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OPEN ACCESS AND THE ONGOING TRANSFORMATION OF SCHOLARLY PUBLISHING: A GUIDE FOR DOCTORAL STUDENTS

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“The chorus of ‘yeas’ was thunderous,” Harvard University librarian Robert Darnton told *The New York Times* on February 12, 2008. “I hope this marks a turning point in the way communications operate in the world of scholarship” (Cohen 2008b). Harvard's Faculty of Arts and Sciences had just passed a resolution declaring that because it was “committed to disseminating the fruits of its research and scholarship as widely as possible,” the faculty would grant the university a broad, nonexclusive license to distribute its scholarly articles, and specifically to “make the article available to the public in an open-access repository” (“Agenda” 2008). Harvard’s action is a particularly dramatic instance of a broader transformation, intent on increasing access to knowledge within scholarly communication, which has been facilitated by developments in information technology. Harvard was not the first institution to pass such an Open Access mandate, but it was an especially significant milestone for what has become known as the Open Access (OA) movement in scholarly publishing.

The Open Access movement was officially named in 2002, but it built on a decade of momentum for Internet-enabled distribution of scholarship and on a centuries-old tradition of open science (David 1998). Numerous Open Access mandates like that of Harvard have been passed, with some funding agencies, such as the U. S. National Institutes of Health creating open access mandates for all publications resulting from funded research. In addition, thousands of journals have adopted OA policies, of varying strength, that result in published work being made free to readers on and some time after publication. As of 2006, an estimated 19.4 percent of all published articles were available under Open Access, that is, free to readers online (Björk et al. 2008). This expansion of access is a defining

characteristic of research in the early twenty-first century and holds the potential to enhance both its public and scholarly value.

In this chapter, we first provide an overview of these changes in the principles and practices of scholarly publishing. In the second half of the chapter, we provide practical information to help new and not-so-new scholars with a way to navigate this environment. What intellectual property rights do you have over your writings? How do those rights differ in different forms of publishing? How can you ensure that your research sees as wide of an audience as possible, does the most good and—to set aside for a moment the pretense of complete altruism—brings you the greatest reputation-building exposure? We also point readers toward noteworthy and interesting projects in networked scholarly communication. Beyond merely negotiating the new information landscape, opportunities are now available to re-shape that environment on the side of greater openness, greater public impact, and a greater global scale to the exchange of knowledge. This can happen through innovation, new initiatives, and through decisions made by voting members of faculties, scholarly societies, research groups and other organizations engaged in forms of scholarly communication.

Development of the Open Access Movement

Technological changes may have made Open Access possible for scholarly work, but the stage was set by a crisis of journal subscription rates during the 1980s and 1990s. As OA maven Peter Suber puts it (2004), during that period journal prices rose at a rate “four times faster than inflation for nearly two decades.” And the increase was not evenly distributed. The journal ecosystem includes several types of publications. Some are put out independently, others by scholarly associations, and the majority—approximately 60%--by commercial publishers. The increasing subscription rates were mainly driven by this last group. In economics, for example, after adjusting for inflation, these profit-maximizing commercial publishers raised rates by 300 percent between 1985 and 2004. By comparison, nonprofit journals in the field increased rates by 50% (Bergstrom and Bergstrom 2004). At

the upper extreme, *Brain Research*, published by Elsevier, costs a library well over \$20,000 a year.

This crisis hit university libraries hard, even well-funded ones. The leading North American libraries, represented by the Association of Research Libraries, increased their journal spending by 260% between 1986 and 2003 (ARL 2004). Eventually, though, libraries were forced to begin cutting subscriptions and scaling back their book-purchases (Suber 2004b). Given that the subscription crisis strained budgets at even the Harvards, Dukes, and MITs of the world, it should not be difficult to imagine its decimating effects on less well-endowed libraries in North America and especially in the developing world.¹

As subscription rates skyrocketed, the Internet was simultaneously enabling wider, cheaper dissemination of knowledge than ever before. Scholars began to post pre-publication copies of articles on their personal homepages, and the more ambitious among them experimented with new forms of publishing. In 1993 Arizona State University education professor Gene V. Glass founded the peer-reviewed journal *Education Policy Analysis Archives (EPAA)*. Glass's journal harnessed the power of email and the Web to publish on zero budget—not a widely replicable model perhaps, but one that would have been unfathomable only a few years before. And its daily viewership—by researchers, but also by teachers, parents, and other interested observers—dwarfed the number of print subscriptions typical for a journal in the field (Glass 2003). Just ask Colorado professor emeritus Robert L. Linn, whose 2003 critique of the performance standards in the No Child Left Behind Act was cited, a mere two weeks after its EPAA publication, in Malcolm Gladwell's "Talk of the Town" *New Yorker* column (Linn 2003; Gladwell 2003). Linn's article had been posted with little fanfare. No press release was issued as, say, *The New England Journal of Medicine* might to do publicize a striking study. One can only assume that Gladwell was able to search for and then read the article because it was available in

¹ Scholarly monographs and edited collections did not experience the same increase in prices over this period, and have not, to date, taken to the web, which has meant that within scholarly publishing Open Access has been almost entirely focused on journals. Library scanning projects such as Google Books and devices such as the Amazon Kindle or Sony E-Reader

Open Access (Willinsky 2005). As of this writing, *EPAA* has published 561 articles in its 17 years of existence. Current traffic information is unavailable, but as of 2003, *EPAA* drew approximately 2,500 visitors a day from 70-80 countries (Glass 2003).

Although most open access journals employ traditional forms of double-blind peer-review (without author or reviewer knowing each other's identities) and publish on the same periodical basis as print editions, online publishing has allowed publishers to experiment with previously taken-for-granted aspects of the publishing system, such as regular publication cycles and the particulars of peer review. This mixture of innovations is perhaps best exemplified by the Public Library of Science (PLOS), and while they have yet to become commonplace in educational journals, these developments suggest the type of changes young scholars can expect to see—and effect—in coming decades. In the six years since, PLoS's slate has grown to include eight online journals, with the innovative *PLoS ONE* among them.² *PLoS ONE* publishes hundreds of studies a year as soon as they “are judged to be technically sound” while providing tools for a more thorough assessment of the article's significance and contribution through what might be called a post-publication open review (“PLOS ONE Journal Information”). This policy allows for the publication of more studies with negative results or those that replicate earlier findings—two important categories of studies that often go unpublished due to a publication bias toward novelty and positive findings (Dickersin 1990). As in research, not all of these experiments have been successful, but it seems likely that these tools will proliferate, and that Open Access journals will be better positioned than closed ones to become part of an annotated, interlinked web of scholarship.³

portend changes in book publishing, but it remains to be seen whether these changes will be characterized by increasingly open form of access or by a more privatized arrangement.

² Stanford biochemist Patrick Brown and Berkeley computational biologist Michael Eisen took the first steps toward PLoS in early 2001, when they launched a petition in which scientists pledged only to submit their work to journals that made full articles viewable by all. Two years later, Brown and Eisen partnered with Nobel Laureate and NIH director Harold Varmus to launch the Public Library of Science and its first journal, *PLoS biology* (“About PLoS”).

³ PLoS is funded through foundation grants and by charging a fee of \$1,300 to the authors or the funding agency that sponsored the research (“PLOS ONE Journal Information”). Such an arrangement is not uncommon in the sciences, especially those with ample funding, and fees typically range from \$1,000-\$3,000. However, it would be a mistake to

In December 2001, the Open Society Institute brought together in Budapest a small group of professors from various fields to discuss the challenges and opportunities facing academic publishing. Together, they drafted and signed what would become known as the Budapest Open Access Initiative, which set out the terms of this new approach:

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. (Chan et al. 2002)

In late 2007, two months prior to the passage of the Harvard's Faculty of Arts and Sciences Mandate, the National Institutes of Health declared that final, peer-reviewed versions of the research that it funds be deposited at its archive, PubMed Central, within 12 months after publication. In the wake of Harvard FAS's Open Access mandate, numerous other institutions started similar initiatives. Other faculties at the famously decentralized Harvard have adopted similar policies—the Law School and the Kennedy School of Government in March 2009, with mandates pending in the university's other faculties (Lauerman 2009). Stanford's School of Education mandated Open Access in June 2008 as did MIT for the entire institution in March 2009 (Viadero 2008; Abelson 2009).

While Open Access is a relatively recent development, its roots lie in a long tradition of efforts to open science, that is, open to review and critique, as well as innovation and development, that dates back to the early modern Europe and the Enlightenment. With the Scientific Revolution came a shift from the closed knowledge of guilds, alchemists, astrologers, and others trafficking in "nature's secrets" to a regime in which scientists' prestige came from their claim to first discovery, which could only be established through publication (Eamon 1994). Along with these self-interested motives,

assume that Open Access necessarily involves author fees. We know of no journals in the field of educational research that require them.

publication allowed scientists to verify each others' discoveries, discard ones that could not be replicated, avoid duplication of effort, and integrate various lines of research (David 1998). In the *Philosophical Transactions*, widely considered the first scientific journal in English, Henry Oldenburg published letters from among members of London's Royal Society. It was in those pages, on January 3, 1671, that Sir Isaac Newton first published his groundbreaking research on optics. And it was there that he spent the next four years responding to critics and providing details of research design—establishing a norm that findings, methods, and sources should be made public so that readers may replicate and challenge them (Kuhn 1978; Willinsky 2006: 234-44). Publication, then, is a matter of epistemological implications. It is only by publishing—describing research thoroughly and circulating the write-up as widely as possible (given current technologies and other means of distribution)—that knowledge is verified, legitimized, and accepted into a larger body of work.

It is also an ethical matter. Most research is funded, in one way or another, from public coffers. It is our responsibility to make the fruits of that research as public as possible. And especially so with educational research, given that work on this topic is intended to contribute to the improvement of learning in so many way among so many people. Mounting evidence suggests that such openness in the circulation of this knowledge has practical consequences. It makes research available to policymakers (Willinsky 2003) and professionals (Willinsky & Quint-Rapoport 2007). Open access articles improve the quality of Wikipedia (Willinsky 2008). Academic libraries in the developing world are especially hamstrung by journal subscription prices, and reducing barriers to access can help scholars worldwide read the latest research and enter the global academic conversation (Willinsky 2006, chapter 6). Open Access publishing tools (such as Open Journal Systems, described below) lower the cost of producing a journal and allow groups of scholars to do so that otherwise could not, which in turn provides an outlet for publications and legitimizes lines of research that are important in particular contexts but may be neglected by current gatekeepers, such as scholarly societies or commercial publishers (Willinsky & Mendis 2007).

As we have seen, though, the push for opening science was brought about for reasons of prestige and primacy (claim of invention and discovery), as well as altruism and the dispassionate pursuit of knowledge. So may today's scholars be as well. Fortunately, Open Access appeals to *vanity* as well as *valor*. Open access to research has been shown to increase its readership (Davis et al. 2008), and although the evidence is somewhat murkier, to increase its citation rates (Hitchcock 2008). This "Open Access advantage" may be transitory; in a world of universal access, there is no advantage to be gained. But in the interim, there may be reputational rewards for academics that take advantage of opportunities to make their work open access whether through open access archiving of their published work or through publishing in open access journals, which represent the two most prominent routes to open access.

Two Routes to Open Access

The OA landscape is heterogeneous enough to require some explanation. Articles can become Open Access in several different ways, and policies vary from journal to journal. The first step in untangling this web is to distinguish between two types of Open Access: OA archiving and OA journals. Below, we describe each and explain how they affect you as an author.

Archiving

In the archiving route to Open Access, an author deposits her published journal articles in a publicly viewable Web-based archive, either on her own website or her university's or funder's. Archiving requires the permission of the publisher but is done without their active assistance. Most publishers grant authors the right to archive, to one degree or another, but OA mandates like Harvard's see university faculties asserting their right to archive regardless of journal policy. In the writing and archiving process, intellectual property rights work as follows:

As an academic, you own the rights to the words you write (which is not the case if you write

software, for example, for a corporation; McSherry, 2002). But don't let yourself become too attached. When your work is accepted for publication in the typical journal, you will be asked to sign a publication agreement in which you sign over all intellectual property rights to the journal or its publisher. They, in turn, license back to you the right to use the work in certain ways—for example, in classes that you teach. However, until your paper is accepted and the publication agreement signed, you have the right to archive your copy on a personal website, in your university or funder's archive, or however you like. This applies up to the final draft of the paper, that is, the version that is accepted for publication after peer review. This is the version that the publishers typically allow you to post to an archive – and it differs from the published version as a result of layout, copyediting and proofreading – sometimes with restrictions although journals commonly impose a delay of 6, 12, or 24 months before archiving is allowed—a so-called “embargo.”⁴

Of the four major corporate academic publishers with substantial number of journals in the social sciences—Sage, Taylor & Francis, Elsevier, and Wiley-Blackwell—the first two are most important in the field of education. Sage, which began, for example, in 2007 to publish the prestigious journals of the American Educational Research Association, allows all authors to archive pre-prints, or the version prior to peer-review. Post-prints, the authors' versions that reflect peer review, may be deposited in personal or institutional archives after a 12-month embargo (while the final, published versions may never be archived). Similarly, Taylor & Francis allows archiving of pre-prints without restriction. However, a post-print embargo of 12 months is imposed for science and technology journals and 18 months in the social sciences and humanities. Elsevier's relatively permissive archiving policy is provided in Appendix A.

⁴ Publishers do have varying policies with regard to the version of an article that may be archived. A minority allow no archiving. Some allow authors to archive their submitted, uncorrected versions, also called *preprints*, but not their peer-reviewed, proofread *postprints*. The majority of publishers allow archiving of postprints (in a few cases, the actual published version but more often the final draft), but not preprints. This is considered preferable for authors because the archived version is identical to the published one in text if not in layout and pagination. A journal might choose blue access to keep substantively different versions of its articles out of circulation. Finally, *some* publishers allow archiving of either pre- or post-prints (<http://www.sherpa.ac.uk/documents/sherpaplusdocs/Nottingham-colour-guide.pdf>).

Each journal's terms will be specified in your publication agreement, but if you would like to know about a journal's policies beforehand—like when you are deciding where to submit, for example—the SHERPA/RoMEO database (<http://www.sherpa.ac.uk/romeo/>) is an invaluable resource. Administered by SHERPA, a consortium of universities in the United Kingdom, RoMEO is a collection of archiving policies searchable by either journal name or publisher. SHERPA also provides similar directories of funder OA mandates, institutional archives, and more. It will also be useful for verifying whether the publisher policies described above are still valid—not a certainty in this rapidly changing and consolidating industry.

The recent wave of OA mandates represent a form of archiving that generally pays little regard to the distinctions among journal's policies. Rather, these mandates use the leverage of the university or the funding institution to require a journal to grant immediate archiving rights. These mandates generally function in similar ways: When an article has been accepted and the author is asked to sign an author's agreement, he or she submits along with it an “author addendum” specifying that the university claims a non-exclusive (and non-commercial) right to archive a pre-publication version. Faculty or staff then deposit the article into the university's online archive. If a publisher objects, the author can request a waiver from their mandating institution, but the OA policy is opt-out rather than opt-in. Mandates vary in their specific policies and in the rights they claim, and you can view the Stanford University School of Education's archive, with which we have been involved, at <http://openarchive.stanford.edu>. Supporting documents such as the Stanford mandate and policies can be found there as well.

Open Access Journals

If posting copies of published work in an open access archive represents an indirect route to increased access, a more direct, if not as widely available path is found with journals that have an Open Access or free to read policy. This Open Access sometimes takes effect immediately, but other journals

impose a delay (of six months, in the case of *The New England Journal of Medicine*) in order to keep some incentive for subscribers to continue with the journal. The *Directory of Open Access Journals*, established by the University of Lund, currently lists 4,000 titles and provides the most complete listing of journals that offer readers immediate open access on publication (<http://www.doaj.org>). In the area of education, the Communication of Research group within the American Educational Research Association maintains a list of titles that currently runs to 247 open access journals (<http://aera-cr.asu.edu/ejournals/>).

Compared to self-archiving, OA journals have the advantage of providing free access to the definitive copies of articles. Several publishers are now experimenting with ways of providing access to their journals while recouping the same revenue they have received from subscriptions by using article processing fees (running as high at this point as \$3,000 USD). Hindawi and BioMed Central, for example, are commercial publishers that publish only open access journals, largely in the life sciences, funded by article processing fees. However the majority of open access journals do not charge such fees to author, but rather rely on other revenue models that include institutional or scholarly society support, as well as grants, while in some cases they are support by subscriptions fees for their print editions. While the Public Library of Science publishes the open access *PLoS Biology*, which has the highest impact factor in its field (meaning that it is cited more often than other titles), education's leading general journals are not open access at this point, although there are certainly a good number of more specialized titles in education that are open access.

To help new and existing journals consider publishing with an open access policy, the Public Knowledge Project, founded in 1998 by one of the authors of this chapter, John Willinsky, has developed Open Journal Systems, free and open source software for managing journals' submission, peer review, and editing processes and for publishing articles to the open web (Willinsky 2005). This software, which helps journal reduce their costs with online management and publishing, is being used

by close to 3,000 journals, 85 percent of which are open access.⁵

Many Open Access journals publish their contents under Creative Commons (CC) licenses, which allows for the reuse of the published work in teaching, public forums, or other non-commercial settings, while protecting the claims of authorship (Lessig 2005). Creative Commons licensing, which is used by millions and millions of items on the Web well beyond scholarly work, draws inspiration from the free and open source software movement, and both might be considered cousins of Open Access and Open Science (Willinsky 2005). Just as open source software is published under a license that permits users to view, modify, and redistribute software's source code, the basic CC license allows users of cultural content to modify and redistribute it, on the condition that they attribute the work to its original creator. Much content on video-sharing Web sites such as YouTube and photo-sharing sites like Flickr.com are licensed under Creative Commons, as are text and images from the collaboratively-written website *Wikipedia*.⁶ The Creative Commons license has become a widely recognized symbol, reflecting a broader cultural interest in allowing others to share one's work as a way of increasing its value others, rather than diminishing its potential for commercialization.

Finding Articles

This chapter is not the place for a full course in research strategies, but a few significant information sources for those working in the area of education bear mentioning. ERIC, the Education Resources Information Center, is the U.S. federal government's directory of articles and other materials related to education (<http://eric.ed.gov>). ERIC itself is not a new development, having existed since 1964

⁵ OJS provides indexing metadata to ensure maximum find-ability by searchers. It also attempts to augment the reading experience by providing, for example, searches of related scholarly and news articles. A set of annotation tools, currently under development, will allow readers to highlight text, make comments, and engage in discussion with other readers. The Public Knowledge Project also produces Open Conference Systems, for running conferences and making conference papers OA while Open Monograph Press, software for writing scholarly books, is under development, both seeking to extend access to research and scholarship.

⁶ Publishers can easily add several restrictions to the basic CC license that will be of interest to scholars, including provisions that the work not be modified or used for commercial purposes. It is important to note that Creative Commons does not entail the cession of copyright but rather the granting of a license. All the same, a CC license is permanent and

(Hoover & Brandhorst 1982) and during that time served the cause of access through its search and document reprint services and its popular research digests for scholars and policymakers. A controversial 2003 privatization eliminated many ERIC programs, such as the research digests and the topical, university-based clearinghouses that published them, and reoriented the service toward online search. After a rocky transition, ERIC has developed a sophisticated set of search tools, prominently displayed indication of peer reviewed articles, and links to open access versions of a number of the indexed articles. Efforts are underway to digitize and provide access to 340,000 resources from ERIC's microfiche archive, beginning in 1992 and working back to 1966. ERIC has not, however, incorporated the sort of participatory tools that are typical of modern web applications. One can imagine Amazon.com-style user-curated lists of related articles.

Google Scholar (<http://scholar.google.com>) is the search tool of first resort for many academics, as well as students, and it has recently begun to provide greater assistance for those interested in finding Open Access materials. While Google Scholar has since its origins in 2004 linked to publishers' versions of articles, these articles are usually only available with a subscription. For members of the public (or even scholars working from off-campus) accessing these articles can be inconvenient, expensive, or impossible. Google Scholar now also links prominently to open access versions of articles, when available, whether from archives, websites, or journals. Such links are marked with a green arrow--we like to think in a nod to the symbolic significance of "green." Google Scholar is also an effort that brings Google back to its roots. The PageRank algorithm used in general Google searches was famously inspired by citation analyses of academic publications. Web pages that receive more inbound links, from more other highly linked-to sites, are displayed more prominently in search results (Battelle 2006). Similarly, in Google Scholar, articles with the most citations are favored, and searchers can conveniently click to see what articles have cited a given article—the opposite of the time honored process of following bibliography citations backward. While still crudely executed at times within

Google Scholar (with multiple entries, for example, for a single item), this feature suggests how the web is also open to more sophisticated citation analysis methods and visualization tools, such as inferring the *types* of citations (extension, rebuttal, or citation of a methodological classic) and mapping the relationships among bodies of work and the development of research lines (Moya-Anegón et al. 2007).

Open Data as a Parallel Development

Open Access to research and scholarship is but one element in this new spirit of openness to academic work. Just as vital a development is open data, which enables readers and researchers to access the complete data sets, source documents, and other resources drawn on by a given study (King 2007; Kühne & Liehr 2009). This access adds greater to the quality of research, as it enables a more thorough review, as well as facilitating replication studies and reanalysis (which also improves the economic efficiency of research in some cases). When articles are published online, supplementary files can be published alongside them—videos, image collections, data sets, etc. This is an extension of the open science imperative to specify the grounds on which claims are made. There are competing interests, such as the effort required to clean up a dataset for public consumption and the researcher's interest in protecting them for further analysis. Despite this, a movement is afoot to raise specification requirements. Drexel's Jean-Claude Bradley writes in support of what he calls Open Notebook Science: “[I]t is essential that all of the information available to the researchers to make their conclusions is equally available to the rest of the world. Basically, no insider information” (Bradley 2006). Cambridge chemist Peter Murray-Rust advocates for the Open Data movement on the grounds that much important data is under-analyzed and contains huge amounts of undiscovered science” (2007). The nonprofit Science Commons has released a legal framework for data sharing, the “Protocol for Implementing Open Access Data” (<http://sciencecommons.org/projects/publishing/open-access-data-protocol/>) and Harvard's Dataverse Network Project produces open source software for publicly archiving datasets for

others to analyze (<http://thedata.org>).

Conclusion

Because the opening transformation of scholarly publishing that we describe is gaining momentum, many of the facts in this article will have changed by the time you read it. Publisher Web pages and academic search engines will have added new features. Further Open Access mandates will have been adopted, we hope, and a higher percentage of articles will be freely available. Commercial publishers are exploring new models for offering open access, in response to those mandates. But we expect that even the narrow issue of how to ensure universal access to published journal articles will remain contested for much of the next decade. Considering Open Access more broadly, it is easy to imagine some of the next issues that will come into focus, among them book publishing, open data, and innovations in open commenting and possibly peer review. And of course if the past is any guide, the future will present possibilities of which we cannot currently conceive.

You, the readers of this article, will have the opportunity to participate in and influence these developments. You will make decisions about where and how to publish and for which journals you are willing to review and serve on the editorial boards. You will have the opportunity to archive your own published work as fully as policies allow. As future journal editors and editorial board members, you may be in a position to influence these policies. As future faculty members and scholarly society members, you may be asked to vote on Open Access mandates and may even feel moved to introduce one, as well as to support open access journals. Some of you will have the opportunity to shape scholarly communication technologies, as users, testers, and perhaps designers. Some of you may even make these issues of access to knowledge an object of study within the field of education and the social sciences. After all, OA is a matter of public education, broadly conceived, as faculty and students, as well as professionals and the public at large come to see greater advantages in having research and scholarship more widely available. We look forward to seeing the relevance and implications of this new standard for public access become clear, for epistemology, deliberative democracy, the sociologies

of science and knowledge, social dimensions of technology design, and networks of knowledge diffusion—to name just a few areas of potential impact.

In this time of transformation for scholarly publishing, we ask you to keep a few considerations in mind. Publishing is a matter of equity, as it allows those far from the centers of academic power to join in the conversation and to define research agendas meaningful in their contexts. Publishing is also a matter of scholarly value. Along the lines just mentioned, it can help to uncover research talent, disseminate methodological advances, and drive research in productive new directions. It also allows researchers to efficiently and effectively verify each others' work, build on it, and integrate it into meaningful bodies of work. Finally, scholarly publishing is a matter of public value and public good. In education and the social sciences especially, much research is clearly relevant to the concerns of parents, teachers, administrators, school board members, curriculum developers, legislators, policymakers, and citizens. The Internet opens possibilities for access to these particular forms of knowledge, forming a natural but still exciting extension of what has been achieved since the early years of open science or the postwar years of journal expansion. By taking care to make work as accessible as possible in an age of Internet-enabled knowledge sharing, rigorous research can increase its contribution, as a public good, on a global scale.

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Appendix A: Example of a Publisher's Policy Enabling Authors To Post a Copy of Their Work Online

Elsevier is liberal with respect to authors and electronic preprints. Unlike some publishers, we do not consider that a preprint of an article (including a prior version as a thesis) prior to its submission to Elsevier for consideration amounts to prior publication, which would disqualify the work from consideration for re-publication in a journal. We also do not require authors to remove electronic preprints from publicly accessible servers (including the author's own home page) once an article has been accepted for publication. Further, we have announced in May 2004 a change in policy that facilitates institutional repositories by permitting authors to revise their personal versions of their papers to reflect changes made in the peer review process. This new policy permits authors to post such revised personal versions on their own web sites and the sites of their institutions, provided a link to the journal is included. Our policy however is that the final published version of the article as it appears in the journal will continue to be available only on an Elsevier site.

<http://www.elsevier.com/wps/find/authorhome.authors/preprints> (April 27, 2009).

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