some 210 journals, mainly in biomedicine, though also with some coverage of chemistry, physics and mathematics. BioMed Central deposits all its journal articles in PMC at the time of publication as well as hosting them on its own website. The Hindawi Publishing Corporation⁴⁴, the Open Access publisher with the largest journal list, also publishes in the sciences. It has more than 300 journals covering the natural and applied sciences, agriculture and medicine.

Another publisher, the Public Library of Science⁴⁵, publishes some of the highest impact journals in biology and medicine (*PLoS Biology* and *PLoS Medicine*, plus others). This publisher has also changed the shape of scientific publishing through the launch of *PLoS ONE*, a journal that covers all the natural sciences. PLoS ONE introduced a new system of quality control. Though still based upon peer review, pre-publication referees are asked to judge an article purely on the basis of whether the work has been carried out in a sound scientific manner. The paper is then published and judgments about its relevance, significance and impact are made through post-publication community response online. The model has proved very successful and has recently been emulated by the Nature Publishing Group with the launch of *Nature Scientific Reports*⁴⁶.

There has been significant activity in this area in developing and emerging countries, too. Open Access provides the means for scientists in these regions to at last make their work easily findable and readable by developed-world scientists. In scientific communication terms, Open Access is becoming a great leveller. SciELO (Scientific Electronic Library Online), a collection of peer-reviewed Open Access journals published mainly from South American countries in Spanish or Portuguese, covers over 800 journals offering over 300,000 articles in the natural sciences, medicine, agriculture and social sciences. And Bioline International⁴⁷, a service that provides a free electronic publishing platform for small publishers wishing to publish Open Access journals in the biosciences, has over 50 journals in its collection, all from developing and emerging countries, covering biomedicine and agriculture. As well as these services, libraries generally include the Directory of Open Access Journals (DOAJ) in their catalogues, thereby increasing visibility or articles from developing countries and bringing them to the attention of developed world researchers.

• • • 2.2.2 'Hybrid' Open Access

As well as the 'pure gold' Open Access journals described above – journals in which all content is Open Access and licensed accordingly – there is another model. Most large scholarly publishers have introduced this in order to offer Open Access while retaining their current subscription-based business model. This so-called 'hybrid' Open Access option allows authors to opt to pay a publication fee and

41 The Directory of Open Access Journals maintains a list and a search facility: <http://www.doaj.org>

42 SciELO is an electronic publishing cooperative that offers a collection of Latin American and Caribbean journals and associated services: <http://www.scielo.org/php/index.php?lang=en>

43 <http://www.biomedcentral.com/>

44 <http://www.hindawi.com/>

45 <http://www.plos.org/>

46 <http://www.nature.com/srep/marketing/index.html>

47 <http://www.bioline.org.br/>

have their article made Open Access within an otherwise subscription journal. Take-up on these options is not high (less than 3% currently), largely because of the level of fee⁴⁸ but also because many universities and funders who permit authors to use their funds to pay for Open Access publishing will not allow them to do so to publishers who ‘double dip’: that is, charge an article-processing fee for making an article Open Access but do not lower their subscription charges in line with the new revenue stream. That said, there are a number of publishers who have made public commitments to adjusting the subscription price of their journals as revenue comes in from Open Access charges.

It should also be noted that many journals offering this option do not make the articles available under a suitable licence: this means that though the articles are free to access and read they are often not allowed to be re-used in other ways, including by computing technologies.

• • • 2.2.3 Other ways of making research outputs open

It is possible to make articles and data open by posting them on publicly available websites such as research group site, departmental websites or authors’ personal sites. As well as these examples, there is growing interest in community websites⁴⁹, and researchers are increasingly using these to share articles and other information.

Although these methods do make papers publicly available, these sites lack the structured metadata (labelling system) that repositories or Open Access journals create for each item, and most do not comply with the internationally-agreed standard OAI-PMH protocol (see section 2.1). This means that their contents are not necessarily fully indexed by Web search engines, which means that their visibility and discoverability are compromised. Author websites are also commonly out of date or become obsolete when researchers move from one institution to another, and they play no reliable preservation role. Moreover, one of the significant reasons from the institution or funder viewpoint for having material in a repository is to create a body of outputs that can be measured, analysed and assessed. If a repository is to be used for this purpose then it is important that it collects all the institution’s outputs, rather than having

them spread across multiple academic community websites.

Summary points on approaches to Open Access

- ▶ There is already considerable infrastructure in place to enable Open Access
- ▶ In some disciplines this is much further advanced than others
- ▶ In some disciplines cultural norms have changed to support Open Access but not so much in others
- ▶ Open Access journals, the ‘gold’ route to Open Access, are a particularly successful model in some disciplines, and especially in some geographical communities
- ▶ The ‘green’ route, via repositories can capture more material, faster, if the right policies are put in place
- ▶ ‘Hybrid’ Open Access is offered by many publishers. Predominantly these publishers are ‘double-dipping’

48 For example, fees for ‘hybrid’ journals published by Wiley and Elsevier are around USD 3000, excluding taxes and colour charges.

49 Such as Mendeley <http://www.mendeley.com> or Academia.edu <http://academia.edu/>



SECTION 3. The Importance of Open Access

The importance of access to research in the context of building a sustainable global future has been highlighted by UNESCO previously, and data have been produced on the patterns and trends with respect to the generation of, and access to, scientific information⁵⁰.

3.1 Access problems

Probably no scientist, wherever they may live and work, would claim that he or she has access to all the information they need. Many studies have shown that this is so even in wealthy research-intensive countries. The Research Information Network (RIN) in the UK, concluded in a meta-report that brought together the findings from five RIN-sponsored studies carried out on discovery and access⁵¹, that 'the key finding is that access is still a major concern for researchers'.

On a global scale, the SOAP study, a large, 3-year, publisher-led, EU-funded project looking at Open Access and publishing, surveyed 40,000 researchers across the world and found that 37% of respondents said they could find all the articles they need 'only rarely or with difficulty'. This presumably even takes into account the workarounds that researchers use – emailing authors, asking colleagues in other institutions, or using paid-for access through ILL (inter-library loan) or PPV (pay-per-view) systems.

Inter-library loan expenditure on journal articles is another indicator of lack of access. The UK's 'Elite 5' universities, those with libraries expected to be the best-resourced in the country, show inter-library loan costs for journal articles currently averaging around USD 50,000 per year. And Open Access repository download figures indicate

the extent that access is being fulfilled through that Open Access route for those who are unable to access the original journal⁵².

We may also assume that journal access problems in the developed world will increase. Library budgets are under pressure, Big Deals (purchase of 'bundles' of a publisher's offerings on 2-, 3- or 5-year deals) are being cancelled⁵³ and society-published journals are feeling the chill wind of recession in the form of attrition of prestigious but unaffordable titles.

In the developing world, the situation is even more serious. A World Health Organization survey carried out in the year 2000 found that researchers in developing countries claim access to subscription-based journals to be one of their most pressing problems. This survey found that in countries where the *per capita* income is less than USD 1000 per annum, 56% of research institutions had no current subscriptions to international journals, nor had for the previous 5 years (Aronson, 2004).

This problem was already acknowledged and understood, of course. The World Conference on Science, held in 1999 under the auspices of UNESCO and the ICSU, declared, *"Equal access to science is not only a social and ethical requirement for human development, but also essential for realizing the full potential of scientific communities worldwide and for orienting scientific progress towards meeting the needs of humankind"*⁵⁴.

Nearly a decade later in 2008, when improvement was still sought, the UK National Commission for UNESCO

50 Reported in the UNESCO Science Report 2010 and the World Social Science Report 2010: see UNESCO (2010) and International Social Science Council (2010) in bibliography for full reference

51 <http://www.rin.ac.uk/our-work/using-and-accessing-information-resources/overcoming-barriers-access-research-information>

52 e.g. The University of Salford's new repository containing some 1500 full-text research papers, experiences 25,000 downloads of these each month; the School of Electronics & Computer Science, University of Southampton, UK, which sees 30,000 downloads a month of the circa 6,000 full-text items in its repository; and the University of Liege in Belgium, with 35,000 downloads per month of the 30,000 articles it holds.

53 In the US: <http://chronicle.com/article/Libraries-Abandon-Expensive/128220/> and in the UK: <http://chronicle.com/blogs/wiredcampus/british-research-libraries-say-no-to-big-deal-serials-packages/32371>

54 UNESCO and the International Council of Scientific Unions (1999): World Conference on Science; Declaration on Science and the Use of Scientific Knowledge (July 1). http://www.unesco.org/science/wcs/eng/declaration_e.htm.

concluded, “Strengthening scientific capacity in developing countries has therefore been greatly hampered by their inability to afford essential scientific literature due to the combined forces of the high cost of journal subscriptions, declining institutional budgets and currency weaknesses”⁵⁵. More recently, a study by the Southern African Regional Universities Association (SARUA) revealed a picture on access to and dissemination of research publications in that region⁵⁶ that indicates that improvement is still far from being realised.

Publisher-mediated initiatives such as the WHO’s HINARI⁵⁷, OARE⁵⁸ and AGORA⁵⁹ provide free access to journals for some developing world users. They are not Open Access by definition, however, since access is available only to some users in some countries. The programmes differentiate between countries that have a *per capita* GNI above and below USD 1250, charging a USD 1000 per institution subscription to those with a *per capita* GNI between USD 1250 and 3500. Countries whose *per capita* GNI is above USD 3500 pay the normal subscription rate, however relatively poor they are: Brazil and India, for example, do not qualify for these schemes, despite their developing country status. And if a country manages to raise its economic status a little it can find itself cut off from these programmes, as the recent experience of Bangladesh demonstrated⁶⁰.

All of the above discussion relates to academic scientists and their institutions. There are other constituencies that can benefit from access to the scientific literature as well. These are what the BOAI terms ‘other curious minds’. They include the professional community (for example, family doctors, legal practices, accountancy firms, healthcare workers), the practitioner community (for example, civil engineering companies, horticulturalists, consultancies), the education community (middle and high school teachers) and independent scholars and consultants whose work is research-based. There is further discussion of this topic in section 4.3.2.

As well as the issue of access *per se*, the type of access is important. Being able to read a simple PDF representation of a journal article is helpful and may be all that is necessary for many researchers. The formal definition of Open Access, however, does require re-use rights to enable the article to be re-used in various ways (text-mined, translated into other languages, used in part in other products, etc.), as discussed in section 1.3.2. This is what is known as ‘libre’ Open Access. ‘Libre’ Open Access does not yet constitute the bulk of the Open Access literature. In institutional repositories the majority of articles are of the ‘gratis’ type, though a small proportion carry an appropriate (usually Creative Commons) licence and are ‘libre’. Where specific policies and processes are in place to ensure that the material collected is ‘libre’ then the level can be raised considerably. The best example of such an effort is UKPMC, which has systems in place to secure ‘libre’ status wherever possible. The proportion of articles in that collection that are ‘libre’ has increased greatly over the last few years⁶¹ (See Figure 3).

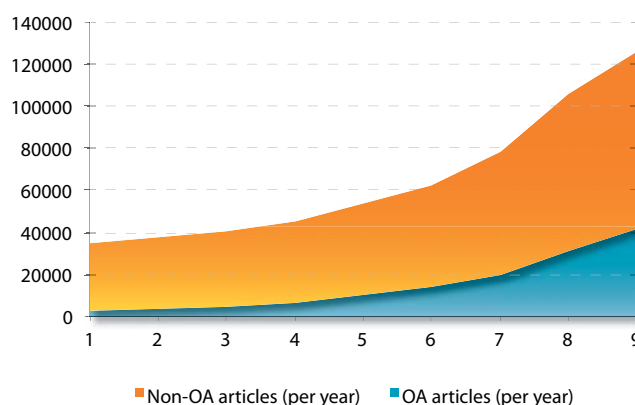


Figure 3: Proportions of ‘gratis’ (orange) and ‘libre’ (blue) articles in UKPMC 2001-2009
(courtesy of Robert Kiley, Wellcome Trust)

55 UNESCO (2008) Improving Access to Scientific Information for Developing Countries: UK Learned Societies and Journal Access Programmes. Report by Improving Access to Scientific Information Working Group (*Natural Sciences Committee*) <http://www.unesco.org.uk/uploads/Improving%20Access%20to%20Scientific%20Information%20-%20May%202008.pdf>

56 Abrahams, L, Burke, M, Gray, E & Rens, A (2008). Opening access to knowledge in Southern African universities. In SARUA 2008 Study Series, Southern African Regional Universities Association, Johannesburg, <http://www.sarua.org/?q=content/opening-access-knowledge-southern-african-universities>

57 Health InterNetwork Access to Research Initiative <http://www.who.int/hinari/en/>

58 Online Access to research in the Environment: <http://www.oaresciences.org/en/>

59 Access to Global Online Research in Agriculture: <http://www.aginternetwork.org/en/>

60 <http://www.bmj.com/content/342/bmj.d196.full>

61 See Robert Kiley’s summary of this in early 2011: <http://ukpmc.blogspot.com/2011/04/increasing-amount-of-content-in-ukpmc.html>

3.2 Levels of Open Access

The level of material that is openly accessible varies considerably from discipline to discipline and field to field. In some cases there is a long-established culture of sharing, such as in high-energy physics, astronomy and computer science. To others, the concept is newer and practice lags behind.

Infrastructure plays a role here, as does community culture and norms, and the interplay between the two can help to strongly drive developments, particularly where there is funding and easily-identifiable scientific and societal benefits to be had from Open Access. Open Access is virtually ubiquitous in the fields of high-energy physics and astronomy because depositing findings in the arXiv repository (see section 1.2) has become a community norm. In the biomedical sciences, a field that has enjoyed rapid and extensive Open Access developments over recent years, there is a well-developed and sophisticated infrastructure in place to enable the sharing of journal articles through PubMed Central (and research datasets, see section 1.4).

The current levels of Open Access material in repositories (the 'green' route) and in journals (the 'gold' route) have been measured in various ways. Figure 4 shows the levels in repositories (green bars) and journals (gold bars) for different disciplines.

Figure 5 shows the levels in repositories (the 'green' route). The bars show the % Open Access, in the year 2008, of the literature from the years 1998-2006. Figure 6 shows these percentages broken down by discipline. Note that these studies have been carried out by two research groups using different methodologies, which explains the variances in the results. Altogether, however, the current overall percentage of the literature that is openly available can be assumed to be currently around 30%.

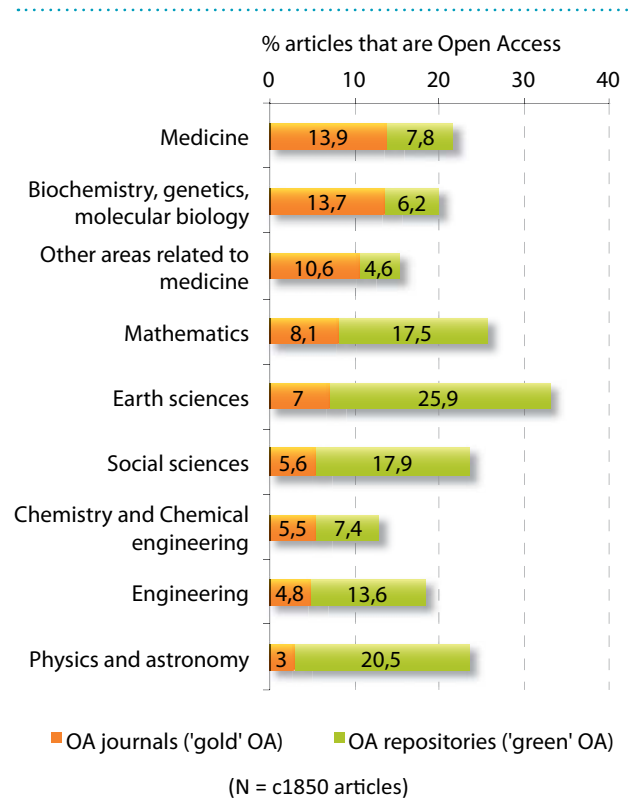


Figure 4: Percentage of the total scholarly literature in the form of Open Access articles, by discipline and mode of dissemination in 2008⁶²

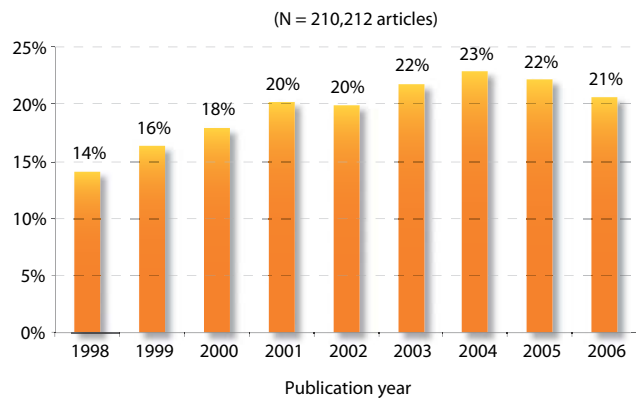


Figure 5: Percentage of the total scholarly literature available in Open Access repositories in 2010⁶³

62 Data from Björk et al, 2010 (see bibliography for full reference). This research group estimates that in 2008, 20.4% of the literature was available in some form of Open Access. The same group measured Open Access in 2006 and estimated that the level of Open Access material was 19.4% of the total literature (Björk et al, 2009: see bibliography for full reference). The difference is within confidence limits.

63 Data from Gargouri et al, 2011 (unpublished; personal communication from Yassine Gargouri, Université du Québec à Montréal)

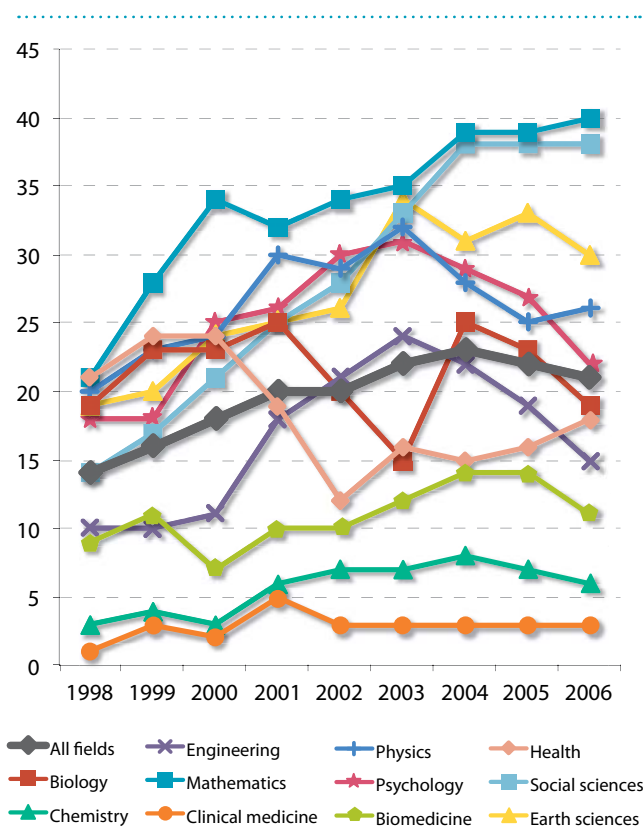


Figure 6: Percentage of the total scholarly literature available in Open Access repositories in 2010, by year of publication, broken down by discipline⁶⁴

Levels of Open Access are also likely to vary by country or region, though little data have been published on this yet.

3.3 Open Access in the wider ‘open’ agenda

Open Access to research outputs is not an isolated concept. It sits within a broad ecosystem of ‘open’ issues that are taking root in the scientific research sphere and, indeed, in the wider society with its open agenda focused on open public domain information. Alongside Open Access in the scientific domain are such things as Open Data, Open Notebooks (or Open Science)⁶⁵, Open Educational Resources (OER; teaching and learning materials)⁶⁶, Open Innovation and Open Source Software.

Importantly, there is interdependency between these things. Opening up teaching and learning materials can be only partly achieved if research information cannot be

included because it is still locked behind proprietary toll barriers: research results are teaching materials in many cases. Open laboratory notebooks only go some of the way towards making experimental results available to all: the context and synthesis of findings in that domain are found in research articles that should be Open Access alongside the notebooks’ content. So Open Access is an important early step in a move towards creating a knowledge commons and building true knowledge societies.

Open Knowledge is perhaps the best term of all to use to indicate the scope of what is trying to be achieved. Open Knowledge is *any kind of information – sonnets to statistics, genes to geodata – that can be freely used, reused, and redistributed*⁶⁷. It is the sum of intellectual endeavour – research, teaching, creating, innovating – made open. Open Access is a crucial piece of this jigsaw.

Summary points on the importance of Open Access

- ▶ There is a problem of accessibility to scientific information everywhere
- ▶ Levels of Open Access vary by discipline
- ▶ Access problems are accentuated in developing, emerging and transition countries
- ▶ There are some schemes to alleviate access problems in the poorest countries but although these provide access, they do not provide Open Access: they are not permanent, they provide access only to a proportion of the literature, and they do not make the literature open to all but only to specific institutions
- ▶ Open Access is now joined by other concepts in a broader ‘open’ agenda that encompasses issues such as Open Educational Resources, Open Science, Open Innovation and Open Data
- ▶ Some initiatives aimed at improving access are not Open Access and should be clearly differentiated as something different

⁶⁴ Data from Gargouri *et al*, 2011 (op cit)

⁶⁵ Where experimental scientists publish their laboratory notebooks containing methodologies and results openly on the Web. For example, see the UsefulChem site: <http://usefulchem.wikispaces.com/All+Reactions> and Cameron’s LaBLog: http://biolab.isis.rl.ac.uk/camerons_lablog

⁶⁶ For example, the OER Commons: <http://www.oercommons.org/>

⁶⁷ Definition from the Open Knowledge Foundation: <http://okfn.org/>



SECTION 4. The Benefits of Open Access

An open approach to scientific communication brings a number of benefits for research itself and for scientists, their institutions and research funders.

4.1 Enhancing the research process

An open research literature enhances the research process in a number of ways.

First, open literature means that research can move faster and more efficiently. Scientists do not have to spend time seeking out articles that they cannot access through their own library. In a subscription-based world, this entails asking colleagues in other institutions, writing to the author or using inter-library loan systems to obtain an article. In an Open Access world the article is available with a few clicks of the mouse. This speeds up not only the research process itself, but peer review, when reviewers look up supporting articles cited in the paper, and other research-related activities such as reviewing the literature for a new project. Authors cite a number of problems that Open Access overcomes⁶⁸, enhancing the efficacy of the research process and 'returning their faith in the integrity of their own work'.

Second, interdisciplinary research is generally considered to be growing in importance as scientific problems increasingly require the input and technologies from various disciplines to resolve. Open Access enhances interdisciplinary research because it makes it easy for scientists in one discipline to locate and use the literature of another (their institution may not cater for this need if there is no strong research programme in the other discipline). Also, in business terms, it is easier to launch successful interdisciplinary journals using an Open Access

model because, with little strong community identity and therefore demand, it has always been difficult to sell subscription-based titles that cover a broad scientific base because libraries find it difficult to assess demand within their institution.

Third, the new computational technologies can *only* work on an open literature, such things as text-mining and data-mining technologies. These computational tools extract information from articles – often across disparate fields of research – and create new knowledge. They are, of course, capable of processing and bringing together information at speeds and in ways that the human brain cannot. These computational applications are already used extensively in pharmaceutical research and some areas of chemistry, and will form the basis of a new approach to research for the future. Their promise, however, is hampered by the fact that they cannot 'see' most of the literature at the moment. Access to abstracts and bibliographic details is not enough: these tools need to be able to 'read' the full text of a research article, including any data within it and supporting it.

4.2 Visibility and usage of research

Open Access maximises visibility of research outputs and through this increases their chances of usage. Articles that are in repositories or Open Access journals are easily and immediately discoverable through a Web search using appropriate keywords and are retrievable, in their entirety, with one click.

Data on repository usage demonstrates the levels of interest in research and at the same time is an indicator of the severity of the access. Would-be users with library access to subscription journals or books have no need to visit repositories. Some examples of repository usage were given in section 3.1. These were from repositories in the developed world, but the same phenomenon can be seen for developing world science: for example, the repository at the Universidad de Los Andes

68 These include: avoiding duplication, going up blind alleys and redundancy in their work; avoiding disruptions to their work due to the need to search for an article, losing their thread and having to revisit issues; avoiding delays in the submission of papers to journal and funding bids; avoiding hindrances to peer review; avoiding resource bias (see full reference to RIN (2009) in bibliography)

in Venezuela enjoyed over 4 million article downloads in 2010⁶⁹. Importantly, Open Access provides this much-needed visibility for developing world research, which has always been hampered by the lack of channels for reaching developed world scientists and the bias of the large abstracting and indexing services towards developed world outputs⁷⁰. Open Access changes this and redresses the balance, making developing world research just as visible as that from wealthy, research-intensive regions. This will help to change roles and perceptions in the scientific community and in time deliver an economic benefit to developing countries as they attempt to build their own knowledge societies⁷¹.

4.3 Impact of research

4.3.1 Academic impact

From visibility derives usage, and from usage derives impact. A considerable body of evidence is accumulating that indicates that Open Access can increase impact in the form of citations as well as the usage impact discussed above. There have been around 35 studies conducted on this topic, a few of which do not show any increase in citations from open Access. The rest, however – about 30 studies – do demonstrate that Open Access increases citations impact with an increase of up to 600% found in some cases, though most showed an increase of up to 200%⁷².

Two things are of great importance here. First, not every article that is Open Access will gain additional citations. This is intuitive, since not every article is worthy of citations in the first place, however many people read it. What Open Access does is to maximise audience size so that articles that are worthy of citing stand the maximum chance of being seen by anyone who might have reason to cite them.

69 This repository publishes its usage statistics: <http://www.saber.ula.ve/stats?level=general&type=access&page=down-series&start=01-08-2011&end=02-08-2011&year=2011&pmonth=08&anoinicio=2011&anofm=2011&mesinicio=01&mesfim=08>

70 And Open Access is expected to overcome the general divide between mainstream and peripheral in science, including the divide between the developed and developing world. For full reference see Guedon (2008) in the reference list

71 As recognised by Dr Blade Nzimande, South Africa's Minister for Higher Education, in a speech to the 2009 World Conference on Higher Education, in which he drew a distinction between the knowledge societies of the developed world and those of the African continent. Specifically, he said that the former are producers of knowledge and the latter are consumers. Open Access will change this, enabling the developed world to discover and consume easily – for the first time – the scientific knowledge created by the developing world. <http://www.education.gov.za/dynamic/dynamic.aspx?pageid=306&id=8720>

72 A summary of studies carried out up to the beginning of 2010 showed that 27 studies demonstrated a citation advantage from Open Access and 4 did not. See Swan (2010) in the Bibliography.

4.3.2 Impact outside academia

As well as citation impact, Open Access can have beneficial impact on other constituencies. The most-often used example of this kind of impact is the benefit to patients from access to health research information, but the education, professional, practitioner and business sectors are potential users and beneficiaries of scientific research. It is early in our understanding of their needs and the benefits that can accrue to these constituencies, but there are pointers.

First, it is known that these people use the literature where it is openly available to them. For example, the usage data for PubMed Central (the NIH's large collection of biomedical literature) show that of the 420,000 unique users per day of the 2 million items in that database, 25% are from universities, 17% from companies, 40% from 'citizens' and the rest from 'Government and others'.

Second, the European Union's Community Innovation Surveys examine innovative businesses at regular intervals: a recent survey showed that 'innovative enterprises find the information they need more easily from suppliers or customers than from universities or public research institutes'⁷³.

Third, some recent work studying the access needs and problems of R&D-based SMEs in Denmark provides some data on how important it is for these companies, and the Danish economy, to have quick, easy and free access to the scientific literature⁷⁴. There is no reason to believe that the Danish situation is so vastly different from any other developed, knowledge-based economy, so the global effect of lack of access to scientific information on innovative businesses can be expected to be huge.

Summary points on the benefits of Open Access

- ▶ Open Access improves the speed, efficiency and efficacy of research
- ▶ Open Access is an enabling factor in interdisciplinary research
- ▶ Open Access enables computation upon the research literature
- ▶ Open Access increases the visibility, usage and impact of research
- ▶ Open Access allows the professional, practitioner and business communities, and the interested public, to benefit from research

73 Parvan, S-V (2007) Statistics in Focus: Science and technology, 81/2007. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-07-081/EN/KS-SF-07-081-EN.PDF

74 See more details in Houghton *et al* (2011) in the bibliography



SECTION 5. Business Models

5.1 The context: traditional business models in scientific communication

Traditionally, and because scientific communication was carried out through print-on-paper methods which carried a cost for every copy produced, access to scientific information was achieved through subscriptions for journals (whereby libraries and other subscribers paid a fee – usually on an annual basis – to receive the journal issues throughout the year as they were published, and through a one-off cash transaction for books.

Inherent in that system was the problem that access was only for those who could afford it, but, until the second half of the twentieth century, at least prices were not considered to be excessive. In the last few decades, however, journal prices have spiralled, increasing by many times the rate of inflation and other price indices. The upshot initially was that libraries struggled to maintain journal subscriptions, generally by plundering the budget for buying books. Book sales suffered as a result⁷⁵. The humanities have paid the price for the rocketing prices of journals in the sciences. But the book budget could not forever be plundered and journal subscriptions eventually began to fall when libraries could no longer keep up with the annual price rises⁷⁶.

Towards the end of the 20th century, a new model was offered by larger publishers with sizeable journal lists, the so-called Big Deal. Under this model, libraries purchased access to all the journals in a publisher's list – a bundled deal – for 2-, 3- or 5-year periods. Libraries were thus able to offer their patrons access to far more material from a single publisher than hitherto, but the cost was also much greater than buying individual subscriptions to selected journals. The Big Deal has persisted successfully for more

than a decade but is now starting to suffer as library budgets are once again under severe pressure.

Against this background, in the interests of science and scientists, began the move to open up the scientific literature.

5.2 New business models in scientific communication

Having largely relinquished academic publishing activities to large commercial publishers (this category includes some learned society publishers) over the past 50 years, the research community is taking the activity back under its control in some areas. Three types of institutional player are engaged in this effort – the library, the university press (if there is one), and individual scientists or groups of scientists. In addition to this institution-level approach, new players are entering the commercial publishing scene with new business models aimed at offering Open Access to their products.

Where operations are not cash-centred, such as in the case of repositories and some Open Access journals, a range of new business models has developed, some of them commonly used by Web-based businesses in other sectors⁷⁷. In brief, these are:

- Institutional model: the operation is supported by the institution
- Community model: the operation is supported by the community by cash donations or in-kind support
- Public sponsors model: the operation is supported by ongoing sponsorship from a public body such as a national ICT organisation

75 In the 1970s a typical academic book would expect sales of around 1500 copies; now typical print runs are between 200 and 500 copies.

76 This has been dubbed the 'serials crisis'. See a full account in Young (2009), listed in the bibliography.

77 Described in more detail in *A DRIVER's Guide to Institutional Repositories* (2007). See full reference under Swan (2007) in the bibliography.

- Subscription model: the operation trades, and is supported through subscription payments from its users
- Commercial model: the organisation trades, and is supported through cash payments from users and/or advertising

• • • 5.2.1 Repositories

Repositories sell nothing, at least for cash, but they return value in other ways to the institution or community that supports them. The business case for repositories is usually made around maximising visibility and impact and optimising research monitoring and management. Where an *institutional* repository is concerned, the business case may also be anchored in the imperative to properly preserve information and to improve teaching. And where a repository also covers educational materials, there is the additional agenda of supporting learning. The overall case can be summarised as a set of purposes:

- To **open up and offer** the outputs of the institution or community to the world
- To **impact on and influence** developments by maximising the visibility of outputs and providing the greatest possible chance of enhanced impact as a result
- To **showcase and sell** the institution to interested constituencies – prospective staff, prospective students and other stakeholders
- To **collect and curate** digital outputs (or inputs, in the case of special collections)
- To **manage and measure** research and teaching activities
- To **provide and promote** a workspace for work-in-progress, and for collaborative or large-scale projects
- To **facilitate and further** the development and sharing of digital teaching materials and aids
- To **support and sustain** student endeavours, including providing access to theses and dissertations and providing a location for the development of e-portfolios

The value proposition, which is that each repository will make available free of charge to all the results of the research effort of the community it represents, is made by repositories to the wider research community from a

position of commitment to the knowledge commons and to sharing the outcomes of publicly-funded work.

Business models for repositories are either institutional – that is, the individual institution finances and supports the repository because the repository returns value to the institution in terms of impact and reputation – or they are public sponsorship or community models.

An example of public sponsorship is the CLACSO (Latin America Social Science Council) regional repository for social science research in Latin America⁷⁸, which has been supported over a decade by development funds from Sweden (SIDA⁷⁹), Norway (NORAD⁸⁰), Canada (IDRC⁸¹) and the UK (INASP⁸²).

• • • 5.2.2 Repository services

Repository services are one of the main keys to success for repositories. Useful, popular services can really boost the use of repositories, both by information creators and information seekers.

Examples of services that can be provided are usage statistics, impact (citation) statistics, policy advice, CV generation, search-and-retrieve, rankings, and journal/book publishing (from the repository).

Business models vary, though most are based on a free-to-use sponsored⁸³ or community-developed⁸⁴ model. There is concern that some or most of these may not be sustainable in the long term, and considerable thought is now going into how to secure that sustainability for the most-used services. Community financial support has been shown to be forthcoming for some Open Access services⁸⁵ and this may be one way forward.

78 <http://www.clacso.edu.ar>

79 Swedish International Development Cooperation Agency: <http://www.sida.se/English/>

80 Norwegian Agency for Development Cooperation: <http://www.norad.no/en/>

81 International Development Research Center: <http://www.idrc.ca/EN/Pages/default.aspx>

82 International Network for the Availability of Scientific Publications: <http://www.inasp.info/>

83 For example, the SHERPA RoMEO service that provides information on publisher policies with respect to self-archiving in repositories, funded over a long period by the UK's Joint Information Systems Committee (JISC): <http://www.sherpa.ac.uk/romeo/>

84 For example, the community-created Open Access Repositories news list: <http://www.connotea.org/tag/oa.repositories?start=10>

85 For example, the arXiv, supported by donations from research institutions http://arxiv.org/help/support/arxiv_busplan_Apr2011 and the Stanford Encyclopaedia of Philosophy, an Open Access resource compiled and kept up to date by experts in the community and sustained by donations from foundations and research institutions: <http://plato.stanford.edu/>

• • • 5.2.3 Open Access journals

Open Access journals use a variety of business models. The lower the cost base, the easier it is to develop a way of doing business that is sustainable, so smaller publishers and society publishers that do not have a strong imperative to maximise shareholder value find it is easier to switch to an Open Access model than large commercial publishers. The main types of business model for Open Access journals are as follows.

..... 5.2.3.1 Article-processing charges

Many Open Access journals levy a charge at the 'front end' of the publishing process. This article-processing charge (APC) is paid by authors, their institutions or their research funders (though most *bona fide* Open Access journals will waive this in case of genuine hardship and some do so as a matter of routine for authors from developing countries). Journals that levy an APC, though, remain in the minority⁸⁶.

Where a charge is levied, it is paid usually from the author's research grant or from an institutional fund specifically established for this purpose. Some research funders have explicitly committed to providing funds specifically for the payment of APCs. In other cases, funders have said that research grants money may be allocated to publishing costs at the grant-holder's discretion⁸⁷. A number of institutions have also established a fund to pay APCs⁸⁸. Each institution has its own policy on how authors may access this fund. The long-term outcomes – that is, the long-term sustainability – of such initiatives are as yet unclear.

..... 5.2.3.2 Institutional membership schemes

Some Open Access publishers have also introduced an institutional membership scheme. Details vary from publisher to publisher and though not suitable for very small publishers, larger ones have found some purchase in this approach. A number of variants have been introduced so far, including: schemes where institutions

86 Various studies have shown that 53% (http://www.alpsp.org/ngen_public/article.asp?id=200&did=47&aid=270&st=&oid=-1) and 67% (http://www.sennoma.net/main/archives/2007/12/if_it_wont_sink_in_maybe_we_ca.php) of Open Access journals charge no fees, and that 83% of Open Access journals published by learned society publishers make no APC fee <http://www.earlham.edu/~peters/fof/newsletter/11-02-07.htm#list>.

87 BioMed Central, a large Open Access publisher, maintains a list of foundations that support Open Access publishing by having some mechanism for allowing payment of APCs from funder grants: <http://www.biomedcentral.com/info/about/apcfaq#grants>

88 For example, the University of Nottingham, UK: <http://eprints.nottingham.ac.uk/UniversityOpenAccessPublicationFund.pdf>

pay a lump sum in advance to cover the cost of articles that their authors will publish in the forthcoming year; schemes where institutions are invoiced at regular intervals in arrears for articles published in the preceding period; flat rate annual payments based on researcher (or student) numbers at the institution⁸⁹.

..... 5.2.3.3 Community publishing

Relatively common for journals in the humanities, this is a model under which journals are produced entirely within the academy as a result of voluntary efforts by researchers who provide editing, peer review and production services. They are published online for free (Open Access) and in addition they are sometimes sold on subscription in print. There is a huge number of new Open Access publishing ventures of this type, many of them spurred by community electronic publishing platforms⁹⁰ or open source, easy-to-use technology for publishing Open Access journals, conference proceedings and books⁹¹.

..... 5.2.3.4 Journals supported by advertising or sponsorship

Public sponsorship is seen in Latin America, where regional and national research journals are largely subsidised by state funds that cover research⁹².

If the basic business model is a community one (section 5.2.3.3), advertising can help to defray any unavoidable overheads expenses (such as communications costs). Advertising sales can help to support Open Access, and although the great majority of journals cannot hope to attract sufficient advertising revenue to support an operation with substantial overhead costs, advertising can be a partial solution. An example of a prestigious journal that makes its research content Open Access online helped by an advertising revenue stream is the *British Medical Journal*⁹³.

89 See, for example, the schemes offered by BioMed Central <http://www.biomedcentral.com/info/about/membership> and Hindawi Publishing Corporation <http://www.hindawi.com/memberships/>

90 For example, SciELO: www.scielo.br and Bioline International: <http://www.bioline.org.br/>

91 For example, the Public Knowledge Project's open source software suite: *Open Journal Systems* <http://pkp.sfu.ca/?q=ojs>, *Open Conference Systems* <http://pkp.sfu.ca/?q=ocs> and, in development, *Open Monograph Press* (expected launch date September 2011) <http://pkp.sfu.ca/omp>

92 For example, the SciELO Open Access journal collection (Scientific Electronic Library Online www.scielo.br) is supported by the Foundation for Research Support of the State of Sao Paulo (FAPESP), the National Council of Scientific and Technological Development (CNPq) and the Latin American and Caribbean Center on Health Sciences Information.

93 This title earns income from selling advertising (it is a prime vehicle for job advertisements in the UK medical arena) and subscriptions to libraries and the revenue enables it to offer its research content free online without any author or reader charges: <https://mx2.arl.org/Lists/SPARC-OAForum/Message/4634.html>

5.2.3.5 Institutional subsidy

Institutions formally subsidise journal publishing wherever they are supporting, even if it is by subventing overhead costs, Open Access journal publishing operations by a university press or by the library. As well as these, universities often informally support community publishing ventures (section 5.2.3.3) by providing space, heat, light and telecoms services.

Although the sustainability of this model may seem unclear at this stage, the model is likely to grow in importance as shifts occur in scholarly communication and researchers take a greater control over the communication process. There is increasing acknowledgment by research institutions and funders that the communication of research should be considered part of the research process, with the concomitant tacit (and occasionally explicit⁹⁴) acknowledgment that the costs will need to be directly borne by the producers of research rather than the consumers. Of course, in some cases these two entities are the same, though in general there is not a direct relationship between research intensiveness (of institutions or nations) and expenditure on communication: research institutions in less research-intensive countries, for example, still need to buy access to research information and the cost is disproportionate in relation to their research programmes.

5.2.3.6 Hard copy sales

Some journals support their Open Access publishing model wholly or partly by sales of the print version. Where this subscription income covers costs, journals have no need to levy an article-processing charge (APC) at the front end of the publishing process.

MedKnow, a Mumbai-based medical publisher, has adopted this model very successfully. All the contents are freely accessible online and subscriptions are sold to libraries around the world for the hard copy version. Since adopting this Open Access model, Medknow has seen sales, submissions and impact all rise⁹⁵.

5.2.3.7 Collaborative purchasing models

It is also possible for a specific community to act in a coordinated fashion to provide Open Access for that specific field. There is just one example of such a model

in the planning at the moment, the SCOAP3 (Sponsoring Consortium for Open Access Publishing in Particle Physics)⁹⁶ initiative in high-energy physics. The SCOAP3 initiative has brought together a collection of institutions, research laboratories and scholarly societies that, together with national research funders, will pay certain sums to the publishers of journals in high-energy physics in return for making the entire contents of those journals Open Access. The project is now preparing its tendering exercise. High-energy physics is a discrete field served by a very small number of journals and is mainly concentrated in a small number of large research centres, which makes this approach potentially viable. Its potential to scale to other fields and disciplines, however, would seem low.

5.2.4 'Hybrid' Open Access

'Hybrid' Open Access is the situation where article-processing charges are paid to make individual articles Open Access within otherwise subscription-based journals. Publishers list this option in order to be able to say they offer authors a route to Open Access if they wish to take it up. In some cases, publishers reduce their subscription prices as revenue from the Open Access option rises but in most cases this does not happen and publishers benefit from the Open Access article-processing fee as *extra* income. Funders⁹⁷ and institutions⁹⁸ can be loathe to pay APCs to publishers who engage in this practice, commonly referred to as 'double dipping'.

5.2.5 Open Access books

Increasingly, experiments are being carried out to find viable and sustainable models for Open Access book publishing. Initiatives have come from university presses, libraries⁹⁹ and even commercial publishers. The development of new technologies and platforms for book production in an Open Access environment has progressed over recent years. To cite just two examples, there is open source software now available specifically for Open Access book production¹⁰⁰; and a new cooperative publishing platform for university presses and other small publishers enables them to take advantage of a

96 <http://scoap3.org/>

97 Wellcome Trust calls for greater transparency on journal Open Access publishing costs: <http://www.wellcome.ac.uk/News/Media-office/Press-releases/2009/WTX057058.htm>

98 <http://tilje.wordpress.com/2009/12/14/policies-of-oa-journal-funds-about-hybrid-oa/>

99 Sometimes referred to as 'librarians', having taken on a publishing role. see Adema and Schmidt 2010) in the bibliography.

100 For example, Open Monograph Press: <http://pkp.sfu.ca/omp>

94 The Wellcome Trust, for example, provides money to cover Open Access journal article-processing fees: <http://www.wellcome.ac.uk/about-us/policy/spotlight-issues/Open-access/Guides/wtx036803.htm>

95 See case study on Medknow: http://www.openoasis.org/index.php?option=com_content&view=article&id=553&Itemid=378



full set of publishing services in return for a fee, leaving them to concentrate on commissioning and editorial work¹⁰¹ as their core activities. In all, there is a great deal of development and activity in this area¹⁰².

The main business models are listed below.

..... 5.2.5.1 Subsidy

This is a model used by some university presses whose parent institution recognises the value of dissemination of research outputs (books) even though there is a cost to the institution in doing this. The trend now is for universities to acknowledge that the role of the press is to support the overall mission of the parent institution by returning value in terms of impact and prestige rather than by striving for profit *per se*. Reputational capital is as valuable to a university as cash and a press can play a major role in maximising that. In many cases there may not be a cash return to the university at any meaningful level, but subvention has traditionally played a part in academic publishing and can now be viewed with even greater confidence as investment in the reputation and brand of the institution.

Some scholarly societies may also work in this way if the society is large enough to be able to support some of the costs of dissemination.

..... 5.2.5.2 Sponsorship

Though rare, it may sometimes be possible to find sponsorship for the occasional volume where a sponsor wishes to support the publication for philanthropic reasons or to increase the reach of a particular message.

..... 5.2.5.3 Hard copy sales

This is the model most commonly in use at the moment. University presses tend to use this model and there is at least one example of a commercial publisher that has employed it, too. Publishers make the digital version of their books Open Access online and earn revenue from print sales. Modern print-on-demand (POD) technology means that fixed-length print runs are no longer necessary and there are no inventory (warehousing) and remaindering costs. Sales of the hard copy support the cost of a book's production and editing. In at least one case a collaborative publishing platform and digital library (i.e. the delivery and marketing tool) has been developed for use by multiple publishers, so that these costs can

be shared, cutting overheads for each participating publisher¹⁰³.

..... 5.2.5.4 Other possible models

Books offer scope for other innovative pricing and business models. For example, the notion of a book can be deconstructed so that there is a basic product – the text – plus various levels of added value. Examples could be extensive hyper-linking, additional graphics, linked datasets, teaching aids, translations and so forth, with buyers opting to pay extra for whichever extras they want. This model will be used by the World Bank as it moves from a sales-based book publisher to an Open Access book publisher over the next twelve months.

5.3 Open data

Where there is organised infrastructure to support Open Data the business model is one based on sponsorship by public bodies (such as the data services operated by the National Centre for Biotechnology Information and the UK Research Councils' data centres) or are community-supported (such as the data services run by the European Bioinformatics Institute).

Institutions may establish dedicated data repositories, though this is a relatively new development and only a few institutions have moved in this direction so far. More commonly, data are deposited and stored in the general institutional repository, so their curation and preservation are supported by the institution.

Research groups may post datasets on their research websites: in these cases the model is still institutional.

5.4 System costs

A number of studies have been carried out over the past 5 years that have examined the costs and benefits of traditional and new forms of scholarly communication. These economic studies have all indicated that moving to an Open Access literature, whatever the business model, would be cheaper overall due to efficiency gains and lower operational costs in research institutions, and would have a societal benefit.

101 Developed and offered by OAPEN: <http://project.oapen.org/>

102 .See Adema and Schmidt 2010): reference listed in full in the bibliography.

103 <http://www.oapen.org/home>

The studies were done for Australia, the UK, Denmark, The Netherlands, and the US¹⁰⁴. In all cases, substantial economic savings were shown to be achievable, whether through Open Access journal publishing or through using the network of institutional repositories to disseminate knowledge¹⁰⁵. The move to Open Access will therefore not only be more effective for communicating scientific knowledge, but will not require more money to be pumped into the dissemination system: indeed, there will be savings to be made.

Summary points on business models for Open Access

- ▶ New business models are being developed to service the 'open' agenda
- ▶ New business models are being developed and tried for Open Access journals, books, repositories, repository services and data
- ▶ These new business models will not require more money to be found for scientific communication

104 See Houghton *et al* (2006a), (2006b), (2009a), (2009b), Knowledge Exchange (2009) and CEPA (2011). Full references in the bibliography.

105 For example, the UK study demonstrated a forty-fold benefit/cost ratio from 'green' Open Access and for the US the benefit from Open Access to all research published by the main Federal agencies would be between 4 and 25 times the cost.



SECTION 6. Copyright and Licensing

Although copyright law varies by jurisdiction there is generally a clause that makes special permission for ‘fair use’ or ‘fair dealing’ of a work, to take account of the special needs of the scholarly community. This allows a written work, for example, to be copied for the purpose of private study, and for parts of the work to be reproduced in other works of a scholarly nature. Details are particular to each jurisdiction.

Copyright is at the heart of Open Access because accessibility depends entirely upon the copyright owner. If the copyright owner consents, then Open Access can happen: if the copyright owner does not consent, Open Access is not possible for that work. Provision of Open Access cannot be made under any ‘fair use’ or ‘fair dealing’ exceptions to copyright law, so if Open Access is the aim, the right steps must be taken to ensure that copyright will not impede it.

6.1 Copyright and Open Access

• • • 6.1.1 Ownership of works of scholarship

The ownership of the intellectual property in a journal article or book resides normally with the author except for those circumstances where the author’s employer claims ownership under conditions of employment. This may be the case where researchers are employed by Government research establishments, for example.

Traditionally, however, scientists submitting an article to a journal have transferred copyright (which is actually a *bundle* of rights) to the publisher by signing the publisher’s copyright transfer agreement (CTA). Included in this bundle of rights is the right to publish the work, and publication is precisely what the author seeks to achieve. Many publishing agreements, however, impose severe

restrictions on the use of the work. In some cases these can even affect the author’s *own* use of his/her work in teaching and research.

It is perfectly possible for scientists to have their work published without signing over *all* rights. Some rights can be retained by scientists, allowing them to do what they want in terms of dissemination through alternative channels as well as through the journal in which they have chosen to publish. The most common way of achieving this is for the publisher to have a Licence To Publish (LTP) and for the author to retain the rest of the bundle of rights. Publishers can use such devices to acquire the rights they need to publish the work without acquiring the rest of the rights in the work. There seems to be a general trend in this direction. A 2008 survey indicated that there had been a drop in the number of publishers requiring copyright transfer from the author from 83% in 2003, to 61% in 2005 and to 53% in 2008. In 2005, 3% of publishers were found not to require any form of written agreement with the author and this had increased to almost 7% by 2008¹⁰⁶.

• • • 6.1.2 Making work Open Access

The perceptions of scientists in respect of what they are allowed to do to disseminate their article, even having signed a publisher CTA, are frequently wrong, and the agreement is often much more liberal than they believe¹⁰⁷. Almost 60% of journals allow self-archiving of postprints, albeit usually with an embargo period and a further third allow self-archiving of preprints¹⁰⁸. So the commonly-held belief that publishers systematically thwart Open Access is largely erroneous.

Nonetheless, some publishers do not allow authors to provide any access themselves to their own work and many allow self-archiving only after an embargo period, put in place to protect their sales revenue. In addition,

106 Cox, J and Cox, L (2008) Scholarly Publishing Practice; Third survey 2008: Academic journal publishers’ policies and practices in online publishing. Shoreham-by-Sea, ALPSP. http://www.alpso.org/ngen_public/article.asp?aid=24781

107 See Morris (2009) Journal authors’ rights: perception and reality <http://www.publishingresearch.net/documents/JournalAuthorsRights.pdf>

108 <http://www.sherpa.ac.uk/romeo/statistics.php?la=en>

their position may change. There have already been cases of publishers shifting their stance on self-archiving as levels of the practice begin to grow.

The simplest approach to ensuring that work can be made Open Access without any problem is to retain the right to do so. The right can be retained either by the authors themselves or by an agent for the author with the author's permission. These are two different situations and warrant brief description.

6.1.2.1 Rights retention by the author

As noted above, at the time a paper is accepted for publication authors are asked by the publisher to sign a CTA and the whole bundle of intellectual property rights usually moves into the publisher's hands. Open Access from that point on is by grace of the publisher. Authors can, however, retain the rights they need to make their work openly available by negotiating with the publisher at this point.

The term 'negotiation' does not imply haggling: there are tools available to help the author amend the CTA so that the necessary rights are retained. These are 'author addenda', specific pieces of legal wording that authors can append to a publisher's CTA and which state the rights that the author will retain after passing an article to a publisher for publication. Addenda vary considerably, so care must be taken to choose an addendum that suits the author (or institution) in each particular case. Many addenda restrict the author to use the work for non-commercial purposes, for example, which may work well if the author is publishing a journal article, but may restrict the author too much if the output is another type of work. Two widely-used author addenda are those from SPARC/ Science Commons¹⁰⁹ and from SURF/JISC¹¹⁰.

Individual universities, such as the University of California at Berkeley, are actively encouraging faculty to retain intellectual property rights altogether or to use only publishers that 'maintain reasonable business practices'¹¹¹.

Sometimes, institutions may develop their own agreements for authors to offer to publishers. In the case of institutionally-developed agreements, there is usually provision for the institution itself to hold some rights to use the work as well. MIT developed an author addendum for its researchers in 2006 and in 2007 a consortium of 12 research universities produced an 'addendum from the Committee for Institutional Cooperation'¹¹² and the same year the University of California produced its own Amendment to Publication Agreement¹¹³. Other addenda or agreements have been drawn up by individual universities or research institutions¹¹⁴. Institutional policies on copyright are increasing as Open Access becomes mainstream and universities seek to protect future research outputs from falling under publisher ownership. The University of Texas, for example, declares in its copyright management guidelines that its researchers must manage copyright in their articles for the benefit of "the authors, the citizens of Texas, state government, the component institutions, and the U. T. System".

Publishers are not obliged to accept author addenda, though many do, including some of the largest publishers, though the author needs to specifically request this: it is not offered as an option upfront by the publisher. In the case of the NIH policy (the Wellcome Trust policy is similar), which stipulates that authors must retain the non-exclusive right to make future articles Open Access, some publishers did indeed initially announce that they would not publish NIH-funded work under such conditions. The aftermath, however, is that these publishers have retracted this position and there are now no publishers that will not publish articles from NIH-funded research, even under the conditions imposed by the NIH¹¹⁵.

6.1.2.2 Rights retention by the employer

As stated above, in the case of Government research establishments, rights over results produced by employees are usually held by the employer. This agreement with the employee, as a condition of employment, predates any subsequent agreement with a publisher and renders it void.

Universities, too, can use this formula, and some are doing so. Harvard University, the most prominent example, was

109 These two organisations have between them developed the Scholar's Copyright Addendum Engine which includes a number of addenda, including SPARC's own Author Addendum: <http://sciencecommons.org/projects/publishing/scae/> plus a brochure about rights <http://www.arl.org/sparc/author/index.shtml>

110 The SURF/JISC Copyright Toolbox, developed by the SURF Foundation in the Netherlands and the Joint Information Systems Committee (JISC) in the UK, incorporates a licence-to-publish that authors can assign to publishers. This enables them to retain a bundle of rights for themselves over the use of their own work. The Toolkit also provides sample wordings that can be used if an author or publisher wishes to amend the standard publishing agreement in the licence: <http://copyrighttoolbox.surf.nl/copyrighttoolbox/authors/>

111 University of California Statement of Principles on Scholarly Publishing(2005): http://senate.britain.dnsalias.net/sites/default/files/recommendations-reports/statement_of_principles_for_web.pdf

112 <http://www.lib.umn.edu/scholcom/CICAAuthorsRights.pdf>

113 <http://osc.universityofcalifornia.edu/manage/model-amendment.pdf>

114 The Open Access Directory maintains a list of addenda: http://oad.simmons.edu/oadwiki/Author_addenda

115 Of publishers surveyed: list maintained by the Open Access Directory: http://oad.simmons.edu/oadwiki/Publisher_policies_on_NIH-funded_authors

given this right by unanimous votes at a series of meetings of faculties. Faculties voted to grant the university a nonexclusive, irrevocable right to distribute their scholarly articles for non-commercial purposes¹¹⁶.

Other universities have established such rights, too. For example, Queensland University of Technology in Brisbane, Australia, has wording in its Intellectual Property Policy¹¹⁷ as follows:

Under the terms of QUT Intellectual Property Policy, the University specifies that any assignment of copyright in scholarly works authored by staff is subject to the University retaining a perpetual, irrevocable, non-exclusive right to use that work for teaching, for research and to disseminate a version of the work online (for non-commercial purposes) via QUT ePrints [the university repository] no later than 12 months after the publication date.

Such agreements with authors, made by the employer in advance of any later arrangement with publishers, ensures that the necessary rights management is in place to enable Open Access, whatever the publisher's position. Of course, the publisher is perfectly at liberty to refuse to publish the work under such conditions: that is the balance that is striven for between author rights and publisher rights. Publishers may opt not to publish the work under these conditions: that is their choice.

6.2 Licensing

6.2.1 Why licensing Open Access content is important

The most fundamental condition for Open Access is simply that the full text of a journal article or book section is available for anyone to read, free of charge. This alone, however, does not conform to the 'BBB' (Budapest, Bethesda, Berlin: see section 1.3) definitions of true Open Access and certainly does not permit the new uses that have so much promise.

Moreover, if an article carries no licence information at all it is not clear to users what they might do with it: can they extract a graph or table and put it in another document? Can they take numerical data and add them to an existing, separate database? Can they use passages from the text to

¹¹⁶ <http://osc.hul.harvard.edu/policies>

¹¹⁷ QUT Intellectual Property Policy: http://www.mopp.qut.edu.au/D/D_03_01.jsp#D_03_01.05.mdcc

illustrate an argument in digital teaching materials placed on the Web?

Proper, appropriate licensing sets out the conditions for re-use and reassures would-be users that they can use the material in particular ways with impunity. This is important both for individuals seeking to understand how they can use the material and for text-mining and data-mining approaches to knowledge creation. This second matter will grow in importance as the use of these technologies become more widespread. Legal changes will be needed in many jurisdictions to enable them. At the time of writing the UK Government has signalled its intent to make the technology exempt from UK copyright law¹¹⁸. As yet, only Japan makes this permissible.

6.2.2 Licensing principles

Formal licensing is not yet ubiquitous in Open Access practice, despite the advantages it brings. Licensing an article or book clarifies what users may do with it and, by instilling confidence in the user about how they might use the work, encourages use.

The Budapest Open Access Initiative, Berlin Declaration and Bethesda Statement on Open Access Publishing laid out the conditions for Open Access (see Section 1.3). Broadly, these were:

- That the peer-reviewed literature is available without subscription or price barriers
- That the literature is available immediately
- That the published material may be re-used in various ways without permission

The Budapest Initiative states:

"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."

This means that Open Access articles and books, including data, graphics and supplements, may be linked to, crawled by search engines, excerpted and extracted, crawled by text mining technologies, clipped into other articles, blogs, and so forth completely free of charge. The only condition is proper accreditation of the source. The publisher may

¹¹⁸ See the UK Government's announcement of a plan of action <http://www.bis.gov.uk/news/topstories/2011/Aug/reforming-ip> in response to a recent review of intellectual property carried out for the UK Government by Hargreaves (2011) (full reference in bibliography) and the Government's response in full: <http://www.bis.gov.uk/assets/biscore/innovation/docs/g/11-1199-government-response-to-hargreaves-review>

be part of that accreditation, though this is not always the case, particularly with journal articles. With Open Access book content, the publisher is almost always cited in the accreditation in alignment with the norms of scholarly practice.

• • • 6.2.3 Licensing practice

Authors and publishers who wish to enable true Open Access must therefore word their licences accordingly. This can be a challenging task for some publishers (or individual authors who may also wish to disseminate their own work with a clear set of permissions attached to it).

..... 6.2.3.1 Repositories

For repository content, there is a variable picture. Repository software usually makes provision for a depositor to select a particular licence to attach to each item deposited (including Creative Commons licences; see below). This is not obligatory, however, so many items carry no licence information at all. Others may have a standard copyright statement or one with some modification for specific use provision (e.g. non-commercial use only), or a formal licence of some kind.

..... 6.2.3.2 Open Access journals

Although libre Open Access is the ideal, even most Open Access journals do not offer this, instead publishing under traditional copyright conditions (all rights reserved) and allowing fair use/fair dealing only¹¹⁹.

..... 6.2.3.3 Creative Commons licensing

The Creative Commons organisation has developed a set of licences from which authors or publishers can choose. Some Open Access publishers use Creative Commons licences to ensure that the content of the articles published in their journals are reusable in the widest (libre Open Access) sense: that is, they can be reproduced, abstracted, 'mashed up' with other material to produce new information, crawled by text-mining and data-mining tools and so on.

Creative Commons has designed a collection of licences to ensure that there is a suitable licence for every purpose. The explanation of these licences and how they can be used to best effect is provided on the Creative Commons

website¹²⁰. The site has a licence generator tool for publishers and creators to use.

Where publishers and authors wish to make their work as freely reusable as possible, including by other parties who may develop new products to sell by reusing the material in some way, the most appropriate licence for the publisher to use in this instance is the Creative Commons 'Attribution' licence (commonly referred to as 'CC-BY'), a tool that requires the creator of the work to be acknowledged when the work is re-used but does not restrict the re-use in any way.

Where publishers and authors may wish to restrict some forms of re-use, such as not permitting commercial derivatives to be made, there is a Creative Commons licence for these possibilities, too. The key terms of CC licences are Attribution, No Commercial, No Derivatives and Share Alike.

The advantages of using a Creative Commons licence over a custom one are:

- There is almost certainly a ready-made licence that will suit the publisher's requirements, saving time and effort in drawing up a custom licence
- Creative Commons licences are easily understood and commonly used, so that a potential reader or re-user of a work will immediately understand the conditions of the licence
- The licences have machine-readable metadata, simplifying processes where applications such as harvesters and text-mining tools carry out automated tasks: these tools can recognise, by the machine-readable licence, which content they are permitted to gather and work upon

¹¹⁹ The Directory of Open Access Journals lists 1535 (22% of the total 6873) using some kind of Creative Commons licence: <http://www.doaj.org/?func=licensedJournals>. 763 journals (11% of the total) have the SPARC Europe Seal of Approval (which requires a CC-BY licence): <http://www.doaj.org/doaj?func=sealedJournals&uiLanguage=en>

¹²⁰ <http://creativecommons.org/>



Summary points on copyright

- ▶ Open Access requires the copyright holder's consent
- ▶ Copyright is a bundle of rights
- ▶ The norm is to sign the whole bundle of rights over to the journal publisher, though it is not necessary to do this in most cases: publishers can go about their work so long as the author signs over to them the right to publish the work
- ▶ Authors and other copyright holders (employers and funders) can retain the rights they need to make the work Open Access
- ▶ A premeditated retention of sufficient rights to enable Open Access is the preferable course of action rather than seeking permission post-publication
- ▶ Licensing scientific works is good practice because it makes clear to the user what can be done with the work and by that can encourage use
- ▶ Only a minor part of the Open Access literature is formally licensed at present: this is the case even for Open Access journal content
- ▶ Creative Commons licensing is best practice because the system is well-understood, provides a suite of licences that cover all needs, and the licences are machine-readable
- ▶ Otherwise, legal amendments to copyright law will be necessary in most jurisdictions to enable text-mining and data-mining for material without an appropriate Creative Commons licence

SECTION 7. Strategies to Promote Open Access

Strategies to promote Open Access fall into three main categories – policy-oriented, advocacy-based and infrastructure development. All three types have been pursued at many levels and in some cases have involved aligning the arguments for Open Access with arguments for other elements of the ‘open’ agenda (such as open Educational Resources or Open Source Software). While doing this can build a very strong case in some circumstances, it should be remembered that the case for Open Access to scientific information does work as an argument on its own and does not necessarily need to be allied to another cause to create an effective advocacy programme.

It is, however, becoming harder to separate the arguments for Open Access to the literature and Open Data, since the aims are so alike and the desired outcomes in terms of scientific progress practically indistinguishable. Policy development is proceeding along the same lines for both issues, advocacy activities are similarly broader now, and infrastructural development is around the needs to open up both the research literature and research data. Because of this increasing alignment UNESCO will find that building strategies into the future to support Open Access will need to also embrace strategies for Open Data.

Strategies are pursued at institutional, national and international levels.

7.1 Policy-focused strategies

There is no doubt that policy development by significant research funders, institutions and other organisations has increased awareness in Open Access and accelerated its development where the policies apply. By their

very existence, policies serve to promote the aims and objectives of Open Access, to engender interest and action and to serve as examples for others.

Many individuals, groups and organisations promoting Open Access have therefore focused their activities on persuading research institutions, research funders and other influential organisations of the need for a policy on Open Access.

Governments and other public sector bodies are increasingly inviting and listening to the arguments for an open scientific literature (and data). In some cases, changes in legislation have been involved.

There is currently legislation being considered, either on the provision of Open Access itself or on changes to copyright law that would assist the move to openness, in Brazil, Argentina, Germany and Poland, for example. In the Ukraine, there is already a law¹²¹, passed in 2007 as part of the country’s information society developments, and the recent National Law of Science in Spain has a section specifically about Open Access (see section 8.1).

Just a few examples of significant policy implementations¹²² that have hastened and promoted Open Access are:

Institutional-level mandatory policies

- The first institutionally-based policy at the School of Electronics & Computer Science, University of Southampton, UK, in 2002
- The first pan-institutional policy at Queensland University of Technology in 2004
- The first Indian institutional policy at the National Institute of Technology, Rourkela in 2006

121 <http://www.eprints.org/openaccess/policysignup/fullinfo.php?inst=The%20Parliament%20of%20Ukraine%20%28Verhovna%20Rada%29>

122 A full list of existing mandatory policies on Open Access can be found at the Registry of Open Access Mandatory Archiving Policies (ROARMAP): <http://roarmap.eprints.org/>

- The eight faculty-specific policies adopted at Harvard University between 2008 and 2011

National-level mandatory policies

- The Open Access policies adopted by the seven UK Research Councils between 2005 and 2011
- The Open Access policy adopted by the US's National Institutes of Health (NIH) in 2007

International-level mandatory policies

- The Wellcome Trust policy, adopted in 2005
- The multi-institutional, international policy from ICRISAT (international Crops research Institute for the Semi-Arid tropics, headquartered in Hyderabad, India) in 2009
- The policy covering 20% of research carried out under the 7th Framework Programme of the European Union

The long-term success of Open Access policies will be assessed by the amount of Open Access content they engender and how well they align with the definitions of Open Access (see section 1.3). Monitoring of compliance with policy is undertaken by some policymaking bodies (but not all) and has resulted in strengthening of policy in at least one high-profile case (the NIH). We know that compliance levels vary considerably. The effectiveness of different policy types is discussed in section 8.

7.2 Advocacy-based strategies

Strategies based on advocacy have focused on two main things – creating an evidence base for the benefits of Open Access, and making the case to policymakers, funders and research managers.

The BOAI was an early, formal advocacy initiative. Published in 2002, it set the direction for Open Access advocacy for the rest of the decade. Funded in its conceptualisation by the Open Society Institute (now called Open Society Foundations: see section 7.4), the BOAI provided in a few, clear, unambiguous paragraphs a description and set of aims that advocates could coalesce around and use to promote the ideas about opening up science. The Initiative can be signed by institutions and foundations that commit to its aims and remains an influential advocacy tool for Open Access alongside the Berlin Declaration (which also collects signatures of commitment from institutions).

Since 2002, there has been increasing intensity in advocacy activity. Organisations specifically established to promote Open Access have emerged (see section 7.4), some with an international remit, some operating within national or regional boundaries. The evidence base for the benefits of Open Access has been growing, demonstrating the value of access to scientific information not just for scientists but for other constituencies, too (see Section 4).

Advocacy targets are policymakers, researchers and, increasingly, students who are receptive to the notion of openness, are open to the development of better ways of communicating science and are the scientists of the future. Culture change is taking root in the young scientists of today. The student 'Free Culture' movement¹²³ and the Right To Research Coalition¹²⁴ are examples of student activism with respect to opening up science.

The research library community has a strong voice in Open Access advocacy, as would be expected. SPARC (and its European and Japanese counterparts) is a highly effective advocacy organisation that has effected change at many levels. The European research library network, LIBER, and EIFL (Electronic Information for Libraries).

There are also actors that have arisen from the research community itself, including from the ranks of senior management: Enabling Open Scholarship, an international organisation of university managers promoting the principles and practices of open scholarship, is one such. These organisations, and others, are listed in section 7.4.

Advocacy is not limited to dedicated organisations, though. It takes place on the ground, locally across the world. The launch of Open Access Day in 2008 by the Public Library of Science was so successful that the next year the event lasted a week and has done so ever since. In 2010, Open Access Week¹²⁵ involved thousands of events in 90 countries and the movement is growing even bigger.

7.3 Infrastructural approaches

Open Access can only be fully achieved if the right infrastructure is in place to enable global access and true interoperability. In section 2.1 the issue of interoperability was mentioned in the context of technical standards for repository metadata (to ensure all Open Access material is described in basically the same way). This is not all that is

¹²³ <http://freeculture.org/>

¹²⁴ <http://www.righttoresearch.org/>

¹²⁵ <http://www.openaccessweek.org/>

needed, however, and much work remains to be done to get the full foundations in place.

What has been achieved so far is the establishment of a Web-based network of repositories and Open Access journal collections plus supporting organisations that set and uphold technical standards, develop technical solutions for outstanding problems and promote Open Access. The essential components are in place, but there remain interoperability issues around transfer of information across the network from one repository to another, usage reporting, impact assessment, and identity management and preservation amongst others, as well as some challenging problems concerning access to research data. These are areas where future work will be focused.

7.4 Organisations engaged in promoting Open Access

There are many organisations, large and small, engaged in promoting Open Access. This is by no means a comprehensive list, but it presents a selection of some of the most prominent actors. These organisations all have distinct remits and each presents an opportunity for collaboration and partnership with UNESCO.

International library community organisations

- SPARC (Scholarly Publishing and Academic Resources Coalition)¹²⁶: established by the Association of Research Libraries in the US
- SPARC Europe¹²⁷: The European equivalent of SPARC in the US. This, like SPARC Japan, operates a programme of activities independently of SPARC but the three organisations also work collaboratively on many initiatives while pursuing their own agendas
- SPARC Japan¹²⁸
- LIBER (Ligue des Bibliothèques Européennes de Recherche - Association of European Research Libraries)¹²⁹
- EIFL (Electronic Information for Libraries)¹³⁰: EIFL (Electronic Information for Libraries): an international organisation that works in collaboration with libraries in more than 45 developing and transition countries

126 <http://www.arl.org/sparc/>

127 <http://www.sparceurope.org/>

128 <http://www.nii.ac.jp/sparc/en/>

129 <http://www.libereurope.eu>

130 <http://www.eifl.net/>

in Africa, Asia and Europe and enables access to knowledge for education, learning, research and sustainable community development.

- COAR (Confederation of Open Access Repositories): a worldwide membership organisation for repository managers launched in 2009¹³¹
- Latin American Federated Network of Institutional Scientific Documentation Repositories, Red CLARA¹³²
- IBICT (Instituto Brasileiro de Informação em Ciência e Tecnologia)¹³³

There are also very many national library organisations around the world that promote Open Access as part of their work.

International organisations that have arisen from the research community

- Open Knowledge Foundation (OKF): established in 2004 to promote open knowledge of all kinds. UK based, but with an international reach¹³⁴
- Enabling Open Scholarship (EOS): established in 2009 to promote the principles and practices of open scholarship to higher education and research institution managers
- Centre for Internet & Society, Bangalore: established in 2008, the CIS works on issues relating to the effect of the Internet on society, including Open Access. Although based in India, the CIS's mission has an emphasis on South-South dialogues and exchanges¹³⁵

Infrastructure organisations

- JISC (Joint Information Systems Committee), UK: The UK's national ICT organisation for higher education, the JISC sponsors a wide-ranging programme of covering infrastructure development and evidence-based research¹³⁶
- SURF Foundation, The Netherlands: the ICT organisation for Netherlands. SURF funds work to promote IT-based innovation in higher education and research¹³⁷

131 <http://coar-repositories.org/>

132 Latin American Federated Network of Institutional Scientific Documentation Repositories, Red CLARA: http://www.redclara.net/index.php?option=com_content&view=article&id=533&Itemid=504&lang=es

133 <http://www.ibict.br/>

134 <http://okfn.org/>

135 <http://www.cis-india.org/>

136 <http://www.jisc.ac.uk/openaccess>

137 <http://www.surffoundation.nl/en/Pages/default.aspx>



- Digital Repositories Federation, Japan: a coalition of Japanese universities that specifically supports developments around repositories in Japan¹³⁸

Funding organisations supporting Open Access

- OSF (Open Society Foundations): funds research, development and advocacy work internationally in support of Open Access¹³⁹
- FECYT (Fundación Española para la Ciencia y la Tecnología): Spanish national research funding body, supporting science and technology, including developments to help Open Access¹⁴⁰
- DFG (Deutsche Forschungsgemeinschaft): German national funding body for research. Supports Open Access infrastructural developments and advocacy¹⁴¹
- European Commission: funds research and development across the European Union and supports Open Access infrastructure and policy development¹⁴²

Publisher associations

- OASPA (Open Access Scholarly Publishers Association)¹⁴³: a membership organisation of Open Access journals and book publishers

Summary points

- ▶ Strategies for Open Access have bases in the development of policy and infrastructure, and in advocacy
- ▶ All three approaches have borne fruit, they are interdependent, and all are on-going
- ▶ All three now increasingly embrace Open Data too
- ▶ There are many actors pursuing these strategies on international, national and local levels with whom UNESCO could work and partner

138 <http://drf.lib.hokudai.ac.jp/drf/index.php?Digital%20Repository%20Federation%20%28in%20English%29>

139 <http://www.soros.org/>

140 <http://www.fecyt.es/fecyt/home.do>

141 <http://www.dfg.de/en/index.jsp>

142 <http://ec.europa.eu/research/science-society/index.cfm?fuseaction=public.topic&id=1294&lang=1>

143 <http://www.oaspa.org/>

SECTION 8. Policy Framework for Open Access

Policy development is of critical importance to the progress of Open Access and a structured process is the best way to ensure a good policy outcome¹⁴⁴. Policy support is necessary even where advocacy is at its most effective.

8.1 Development and growth of policies

While there had been various policy approaches that involved encouraging Open Access or issuing a declaration of approval for the concept, the first policy to have any real effect was the mandatory one adopted by the School of Electronics & Computer Science at the University of Southampton, UK, in 2002. This required authors in that School to place their postprints (the authors' final version of their peer-reviewed articles) in the School's repository. It was followed by a similar policy covering the whole institution at Queensland University of Technology, Brisbane, in 2004 and, later in that year, at the University of Minho in Braga, Portugal.

These are institutional policies – or, in the case of Southampton, a sub-institutional policy since it affected just one School. Research funders, too, have been introducing policies over the past 5 years or so. The first was the Wellcome Trust, a London-based funder of biomedical research worldwide. It adopted its policy in 2005, quickly followed by the National Institutes of Health (NIH) in the US.

As well as institutional and funder policies, there has been some development of policy at national level. The first national policy was in the Ukraine in 2007. A draft law on science policy was released in early 2009 in Spain that included a section on Open Access and this was ratified

on 12 May 2011¹⁴⁵. Laws are also under development in Argentina¹⁴⁶, Poland and Brazil at the present time.

At the time of writing there are in total 297 mandatory Open Access policies in force from research funders (52 policies), universities and research institutes (132 policies) and individual departments, faculties or schools in research-based institutions (31 policies). Mandatory policies covering doctoral and master's theses have also been introduced in some institutions (82 policies).

Figure 7 shows the growth of mandatory Open Access policies over the last decade¹⁴⁷.

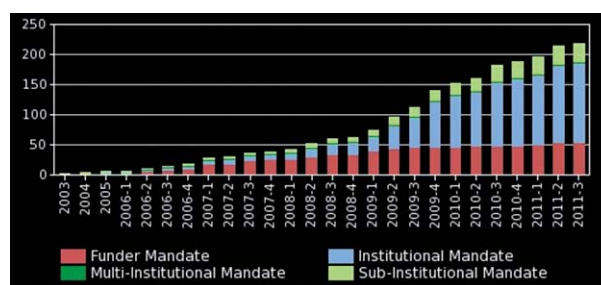


Figure 7: Growth of mandatory policies on Open Access (data for years 2006 onwards shown by year-quarter)

Source: ROARMAP¹⁴⁸

8.2 Policy issues

• • • 8.2.1 Voluntary or mandatory

Welcome though the growth in policies is, there are nonetheless many thousands of universities, research institutes and research funders across the world that

144 See guidelines in the Portuguese RCAAP OA Policy Toolkit: <http://projecto.rcaap.pt/index.php/lang-pt/consultar-recursos-de-apoio/remository?func=startdown&id=336>

145 Ley de la Ciencia (government press release in Spanish): <http://bit.ly/nfeiAC>. For a translation of the relevant Article into English: <http://bit.ly/l4wmVQ>

146 http://www.unlp.edu.ar/uploads/docs/con_sup_junio_2011anteproyecto_de_ley_de_repositorios.pdf

147 The Registry of Open Access Repository Mandatory Archiving Policies (ROARMAP) monitors policy growth: <http://roarmap.eprints.org/>

148 <http://roarmap.eprints.org/> (accessed August 2011)



have not yet implemented an Open Access policy – and without policies deposit levels (self-deposit) for repositories remain obstinately low at around 20-30% of total scholarly works (research outputs).

Evidence has unequivocally demonstrated that to have real effect policies must be mandatory, whether institutional or funder policies. Mandatory policies at institutions succeed in accumulating content in their repositories, averaging 60% of total output after a couple of years of the policy being in place¹⁴⁹. Figure 8 shows the levels of Open Access in institutional repositories with mandatory policies compared to the level of voluntary self-archiving.

Evidence shows that researchers are quite happy to be mandated to act in this way¹⁵⁰. The recent growth in policies based on the ‘Harvard model’, where faculty members vote to approve a mandate for Open Access, is a manifestation of this.

The NIH introduced a voluntary policy in May 2005 but, despite publicising the policy widely and informing grant-holders, the compliance rate remained stubbornly low (below 5% in the first year and not much better the following year). The US Congress then ordered NIH to make the policy mandatory and the new policy took effect at the beginning of 2008. Compliance is now well over 50% and rising.

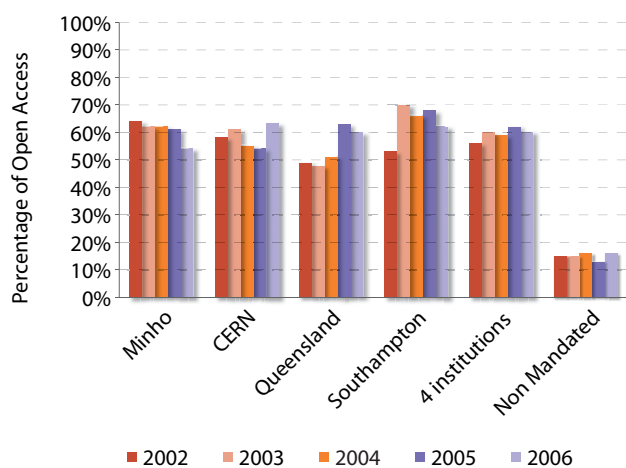


Figure 8: Percentage of the total institutional journal article outputs made Open Access by self-archiving in repositories at four institutions

(universities of Minho and Southampton, Queensland University of Technology and CERN) with mandatory policies, compared with the level of self-archiving at non-mandated institutions (source: Gargouri et al, 2010)

• • • 8.2.2 Types of Open Access

A policy can cover either only ‘green’, or both ‘green’ and ‘gold’, Open Access, but there is a difference of approach for each type. While ‘green’ Open Access (using repositories) can be mandated by institutions or funders, it would be extremely problematical for a policy to insist on ‘gold’ Open Access: that would mean compelling scientists to publish in particular journals. There is no mandatory policy on ‘gold’ Open Access to date, though many do include encouragement to scientists to publish in an Open Access journal if there is a suitable one.

Some funders (and a very few universities) also provide funds specifically to pay for article-processing fees for Open Access journals; rather more do not allocate new funds but permit the payment of APCs from grant money. It should be noted that grant money has been used for decades to pay colour charges or page charges to subscription journals: funders that allow this might now consider requiring Open Access for such articles as a payoff from an otherwise toll-access journal.

All mandatory policies have a focus on ‘green’ Open Access. They require articles to be deposited in a repository and made Open Access at an appropriate time.

• • • 8.2.3 Locus of deposit

Many funder policies stipulate only that articles must be deposited in ‘a suitable repository’, acknowledging that in the disciplines they fund there may be a choice of deposit loci. In physics, for example, scientists may prefer to deposit their articles in the central arXiv repository rather than their institutional repository. In other disciplines, where there is not a popular central repository, the institutional repository will be the most appropriate place for deposit.

Institutional policies naturally oblige authors to use the institutional repository for deposit. Not only does this enable them to benefit from the advice and assistance of the repository staff, it has institutional benefits, too, in terms of collecting together *all* the research outputs from an institution, forming a permanent record of digital scholarship for that institution. In research management terms, the repository is a valuable tool.

Some scientists may find themselves under more than one mandatory policy – one from their institution and one from their research funder. In response to increasing incidents of this type, technical development work has been carried out to provide tools that enable the author

¹⁴⁹ Studies by Sale (2006) and Gargouri et al (2010) have produced data to show this: full references in the bibliography.

¹⁵⁰ In surveys, over 80% of authors say they would be willing to cooperate with a mandate and a further 14% saying they would do so with some reservations. See Swan & Brown (2005); full reference in the bibliography

to deposit an article once and for it to be copied into other repositories¹⁵¹. UKPMC is developing the means to send a copy of articles deposited there as a result of funder mandates to the institutional repository of the author. These schemes simplify life for authors, encourage compliance with policies and enhance Open Access.

The optimum arrangement, one that accommodates the needs of all stakeholders, and has the potential to collect the greatest amount of Open Access content, is for a network of institutional repositories to be the primary locus for deposit and for centralised, subject-specific collections to be created by harvesting the required content from that network of distributed repositories¹⁵². Institutions have a strong interest in collecting and stewarding the intellectual capital resulting from their research programmes and can ensure that the material is collected through implementation of a mandatory policy.

• • • 8.2.4 Content types

..... 8.2.4.1 Literature

The target for Open Access is the peer-reviewed literature and most repositories use software that enables searching limited to peer-reviewed material, a matter of good practice. Most policies cover journal articles. Many policies also encompass peer-reviewed conference proceedings because that is the primary publication route for some disciplines, notably engineering and computer sciences. In other disciplines conference proceedings may also be peer-reviewed and published some of the time, but the journal literature remains the main publication route: those cases fall into the 'nice to have' rather than 'must have' category for Open Access.

As well as these things, many policies cover theses (masters and doctoral) which are, of course, peer-reviewed outputs. In some cases, and in particular in Latin America, most policies developed so far are thesis-specific.

Many policies specifically mention and encourage Open Access to books and book sections (chapters) but do not include these in the mandate since, as discussed in section 1.4, books represent a different case as they are not part of the literature given away for free by scientists.

With respect to journal articles, policies generally specify that the version that must be deposited is the postprint

– that is, the author's final version of the article once peer-review has taken place and any required changes have been made. If the policy of the journal in which the article will be published is to allow preprint-only Open Access, then the policy may mention this. The policy will also cover the issue of publisher embargoes.

..... 8.2.4.2 Data

Research data are increasingly covered by policies and often these policies are being implemented by smaller, niche players as well as large research funders¹⁵³. These policies are not usually, however, the same (Open Access) policies that cover the text-based literature. Data are exceptional because policies must take into account issues of privacy and special cases where data cannot be released for other reasons. Developing and wording Open Data policies is therefore a specialised issue that is not as straightforward as developing policies for Open Access to the literature. Where there is Open Access policy development now, Open Data policy development will follow.

• • • 8.2.5 Embargoes

Many publishers – but certainly not all – stipulate an embargo period before an article can be made Open Access. This is a result of publishers' fears of falling sales. Most Open Access policies will acknowledge this and permit embargoes so that authors are not placed in a position of difficulty with respect to their publisher. In science, publisher embargoes are normally 6-12 months: anything longer than that is considered unreasonable by the community, and certainly not in the public interest, and most mandatory policies make a 12-month embargo the maximum permissible: in a considerable number of science funder policies the maximum embargo allowed is 6 months. In any event, policy should specify the length of embargo allowed and not simply leave it as vague language such as 'in accordance with the publisher's policy'.

The problem with allowing embargoes, however, is that authors are almost certain to forget about depositing once months have passed after publication. The natural time for an author to deposit their postprint is when it is ready for final submission to the journal.

To accommodate this, and hence maximise deposit levels, the most common types of repository software

151 For example, SWORD (Simple Web Service Offering repository deposit): <http://swordapp.org/>

152 The conclusion of a study on the optimal technical and organisational infrastructure to deliver Open Access on a national scale (Swan *et al*, 2005): full reference in the bibliography.

153 See, for example, the Centre for Global Development's new data policy: <http://blogs.cgdev.org/globaldevelopment/2011/08/cgds-new-data-code-transparency-policy.php>



offer an embargo facility: the author deposits the postprint at the time of submission to the journal and chooses the embargo length from a list provided by the software. At the end of that embargo period, the software automatically makes the article Open Access.

There is something more to this, too: the software ensures that the article metadata (the title, authors, etc) are open from the time of deposit. Metadata are not copyrightable and so publishers cannot prevent them from being displayed. The metadata are indexed by Web search engines (e.g. Google Scholar), so during the embargo period it is possible for users to discover the existence of the article, even though the full-text is not open to them. Also, and importantly, the institution has a complete record of the research outputs of the institution, not the partial one that would result from a policy that relied upon researchers remembering to deposit six or twelve months down the line from publication.

The software has a 'request a copy' button that automatically sends an email message to the depositing author asking for a copy to be emailed to the would-be user. This is allowable under 'fair use': the author is providing a single copy for private study. Through this arrangement, the article's usage and impact can begin to grow from the moment of deposit, despite the embargo.

• • • 8.2.6 Gratis and libre Open Access

Existing mandatory policies generally avoid this distinction¹⁵⁴. Requiring libre Open Access is considered a step too far at present, despite its promise for science, as it would make it very difficult for authors to publish in journals of choice because of publisher resistance. It is an issue for future policy, though that future will not be too far ahead. The trend for Open Access journals to use Creative Commons licensing to permit liberal re-use is upwards, and as more journals convert to Open Access this can be expected to continue.

• • • 8.2.7 Permissions

As discussed in section 6, Open Access is dependent upon the permission of the copyright holder.

¹⁵⁴ The exceptions are the UKPMC funders (8 UK medical charities and the Medical Research Council), which require libre Open Access where they pay the whole or part of an article-processing charge for publishing in Open Access journals.

• • • • • 8.2.7.1 Authors as copyright holders

Where authors retain sufficient right to enable Open Access, policymakers need to find ways to work with that. Institutions can either secure sufficient rights themselves as a condition of employment, or they can be granted those rights by the authors.

An example of the former is Queensland University of Technology, which has the following wording in its Intellectual Property Policy¹⁵⁵:

Ownership of copyright

- ▶ In accordance with general law principles noted in section 3.1.4 above, QUT as an employer is the owner of copyright where the work is created by staff members in the course of their employment. QUT's ownership of copyright applies to both academic and professional staff.

Assignment of scholarly works

- ▶ Provided that QUT does not have contractual obligations to a third party which would prevent QUT effecting such an assignment, QUT assigns the right to publish scholarly works to the creator(s) of that work. The assignment is subject to a perpetual, irrevocable, worldwide, royalty-free, non-exclusive licence in favour of QUT to allow QUT to use that work for teaching, research and commercialisation purposes and to reproduce and communicate that work online for non-commercial purposes via QUT's open access digital repository.
- ▶ If required, QUT will sign documents to more fully record the staff member's ownership of the right of publication of the copyright in a scholarly work and QUT's non-exclusive licence to that work.
- ▶ If required, a staff member will sign documents to more fully record the licence in favour of QUT to use scholarly works as contemplated by this section 3.1.5.
- ▶ The "right to publish" scholarly works in this section 3.1.5 means the right to publish a work as referred to in the Copyright Act 1968 (Cwth).
- ▶ The version of the scholarly work that QUT can make available via the digital repository may be the published version or the final post-peer review manuscript version. QUT will agree to third party publisher-requested embargoes of 12 months or less (from date of publication by the third party publisher) on the publication of the manuscript via the digital repository.
- ▶ Any subsequent publication agreement or assignment of the right to publish the scholarly work entered into by the creator will be subject to the terms of the pre-existing non-exclusive licence referred to in this section 3.1.5.

¹⁵⁵ http://www.mopp.qut.edu.au/D/D_03_01.jsp#D_03_01.05.mdoc

An example of the latter is the Harvard University position, where researchers in six faculties have voted to grant to the University a nonexclusive, irrevocable right to distribute their scholarly articles for any non-commercial purpose¹⁵⁶. This right trumps any other, subsequent agreement with publishers.

8.2.7.2 Publishers as copyright holders

Where the author has transferred all rights to the publisher, as is most often the case when signing a standard publisher CTA (see section 6), permission to make work Open Access must be sought from the publisher.

Seeking permission from publishers for more than they offer as standard is unlikely to be successful. In the case of more than half of journals, the publisher does allow some form of self-archiving, though in around one-third of journals this is for the preprint only, an unsatisfactory state of affairs for many authors. It is unusual for a publisher to change position, when asked, to permit self-archiving of the postprint. Publishers are also unlikely to change their stance on embargo length.

Policymakers should take these things into account when wording a policy. Above all, the balance of interests of the different parties should be considered. The public interest is that scientific results are placed in the public arena immediately they are publishable. A policy position that compromises this by deferring to publisher interests¹⁵⁷ is a weak one.

In most cases of policy development at the moment, the policy depends on publisher permission because rights are transferred to the publisher as a matter of routine. Best practice is for sufficient rights to be retained, as a matter of routine, so that the provision of Open Access is not at all dependent on publisher permissions. Publishers may opt not to publish work under those conditions, and that is part of the balance of rights and choices.

8.2.8 Compliance

Compliance levels do vary, even for mandatory policies. The wording of the policy is one factor in this, but the way the policy is implemented is certainly another, strong, one. A good advocacy programme to back up a policy is usually necessary to reach acceptable compliance levels.

Institutions can monitor compliance with their policies more easily than funders can, though it may still not be a simple task. There is no indexing service that covers 100% of the literature, so checking the repository content against what is recorded by literature indexing services gives only an approximation of how complete the repository's content is.

Some universities have a CRIS (Current Research Information System) that records grant awards, research groups, equipment purchased, collaborations, and so forth. Many CRIS also record the bibliographic details of items published. Where this is the case, the institution has a method for tracking whether all items published are also deposited in the repository. It has to be said, however, that the vast majority of universities do not have such a system, and so monitoring compliance with an Open Access policy is a challenge.

Funders find it even more of a challenge as it is very difficult for them to know precisely what has been published from research they have funded. Often, publications follow after the end of the project-funding period so that a record of them does not appear in the final project report to the funder. Tracking the publications that result from their funding has been largely through labour-intensive, manual searching of the literature and matching it against accumulation of Open Access content.

Where funders have tried to increase compliance there has been some success. Both the Wellcome Trust and the NIH, for example, have sent out letters to grant-holders reminding them of their obligations under the policy. Wellcome's letter asks grant-holders why they have not complied with the policy¹⁵⁸. These funders also wrote to the grant-holders' institutions, thereby reminding them of their responsibilities and interests in this process.

There are moves now by large funders to develop systems for better monitoring of the outcomes of their funding programmes. The NIH now requires its grant-holders to use the PubMed Central (PMC) manuscript submission reference when they cite articles in project reports or new grant applications¹⁵⁹. This ensures that the grant-holder does, indeed, submit the manuscript to PMC so that a submission number is obtained.

Repository software developers are also beginning to work with funders to understand their needs and to build into the software the right metadata fields that can capture

156 <http://osc.hul.harvard.edu/policies>

157 For example, the UK's Economic & Social Research Council's policy states that it requires its grant-holders to make their work Open Access 'where this is permitted by publishers' licensing or copyright arrangements'.

158 See the Wellcome Trust Open Access compliance audit 2009: <http://www.wellcome.ac.uk/About-us/Publications/Grantholders-newsletter/WTX052748.htm>

159 http://publicaccess.nih.gov/citation_methods.htm



information on grants and awards. This is an area that is in the early days of development, but is likely to grow and become more widespread. Being able to account for the outcomes of public spending and to demonstrate return on research investment are issues that are growing in importance across the world, and universities and funders will increasingly see the value of an Open Access literature in helping them assess these things.

• • • 8.2.9 Sanctions

Compliance with a policy is usually encouraged by a mixture of carrot¹⁶⁰ and stick approaches: policymakers may consider exerting sanctions when advocacy and rewards fail.

Research funders have a number of options. They could refuse further funding, or suspend current funding, if a grant-holder fails to comply. So far, none have taken this step, but there have been strong hints in the past from the NIH that it may become stricter with its grantees, 'suspending funds' being one option¹⁶¹.

Research institution managers have a different set of sanctions, including linking self-archiving to promotion and tenure applications¹⁶².

• • • 8.2.10 Advocacy

Policies, however well worded, need advocacy support to really take effect. In all the best-performing institutions in terms of percentage of their outputs that can be found in the repository, there is a strong, sustained advocacy programme. Precise details vary from institution to institution but ranges from publicising repository usage and impact statistics to awarding prizes. Emphasis is placed on how opening up the institution's outputs enhances its reputation and that of the individual

scientists: linking behaviour and benefits is always strongly promoted¹⁶³.

• • • 8.2.11 Waivers

Some policies provide a waiver facility. If authors cannot or will not comply for some reason, they are invited formally to request a waiver and provide the reason why they need this. Usually this option operates alongside a rights-retention policy, and accommodates those instances where the author wishes to publish in a particular journal and the publisher will require full copyright to be assigned to the journal.

• • • 8.2.12 'Gold' Open Access

Finally, some policies make a specific statement about 'gold' Open Access where there is a willingness on the part of the policy-holder to pay APCs or permit the use of grant funding to pay for them.

8.3 A typology of policies

The policy issues covered in the sections above can be summarised in a typology of policies. Of course, it is possible for policies to vary on all these parameters so the total number of permutations is very large. In practice, however, a number of main variants have arisen and these are shown in Table 1.

160 An example of a reward system for depositing is that operated at the University of Minho, Portugal, where cash payments are made to departments for every item deposited, thus incentivising departments to incentivise their researchers: <https://mx2.arl.org/Lists/SPARC-OAForum/Message/2807.html>

161 NIH Deputy Director for Extramural Research, Norka Ruiz Bravo: 'Other possible ways of forcing scofflaws to comply range from having a program director call with a reminder, to the most extreme – suspending funds'. Quoted in an article in *Science*, 18 January 2008, 266 DOI:10.1126/science.319.5861.266 [this article is toll-access].

162 This has worked well in practice at the University of Liège in Belgium, where the rector's policy makes clear that when applications are made to him for promotion or tenure he will use the repository to see the publication record of the applicant.

163 For a range of effective advocacy activities that have been proven in use, see Enabling Open Scholarship's briefing paper for librarians: http://www.openscholarship.org/jcms/c_7152/making-the-case-for-open-access-guide-for-librarians

Mandatory	Immediate deposit	Embargo permitted	Retention of rights	Waiver permitted	Notes	Example
Type 1: Immediate deposit, no waiver						
Yes	Yes	Yes, on opening of the full-text: metadata open from deposit	Optional	No	This type of policy applies where the policymaker does not already, and does not wish to, acquire the rights to the work covered by the policy. The policy leaves the rights where they already reside – that is, either with the author or with the publisher. In the latter case, publisher permissions must be respected, entailing provision in the policy for an embargo period. The policy requires the metadata to be visible from the time of deposit so that would-be users can discover the existence of the article and request a copy from the author	University of Liege http://www.eprints.org/openaccess/policysignup/fullinfo.php?inst=Universit%C3%A9%20de%20Li%C3%A8ge
Type 2: Rights-retention						
(a) Authors assign sufficient rights to policymaker						
Yes	Usually	Usually. Embargo handled as in Type 1	Yes	Yes	This type of policy applies where the policymaker does not already have the rights to the work produced but is prepared to acquire from the creators of the work sufficient rights to make the work Open Access. The creators are usually granted the option of a waiver where the policy prevents publication in the journal of choice	Harvard University Faculty of Arts & Sciences http://osc.hul.harvard.edu/hfaspolicy
(b) Policy maker already holds sufficient rights						
Yes	Usually	Usually. Embargo handled as in Type 1	Yes	Yes	This type of policy applies where the policymaker already has the rights to the work produced or is prepared to make that the case	Queensland University of Technology http://www.mopp.qut.edu.au/F/F_01_03.jsp#F_01_03.02.mdoc
Type 3: Deposit within a certain period						
Yes	No	Yes, but specified by the policy	Optional	No	This type of policy accommodates, to a degree, publisher requirements for an embargo, but it specifies the maximum length of the embargo period. In practice this is usually 6 months if the policy applies only to the natural sciences, and 12 months if it has a broader disciplinary coverage	Wellcome Trust http://www.wellcome.ac.uk/About-us/Policy/Policy-and-position-statements/WTD002766.htm
Type 4: Deposit if/ when publisher permits						
Yes	No	Yes, whatever the publisher requires	No	Yes	This type of policy accommodates all publisher requirements, including embargoes of any length	University of Southampton http://www.soton.ac.uk/library/research/eprints/policies/oapolicy.html
Type 5: Voluntary						
No	Immaterial					Athabasca University http://www2.athabasca.ca/secretariat/policy/research/openaccess.htm

Table 1: Typology of Open Access policies: main variants in use

Note 1: any of these policies may require libre Open Access, though so far almost all have only required gratis Open Access.

Note 2: Any of these policies may include mention of 'gold' Open Access and what the policymaker wishes authors to do in that regard (for example, the policy may merely encourage authors to publish in Open Access journals or the policymaker may wish to describe a specific fund made available for this purpose).

Summary points on policy best practice

- ▶ **Policy type:** policies may request and encourage provision of Open Access, or they may require it. Evidence shows that only the latter, mandatory, type accumulate high levels of material. Evidence also shows that researchers are happy to be mandated on this issue
- ▶ **Open Access routes covered:** policies can require 'green' Open Access by self-archiving but to preserve authors' freedom to publish where they choose policies should only *encourage* 'gold' Open Access through publication in Open Access journals
- ▶ **Deposit locus:** deposit may be required either in institutional or central repositories. Institutional policies naturally specify the former: funder policies may also do this, or may in some cases specify a particular central repository
- ▶ **Content types covered:** all policies cover journal articles: policies should also encourage Open Access for books: funder policies are increasingly covering research data outputs
- ▶ **Embargoes:** Policies should specify the maximum embargo length permitted and in science this should be 6 months at most: policies should require deposit at the time of publication with the full-text of the item remaining in the repository, but closed, until the end of the embargo period
- ▶ **Permissions:** Open Access depends on the permission of the copyright holder, making it vulnerable to publisher interests. To ensure that Open Access can be achieved without problem, sufficient rights to enable that should be retained by the author or employer and publishers assigned a Licence To Publish. Where copyright is handed to the publisher, Open Access will always depend upon publisher permission and policies must acknowledge this by accommodating a 'loophole' for publishers to exploit
- ▶ **Compliance with policies:** compliance levels vary according to the strength of the policy and the ongoing support that a policy is given: compliance can be improved by effective advocacy and, where necessary, sanctions
- ▶ **Advocacy to support a policy:** there are proven advocacy practices in support of an Open Access policy: policymakers should ensure these are known, understood, and appropriate ones implemented
- ▶ **Sanctions to support a policy:** both institutions and funders have sanctions that can be used in support of an Open Access policy: policymakers should ensure that these are identified, understood and appropriate ones implemented where other efforts fail to produce the desired outcome
- ▶ **Waivers:** where a policy is mandatory authors may not always be able to comply. A waiver clause is necessary in such policies to accommodate this
- ▶ **'Gold' Open Access:** where a funder or institution has a specific commitment with respect to paying 'gold' article-processing fees, this should be stated in the policy

SECTION 9. Summary Policy Guidelines

9.1 The context

The case for Open Access policy is built around the opportunity presented by the World Wide Web to optimise the dissemination of scientific information to all constituencies that could benefit from it. A global, interoperable, open, re-usable, permanently available database of scientific knowledge is achievable with the right strategies and policies.

There is a worldwide effort to promote Open Access – much of it coordinated through collaborative efforts between established actors in the field – and focused on particular practical, strategic and political goals. Critical way-markers have already been reached and passed. There are formal definitions in place to describe and explain the concept of Open Access itself, the distinctions between gratis and libre Open Access and the two routes to making research findings openly accessible – ‘green’ and ‘gold’ Open Access. There are also agreed definitions of allied concepts such as Open Data (which is increasingly becoming included alongside the research literature as a primary target for openness in science), Open Science, Open Educational Resources and Open Innovation.

Some success has been achieved, with Open Access content accumulating in repositories and Open Access journals, but as this Open Access corpus has not yet reached 30% of the whole literature there is considerable work to be done to raise this level. Continuing work is needed in three areas – infrastructure development, advocacy and policy-making.

Guidelines are set out below for research funders and for institutional policy-makers. The sets are very similar, but there are some differences where policy varies for each case.

9.2 Guidelines for governments and other research funders

Research funders play a crucial role in policymaking with respect to Open Access. Where funders are disbursing public money they will wish to ensure that the results of their funding are disseminated as widely as possible and used by all who can benefit. Open Access increases the visibility, usage and impact of research, and enables it to reach all constituencies that can benefit, including the education, professional, practitioner and business communities, as well as the interested public. The return on public investment in science is thereby maximised.

Research funders are therefore encouraged to develop and implement an Open Access policy. In preparing for this, funders may wish to consider the following issues:

• • • 9.2.1 Form of policy

Policies that encourage or request scientists to make their work Open Access gather relatively little content for the Open Access corpus. Mandatory policies, on the other hand, are effective, given the right support. The policy should therefore *require* that scientists comply, stating the reason for the policy and the benefits that scientists and the public will derive.

• • • 9.2.2 Scope of the policy: target content

The accepted definitions of Open Access make plain that the target content for Open Access is the journal literature (journal articles, peer-reviewed conference proceedings and theses). They also address the desirability of including research monographs but acknowledge that these are a special case because of the issue of royalty payments: books are not ‘give-away’ literature as journal articles



are. Policies should follow this model, specifying that the journal literature is the main policy target but that access to the monograph literature is equally important and is encouraged, though it cannot be the subject of mandatory policy.

Research data *can* be the subject of a mandatory policy, but is best covered by a separate policy document. Many funders now have Open Data policies in place, but a data policy must cover more complex issues than an Open Access policy and the two are better not conflated. That said, an Open Access policy can also mention and *encourage* scientists to make their data shareable alongside their articles wherever possible.

• • • 9.2.3 Scope of the policy: gratis or libre Open Access

The reasons for libre Open Access are important for the future of research, and as such deserve acknowledgement in policy wording. The provision of material that satisfies the libre definition is to be encouraged though not required. Guidance on the use of Creative Commons (or similar) licensing procedures should be provided, with an explanation of the most appropriate licence for most academic purposes (CC-BY, or 'attribution' licence).

• • • 9.2.4 How to comply with the policy

Policies should explain the two routes to Open Access – 'green', through repositories, and 'gold', through Open Access journals. The policy can and should *require* 'green' but only *encourage* 'gold', since to do otherwise would remove the scientist's choice of journals in which to publish. It should point to the Directory of Open Access Journals as a source of information about the range of these journals, and encourage authors to consider one of them when they next publish an article.

• • • 9.2.5 Locus of deposit

Policies should specify where articles are to be deposited in the case of 'green' Open Access. If the funder has its own repository that may be target location. Otherwise, there may be a central subject repository that accepts direct deposits (in the high-energy physics and biomedical disciplines this is the case): funders sometimes wish to leave the locus for deposit in this case to the author. It is best for the growth of Open Access, however, if deposit is specified as the local repository in the author's

institution. In this way, the funder works *with* institutions, many of which are implementing their own local policy that naturally stipulates local deposit, and encourages institutions to establish repositories for this purpose. Technologies exist that enable an author to deposit locally and have their article duplicated in other repositories, a solution that streamlines the situation where an author finds under obligations from both his/her institution and his/her funder.

• • • 9.2.6 Time of deposit

The policy should require the deposit of an article immediately it is ready for publication. If an embargo period is to be accommodated the author is required to ensure that the article will be openly available at the end of that period. In most cases, repository software can automate this process once the author has indicated, as part of the deposit process, how long the embargo period is to be.

• • • 9.2.7 Article-processing charges (APCs)

Funders should take a position on the payment of article-processing fees for 'gold' journals. It should clearly state whether it is permitted to use grant funds for this purpose and if the funder is prepared to make additional funds available for Open Access publishing the amounts available and how to access these funds should be explained. There should also be a statement on whether it is permissible to use these funds to pay APCs for 'hybrid' journals (because most hybrid journals are published under 'double dipping' conditions, many funders do not permit this).

• • • 9.2.8 Copyright

Funder policies should explain that copyright is a bundle of rights and that it is possible to retain sufficient of these to be able to disseminate the work as required. It should also explain that the majority of journals allow self-archiving (the 'green' route via repositories), though many insist on an embargo period before the article is made openly available. If the funder does not wish to accommodate an embargo, this should be made clear, though most funder policies currently do allow short embargo periods (6 months). In this case, it will be usually necessary for the funder to require that some rights are retained by itself or the author so that Open Access can

be effected immediately at publication. The policy should be clear on which option the funder is taking in this circumstance:

- The funder, as a condition of funding, requires the author to retain sufficient rights to make the work Open Access
- The funder, as a condition of funding, requires the author to assign sufficient rights to the funder to make the work Open Access

It should point authors to the SHERPA RoMEO service that lists publisher permissions so that they can check what the position is for the journal in which they wish to publish. The policy may alternatively provide, or point authors to, a suitable *Licence To Publish* which the author might optionally offer the publisher. Finally, the policy should make clear to publishers what options they have under the policy.

Best practice for self-archiving is to assign a Creative Commons licence to each work, thus clarifying for both human and machine user the conditions under which the material may be used.

• • • 9.2.9 Embargo period

Funders may decide to accommodate a short embargo period after publication before an article can be made Open Access. The policy should clearly state the length of the permitted embargo. It should also make clear that where the publisher's policy requires a longer embargo, authors should publish elsewhere.

• • • 9.2.10 Compliance and sanctions

Since the policy will be mandatory, compliance should be expected. Evidence suggests, however, that additional support in terms of advocacy and 'reminders', either periodic and general or specific to particular recalcitrant grant-holders, will be necessary. Funders should be prepared to put these systems in place to support the policy. Funders should also state clearly that they will be monitoring compliance, and what sanctions might be brought to bear on non-compliers.

9.3 Guidelines for Institutional policy-makers

The case for Open Access at institutional level is founded both on the moral argument and self-interest. Open Access increases the visibility, usage and impact of research, and enables it to reach all constituencies that can benefit, including the education, professional, practitioner and business communities, as well as the interested public. Both the institution and the individual scientists in it benefit from this visibility and impact. Public universities are increasingly being required to demonstrate their value to the public that supports them, and Open Access is part of that value.

Institutions are therefore encouraged to develop and implement an Open Access policy. In preparing for this, institutional managers may wish to consider the following issues:

• • • 9.3.1 Form of policy

Policies that encourage or request scientists to make their work Open Access gather relatively little content for the Open Access corpus. Mandatory policies, on the other hand, are effective, given the right support. The policy should therefore *require* that scientists comply, stating the reason for the policy and the benefits that scientists and the public will derive.

• • • 9.3.2 Scope of the policy: target content

The accepted definitions of Open Access make plain that the target content for Open Access is the peer-reviewed literature that is given away for free by authors (journal articles, peer-reviewed conference papers and theses). They also address the desirability of including research monographs but acknowledge that these are a special case because of the issue of royalty payments: books are not 'give-away' literature as journal articles are. Policies should follow this model, specifying that the journal literature is the main policy target but that access to the monograph literature is equally important and is encouraged, though it cannot be the subject of mandatory policy.

Research data *can* be the subject of a mandatory policy, but is best covered by a separate policy document. A few universities currently have Open Data policies in place, but a data policy must cover more complex issues than an



Open Access policy and the two are better not conflated. That said, an Open Access policy can also mention and *encourage* scientists to make their data shareable alongside their articles wherever possible.

• • • 9.3.3 Scope of the policy: gratis or libre Open Access

The reasons for libre Open Access are important for the future of research, and as such deserve acknowledgement in policy wording. The provision of material that satisfies the libre definition is to be encouraged though not required. Guidance on the use of Creative Commons (or similar) licensing procedures should be provided, with an explanation of the most appropriate licence for most academic purposes (CC-BY, or 'attribution' licence).

• • • 9.3.4 How to comply with the policy

Policies should explain the two routes to Open Access – 'green', through repositories, and 'gold', through Open Access journals. The policy can and should **require** 'green' but only **encourage** 'gold', since to do otherwise would remove the scientist's choice of journals in which to publish. It should point to the Directory of Open Access Journals as a source of information about the range of these journals, and encourage authors to consider one of them when they next publish an article.

• • • 9.3.5 Locus of deposit

Policies should specify that articles are to be deposited in the institutional repository. Technologies exist that enable an author to deposit locally and have their article duplicated in other repositories if necessary or desirable, a solution that streamlines the situation where an author finds under obligations from both his/her institution and his/her funder.

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The policy should require the deposit of an article immediately it is ready for publication. If an embargo period is to be accommodated the author is required to ensure that the article will be openly available at the end of that period. In most cases, repository software can automate this process once the author has indicated, as part of the deposit process, how long the embargo period is to be.

• • • 9.3.7 Article-processing charges (APCs)

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• • • 9.3.8 Copyright

Institutional policies should explain that copyright is a bundle of rights and that it is possible to retain sufficient of these to be able to disseminate the work as required. It should also explain that the majority of journals allow self-archiving (the 'green' route via repositories), though many insist on an embargo period before the article is made openly available. If the institution does not wish to accommodate an embargo, this should be made clear. In this case, it will be usually necessary for the institution to require that some rights are retained by itself or the author so that Open Access can be effected immediately at publication. The policy should be clear on which option the funder is taking in this circumstance:

- The institution, as a condition of employment, requires the author to retain sufficient rights to make the work Open Access
- The institution, as a condition of employment, requires the author to assign sufficient rights to the institution to make the work Open Access

It should point authors to the SHERPA RoMEO service that lists publisher permissions so that they can check what the position is for the journal in which they wish to publish. The policy may alternatively provide, or point authors to, a suitable *Licence To Publish* that the author might optionally offer the publisher. Finally, the policy should make clear to publishers what options they have under the policy.

Best practice for self-archiving is to assign a Creative Commons licence to each work, thus clarifying for both human and machine user the conditions under which the material may be used.

• • • 9.3.9 Embargo period

Institutions may decide to accommodate a short embargo period after publication before an article can be made Open Access. The policy should clearly state the length of the permitted embargo. It should also make clear that where the publisher's policy requires a longer embargo, authors should publish elsewhere.

• • • 9.3.10 Compliance and sanctions

Since the policy will be mandatory, compliance should be expected. Evidence suggests, however, that additional support in terms of advocacy and other measures will be necessary. University managers may not wish to make specific threats of sanctions, nor feel they are in a position to do so. What they can consider is linking the repository to research assessment and monitoring, thereby encouraging authors to deposit so that their work is taken into account in consideration of their chances of tenure or promotion.



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GLOSSARY OF KEY TERMS AND ABBREVIATIONS

‘BBB’ definition of Open Access: The amalgam of the three most important formal attempts to define Open Access, at meetings in Budapest (see BOAI), Bethesda and Berlin.

Big Deal: A subscription to a package of multiple journals from one publisher. Usually purchased by libraries for a multi-year period.

BOAI: Budapest Open Access Initiative. This is the first formal definition of Open Access, developed at an Open Society Institute (now Open Society Foundations)-funded meeting in Budapest, Hungary in December 2001 and published on 14 February 2002.

Creative Commons: A non-profit organisation that develops, supports, and stewards legal and technical infrastructure to enable sharing of digital outputs, including by the development of a suite of licensing products.

Data mining: Computational process whereby text or datasets are crawled by software that recognises entities, relationships and actions and can put these together in new ways to create new knowledge.

Double-dipping: The practice where a publisher offers ‘gold’ open Access in an otherwise subscription-based journal, without a commitment to reduce subscription charges in line with the new revenue stream. The author pays an article-processing fee and the publisher makes that article Open Access: the rest of the issue is only available to subscribers. Some publishers do reduce their subscription rates as revenue from APCs increases but most do not, and therefore ‘double-dip’ into research community funds.

Eprint: An electronic version of a journal article or book chapter.

‘Gold’ Open Access: Open Access achieved by publishing articles in Open Access journals.

‘Green’ Open Access: Open Access achieved by depositing items (journal articles, peer-reviewed conference papers and theses) in an open Access repository, a process known as ‘self-archiving’.

Harvesting: The collecting of objects or information from one or more remote sites into another site. Used, for example, in relation to the collection of articles from institutional repositories into a central database.

‘Hybrid’ Open Access: Open Access on a single-article basis in an otherwise subscription-based journal. Authors can pay to make their own article Open Access while the rest of the journal remains toll-access. Offered by publishers that wish to maintain their subscription-based business but still offer an Open Access option, and may be seen as a transition mechanism towards full Open Access at some time in the future.

Metadata: The information that describes an object. In scholarly communication terms the object could be an article, book, dataset, etc. The metadata (or bibliographic data) describe the authorship, provenance, publication location, date of publication, object type and so forth.

OAI-PMH: Open Archives Initiative Protocol for Metadata Harvesting. A technical standard for metadata for Open Access repositories and Open Access journals. Adherence to this standard ensures interoperability.

Open Access journal: A journal that makes its contents freely available online immediately at the time of publication and on a permanent basis.

Open Data: In the scholarly communication context, Open Data are datasets produced by research that are made openly available. Some conditions on their use may apply depending on the need for privacy or similar restrictions.

Postprint: A journal article (or book chapter or book) that has been peer-reviewed and revised appropriately as a



result of peer review, but is still in the format created by the author (i.e. not the publisher's formatted form).

Preprint: A journal article (or book chapter or book) that has not yet been peer-reviewed.

Repository: A database of digital research outputs. May be institutionally-based or be a service to a particular disciplinary, geographical or other type of community.

Self-archiving: The process of depositing a digital research article or other digital research output into an Open Access repository.

Text mining: Computational process whereby texts are crawled by software that recognises entities, relationships and actions and can put these together in new ways to create new knowledge.



APPENDIX 1. Example policies

A1.1 Funder policies

Some examples of funder policies follow here.

• • • A1.1.1 The Wellcome Trust¹⁶⁴

[This is an example of a Type 3 policy]

Open access policy

Position statement in support of open and unrestricted access to published research

The mission of the Wellcome Trust is to support the brightest minds in biomedical research and the medical humanities.

The main output of this research is new ideas and knowledge, which the Trust expects its researchers to publish in high-quality, peer-reviewed journals.

The Wellcome Trust believes that maximising the distribution of these papers - by providing free, online access - is the most effective way of ensuring that the research we fund can be accessed, read and built upon. In turn, this will foster a richer research culture.

The Wellcome Trust therefore supports unrestricted access to the published output of research as a fundamental part of its charitable mission and a public benefit to be encouraged wherever possible.

Specifically, the Wellcome Trust:

- *expects authors of research papers to maximise the opportunities to make their results available for free*
- *requires electronic copies of any research papers that have been accepted for publication in a peer-reviewed journal, and are supported in whole or in part by Wellcome Trust funding, to be made available through PubMed Central (PMC) and UK PubMed Central (UKPMC) as soon as possible and in any event within six months of the journal publisher's official date of final publication*

- *will provide grantholders with additional funding, through their institutions, to cover open access charges, where appropriate, in order to meet the Trust's requirements*
- *encourages - and where it pays an open access fee, requires - authors and publishers to license research papers such that they may be freely copied and re-used (for example for text and data-mining purposes), provided that such uses are fully attributed*
- *affirms the principle that it is the intrinsic merit of the work, and not the title of the journal in which an author's work is published, that should be considered in making funding decisions.*

Specific details of how authors are required to comply with this policy can be found in the authors' FAQs. Information for publishers can be found in the publishers' guide. This policy will be kept under review.

• • • A1.1.2 The National Institutes of Health (USA)¹⁶⁵

[This is an example of a Type 3 policy]

The Director of the National Institutes of Health shall require that all investigators funded by the NIH submit or have submitted for them to the National Library of Medicine's PubMed Central an electronic version of their final, peer-reviewed manuscripts upon acceptance for publication, to be made publicly available no later than 12 months after the official date of publication: Provided, That the NIH shall implement the public access policy in a manner consistent with copyright law.

Specifics

1. The NIH Public Access Policy applies to all peer-reviewed articles that arise, in whole or in part, from direct costs funded by NIH, or from NIH staff, that are accepted for publication on or after April 7, 2008.
2. Institutions and investigators are responsible for ensuring that any publishing or copyright agreements

¹⁶⁴ <http://www.wellcome.ac.uk/About-us/Policy/Policy-and-position-statements/WTD002766.htm>

¹⁶⁵ <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-08-033.html>

concerning submitted articles fully comply with this Policy.

3. PubMed Central (PMC) is the NIH digital archive of full-text, peer-reviewed journal articles. Its content is publicly accessible and integrated with other databases (see: <http://www.pubmedcentral.nih.gov/>).
4. The final, peer-reviewed manuscript includes all graphics and supplemental materials that are associated with the article.
5. Beginning May 25, 2008, anyone submitting an application, proposal or progress report to the NIH must include the PMC or NIH Manuscript Submission reference number when citing applicable articles that arise from their NIH funded research. This policy includes applications submitted to the NIH for the May 25, 2008 due date and subsequent due dates.

Compliance

Compliance with this Policy is a statutory requirement and a term and condition of the grant award and cooperative agreement, in accordance with the *NIH Grants Policy Statement*. For contracts, NIH includes this requirement in all R&D solicitations and awards under Section H, Special Contract Requirements, in accordance with the Uniform Contract Format.

• • • A1.1.3 The Irish Research Council for Science, Engineering & Technology (IRCSET)¹⁶⁶

[This is an example of a Type 1 policy]

THE IRISH RESEARCH COUNCIL FOR SCIENCE, ENGINEERING & TECHNOLOGY

STATEMENT OF POLICY RELATING TO: THE OPEN ACCESS REPOSITORY OF PUBLISHED RESEARCH PAPERS

The Irish Research Council for Science, Engineering & Technology (IRCSET) has established and will promote the following policy relating to the placement of research publications in Open Access Repositories.

Where a research publication arises in whole or in part from IRCSET funded research (i.e. where one or other of the researchers concerned receives IRCSET funds in support of their endeavours), the following policy will be adhered to with effect from 1st May 2008.

THE FOLLOWING IS APPLICABLE TO IRCSET FUNDED RESEARCHERS

The IRCSET policy is adopted on the following key principles:

The intellectual effectiveness and progress of the widespread research community may be continually enhanced where the community has access and recourse to as wide a range of shared knowledge and findings as possible. This is particularly the case in the realm of publicly funded research where there is a need to ensure the advancement of scientific research and innovation in the interests of society and the economy, without unnecessary duplication of research effort.

1. *This publication policy confirms the freedom of researchers to publish first wherever they feel is the most appropriate.*
2. *The effect of the policy is intended to increase the visibility of, and improve access to, the research funded by IRCSET and the State, where such research is intended to be published by the researcher(s) concerned.*
3. *The policy is based on recognised best practice. It is in keeping with the recommendations of the European Research Advisory Board (EURAB) Policy in relation to scientific publication. It is also in keeping with the combined OECD Ministers' Declaration entrusting the OECD to work towards commonly agreed Principles and Guidelines on Access to Research Data from Public Funding.*

Conditions to which IRCSET funded Award Recipients should adhere:

1. *All researchers must lodge their publications resulting in whole or in part from IRCSET-funded research in an open access repository as soon as is practical, but within six calendar months at the latest.*
2. *The repository should ideally be a local institutional repository to which the appropriate rights must be granted to replicate to other repositories.*
3. *Authors should deposit post-prints (or publisher's version if permitted) plus metadata of articles accepted for publication in peer-reviewed journals and international conference proceedings;*
4. *Deposit should be made upon acceptance by the journal/conference. Repositories should release the metadata immediately, with access restrictions to full text article to be applied as required. Open access should be available as soon as practicable after the author-requested embargo, or six month, whichever comes first;*

¹⁶⁶ <http://www.ircset.ie/Default.aspx?tabid=102>





5. *Suitable repositories should make provision for long-term preservation of, and free public access to, published research findings.*
6. *IRCSET may augment or amend the above requirements wherever necessary to ensure best practice in Open Access.*

How does Open Access work?

An Open Access Repository is a storage and retrieval system where published research findings and papers would be stored and made available for full, open and free access by the research community and the general public.

A number of Irish universities currently provide open access repositories of their own and a consortium of Irish universities is engaged in the development of a national open access repository system, i.e., connecting the repositories of each participating institution for fuller public accessibility.

In an Open Access Repository system, the usual copyright and fair practice considerations are not waived and publication on Open Access does not preclude prior publication in a recognised research journal or commercial publication.

Making scholarly publications available on "Open Access" allows them to be freely accessed by anyone in the world using an internet connection. The potential readership of Open Access material is far greater than that for publications where the full-text is restricted to subscribers only. Open Access repositories are also designed to expose the details of their contents to specialised web search engines.

A1.2 Institutional policies

• • • A1.2.1 The University of Liège (Belgium)¹⁶⁷

[This is an example of a Type 1 policy]

[By the rector, Professor Bernard Rentier]

The policy is mandatory: the Immediate-Deposit/Optional-Access (ID/OA) mandate¹⁶⁸

1. All publications must be deposited.
2. Wherever publisher agreement conditions are fulfilled, the author will authorize setting access to the deposit as open access
3. By default, access to a deposit will be closed access, except where open access has been authorised.

In case of doubt, access will remain closed to avoid any conflict with publisher agreement conditions

4. For closed access deposits, the institutional repository <http://orbi.ulg.ac.be/> will have an EMAIL EPRINT REQUEST BUTTON which allows the author to fulfill individual eprint requests¹⁶⁹.

November 26, 2008 (message from Rector to faculty):

The increase in international visibility of the ULg [Université Liège] and its researchers, mainly through their publications, as well as the support for the worldwide development of an open and free access to scientific works (Open Access) are two essential objectives at the heart of my action, as you probably know.

At my request, the Institutional Repository "ORBi" (Open Repository & Bibliography) has been set up at the ULg by the Libraries Network to meet these objectives.

- [i] The experimental encoding phase based on volunteerism being now successfully completed, we can step forward and enter the "production phase" this Wednesday November 26th, 2008. I take this opportunity to thank all the professors and researchers who have already filed in ORBi hundreds of their references, 70% of them with the full text. Thanks to their patience, ORBi's fine tuning could be achieved.

From today onward, it is incumbent upon each ULg member to feed ORBi with his/her own references. In this respect, the Administrative Board of the University has decided to make it mandatory for all ULg members:

- to deposit the bibliographic references of ALL their publications since 2002;
- to deposit the full text of ALL their articles published in periodicals since 2002.

Access to these full texts will only be granted with the author's consent and according to the rules applicable to author's rights and copyrights. The University is indeed very keen on respecting the rights of all stakeholders.

- [ii] For future publications, deposit in ORBi will be mandatory as soon as the article is accepted by the editor.

- [iii] I wish to remind you that, as announced a year ago in March 2007, starting October 1st, 2009, only those references introduced in ORBi will be taken into consideration as the official list of publications accompanying any curriculum vitae for all evaluation

¹⁶⁷ http://orbi.ulg.ac.be/files/extrait_moniteur_CA.pdf

¹⁶⁸ <http://openaccess.eprints.org/index.php?archives/71-guid.html>

¹⁶⁹ <http://openaccess.eprints.org/index.php?archives/274-guid.html>

procedures 'in house' (designations, promotions, grant applications, etc.).

Information seminars have been planned during the next months to allow every one of you to make the tool your own thing. Help is also accessible online, such as the simplified user's guide (also available as a leaflet) and the Depositor's Guide.

The development of ORBi offers multiple advantages not only to the Institution, but also to the researchers and their teams, such as:

- a considerable speeding up of the dissemination and visibility of the scientific works (as soon as publication approval is granted);
- a considerable increase in visibility for the published works through referencing in the main search engines (Google Scholar, OAI meta-engines, etc.);
- centralised and perennial conservation of publications allowing multiple exploitation possibilities (integration in personal web pages, in institutional web pages, export of reference lists towards other applications and to funding organisations such as the Belgian National Fund for Scientific Research); - etc.

I hope that, despite the time you are going to devote to this somewhat tedious task, you will soon realise the benefits of this institutional policy.

• • • **A1.2.2** University of Pretoria (South Africa)¹⁷⁰

[This is an example of a Type 1 policy]

To assist the University of Pretoria in providing open access to scholarly articles resulting from research done at the University, supported by public funding, staff and students are **required** to:

- submit peer-reviewed postprints + the metadata of their articles to UPspace, the University's institutional repository, **AND** -- give the University permission to make the content freely available and to take necessary steps to preserve files in perpetuity. Postprints are to be submitted **immediately** upon acceptance for publication.

The University of Pretoria **requires** its researchers to comply with the policies of research funders such as the Wellcome Trust with regard to open access archiving. Postprints of these articles are not excluded from the UP

mandate and should first be submitted as described in (1). Information on funders' policies is available at <http://www.sherpa.ac.uk/juliet/>.

Access to the full text of articles will be subject to publisher permissions. Access will not be provided if permission is in doubt or not available. In such cases, an abstract will be made available for external internet searches to achieve maximum research visibility. Access to the full text will be suppressed for a period if such an embargo is prescribed by the publisher or funder.

The Open Scholarship Office will take responsibility for Adhering to archiving policies of publishers and research funders, and managing the system's embargo facility to delay public visibility to meet their requirements.

The University of Pretoria strongly **recommends** that transfer of copyright be avoided. Researchers are **encouraged** to negotiate copyright terms with publishers when the publisher does not allow archiving, reuse and sharing. This can be done by adding the official UP author addendum to a publishing contract.

The University of Pretoria **encourages** its authors to publish their research articles in open access journals that are accredited.

• • • **A1.2.3** Harvard University (USA)¹⁷¹

[This is an example of a Type 2a policy]

[by Professor Stuart Shieber, Office of Scholarly Communication]

The following is a model open-access policy in the Harvard style — with a freely waivable rights-retaining license and a deposit requirement. This language is based on and informed by the policies voted by several Harvard faculties, as well as MIT, Stanford University School of Education, Duke University, and others. I have added some annotations explaining why the wording is chosen as it is.

Further information explaining the motivation for and implementation of the Harvard open-access policies is available at the web site of Harvard's Office for Scholarly Communication (<http://osc.hul.harvard.edu/>). Inquiries about the policy and this model language can be made to osc@hulmail.harvard.edu.

This document will be updated over time as further refinements are made to the policy. This is revision 1.7 of April 17, 2010, 00:57:25.

¹⁷⁰ <http://roarmap.eprints.org/137/>

¹⁷¹ Written by Stuart Shieber. Original document at http://osc.hul.harvard.edu/sites/default/files/model-policy-annotated_0.pdf





1 The Faculty of <university name> is committed to disseminating the fruits of its

2 research and scholarship as widely as possible. In keeping with that commitment,

3 the Faculty adopts the following policy: Each Faculty member grants to <university

4 name > permission to make available his or her scholarly articles and to exercise

5 the copyright in those articles. More specifically, each Faculty member grants to

6 <university name> a nonexclusive, irrevocable, worldwide license to exercise any

7 and all rights under copyright relating to each of his or her scholarly articles, in any

8 medium, provided that the articles are not sold for a profit, and to authorize others

9 to do the same. The policy applies to all scholarly articles authored or co-authored

10 while the person is a member of the Faculty except for any articles completed

11 before the adoption of this policy and any articles for which the Faculty member

12 entered into an incompatible licensing or assignment agreement before the adop-

13 tion of this policy. The Provost or Provost's designate will waive application of the

14 license for a particular article or delay access for a specified period of time upon

15 express direction by a Faculty member.

16 Each Faculty member will provide an electronic copy of the author's final

17 version of each article no later than the date of its publication at no charge to the

18 appropriate representative of the Provost's Office in an appropriate format (such

19 as PDF) specified by the Provost's Office.

20 The Provost's Office may make the article available to the public in an open-

21 access repository. The Office of the Provost will be responsible for interpreting this

22 policy, resolving disputes concerning its interpretation and application, and rec-

23 ommending changes to the Faculty from time to time. The policy will be reviewed

24 after three years and a report presented to the Faculty.

EXPLANATORY NOTES

line 1, disseminating the fruits of its research and scholarship as widely as possible: The intention of the policy is to promote the broadest possible access to the university's research. The preamble emphasizes that the issue is access, not finances.

line 3, grants: The wording here is crucial. The policy causes the grant of the license directly. An alternative wording, such as "each faculty member shall grant", places a requirement on faculty members, but does not actually cause the grant itself.

line 4, scholarly articles: The scope of the policy is scholarly articles. What constitutes a scholarly article is purposefully left vague. Clearly falling within the scope of the term are (using terms from the Budapest Open Access Initiative) articles that describe the fruits of scholars' research and that they give to the world for the sake of inquiry and knowledge without expectation of payment. Such articles are typically presented in peer-reviewed scholarly journals and conference proceedings. Clearly falling outside of the scope are a wide variety of other scholarly writings such as books and commissioned articles, as well as popular writings, fiction and poetry, and pedagogical materials (lecture notes, lecture videos, case studies). Often, faculty express concern that the term is not (and cannot be) precisely defined. The concern is typically about whether one or another particular case falls within the scope of the term or not. However, the exact delineation of every case is neither possible nor necessary. In particular, if the concern is that a particular article inappropriately falls within the purview of the policy, a waiver can always be obtained.

line 5, grants: Again, not "shall grant".

line 6, exercise any and all rights under copyright: The license is quite broad, for two reasons. First, the breadth allows flexibility in using the articles. Since new uses of scholarly articles are always being invented — text mining uses being a prime example — retaining a broad set of rights maximizes the flexibility in using the materials. Second, a broad set of rights allows the university to grant back to an author these rights providing an alternative method for acquiring them rather than requesting them



from a publisher. Even though the university is being allowed to exercise a broad set of rights, it is not required to exercise them. Universities are free to set up policies about which rights it will use and how, for instance, in making blanket agreements with publishers. For example, a university may agree to certain restrictions on its behavior in return for a publisher's acknowledgement of the prior license and agreement not to require addenda or waivers. Harvard has provided a model agreement of this type as well: <http://osc.hul.harvard.edu/docs/model-pub-agreement-090430.pdf>.

line 8, not sold for a profit: This term may be preferable to the vaguer term "noncommercial". The intention is to allow uses that involve recouping of direct costs, such as use in coursepacks for which photocopying costs are recovered. Given that open access availability allows seamless distribution using a medium with essentially zero marginal cost, even this level of commercial activity may not be needed. Indeed, Harvard has stipulated in agreements with publishers that it will refrain even from cost-recouping sales: "When Harvard displays or distributes the Article, Harvard will not charge for it and will not sell advertising on the same page without permission of Publisher. Even charges that merely recoup reproduction or other costs, and involve no profit, will be forbidden." Allowing cost recovery does provide an additional set of rights that can be negotiated in this way. Alternatively, the policy can eschew all sales if deemed preferable, in which case, the phrase "for a profit" can be dropped.

line 8, authorize others: The transferability provision allows the university to authorize others to make use of the articles. For instance, researchers can be authorized to use the articles for data mining. Importantly, the original authors themselves can be authorized to make use of their articles, for instance, to legally distribute their articles from their own web sites (as they often do illicitly now), to use them for their classes, to develop derivative works, and the like.

line 9, do the same: This ordering of phraseology, introduced in the MIT policy, makes clear that the transferability provision applies both to the retained rights and the noncommercial limitation.

line 10, articles completed before the adoption: Application of the license retroactively is problematic, and in any case suspect. This clause makes clear that the license applies only prospectively.

line 13, Provost: The model language is envisioned as a university policy, where the university academic arrangements are overseen by a Provost. For a school-wide

policy within a university, with oversight by a Dean, some occurrences of "Provost" may be replaced by "Dean" where appropriate, as was done in the Harvard policies.

line 13, will waive: Not "may waive". The waiver is at the sole discretion of the author. This broad waiver policy is important for the palatability of the policy. It is perhaps the most important aspect of this approach to open-access policies. The ability to waive the license means that the policy is not a mandate for rights retention, but merely a change in the default rights retention from opt-in to opt-out. Many of the concerns that faculty have about such policies are assuaged by this broad waiver. These include concerns about academic freedom, unintended effects on junior faculty, principled libertarian objections, freedom to accommodate publisher policies, and the like. Some may think that the policy would be "stronger" without the broad waiver provision, for instance, if waivers were vetted on some basis or other. In fact, regardless of what restrictions are made on waivers (including eliminating them entirely) there is always a de facto possibility of a waiver by virtue of individual faculty member action demanding an exception to the policy. It is far better to build a safety valve into the policy, and offer the solution in advance, than to offer the same solution only under the pressure of a morale-draining confrontation in which one or more piqued faculty members demand an exception to a putatively exceptionless policy.

line 14, license: The waiver applies to the license, not the policy as a whole. The distinction is not crucial in a pragmatic sense, as it is generally the license that leads to waiver requests, not the deposit aspect of the policy, and in any case, an author has a de facto waiver possibility for the deposit aspect by merely refraining from making a manuscript available. Nonetheless, if it is possible to use this more limited formulation, it is preferable in reinforcing the idea that all articles should be deposited, whether or not a waiver is granted and whether or not they can be distributed.

line 14, delay access: Duke University pioneered the incorporation of an author-directed embargo period for particular articles as a way of adhering to publisher wishes without requiring a full waiver. This allows the full range of rights to be taken advantage of after the embargo period ends, rather than having to fall back on what the publisher may happen to allow. Since this is still an opt-out option, it does not materially weaken the policy. An explicit mention of embargoes in this way may appeal to faculty members as an acknowledgement of the prevalence of embargoes in journals they are familiar with.



line 15, express: An author must direct that a waiver be granted in a concrete way, but the term “express” is preferred to “written” in allowing, e.g., use of a web form for directing a waiver.

line 15, direction: This term replaced an earlier term “request” so as to make clear that the request cannot be denied.

line 16, author’s final version: The author’s final version—the version after the article has gone through peer review and the revisions responsive thereto and any further copyediting in which the author has participated—is the appropriate version to request for distribution. Authors may legitimately not want to provide versions earlier than the final version, and insofar as there are additional rights in the publisher’s definitive version beyond the author’s final version, that version would not fall within the license that the author grants.

line 17, no later than the date of its publication: The distribution of articles pursuant to this policy is not intended to preempt journal publication but to supplement it. This also makes the policy consistent with the small set of journals that still follow the Ingelfinger rule. An alternative is to require submission at the time of acceptance for publication, with a statement that distribution can be postponed until the date of publication.

line 23, reviewed: Specifying a review makes clear that there will be a clear opportunity for adjusting the policy in light of any problems that may arise.

• • • **A1.2.4** Strathmore University (Kenya)¹⁷²

[This is an example of a Type 2a policy]

Strathmore University is committed to disseminating the fruits of its research and scholarship as widely as possible. In keeping with that commitment, the University adopts the following policy: Each University member grants to the Vice Chancellor and Academic council of Strathmore University permission to make available his or her scholarly articles and to exercise the copyright in those articles. More specifically, each Faculty member grants to the Vice Chancellor and Academic council of Strathmore University a nonexclusive, irrevocable, worldwide license to exercise any and all rights under copyright relating to each of his or her scholarly articles, in any medium, and to authorize others to do the same, provided that the articles are not sold for a profit.

¹⁷² <http://roarmap.eprints.org/344/>

The policy will apply to all scholarly articles authored or co-authored while the person is a member of the University except for any articles completed before the adoption of this policy and any articles for which the Faculty member entered into an incompatible licensing or assignment agreement before the adoption of this policy.

The Vice Chancellor or the Vice Chancellor’s designate will waive application of the policy to a particular article upon written request by a Faculty member explaining the need. Each Faculty member will provide an electronic copy of the final version of the article at no charge to the appropriate representative of the Vice Chancellor’s Office in an appropriate format (such as PDF) specified by the Vice Chancellor’s Office no later than the date of its publication. The Vice Chancellor’s Office may make the article available to the public in an open-access repository. The Office of the Director of research will be responsible for interpreting this policy, resolving disputes concerning its interpretation and application, and recommending changes to the University from time to time. The policy will be reviewed after three years and a report presented to the Academic Council.

• • • **A1.2.5** Queensland University of Technology (Australia)¹⁷³

[This is an example of a Type 2b policy]

Material which represents the total publicly available research and scholarly output of the University is to be located in the QUT ePrints institutional repository, subject to the exclusions noted below. In this way it contributes to a growing international corpus of refereed and other research literature available on open access, a process occurring in universities worldwide.

The following materials **must** be included in QUT ePrints

- refereed research articles and conference papers (author’s accepted manuscript) at the post-peer review stage
- digital theses submitted by research higher degree candidates via the Research Students Centre (see F/1.10 Library treatment of theses).

The following materials **may** be included in QUT ePrints

- refereed research articles and conference papers (authors’ submitted manuscript) with corrigenda added following peer review if necessary
- books and book chapters

¹⁷³ http://www.mopp.qut.edu.au/F/F_01_03.jsp#F_01_03.02.mdoc



- un-refereed research literature, conference contributions, chapters in proceedings (the accepted draft)
- creative works with a research component
- descriptions of research data and datasets.

Materials to be commercialised, or which contain confidential material, or where the promulgation would infringe a legal commitment by the University and/or the author, will not be included in QUT ePrints. Materials will be organised in QUT ePrints according to the same categories used for the reporting of research to DIISR (see Office of Research website).

QUT's preference is to make materials available at the time of publication. Requests for embargos of more than twelve months must be referred to the Deputy Vice-Chancellor (Technology, Information and Learning Support).

• • • **A1.2.6** University of Southampton (United Kingdom)¹⁷⁴

[This is an example of a Type 4 policy]

1. Position statement

1. The University of Southampton requires that all of its staff deposit bibliographic information for all research outputs in the Eprints Soton research repository, so there is a comprehensive institutional record of research activity.
2. The University requires that post-prints of journal and conference articles are deposited, and made open access where this is permitted by the publisher, to maximise the visibility and impact of research.

2. Policy

2.1 Deposit of research outputs

Staff are **required** to deposit the bibliographic metadata of all forms of published output in the Eprints Soton research repository.

Staff are **required** to deposit the final, refereed, corrected, accepted drafts (post-prints) of all peer-reviewed journal articles and peer-reviewed conference articles.

Staff are **encouraged** to deposit, subject to any publishers' restrictions, the following forms of research output:

1. "pre-print" pre-refereed drafts of articles where this will not limit future publication opportunities
2. post publication updates and corrections
3. research data-sets on which the articles are based
4. conference and workshop papers
5. books, book chapters, monographs, reports and working papers
6. image, video and audio representations of creative works

2.2 Open access to research and external compliance

It is a **requirement** to make the post-prints of journal and conference articles open access where this is permitted by the publisher. In all cases repository staff will work with authors and depositors to ensure that the requirements of publishers, funding councils and commercial sponsors are met. If an embargo period is needed the output can be stored in the repository and set for public release on the appropriate date.

2.3 Use of research outputs for research assessment

The deposited records and outputs may be used for:

- internal review of research performance and to assist in appraisals and promotions within the University
- modelling profiles and submitting information for external review e.g. the Research Excellence Framework

Any additional contextual information stored will be subject to appropriate levels of restricted access.

• • • **A1.2.7** Hong Kong Polytechnic University (China)¹⁷⁵

[This is an example of a Type 4 policy]

Starting from September 2010, PolyU adopts the following Policy in Support of Open Access to Published Research:

PolyU academic and researchers are required to deposit electronic copies of their peer-reviewed journal articles and conference proceedings (author's final accepted manuscript) in the PolyU Institutional Repository for open access, as of the date of paper publication. Full text of other research outputs should also be deposited where appropriate.

¹⁷⁴ <http://www.soton.ac.uk/library/research/eprints/policies/oapolicy.html>

¹⁷⁵ <http://www.polyu.edu.hk/ro/newRO415.html>



PolyU authors will provide to the University Library copies of their work and the University Library will determine publisher agreements permit deposit in institutional repositories for public access. PolyU IR staff will check publishers' copyright agreements to ensure that the deposits are permitted.





APPENDIX 2. Model policies for institutions, funders and governments

This section provides model policy wordings that can be adapted and used by institutions, funders and national governments. There are two variants, following the typology in section 8. The first is Type 1 (immediate deposit with no waiver) and the other is Type 2 (rights-retention with a waiver).

A2.1 Type 1: immediate deposit, no waiver (“Liège-style” policy)

This type of policy applies where the policy-maker does not already, and does not wish to, acquire the rights to the work covered by the policy. The policy leaves the rights where they already reside – that is, either with the author or with the publisher. In the latter case, publisher permissions must be respected, entailing provision in the policy for an embargo period. The policy requires the metadata to be visible from the time of deposit so that would-be users can discover the existence of the article and request a copy from the author.

[Institution/funder/government] expects the authors of papers reporting publicly-funded research to maximise the accessibility, usage and applications of their findings. To this end:

[Institution/funder/government]

- (1) requires electronic copies of any research papers that have been accepted for publication in a peer-reviewed journal, and are supported in whole or in part by public funding, to be deposited into the [institutional/central] digital repository immediately upon acceptance for publication.
- (2) requires that the metadata (title, authors, institutional affiliation, name of journal that has accepted the paper) be exposed from the time of deposition of the research paper

- (3) requires that the full-text be exposed no later than 6 months after publication of the research paper
- (4) encourages authors to retain ownership of the copyright of published papers where possible

FAQs

What are the benefits to researchers of Open Access?

As *authors*, researchers benefit because their research papers are given a much wider dissemination and can be read without restriction by anyone with Internet access. This increases the impact of their research. Indeed, evidence is accumulating to show that Open Access articles are cited 25-250% more than non-open access articles from the same journal and year. As *readers*, researchers benefit because they will increasingly be able to access and use the full text of all the research published in their area, not just the research available to them via the subscriptions their institution can afford.

What are the benefits to [institution/funder/nation]?

First, [name's] research will be more accessible to global researchers, hence better known and more widely used and cited. The prestige of high-profile [name] researchers will increase; even lesser-known researchers will gain more exposure and impact. Second, all [name] research will be open to all [name] entrepreneurs and the general public with Internet access. This will be beneficial both commercially and culturally. Third, access, usage and citation data on this research will increasingly become available and analysable to help shape researchers', institutions' and nations' strategies and policies.

What should be deposited when I have a paper ready for publication?

The final manuscript of the author's research paper should be deposited. This is the author's own final draft, as accepted for journal publication, including all modifications resulting from the peer-review process. In addition, depositing pre-peer-review preprint drafts



is welcome, if the author desires early priority and peer feedback, but this is of course not a requirement. In some cases publishers may permit their own published version, either in SGML/XML or PDF, to be deposited as well; this too is welcome, but not a requirement.

When should papers be deposited?

An electronic version of the author's final manuscript resulting from research supported, in whole or in part, by public [*or funder name*] funding must be deposited immediately upon acceptance for publication.

Will authors still be able to publish in a journal of their choice?

Authors will of course still decide in which journal they choose to publish their research papers. They will merely have to ensure that a copy of the final, peer-reviewed paper is deposited in their institutional repository immediately upon acceptance for publication.

Does the policy apply to all articles?

The policy applies to all scholarly articles authored or co-authored while the person is a [*member of the Faculty/ grant-holder*] except for any articles completed before the adoption of this policy and any articles for which the Faculty member entered into an incompatible licensing or assignment agreement before the adoption of this policy.

A2.2 Type 2: rights-retention policies

- • • **A2.2.1** Type 2(a): Voluntary provision of rights to the institution / funder/ government by the author, with waiver ('Harvard-style' policy)

This type of policy applies where the policymaker does not already have the rights to the work produced but is prepared to acquire from the creators of the work sufficient rights to make the work Open Access.

[*Institution/funder/government*] expects the authors of papers reporting publicly-funded research to maximise the accessibility, usage and applications of their findings. To this end:

Each author grants to [*institution/funder/other entity*] permission to make available his or her scholarly articles and to exercise the copyright in those articles. More specifically, each author grants to [*institution/funder/ government*] a nonexclusive, irrevocable, worldwide licence to exercise any and all rights under copyright relating to each of his or her scholarly articles, in any

medium, [*provided that the articles are not sold for a profit,*] and to authorise others to do the same. The [*institution/ funder/government*] may make the article available to the public in an Open Access repository.

The [*institution/funder/other entity*] or [*institution/funder/ other entity*] 's designate will waive application of the licence for a particular article or delay access for a specified period of time upon express direction by an author. Each author will provide an electronic copy of the author 's final version of each article no later than the date of its publication at no charge to the appropriate representative of the [*institution/funder/other entity*] in an appropriate format specified by the [*institution/funder/other entity*].

FAQs

What are the benefits to researchers of Open Access?

As *authors*, researchers benefit because their research papers are given a much wider dissemination and can be read without restriction by anyone with Internet access. This increases the impact of their research. Indeed, evidence is accumulating to show that Open Access articles are cited 25-250% more than non-open access articles from the same journal and year. As *readers*, researchers benefit because they will increasingly be able to access and use the full text of all the research published in their area, not just the research available to them via the subscriptions their institution can afford.

What are the benefits to [institution/funder/nation]?

First, [*name's*] research will be more accessible to global researchers, hence better known and more widely used and cited. The prestige of high-profile [*name*] researchers will increase; even lesser-known researchers will gain more exposure and impact. Second, all [*name*] research will be open to all [*name*] entrepreneurs and the general public with Internet access. This will be beneficial both commercially and culturally. Third, access, usage and citation data on this research will increasingly become available and analysable to help shape researchers', institutions' and nations' strategies and policies.

What should be provided when I have a paper ready for publication?

The final manuscript of the author's research paper should be provided. This is the author's own final draft, as accepted for journal publication, including all modifications resulting from the peer-review process. In addition, depositing pre-peer-review preprint drafts is welcome, if the author desires early priority and peer feedback, but this is of course not a requirement. In some



cases publishers may permit their own published version, either in SGML/XML or PDF, to be provided as well; this too is welcome, but not a requirement.

When should papers be provided?

An electronic version of the author's final manuscript resulting from research supported, in whole or in part, by public *[or funder name]* funding must be deposited immediately upon acceptance for publication.

Will authors still be able to publish in a journal of their choice?

Authors will of course still decide in which journal they choose to publish their research papers. They will merely have to ensure that a copy of the final, peer-reviewed paper is deposited in their institutional repository immediately upon acceptance for publication.

Does the policy apply to all articles?

The policy applies to all scholarly articles authored or co-authored while the person is a *[member of the Faculty/ grant-holder]* except for any articles completed before the adoption of this policy and any articles for which the Faculty member entered into an incompatible licensing or assignment agreement before the adoption of this policy.

Why do we need non-exclusive rights to your article?

The rights to your article rest with you until you assign any or all of them to another party. Under the terms of the policy you vest in this institution those rights necessary to make the article available on your behalf through the repository. Until you vest those rights in the institution, the institution cannot act in this way. The institution requires only sufficient right to make your work publicly-available: the rest of the rights remain with you to do with them what you wish, including signing over to a publisher the right to publish the work and sell it on your behalf. Under this agreement, you are assigning to the institution permission to disseminate your work for you, *before you sign over any rights to third parties.*

• • • **A2.2.2** Type 2(b): Retention of rights by the institution/funder/government ('QUT-style' policy)

This type of policy applies where the policymaker already has the rights to the work produced or is prepared to make that the case.

[Institution/funder/government] expects the authors of papers reporting publicly-funded research to maximise the accessibility, usage and applications of their findings.

[institution/funder/government] is the owner of copyright where the work is created by *[staff members/grant-holders]* in the course of their *[employment/research]*.

[institution/funder/government] assigns the right to publish scholarly works to the creator(s) of that work. The assignment is subject to a perpetual, irrevocable, worldwide, royalty-free, non-exclusive licence in favour of *[institution/funder/government]* to allow to use that work for teaching and research *[and commercialisation]* purposes and to reproduce and communicate that work online for non-commercial purposes via *[institution/funder/government]'s* open access digital repository.

The version of the scholarly work that *[institution/funder/government]* can make available via the digital repository may be the published version (if the publisher agrees) or the final post-peer review manuscript version. *[institution/funder/government]* will agree to third party publisher-requested embargoes of 6 months or less (from date of publication by the third party publisher) on the publication of the manuscript via the digital repository.

Any subsequent publication agreement or assignment of the right to publish the scholarly work entered into by the creator will be subject to the terms of the pre-existing non-exclusive licence referred to here.

If required, *[institution/funder/government]* will sign documents to more fully record the author's ownership of the right of publication of the copyright in a scholarly work and *[institution/funder/other entity]'s* non-exclusive licence to that work.

FAQs

What are the benefits to researchers of Open Access?

As *authors*, researchers benefit because their research papers are given a much wider dissemination and can be read without restriction by anyone with Internet access. This increases the impact of their research. Indeed, evidence is accumulating to show that Open Access articles are cited 25-250% more than non-open access articles from the same journal and year. As *readers*, researchers benefit because they will increasingly be able to access and use the full text of all the research published in their area, not just the research available to them via the subscriptions their institution can afford.

What are the benefits to [institution/funder/nation]?

First, *[name's]* research will be more accessible to global researchers, hence better known and more widely used and cited. The prestige of high-profile *[name]* researchers will increase; even lesser-known researchers will gain



more exposure and impact. Second, all *[name]* research will be open to all *[name]* entrepreneurs and the general public with Internet access. This will be beneficial both commercially and culturally. Third, access, usage and citation data on this research will increasingly become available and analysable to help shape researchers', institutions' and nations' strategies and policies.

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The final manuscript of the author's research paper should be provided. This is the author's own final draft, as accepted for journal publication, including all modifications resulting from the peer-review process. In addition, depositing pre-peer-review preprint drafts is welcome, if the author desires early priority and peer feedback, but this is of course not a requirement. In some cases publishers may permit their own published version, either in SGML/XML or PDF, to be provided as well; this too is welcome, but not a requirement.

When should papers be provided?

An electronic version of the author's final manuscript resulting from research supported, in whole or in part, by public *[or funder name]* funding must be deposited immediately upon acceptance for publication.

Will authors still be able to publish in a journal of their choice?

Authors will of course still decide in which journal they choose to publish their research papers. They will merely have to ensure that a copy of the final, peer-reviewed paper is deposited in their institutional repository immediately upon acceptance for publication.

Does the policy apply to all articles?

The policy applies to all scholarly articles authored or co-authored while the person is a *[member of the Faculty/ grant-holder]* except for any articles completed before the adoption of this policy and any articles for which the Faculty member entered into an incompatible licensing or assignment agreement before the adoption of this policy.

Why do we need non-exclusive rights to your article?

The rights to your article rest with you until you assign any or all of them to another party. Under the terms of the policy you vest in this institution those rights necessary to make the article available on your behalf through the repository. Until you vest those rights in the institution, the institution cannot act in this way. The institution requires only sufficient right to make your work publicly-available:

the rest of the rights remain with you to do with them what you wish, including signing over to a publisher the right to publish the work and sell it on your behalf. Under this agreement, you are assigning to the institution permission to disseminate your work for you, *before you sign over any rights to third parties.*

POLICY GUIDELINES FOR THE DEVELOPMENT AND PROMOTION OF OPEN ACCESS



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UNESCO values your feedback, and would appreciate your taking a moment to evaluate this publication by answer a few questions.

1. Please rate (by tick ✓) the following statements using the five-point scale below and comment on your rating to justify.

SA = Strongly Agree **A** = Agree **U** = Undecided **D** = Disagree **SD** = Strongly Disagree

Statements	SA	A	U	D	SD
In general, the publication is useful. Comments:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Jānis Kārklīņš,
Assistant Director-General
for Communication and Information,
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for more information

