Rewards await the far-cited

Putting research online could lift a university from a two-star ranking to a five, writes Brendan O'Keefe

A USTRALIA'S research impact could be increased to a level that would otherwise require an extra $425 million a year in funding if academics simply posted their papers on a personal or university web page rather than shelving them in a library or publishing them only in a little-read journal.

Self-archiving, as proposed by Canadian academic Stevan Harnad, could bring academics and students greater exposure and more citations than through traditional publication. Harnad says the increase in impact of published research could elevate a university from a two-star ranking to five stars under the British research assessment exercise and Australia's proposed research quality framework.

"It's transparently obvious that [papers, theses and so on] should be digital, online and freely accessible to everybody," says Harnad, who was the keynote speaker at a recent conference run by the Australian Digital Thesis Program at the University of NSW. "You have to supplement your published version with a home-brewed version that you put in your own institutional repository ... your own refereed final draft for those who can't afford the publisher's value-added version."

Harnad is moderator of the American Scientist Open Access Forum and a professor of cognitive science at the University of Southampton and the University of Quebec in Montreal.

He says the publish-or-perish mandate has to be taken further. Only Southampton, the Swiss physics research laboratory CERN and the Queensland University of Technology have made it policy that staff and students self-archive.

Smaller universities stand to gain more by self-archiving. Harnad says even the richest university, Harvard, can afford to subscribe to only a small fraction of the 24,000 peer-reviewed journals in the world, which carry about 2.5 million articles per year.

Smaller universities can afford even fewer subscriptions, so most published academic work remains unseen by most of the author's peers.

"From the point of view of the author, the fact that so many potential users can't access his giveaway work is appalling," Harnad says. "There was nothing could be done about this in [pre-internet] paper days; costs meant the only way you could provide access was by charging a toll. This is not true any more."

Also, publicly funded academics owe it to taxpayers and funding bodies to ensure that their work is disseminated far and wide.

Harnad says failure to self-archive could cost 50 per cent of the potential citations on Australia's $1 billion research spend.

"About 15 per cent of Australian researchers already do self-archive: 50 per cent times 85 per cent of the current citation total that $1 billion buys equals $425 million worth more of citations. So if the Australian funding councils mandated self-archiving [as Britain is planning to do], then that would increase the return of its research investment by $425 million."

Harnad explains his idea in an analogy of forgone potential: "You buy a battery and it costs you $1 and for that you get 20 hours' use," he says. "Someone tells you that you can increase your battery's usage by 50 per cent if you put it in the refrigerator before you use it; [therefore] someone who doesn't put it in the refrigerator is basically losing [that] 50 per cent."

University of Tasmania computer scientist Arthur Sale, who has designed software that tells authors how often and where their work is being read, says research impact could skyrocket with self-archiving. "If the Government contributed an extra $425 million per year for the ARC [Australian Research Council] and the NHMRC [National Health and Medical Research Council], Australia's research impact as measured by citations would probably increase by about 40 per cent," he says.

"However, if it instead required a copy of all publications derived from research funded by ARC or NHMRC grants to be deposited in an institutional repository at the time of final acceptance, Australia's research impact would rise to the same level. That is what taxpayers are losing annually from delay in this necessary decision."

QUT ePrint archive project officer Paula Callan oversaw the introduction of a self-archiving policy at the university in January last year. She says the concept was difficult to institute but, once authors saw the benefits, take-up spread.

"In the feedback I've received, some expressed absolute wonder that their paper was being downloaded so often," Callan says. "One found it interesting that one aspect of his work was of more interest than another, he thought: 'I know where I'm going to expend my energies in future.'"
Net effect on peer review

It used to be so straightforward. A team of researchers working together would submit the results of their work to a journal. A journal editor would then refer the paper to reviewers, who would send their comments to the editor and researchers seeking knowledge of the results would have to subscribe to the journal.

No longer. The Internet—and pressure from funding agencies, which are questioning why commercial publishers are making money from government-funded research by restricting access to it—is making free access to scientific results a reality. Last month, the Organisation for Economic Co-operation and Development issued a report describing the far-reaching consequences of this.

The report, by John Houghton of Victoria University in Australia and Graham Vickery of the OECD, makes heavy reading for publishers who, so far, have made handsome profits. But it goes further than that. It signals a change in what has been, until now, a key element of scientific endeavour.

The value of knowledge and the return on the public investment in research depends, in part, on widespread distribution and ready access. It is big business. In the U.S., the core scientific publishing market is estimated at $US7 billion ($9.3 billion) to $US11 billion. The International Association of Scientific, Technical and Medical Publishers says there are more than 2000 publishers worldwide specializing in these subjects. They publish more than 1.2 million articles each year in 16,000 journals.

This is changing. According to the OECD report, 75 per cent of scholarly journals are online. Entire new business models are emerging. There is the so-called big deal, where institutional subscribers pay for access to a collection of online journal titles through site-licensing agreements. There is open-access publishing, typically supported by asking the author (or their employer) to pay for the paper to be published. Finally, there are open-access archives, where organisations such as universities support institutional repositories. Other models exist that are hybrids of these three, such as delayed open-access, where journals allow only subscribers to read a paper for the first six months before making it freely available to everyone who wishes to see it.

All this could change the traditional peer-review process, at least for the publication of papers. The process is organised by the publisher but conducted, for free, by scholars. The advantages afforded by the Internet mean that primary data is becoming available freely online. Indeed, often the online paper has a direct link to it. This means that reported findings are more readily replicable and checkable by other researchers. Moreover, online publication offers the opportunity for others to comment on the research. Research is also becoming more collaborative so that, before they have been finalised, papers have been reviewed by several authors. This central tenet of scholarly publishing is changing, too.

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Tasmania analyses the log files of all archives. “Anyone can look up their papers or theses and see what has happened to them,” he says. “One of my staff had a thesis [on computer recognition of sign language] which for a year and a half hovered at 10 to 20 uses a month, but in the past two months it was up to 60 and 70.”

“We discovered the thesis had been cited in someone else’s paper in the U.S. but also that there was a huge number of downloads from India.”

“An Indian colleague said disabilities were a no-go area for research in India but just in the past two months [there had been] a major Bollywood movie that featured a handicapped actor and maybe that has opened doors.”

Sale says the set-up costs are about $5000. “If you need is a relatively small server and the software is free,” he says. “It’s the sort of money that a vice-chancellor could find in his back pocket.”

Harnad says the US botched its first try at self-archiving and Britain is planning to introduce a mandate.

Now China, too, wants academics to save their work. Just one arm of the country’s tertiary education sector, the Chinese Academy of Sciences, represents 30,000 graduate students and 20,000 researchers at 91 universities in 24 cities.

CAS library director Zhang Xiaolin says the library is building a dissertation repository for graduating students.

“The metadata is open to anybody, the full text is open to anybody in the academy and, if authorised by the author, the full text could be open to the world,” he says.

The academy is planning an institutional repository for researchers.

Zhang says Chinese researchers suffer from a lack of exposure but another problem is the loss of copyright to commercial journals and the expense to the library of buying it back.

“We are urging the institutes and academies to build internal repositories so at least those published papers can be deposited back into our organisation so we keep our intellectual assets,” Zhang says.

Copyright laws and protective publishers are the only hurdles to self-archiving, says Harnad, who implores Australian universities to take “this tiny and very natural evolutionary step” for the benefit of researchers, institutions, funders and taxpayers. “It will be to the collective advantage of worldwide research progress and productivity itself.”

www.ecs.soton.ac.uk/~harnad/Temp/research-australia.doc