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The Open Access Initiative in access to technical and scientific information in health sciences

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Abstract
The Open Access Initiative (OAI) relates to documents published electronically, and allows free and unrestricted access to the full text of scientific and research literature via the Internet. This assumes the free use of scientific information, as long as its authorship is recognized. The three main statements about the OAI are contained in the declarations of Budapest (2002), Bethesda (2003) and Berlin (2003). Open access is compatible with copyright, copyleft, peer review, printing, preservation and other characteristics associated with conventional academic literature. The most relevant difference consists in the fact that readers are not charged for access to the information, and therefore there are no barriers to research. Even so, the success of the OAI does not depend only on the availability of documents, but also on the support of the scientific community.

Keywords
Open access, access to information, information recovery, internet, documents

Introduction

Support for open access to scientific literature, via the Open Access Initiative (OAI), is growing. This is a result of the technical possibilities available today. In fact, many theorists label the current age the information society or the digital society. The reason for this lies in the influence of the dominant technological paradigm, which has caused changes in human relations and lifestyles. Others, more pragmatically, have called it the "post-Gutenberg era".

It is therefore not surprising, given the growth of the Internet, that these resources are used to help academic institutions and individual researchers in the diffusion of scientific knowledge, promoting the

exchange and the visibility of their scientific work, thereby building and developing knowledge. However, attention should be paid to the collateral effects which may limit access and the increasing need for vigilance about the quality of the information obtained via the Internet, as well as the protection of the user, the right to information and data protection.

Despite the consensus about the advantages of the OAI among academics and agreement that this would be the ideal way to distribute the results of publicly funded research, it remains a minority phenomenon in the publishing world, even though the number of its supporters is fortunately growing all the time. The possibilities offered to scientific publications by new technologies are restricted by the mainly economic barriers imposed by the large publishing companies. The main problems are the abusive increase in the cost of subscriptions and the imposition of bundle contracts, or "Big Deal" schemes. However, let us agree that this increase in costs has led to greater support for the OAI.

The aim and the purpose of this article is to offer an overview of the current status of the Open Access Initiative, analyzing some aspects relating to copyright and copyleft, and providing information about the main ways of accessing scientific literature through portals which have adhered to this initiative.

Open Access: a knowledge sharing initiative

An important milestone in document visualization has been the emergence of the Portable Document Format (PDF) as a standard for the distribution of electronic documents throughout the world. The PDF format is a universally accessible file which preserves all of the fonts, the appearance, the colors and the graphics of any source document, independent of which application or platform was used to create it. PDF files are compact and can be shared, viewed, navigated and printed exactly as their creator intended.

The "open access" in open access journals refers to publications which have been subject to evaluation mechanisms and which are published electronically. This allows free and unrestricted access to the full text of scientific literature and research via the Internet, even though the majority of these journals are still facsimile copies of the respective paper editions.

Open access may also refer to other document resources in addition to journals, such as books, theses, clinical practice manuals or eprints. According to the Budapest Open Access Initiative (BOAI), a pioneering body in open access, eprints are digital documents which are intended for publication, but which may or may not have undergone peer review. When the document has not been peer reviewed, it is called a preprint, and when this review has taken place and it is ready for publication, it is known as a postprint. Preprints and postprints together make up eprints.

Obviously, some authors believe that the quality of the journal is more important than open access when it comes to choosing where to publish their work, but there is also concern about who will control the quality of what is published, and how. Authors want their work to be published as quickly as possible in high quality vehicles and those which give high visibility. As far as the delivery of manuscripts is concerned, the editors of the large majority of journals, if not all of them, accept the submission of the originals in electronic format. In fact, from the point of view of greater scientific evidence, the fact that open access can make documentation more widely available should not generate discussion. Sponsors and funding agencies do not wish to waste resources by supporting research which has already been carried out. At the same time, researchers who are developing meta-analyses or systematic reviews need to be able to identify all the work that has already been done about the specific topic, in order to avoid the publication bias.

The three main statements about open access are the Budapest (February 2002, www.soros.org/openaccess/read.shtml), Bethesda (June 2003, www.wsis-si.org/mdpi-bethesda.pdf) and Berlin (October 2003, www.zim.mpg.de/openaccess-berlin/berlindeclaration.html) declarations. They were based on the convergence between the desire of scientists to publish and share the results of their work and the increasingly wide availability of online scientific publications.

A commitment to the establishment of open access as a worthwhile procedure must satisfy two conditions (Berlin Declaration on Open Access):

1.The author(s) and right holder(s) of such contributions grant(s) to all users a free, irrevocable, worldwide, 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 (community standards, will continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now), 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 an appropriate standard electronic format is deposited (and thus published) in at least one online repository using suitable technical standards (such as the Open Archive definitions) that is supported and maintained by an academic institution, scholarly society, government agency, or other well-established organization that seeks to enable open access, unrestricted distribution, inter operability, and long-term archiving.

Open access is compatible with copyright, copyleft, peer review, printing, preservation and other characteristics associated with conventional academic literature. The substantial difference lies in the fact that readers are not charged for access to the information, and therefore there are no barriers to research.

The main advantages of open access are

1. Free to read and search
2. In most cases, it is not necessary to transfer the copyright
3. Rapid peer review
4. Immediate publication
5. Electronic document submission
6. Greater visibility and promotion of the work
7. More up to date information.

The success of the Open Access initiative does not depend only on the availability of and the access to scientific documents, but also on the progressive support of the scientific community and its institutions.

Attaching importance to the recommendation made by Dr Melero, that there is a need to better understand the Open Access Initiative, we recommend her own work, as well as that developed periodically by Peter Suber, *Timeline of the free online scholarship movement*, and the monograph written by Professor Bailey, *Open access bibliography*, a collection of around 1,300 references classified by topic and published during the period from 1999 to 2004.

In order for scientific journals to fulfill their mission of communicating the scientific knowledge which is published in them, they need to be distributed as widely as possible.

Direct distribution is that which is achieved through the number of copies which are published, which is in turn conditioned by the number of subscriptions taken out. However not all subscriptions have the same value. For the purposes of disseminating the content of a journal, a personal subscription is not the same as one taken out by the research department of a university, or an academic library. Indirect distribution is what publications achieve through the inclusion of their abstracts or their articles in databases and other reference sources which are used to research information. The journals included in the most important thematic databases obtain much greater international dissemination and visibility than those which are not collected in these secondary information retrieval sources.

It is clear that the Internet helps the dissemination of knowledge on a global scale. This means that the presence of a journal on the Internet facilitates its worldwide dissemination, since it can be viewed by a massive population of potential users. For this reason, the possibility of being available on the Internet is a sure way for a journal to become visible to a large part of the scientific community, a visibility which increases if it is published in English. This visibility will be greater still if the information placed online is complete and stored in quality journals. The requirement that the work is reviewed before being placed online will also be conclusive for gauging its quality.

The advantages offered by the Internet have been key at a point when paper has stopped being the essential medium for transmitting knowledge. These qualities have led to the emergence, within the scientific community itself, of approaches which aim to facilitate free access to specialist literature. Two of the main options are self-archiving and open access journals.

In self-archiving, authors themselves deposit their articles, whether in a thematic repository (such as E-LIS, mentioned later on), or an institutional repository, something which is increasingly encouraged by universities. Self-archiving is already a fast-developing international movement, which will become a reality through open archives for scientific production. They may be considered a sort of virtual library, but due to the multiplicity of work and therefore the difficulty in finding it, the emergence of thematic collections would be welcome, and E-LIS is a magnificent example of this.

Where open access journals are concerned, we can distinguish between:

a) Journals published only in electronic format, for example those hosted by BioMed Central or PLoS Medicine.

b) Journals published in both electronic and paper formats, including those collected under SciELO or DOAJ.

c) Journals in both formats which allow access to the online version after a certain period of time. This group covers those included in PubMed Central and others which fit into this modality such as the *New England Journal of Medicine* or the *Lancet*.

If we accept that scientific literature should be accessible through the Internet free of charge, we must not forget that its production, archiving and dissemination are not cost-free. Nowadays, an increasing number of journals allow open access to articles, but the author is charged a contribution. In other words, the maintenance, review and publication costs fall to authors or their institutions. A publication model based on the author or the institution covering the editorial costs raises some doubts, concerns or misgivings about its sustainability.

There are therefore two strategies to support open access publication:

1. Publishing in an open access journal. This is known as gold open access.
2. Publishing in any kind of restricted access journal and then depositing the work in an institutional repository. This is known as green open access.

Impact *versus* visibility

The visibility of work is a determining factor for the citation process. An article which is not visible, accessible and available can not be taken into consideration, evaluated or used to develop other work. For this reason, an important variable is the possibility of having free access to the full text of the contribution. More than that: it is a decisive factor.

Until a short time ago, the main indicator for measuring the trail a publication left within the

scientific community was the impact index (the number of times a publication is cited according to the criteria developed by the Institute for Scientific Information) – and unfortunately this remains the case. In actual fact, the impact factor of a journal is not statistically representative of the citation rate of its articles.

The appearance of the Open Access Initiative, together with the possibilities offered by telematics, allows new ways of measuring the visibility or the interest which each document generates.

The different indicators include

4. Hits: the number of times the document is accessed
5. Downloads: the number of times the document is downloaded
6. Visibility: inclusion based on where the document is found, with a link to another Web page.

In general, making a publication available online increases the number of times it is consulted. Bibliometric studies therefore show an increase in referencing of open access documents deposited online in relation to those which are not or those which are restricted access, with significant differences in favor of open access journals when the immediate citation index is studied (citation of documents which are a year older or less). That is, there is greater speed in the dissemination of scientific documentation (study carried out in 2004 by the Institute for Scientific Information (ISI) with data from the *Journal Citation Report* of 2003).

There is still not an analytical model which is completely accepted and which manages to supply the characteristics of the ISI model, even though there are some proposals which coexist alongside those mentioned above in the context of electronic publishing. We can also point to the work carried out by the Open Citation Project, which aims to study and build tools for the analysis of citations in electronic open access publications. One example is CITEBASE (www.citabase.org).

When a scientific document is deposited in a repository, its distribution and efficient use must be clearly identified and quantified, as well as measurable.

In addition, the Bethesda Declaration is collecting signatures from institutions which pledge to support and encourage researchers to use journals which include this approach. They also commit themselves to develop new methods for evaluating and recognizing the academic merits of scientists who publish under the auspices of this initiative.

Intellectual property: the Open Access movement

The facilities offered by telematics for distributing and accessing communication and scientific documentation contrast with the economic and copyright barriers imposed by the large publishing firms which control the majority of the scientific publication market. Researchers and the administrators of academic information have reacted to this situation, giving rise to what is known as the open access movement. The University of Harvard even published an article in its journal on the budgetary implications of guaranteeing access to scientific literature to all the users of its libraries.

The concept of open access is not just related to the accessibility of scientific documentation, but also to the idea of ending the compulsory ceding of the copyright of published articles, which makes it easier for authors to deposit them in institutional or thematic archives and repositories.

Copyright is a set of rights attributed automatically to authors by the legislation of most countries. It is a combination of ethical rights and the right of use. Ethics tend to be quite present in the academic world and are not usually questioned or even debated (if we may say so), a situation which is quite different when we talk about the right of use. We recommend the excellent work of Hoorn and van der Graaf on the attitudes of authors from the United Kingdom and the Netherlands to copyright.

In terms of the question of open and restricted access, we are dealing with something which does not fail to be a discussion about the development and protection of intellectual property, and, by extension, of the right of authors to have control of and watch over their work. The intellectual property of a literary, artistic or scientific work belongs to the author simply because of its creation. For this reason, it is better not to assume that authors have the obligation to make their work available free of charge. This would be to presume that the right to use the work belongs to the author, while no formal contract exists to the contrary. Therefore, any ceding of rights should be made in writing. Notwithstanding, the majority of journals currently allow authors to self-archive a copy of their work, though not of the published work. In other words, the self-archived version is not a substitute for the official version produced by the editor of the journal where the article was published. (To see the regulations of the majority of the main scientific journals visit the SHERPA page – www.sherpa.ac.uk/ – at the University of Nottingham.)

In 2004, some institutions, such as the US National Institutes of Health and the Wellcome Trust, decided that publications derived from projects funded by them should be stored in open access databases or repositories. These institutional policies in favor of open access provoked a discussion about support for strategies for archiving publicly funded scientific work. In this respect, there is a tendency known as "archivangelism", whose best-known representative is Stevan Harnad, a professor at Southampton University, who argues that the only way to gain widespread support for open access is by obliging authors to keep a copy of their work in the archives of their institution.

It must therefore be clear that archiving a work in an open format does not require authors to give up their rights. They can use the work however they wish. Making a work available in an open access format does not mean, in any of the cases, an author's abdication of his or her rights.

Relevant to this is the growing support for the copyleft movement, understood as the promotion of greater control of creators over their works, research and projects, and more reasonable financial compensation for their work. It also allows end users better access to and use of the works covered by these unrestrictive licenses. That is, authors retain the right to decide how and in what conditions their work will be reproduced and distributed. In general three circumstances are permitted: non-commercial copying and distribution (the minimum requirement for a work to be considered copyleft), derivative works and commercial distribution; and all of this without the need for additional permission from the author.

On the other hand, it must be taken into consideration that all of the ethical principles accumulated about scientific publication are applicable to open access publishing, and it may be necessary to hold a wide debate on this topic.

Open access portals

Among the open access portals now completely established on the Internet, which have gained recognition and prestige and which facilitate free and unrestricted access to full texts, we draw attention to the following:

· ***Access to Global Online Research in Agriculture*** **– AGORA** (www.aginternetwork.org/): set up by the Food and Agriculture Organization of the United Nations (FAO) with private partners, it gives access to an outstanding digital library collection in the fields of food, agriculture, environmental science and related social sciences. AGORA provides a collection of 918 journals to institutions in 107 countries.

· *Bioline International* (www.bioline.org.br/): provides open access to peer-reviewed scientific publications produced in developing countries. Its goal is to provide sustainable access and promote increased quality. The main partners are the Reference Center on Environmental Information (CRIA - *Centro de Referência em Informação Ambiental*), the Open Society Institute and the University of Toronto.

· *BioMed Central* (www.biomedcentral.com/): independent publisher from the United Kingdom, committed to providing immediate open access to peer-reviewed biomedical research. Gives access to more than 140 peer-reviewed open access journals in the health sciences.

· *Directory of Open Access Journals* – DOAJ (www.doaj.org/): developed by Lund University Libraries in Sweden. A directory of open access journals which covers free, full text, quality controlled scientific and scholarly journals. There are now 2,009 journals in the directory.

· *Documents in Information Science* – DoIS (wotan.liu.edu/dois/): a service for finding and downloading the latest research results in Information Science. DoIS is a database of articles and conference proceedings published in electronic format in the area of Library and Information Science. It is a volunteer effort to create a free bibliographic resource of scientific texts specialized in Information Science.

· *Eprints in Library and Information Science* – E-LIS (eprints.rclis.org/): an open access archive for scientific or technical documents on librarianship and information science. It is promoted by the Spanish Ministry of Culture and hosted on machines of the Italian *Consorzio Interuniversitario Lombardo per Elaborazione Automatica* (CILEA). It is the first international e-server in this subject area.

· *Health InterNetwork Access to Research Initiative* – HINARI (www.who.int/hinari/): set up by the WHO together with major publishers, enables access to one of the world's largest collections of biomedical and health literature. Over 3,070 journal titles are now available to health institutions in 113 countries.

· *Latindex* (www.latindex.org/): regional online information system for scientific journals from Latin America, the Caribbean, Spain and Portugal. Gives access to more than 3,000 health sciences journals. It is the result of cooperation among a network of institutions which operate in a coordinated way to collect and distribute bibliographical information about seriate scientific publications produced in the region.

· *Los Alamos Preprint Archive* – arXiv (arxiv.org/): arXiv is an e-print service in the fields of physics, mathematics, computer science, and quantitative biology. The contents of arXiv conform to Cornell University academic standards. arXiv is owned, operated and funded by Cornell University, a private not-for-profit educational institution in New York. arXiv is also partially funded by the National Science Foundation.

· *Online Access to Research in the Environment* – OARE (www.oaresciences.org/): an international public-private consortium coordinated by the United Nations Environment Program (UNEP), Yale University, and leading science and technology publishers, enables developing countries to gain free access to one of the world's largest collections of environmental science literature.

· *Open Access Repositories* – OpenDOAR (www.opendoar.org/index.html): a directory of academic open access repositories. Each *Open*DOAR repository has been visited by project staff to check the information that is recorded there. Developed and maintained by the University of Nottingham.

· *Public Library of Science* – PloS (www.plos.org/): a nonprofit organization of scientists and physicians committed to making the world's scientific and medical literature a public resource. Received funding from the

Gordon and Betty Moore Foundation, the Sandler Family Supporting Foundation, the Irving A Hansen Memorial Foundation, the Open Society Institute (OSI) and the Joint Information Systems Committee (JISC). Has also received donations and funding from private citizens, universities, and other organizations. PloS Medicine's publishing system is based on charging a publication fee to authors or their institutions.

· *PubMed Central* (www.pubmedcentral.nih.gov/): project developed and managed by the National Center for Biotechnology Information (NCBI) in the National Library of Medicine (NLM) at Bethesda in the United States which gives free and unrestricted use to the scientific material archived in this digital platform. Provides free access to more than 227 journals.

· *Research Papers in Economics* – RePEc (repec.org/): a collaborative effort of hundreds of volunteers in 59 countries to enhance the dissemination of research in economics. The heart of the project is a decentralized database of working papers, journal articles and software components. All RePEc material is freely available. RePEc does not contain full-text journal articles, but it provides links to many full text articles available online through other institutions and individuals.

· *Scientific Electronic Library Online* – SciELO (www.scielo.org/index.php?lang=en): a project of the Latin American and Caribbean Center on Health Sciences Information, of the Pan-American Health Organization, part of the World Health Organization (BIREME/PAHO/WHO). The main goal is to contribute to the development of research, increasing the dissemination of national scientific production, improving and widening the means of publication and the evaluation of results.

· *SciELO Spain* (scielo.isciii.es/scielo.php/lng_en): developed by the National Health Sciences Library at the Carlos III Health Institute in Madrid, Spain. SciELO Spain is a virtual library made up of a collection of certified Spanish health sciences journals, selected according to certain pre-determined quality criteria.

· *The Scholarly Publishing and Academic Resources Coalition* – SPARC (www.arl.org/sparc/): an alliance of universities, libraries, researchers and academic organizations. Developed by the Association of Research Libraries, SPARC was set up in 1997 as a constructive response to the imbalances in the scholarly publishing system.

· *SPARC Europe* (www.sparceurope.org/): the European version of the Scholarly Publishing and Academic Resources Coalition (SPARC). The Spanish universities involved are the University of Las Palmas, the University of Gran Canaria, and the Polytechnic University of Catalonia.

Final reflections

We live in a complex, globalized and technicized world, in which information plays a crucial role in decision-making and carrying out actions on a day-to-day basis. There is therefore the risk of a fissure between sectors, zones, regions and countries in relation to their capacity to use information.

Much is said about the threat of digital exclusion for those who cannot take advantage of the technological revolution. The open access initiative, and free access to information, should play a fundamental role in supporting those people who are deprived of the advantages of access to scientific literature.

The lack of equal access to global scientific production permits a final reflection: while part of the world may risk madness due to the various excesses associated with the practice of research, the other part will try to find often unsatisfactory ways of resolving this information divide, which in turn leads to greater digital divides.

If it is possible to affirm that new technologies bring us closer to information, overcoming geographic barriers, it is also correct to admit that they generate new needs. Nowadays, a researcher who is not very well informed and knowledgeable about the channels through which new knowledge circulates becomes a "know-not", which is a synonym for an unqualified person, unprepared to carry out his or her work, to engage in the world. Therefore, this inequity in access to scientific literature, which the open access movement seeks to avoid, may generate a new form of illiteracy, if it has not already done so.

In the guise of a conclusion, we would say that we are certain that the success of the Open Access Initiative lies in the progressive support of the scientific community and its institutions. We long for this to come about.

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