Maximizing university research impact through self-archiving

Stevan Harnad

Canada Research Chair, University of Quebec at Montreal

To appreciate what a huge difference there is between the author of a peer-reviewed journal article and just about any other kind of author we need only remind ourselves why universities have their "publish or perish" policy: Aside from imparting existing knowledge to students through teaching, the work of a university scholar or scientist is devoted to creating new knowledge for other scholars and scientists to use, apply, and build upon, for the benefit of us all. Creating new knowledge is called "research," and its active use and application are called "research impact." Researchers are encouraged, indeed required, to publish their findings because that is the only way to make their research accessible to and usable by other researchers. It is the only way for research to generate further research. Not publishing it means no access to it by other researchers, and no access means no impact – in which case the research may as well not have done in the first place.

So it is the need for research impact that makes the author of a peer-reviewed journal article different from every other kind of author. The author of a book, textbook, or magazine article might sometimes even be a peer-reviewed research author wearing another hat, but the difference is like night and day: The author of a book or textbook

writes in order to have the text sold for royalty income; similarly, the author of the magazine or newspaper article is writing a work for hire, for a fee or salary. Not so the researcher, who publishes in the peer-reviewed journal solely for maximal research impact, never seeking or receiving a penny from the sale of the text. On the contrary, researchers have traditionally, at their own expense, mailed reprints of their articles to anyone who requested them, so important was it to them that their research be read and used.

Why were researchers (and their universities) actually willing to pay to maximize the accessibility of their research output by disseminating reprints? Because access is a prerequisite for impact: Anything that blocks access blocks impact. The unread article is the unused, uncited article. This is also why citation-counts – "how many papers have cited my paper?" – have become such important performance indicators for research uptake and impact. The more a piece of research is used in further research, the more it has contributed to knowledge. And both the universities' publish-or-perish reward system (of salary, promotion, tenure, prizes) and the public and private research funding system (of grants to researchers and overheads to their universities) are based on measuring, predicting and rewarding research impact.

But something has changed. Researchers and their universities are beginning to realize that the online era has made it possible to enhance their research impact dramatically. It is no longer necessary to expend the effort and cost of mailing out individual reprints of one's peer-reviewed articles; they don't even need to be emailed any more. They can be publicly self-archived in the university's Eprint Archives – websites that are accessible to all would-be users worldwide, without anyone having to make or respond to reprint requests.[1]

The transition began spontaneously: Researchers began to post their papers on their own websites, to be found by would-be users through google. But this was a bit like finding a needle in a haystack, unless the user happened to know in advance the title of the paper and the author. It was certainly no substitute for literature searches in a focussed database consisting exclusively of peer-reviewed journal abstracts (such as *Medline*[2] or *Web of Science*[3]). But such databases, with their focus, lacked the full-texts

---

[1] http://www.eprints.org/self-faq/

[2] http://www.ncbi.nlm.nih.gov/PubMed/

[3] http://wos.mimas.ac.uk/

of the papers themselves, whereas google, with its universal reach, lacked the focus to find and search peer-reviewed research alone.

The solution was twofold. First, The Open Archives Initiative (OAI)[4] created a convention for tagging the critical metadata identifying papers as research articles (author, title, journal, date, abstract, keywords) so that all papers that were compliant with the OAI convention would become "interoperable," meaning that they could be harvested, searched and retrieved as if they were all in one virtual archive containing all and only peer-reviewed research. The second step was to design (free) software that would create OAI-compliant university Eprint Archives[5,6] in which authors could immediately deposit all their articles so as to make them openly accessible to all other researchers, thereby maximizing their impact. This spawned OAI harvesters such as OAIster[7] which now allow researchers to search the archives of 185 OAI-compliant institutions, already containing over a million records.

The infrastructure for maximizing university research impact is hence already available or in place. What are urgently needed now are institutional policies and computational tools designed to create and fill the university Eprint Archives as soon as possible, for until those archives are filled, research impact is being needlessly lost every day.

(1) Universities need to adopt a self-archiving policy – an extension of their existing "publish or perish" policy to "publish with maximal impact". A potential model for such a policy can be found at *Departmental Research Self-Archiving Policy*[8] along with (free) software for creating a standardized online university CV, linking all entries for peer-reviewed articles to their full text self-archived in the university eprint archives.[9] http://paracite.eprints.org/cgi-bin/rae_front.cgi

---

[4] http://www.openarchives.org/

[5] http://software.eprints.org/ep2

[6] http://www.arl.org/sparc/core/index.asp?page=g20#6

[7] http://oaister.umdl.umich.edu/o/oaister/

[8] http://www.ecs.soton.ac.uk/~harnad/Temp/archpolnew.html

[9] http://www.ariadne.ac.uk/issue35/harnad/

(2) University libraries need to help with the first wave of self-archiving, doing "proxy" self-archiving for those researchers who feel too old, tired, or busy to do the few keystrokes per paper that are involved.[10]

Growth in number of OAI Archives
(now 140+ Archives, *but the average number of papers per Archive (9000) needs to grow faster!*)

Growth in number of Eprints.org Archives
(c. 70)
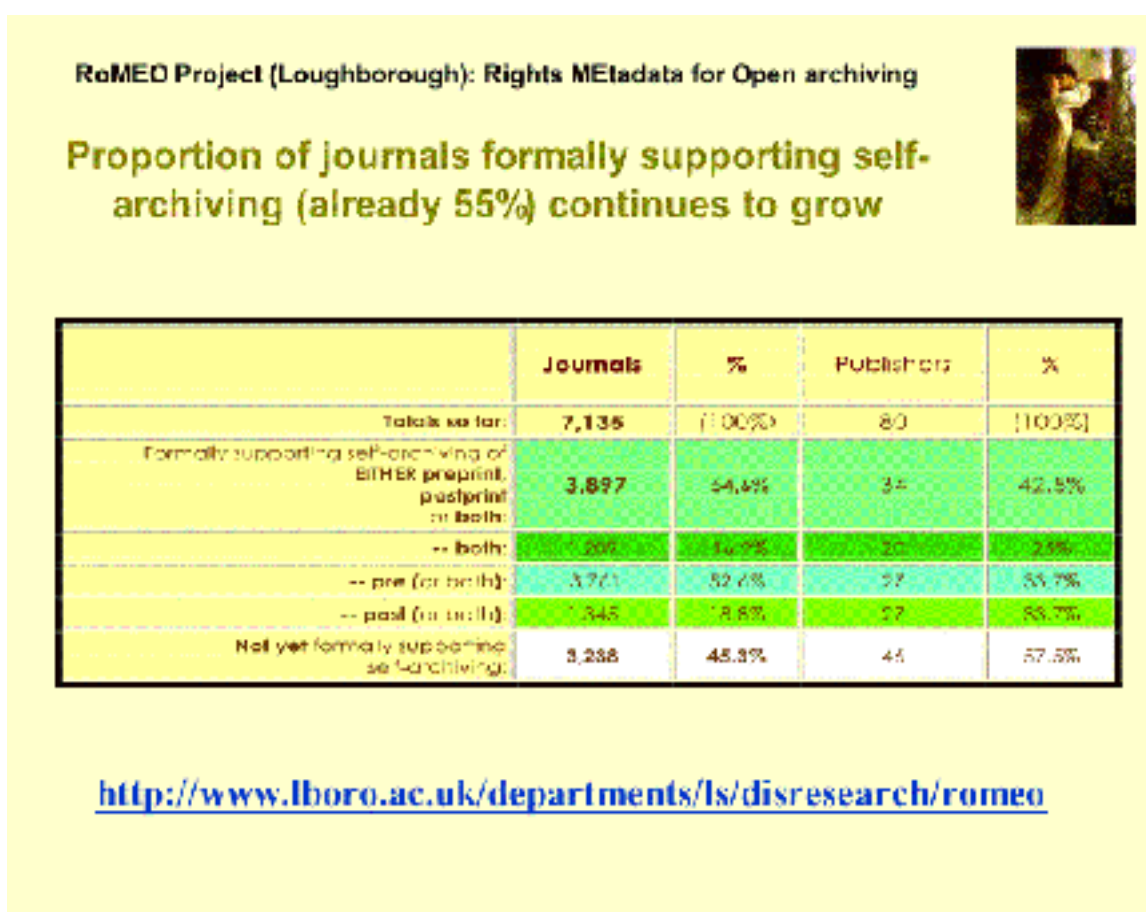(again, average number of papers per Archive (c. 120) needs to grow faster!)
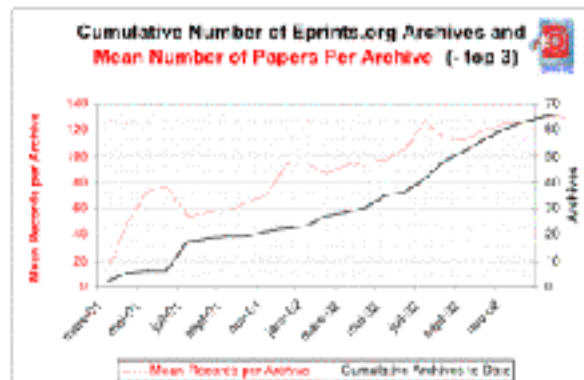
(3) Research funding agencies such as NSF or NIH (US), HEFCE or EPSRC (UK), NSERC, CFI or FRSQ (Canada), or CNRS or INSERM (France) need to encourage self-archiving as part of the normal research cycle, requiring not only that the research findings be published, as they already require, but that their visibility and usage be

---

[10] http://www.ecs.soton.ac.uk/~harnad/Tp/resolution.htm#7.3

maximized by making them openly accessible through self-archiving.

(4) Scientometric performance indicators and analyzers[11] – rather like google, but based on citation links instead of ordinary links – need to be created and used to demonstrate, monitor, measure, evaluate and reward the maximization of research impact through open access. Free online accessibility increases citation impact by 336%.[12]

(5) Journals need to support self-archiving by modifying their copyright transfer or licensing agreements to encourage self-archiving (as 55% of them already do, with most others agreeing on a per-paper basis if asked: so ask!).[13]

RoMEO Project (Loughborough): Rights MEtadata for Open archiving

Proportion of journals formally supporting self-archiving (already 55%) continues to grow

	Journals	%	Publishers	%
Totals so far:	7,135	[100%]	80	[100%]
Formally supporting self-archiving of EITHER preprint, postprint or both:	3,897	54.6%	34	42.5%
-- both:	209	16.7%	20	25%
-- pre (or both):	3,721	52.4%	27	33.7%
-- post (or both):	1,345	18.8%	27	33.7%
Not yet formally supporting self-archiving:	3,238	45.3%	46	57.5%

http://www.lboro.ac.uk/departments/ls/disresearch/romeo

---

[11] Such as http://citebase.eprints.org/cgi-bin/search

[12] http://www.neci.nec.com/~lawrence/papers/online-nature01/

[13] http://www.lboro.ac.uk/departments/ls/disresearch/romeo/Romeo%Publisher%Policies.htm

There are at least 20,000 peer-reviewed journals, publishing at least 2,000,000 articles annually. Their impact could be at least 4.5 times as great if these articles were all self-archived. The financier George Soros's Open Society Institute's BOAI is now supporting open access[14] as is the Scholarly and Academic Resources Coalition[15]. The momentum of self-archiving is growing, but if universities and their research funders were to take the five steps outlined above in a concerted way, there is no reason why all their refereed research output could not be openly accessible, virtually overnight, for all other scholars and scientists to use, apply, and build upon, to the benefit of us all.

---

[14] http://www.soros.org/openaccess/

[15] http://www.arl.org/sparc/

Bibliography

Harnad, S. (2001) "The Self-Archiving Initiative." *Nature* 410: 1024-1025

http://www.nature.com/nature/debates/e-access/Articles/harnad.html

Harnad, S. (2003) "Electronic Preprints and Postprints." *Encyclopedia of Library and Information Science*. Marcel Dekker, Inc.

http://www.ecs.soton.ac.uk/~harnad/Temp/eprints.htm

Harnad, S. (2003) "Online Archives for Peer-Reviewed Journal Publications." *International Encyclopedia of Library and Information Science*. John Feather & Paul Sturges (eds). Routledge.

http://www.ecs.soton.ac.uk/~harnad/Temp/archives.htm

Harnad, S. (2003) "Back to the Oral Tradition Through Skywriting at the Speed of Thought." *Interdisciplines*.

http://www.interdisciplines.org/defispublicationweb/papers/6

Harnad, S. (2003) "Self-Archive Unto Others as Ye Would Have Them Self-Archive Unto You." *The Australian Higher Education Supplement.*

http://www.ecs.soton.ac.uk/~harnad/Temp/unto-others.html

Harnad, S., Carr, L., Brody, T. & Oppenheim, C. (2003) "Mandated online RAE CVs Linked to University Eprint Archives: Improving the UK Research Assessment Exercise whilst making it cheaper and easier." *Ariadne*.

http://www.ecs.soton.ac.uk/~harnad/Temp/Ariadne-RAE.html

Harnad, S. (2003) "Measuring and Maximising UK Research Impact." *Times Higher Education Supplement.* Friday, June 6 2003.

http://www.ecs.soton.ac.uk/~harnad/Temp/thes.html