OPEN ACCESS

Marine Science Journals, Open Access and social networking

Publishing scientific papers in peer-reviewed journals is the life-blood of scientists. The 'metrics' of such publishing – impact factors and the like – and the accessibility of the data contained in scientific journals, i.e. at what point they should be paid for or whether they should be freely available, are hugely controversial among scientists, publishers and librarians. New initiatives for facilitating scientific publishing are appearing all the time. *Marine Scientist* commissioned science journalist **Eric Marx** to look at this rich and fast-moving area.

Roughly 25 percent of all new academic research is today Open Access. Trajectories are inching towards more free and immediately accessible material, and yet the movement is hardly near a tipping point moment.

Going Open Access

All an author has to do at the moment of send-off to a chosen journal is to simultaneously make a deposit in an Open Access (OA) repository. It costs nothing to self-archive on the web (called 'Green OA') and, if post-print rights have not been foolishly signed away, the deed can be done in as little as 15 minutes – even if the journal in which you wish to publish is not itself 'open'. Alternatively, one can opt for the so-called 'Gold' route, a model in which authors pay to publish their articles in peer-reviewed OA journals.

Most OA material is the result of archiving mandates instituted by universities and funders, not spontaneous self-archiving. Only about 15 percent of authors self-archive spontaneously. "They [authors] don't understand Open Access repositories because it's something new to the digital world," says Peter Suber, director of the Harvard Open Access Project. "It's a cultural barrier, not a legal or economic barrier."

For post-prints, the majority of journals now grant authors this unfettered Green archiving right, while the remainder (roughly 40 percent) do so under embargo restrictions typically lasting less than one year. Pre-prints are a bit trickier but here, too, permissive policies exist alongside a comprehensive array of Green archives that include repositories hosted by university libraries or departments, research centers and, increasingly, free social networking sites for academics such as ResearchGate, Mendeley and Academia.edu – each now with over 2 million members.
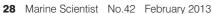
The Open Access Initiative

Author ignorance is a near-fatal flaw in the Green armour that worries Stevan Harnad, a cognitive scientist at the University of Southampton who first explicitly argued for self-archiving as a universal practice in his 1994 online posting 'Subversive Proposal'. Later, Harnad, Suber and other academics came together at the 2001 Budapest Open Access Initiative, where the term 'open access' was coined alongside the Green and Gold strategies.

An ardent advocate for archiving mandates, Harnad has little faith in authors and researchers individually propelling the movement forward. It remains librarians and a smattering of other academics who seriously engage the OA universe.

"They're [authors] afraid of publishers," he says, and too fixated on the Gold route, an innovative model that holds promise but which, at present, he feels is a hindrance owing to the precious funds it locks away in current subscriptions.

For this reason, Harnad says he's dubious of a Facebook style revolution for researchers

ResearchGate
SCIENTIFIC NETWORK

accomplishing much of anything on the OA front. "Is it useful to have a tool to allow us to collaborate on 25 percent of what's currently available?" he asks.

At present, most sites interoperate with neither existing publisher databases, institutional repositories, nor other academic network tools. There's a danger of over-filtering within a closed universe, as well as the possibility of fragmentation if a given subject area gets bifurcated onto isolated networks. And yet to Suber, an acknowledged leader and chief strategist of the OA movement, social service sites do hold promise.

"If the users of ResearchGate are actually archiving – they're not just being given the chance to archive but if they are actually taking advantage of the chance – then it's all for the good," says Suber, "Then it's making progress towards Open Access."

The promise of social media

Distinct from its peers for the strong emphasis it places on member profiles, Berlin-based ResearchGate (RG) is considered the closest thing there is currently to a Facebook-style offering for academics.

Founded by virologists Dr Ijad Madisch and Sören Hofmayer, and IT specialist Horst Fickenscher, the effort was launched in 2008 simultaneous to a slew of other services promising combined literature search tools with social networking capability. Tagging scholarly resources as book-

marks into transportable online repositories gave birth to so-called social tagging services offered by companies like Connotea and CiteULike.

There also arose companies like Mendeley, Papers and Academia.edu, each with varying levels of social interaction premised upon a fuller package of services. Mendeley and Papers are both used primarily by researchers as reference managers, whereas Academia.edu is focused more on the sharing of papers via Green archiving.

ResearchGate

Among the services, ResearchGate stands out for its seamless functionality – incorporating good metrics, article tagging and overall management functionality such that it has created the most active community. One-third of all members use the network at least once a month,

where they have access to more than 50 million papers and 10 million full texts.

At present, roughly 2.4 million researchers, PhDs and scientists populate their RG profiles with their real names, professional details and publications – data that the site uses to suggest connections with other members. The profiles list far more information than university websites typically afford, including links to papers, books, blogs and even forthcoming talks. All of this can help raise an individual researcher's standing and, in the process, provide an incentive for Green archiving.

RG user skills are indexed by subject area, so questions can be put to specific talents, either in public or private discussion groups. As with many other social networks, helpful people are given good ratings, a status that seems to promote information sharing. Recent exchanges in the marine science community ranged from questions on how to forestall biological invasions in marine conservation planning to the effects of ocean acidification and the mortality rates of bamboo shark juveniles in captivity. Only scientists are invited to pose and answer questions. Approximately 80 percent of RG users have a PhD and roughly 20,000 users self-identify as marine scientists.

"I definitely think of ResearchGate as a revolution, but one that is very different from what Facebook is doing," says co-founder Ijad Madisch, RG's CEO. "With ResearchGate we are changing the way science is conducted."

Madisch cites as an example the unlikely pairing of a graduate student in the Philippines collaborating with a professor of organic chemistry in Spain after finding each other at an online

Ijad Madisch and Axel Toelke of ResearchGate

RG forum. Working together, the two discovered and then published a paper on the use of leftover corncobs to make highly effective and eco-friendly catalysts for biofuel.

In October, ResearchGate relaunched the RG Score, a metric that assesses how the online community engages with an academic's research outputs. The tool aims to enable researchers to "turn all of their work into a source of reputation," including raw, negative, or inconclusive data. A score is rounded out based on the user's quality of inputs, type of interaction, and calibre of social network.

Madisch says ResearchGate is advancing Open Access in two ways: first, by making all of the researcher articles freely available on line to both users and non-users alike, what would qualify as Green OA; and by "publishing" their work through ResearchGate onto the Web, a version of the Gold model. Moreover, plans to add an API (Application Programming Interface) in the near future would interconnect the data, satisfying another OA goal.

Madisch says the site is aiming to be far more than just a repository or a reference management tool. There is a desire, he says, to dislodge the journal impact factor by using alt-metrics downstream in determining a paper's use for a particular purpose or community.

In this way, social media is aligned with OA publishing efforts such as *PLOS ONE* and

OPEN ACCESS (OA) continues to evolve, with an estimated four OA journals being added to the Directory of Open Access Journals (DOAJ) per week.

No longer is OA just a noble idea, but a viable – and increasingly the most viable – way to publish. Of all the new journals launched by traditional publishers, pretty much all of them are OA journals. Among them, Thomson Reuters, Elsevier, and Springer Science+Business Media are the trailblazers. Each has a well-defined Gold road digital strategy that actively lobbies against mandated Green archiving policies.

There are at present 1943 OA repositories, of which 321 belong to Asia and 48 to Africa, according to statistics compiled by the Directory of Open Access Repositories' statistics.

Astronomy, mathematics and physics lead the scientific world in OA awareness, while the Marine Science community falls somewhere in the middle, according to a 2011 study conducted by the Study of Open Access Publishing (SOAP). Researchers rated accessibility of content to readers, perceived quality of the journal, the journal's Impact Factor, and the absence of fees as the four most important factors for publishing in an OA journal.

Yet exact numbers are hard to tie down due to the complexity of bounding fields. In the SOAP survey, for example, marine and earth sciences are lumped together.

A promising development in marine science concerns OA data journals enabling scientists to upload their primary research for publication and refereeing as separate data articles. Geoscience Data Journal and Earth System Science Data Journal are examples, as are Dryad, GigaScience and Figshare in the biosciences field.

As for making your own works open-access, the SHERPA/RoMEO database is an excellent source of information on publisher's policies regarding the self-archiving of journal articles on the web and in OA repositories.

BMC Research Notes, which publish all found science. "That's becoming a more attractive route on the basis that there are other metrics which will demonstrate the calibre of your research," says Matt Cockerill, managing director of BioMed Central, the world's largest and oldest Open Access publisher.

That doesn't necessarily mean that ResearchGate, Mendeley or Academia.edu are attempting to bypass traditional peer review journals en route to sharing their research results. Journals are themselves becoming open. As a result, says Cockerill, systems like RG and Mendeley, which add value to journals, work more effectively.

This is the case even for closed access literature for which these sites derive metadata through cross referencing sources like PubMed. Just by knowing when authors are listing articles in their profile, ResearchGate is alerted and then redistributes the content to like-minded users.

It's a tremendous service for driving traffic to one's own repository, but it also has the knock-on effect of making visible what is and what is not available. "As a result of that," adds Cockerill, "people say 'this is frustrating, so from now I'm going to send all my articles to an Open Access journal,' or 'I'm only going to review for an Open Access journal.'"

Growing frustrations

The real point about social networking sites is less about technology and, to some extent, less about content. "It's actually about community," says Cameron Neylon, director of advocacy at the Public Library of Science (PLOS).

Interactive networks are good at creating new discovery paths but accessibility in itself is not necessarily sufficient. "If something is on line but no one can find it, then that's of no use to anybody," says Neylon. "It might as well not exist."

Interoperability and the

expansion of a range of services are essential for these sites if they are to grow towards critical mass. As it is now, many users say they plug existing gaps by patching together complementary social media offerings in order to maximise their literature search. They're aware of the shortcomings but sense they have few options – given the amount of content still residing behind pay walls.

The obvious choice – spontaneous green archiving – still eludes most.

Instead, one increasingly hears vows of commitment to OA journals, sparked largely by two important developments – a worldwide boycott of Elsevier launched in January of last year, followed in July by a UK government policy announcement mandating open-access publishing in the case of taxpayer-funded work.

Never mind that prior to this decision Britain had actually been moving in a green archiving direction. OA advocates like

Stevan Harnad howled their disappointment, while ecumenical strategists like Peter Suber culled a more optimistic outlook.

Boycotts

"What's notable about them [boycotts] is they are from authors or from researchers," says Suber. "They are not from librarians or from gadflies like me... This is evidence that researchers themselves are not only committed to open access, but they are angry with the lack of open access. That's a sign of progress."

In theory, once there are enough top-tier OA journals attracting a substantial number of authors, there would be price competition with regards to fees. PLOS Biology and PLOS Medicine, for example, charge their authors about $2,900 and $1,350 per article, whereas PLOS ONE, the largest OA journal in the world, charges roughly $1,300. Considered a fairly inexpensive journal, its rate nevertheless resides above the average OA journal cost of $906.

"The majority of OA journals charge no fees," says Suber. "Gold doesn't presuppose fees."

Roughly 30 percent of OA journals charge fees, he says, and mostly they are paid by the author's employer or funding agency. Only 12 percent of the time does the author pay out-of-pocket.

Suber acknowledges the Gold route is far more complicated. It will make only slow progress and could be hijacked by the big three publishing houses – Elsevier, Springer and Wiley – if not handled right.

Meanwhile, the Green architecture is almost entirely in place right now. Mandates could achieve universal OA tomorrow – a realisation that drives Harnad crazy.

"The reason authors don't do it [Green OA] is because they are afraid of publishers – and mandates cure that," he says.

Peer-review demise?

Twenty years of OA archiving has demonstrated that it is no longer rational, or even neces-

sary, for subscription pay walls to be built between researchers and research, says Harnad. Arguments publishers make of the demise of peer-review have been proven false. The Gold model demonstrates that. Library subscriptions may diminish, but in Harnad's estimation that's a good thing.

To date, OA self-archiving has been mandated by more than 200 universities and funders, the best examples of which are Harvard University and the National Institutes of Health.

"The formula is simple," says Harnad. "Universal Green needs to be mandated and provided, worldwide, to provide first, OA, and then through donations, the money to convert and pay for Gold at a fair price."

Given that there are an estimated 10,000 universities and 25,000 scholarly peer-reviewed journals to bring into the fold, the OA movement has a long way to go. ◉

ResearchGate: https://www.research-gate.net