

Recent developments in Open Access

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Open Access to the world's research literature has been an obvious development since the emergence of the Internet. To everyone, it appears clear that the costs of disseminating research could drop dramatically. Yet, progress in achieving it is strangely slow. This paper explores recent developments in open access, including:

- The recent Australian NH&MRC and ARC mandates for open access deposit in university repositories, and how universities are responding to them
- The UK's Finch Report, and Lord Krebs' Committee Report
- Recent USA and German developments
- Gradual growth in open access journals, and the challenge for universities and their libraries of transferring reader-side fees (subscriptions) to author-side fees (publication charges)
- The emergence of submission fees so that highly selective journals need not transfer all the costs of rejections onto successful articles
- Fake conferences and journals which exist only to extract attendance or publication fees
- Newer publishing models
- The recent emergence of a third route to open access based on social networking.

The delays in establishing an obvious developmental consequence of the Internet can largely be attributed to two factors: (a) academic apathy and inertia, and (b) publisher protection of profit margins and old business models. Neither of these can be expected to last.

Of particular interest is the '*Titanium Road*', a route to open access that is reliant on social networking.

Keywords and phrases: open access, Internet, research publication.

Introduction

Almost as soon as it became obvious that the Internet was going to go global, and the World Wide Web was invented, some researchers realized that it offered, amongst its other opportunities, the possibility of transforming the publication of scholarly research. In a word, the dissemination costs would disappear, and it might become possible for scholarly articles to be provided free to any researcher wanting to read them.

This became known as 'open access', and the open access (or OA) movement began to gather momentum. No sooner did it do so than the problems became to appear. One of these was the scholarly publishing industry. Although of tiny proportions compared to the cost of the research itself, the industry commanded respect, had tradition on its side, and was determined to protect its profits.

After more than a decade, during which many other innovations have transformed our society, the open access dream has not yet come to fruition. The reasons for this are complex, and this is not the place to canvass them, apart from this brief summary:

- The scholarly publishing industry has resisted moving to open access (an approximation to suicide or at best loss of profits). Profitability of the scholarly publishing industry exceeds many other companies considered to be leaders in technology, such as Apple and Google (Morrison, 2013).
- Many researchers have been reluctant to pressure the publishing industry, bypass them, or change their own traditional practices. Disinterest in dissemination of research is fairly common.
- Research institutions have been reluctant to require their researchers to make their publications open access, partly because of tradition, and partly because senior administrators are usually ex-researchers firmly grounded in the same traditional practices as the researchers.

Responses

Australian responses

Two major developments have taken place in the last year. Firstly the NHMRC (*National Health & Medical Research Council*) announced a new policy that all publications arising from one of their project grants would have to be placed in an institutional repository and made open access, no later than twelve months after publication. This policy took effect from 1 July 2012, took effect immediately, and was stated as being influenced by public demand to see the results of publicly funded medical research.

The second of Australia's two research councils, the ARC (*Australian Research Council*) initially resisted a change, but have now brought in a similar policy, effective on new project grants awarded after 1 January 2013 (ARC, 2013). The ARC policy has several examples of poor wording, which is not surprising since this is their first attempt to adapt to open access, but the following is pretty clear:

- All new project grants are subject to the policy. Administering institutions and Chief Investigators are responsible for compliance.
- The ARC policy precedes publisher agreements for publications deriving from grants accepted after 1 January 2013, and thus over-rides such agreements if there are conflicts, as there is acceptance of a prior contract by the researcher and the administering institution.
- In all cases metadata to each article arising from the research must be placed in the institutional repository as soon as possible.
- The full text should be deposited as soon as possible, and made open access as soon as possible, but no later than twelve months after publication. Either the Accepted Manuscript (AM) or the Version of Record (VoR) is acceptable.
- In rare cases such as a third party IP interest, or inclusion of cultural data (such as secret Aboriginal business), the article may be restricted but has to be justified in the Final Report.
- If the full-text is already open access, for example in an OA journal, then it does not need to be re-deposited, and a link to the OA version will suffice for the repository.
- Interestingly, the policy is deemed to apply to books (whatever they are in this transition period) as well as journal and conference articles.

The effect of these policy shifts have not yet been tested, but two things are beginning to take place around Australia.

- All universities will be working to track recipients of research grants and to ensure that the Chief Investigators are aware of their responsibilities. Guidelines will be drawn up and circulated to

advise authors what to do in their negotiations with publishers. All Australian universities have institutional repositories in 2013. The policies will have a broad impact on research in universities, since although the number of ARC and NH&MRC grants is small compared to their research-active staff, the most active researchers are usually involved in them, and a single grant brings in many ancillary researchers. The impact on Cooperative Research Centres (CRCs) will also be significant. One can also expect CSIRO to examine the policies carefully.

- Some more perceptive universities will take these new policies as indicative, and may be motivated to develop their own mandatory policies applying to all staff and all research. The number of effective deposit mandates is at present rather small, probably because university administrators are almost universally old-school researchers and out of touch with trends. It is to be expected that such policies will adapt consensus of the ARC and NH&MRC policies. More effective policies are possible, but a major benefit that universities would see would be unifying their procedures. Weaker mandates would be unlikely.

This change is long overdue, but its advent is welcome. Its most important effect will not be the numbers of articles directly affected by the changes, but a sea-change in Australian attitudes, including an urgent need to educate researchers regarding dissemination and copyright. This will inevitably lead to discussion and use of open access journals, and similar issues regarding hybrid journals (traditional publishers who offer an open access option at extra cost).

Training of PhD candidates will be affected; directly in the case of those funded by research grants. It remains to be seen if DETYA will amend the guidelines for PhD scholarships, but in any case the majority of universities already have put in place effective procedures for making all theses and dissertations open access, with an optional short student-requested embargo of at most two years, usually to enable them to publish journal articles from the thesis.

A strange feature of the ARC and NH&MRC policies are the imposition of a maximum embargo period of one year. This is longer than is used in many other jurisdictions with similar policies (usually 6 months embargo), and presumably is a consequence of representations by publishers. An alternate view suggests that it may be due to the annual reporting cycle of HERDC in Australia. Although regrettable, it is not ultimately important for the progress of open access. Embargoes will eventually disappear.

The UK and European response

The European response is very varied. Some jurisdictions have strong open access policies, others are targeted to the very best researchers, and some have none. It has been argued that the (post-WW2) German Constitution prohibits a mandatory open access policy, deriving from rejection of controls on academics in the Nazi era. The EU has several committees and bodies working on open access policies.

The United Kingdom as usual goes its own way. JISC (Joint Information Systems Committee) has had a long and proud record of supporting open access, funding the development of EPrints, and therefore indirectly leading to DSpace development, as well as OpenDOAR, and many other initiatives. The seven UK research councils had policies somewhat similar to those now applying in Australia, until the publication of the Finch Report (UK Government, 2012a and b). This report turned British policy on its head.

The Finch Report changed the direction previously adopted by the UK and recommended that publication in journals providing open access (across the board, or on an item-by-item basis) was the preferred way forward. Money would be taken from research to fund the fees that might be incurred, and it was expected that this initiative would be of short duration. About £60M/year was estimated to be required,

which would end up being taken from research funds. The RCUK (Research Councils UK) were required to adopt the policies. This policy harked back to the first era of open access activism, and aroused a storm of protest from open access activists.

Basically, what Dame Janet Finch's working group recommended was that

1. The future of scientific publication was in publication in journals with open access (on the Internet) attached -- the so-called *Gold Road* to open access.
2. Since recovering costs from readers was thereby precluded, publishers would have to recover costs from authors, or more probably author institutions.
3. The RCUK would provide transitional funds from its allocations to meet these fees for grant recipients, in the anticipation that when Open Access journals were universal, institutional funds no longer needed for journal subscriptions could be diverted to this purpose.
4. The so-called *Green Road* (deposit of ancillary copies of publications in open repositories) was described in the report as inadequate. [However this is what Australia is using.]

The effects are fairly predictable, and were widely discussed:

- If there is extra money available to them (not extra to the research system or researchers), subscription scholarly publishers will ensure that an open access hybrid option is available to authors, so that authors are forced to apply for funding to use it, thereby boosting their profits. It is not expected that the subscription rate will change in the short term, though this might happen over time. The net effect will be to boost the already high profitability of scholarly publishers with no long term change certain.
- Open access journals will be encouraged to start up, but since their impact will be low, they will make little difference to the scholarly publishing scene in the next decade. The Finch Report looks likely to delay the transition to open access rather than accelerate it.
- The UK produces only 6% of the world's research, so this funding will be seen as icing on the cake for publishers. UK research might become more open, but it is such a small fraction of the world's research that it will not satisfy UK researchers. The Finch Report is totally reliant on the major research-producing countries (USA, China) adopting the same model. This is implausible.
- Researchers will not switch to open access journals with author-side fees, preferring to stay with subscription-based publishers (the majority) because of their perceived higher impact factor, and because of extra work required from them. This will inflate the costs of research publication for the UK significantly, and over at least a decade.

In short, the Finch Report could have wasted UK research funds, and any hope that the funding would be short-term seems unlikely. The Report did not adequately take into account how such a technological revolution might be achieved, but took a wild leap into the possibilities. Australia should not, and has not, followed its lead.

However to balance this up, open access journals are indeed the long-term future of scientific publication. The Finch Report realized that. Where they fell down is in the analysis of what had already happened, and the nature of the paradigm change that is needed.

Late-breaking UK news

The House of Lords Science & Technology Committee examined the UK's response to open access, the Finch Report, and what the Research Councils of the UK had done. The report was recently released (UK Government, 2013), and it yielded few surprises. The Lords (under Lord Krebs as chair) thought that the RCUK actions were dubious, as were the Finch Committee findings. They recommended examining

whether other countries were following the UK emphasis on the Gold route or had adopted it (they haven't) and suggested that the Finch recommendations alone were probably counter-productive. They called for more discipline analysis, endorsed the move to making public research open access, and called for greater scrutiny and regular implementation review. We are yet to read the full outcome of this process, but it does not seem to be in much doubt. The consequent changes to the RCUK guidelines have gone a long way to nullifying the bad effects of the Finch Report, which was universally condemned by OA advocates.

No other country is contemplating, let alone implementing a scheme like that recommended in the Finch Report so that will be reduced in emphasis; discipline differences will be revealed; and the emphasis on flexibility and a whole-of-country approach will be emphasized, with reviews every two years. The RCUK has responded to the House of Lords Committee report. Australia's response to the idea of open access is far more muted, with its low interest in science & technology, and concentration on minority government politics.

Late-breaking German news

A Bill has been introduced into the German parliament. This seeks to change its copyright act so as to provide for 'secondary publication', which may be interpreted as open access. The following is the German text and a translation of the relevant paragraph of Section 38 of the Bill (German Parliament, 2013).

(4) *Der Urheber eines wissenschaftlichen Beitrags, der im Rahmen einer mindestens zur Hälfte mit öffentlichen Mitteln finanzierten Lehr- und Forschungstätigkeit entstanden und in einer periodisch mindestens zweimal jährlich erscheinenden Sammlung erschienen ist, hat auch dann, wenn er dem Verleger oder Herausgeber ein ausschließliches Nutzungsrecht eingeräumt hat, das Recht, den Beitrag nach Ablauf von zwölf Monaten seit der Erstveröffentlichung in der akzeptierten Manuskriptversion öffentlich zugänglich zu machen, soweit dies keinem gewerblichen Zweck dient. Die Quelle der Erstveröffentlichung ist anzugeben. Eine zum Nachteil des Urhebers abweichende Vereinbarung ist unwirksam.*

(4) Even if copyright was transferred exclusively to the publisher, the author of a scientific contribution, which stems from at least half publicly funded research and teaching activities and published in a periodical which is at least published twice yearly, has the right to make the accepted manuscript version of the contribution publicly available [on the Internet] after the expiration of twelve months after the first publication, provided this serves no commercial purpose and the source of the original publication is indicated. A deviating agreement to the disadvantage of the author is invalid.

The USA response

Since the USA is the 'land of the free', coordinated responses to open access opportunities are rare and not to be expected very often. Of note is the NIH (National Institute of Health) policy which requires deposit of NIH-funded articles in PubMed by no later than six months (policy now several years old), and the Harvard policy.

The Harvard model is worth discussing. It is not a mandate in that deposit of an article is not *required*, but reverses the onus for non-deposit onto the author. If he or she does not make their article open access after a reasonable period (usually six months), they are required to have sought prior permission. Thus authors are free to use any publication outlet they choose, under any conditions, but it is clear that they

are expected to make the article open access, or seek prior permission as to why not. The article can be published in an open access journal, via a fee for hybrid OA, or via conventional subscription journals. No matter: the freedom is there; but you have to ask for it.

The effect is remarkable. Authors take an adaptation of the Harvard policy as endorsement by their employer that open access is desirable and has official endorsement, and mostly comply. The reversal of the onus to deposit is sufficient, since it takes more work to apply for exemption than it does to deposit the article for open access. The Harvard Policy has been widely copied in the USA, but seems to not have an example in Australia. The Australian system is much more centrally regulated.

Late-breaking US news

In the gap between this paper being accepted and the final version being due, the USA made two massive shifts which will reverberate in Australia. Firstly *both* the Democrats and the Republicans sponsored a Bill (known by the acronym FASTR) in *both* the Congress and the US Senate (US Congress, 2013). This Bill required all federal agencies spending more than \$100M/year in extramural research to arrange for all associated publicly funded publications to be made available free to the public in a repository, as soon as possible but no later than six months after publication. Though nothing is certain in US politics, it seems probable that FASTR will pass, perhaps in a modified form.

Immediately afterwards, President Obama issued a directive (effective immediately) to all federal agencies spending more than \$100M/year on R&D, to produce a plan in six months that ensured that for all associated publicly funded publications to be made available free to the public in a repository, as soon as possible but no later than twelve months after publication (US President, 2013). The following are the agencies that seem to be covered:

- National Science Foundation (NSF) – the equivalent of ARC
- Department of Education - including federally funded universities
- EPA (Environment Protection Agency)
- NASA
- USDA
- HHS (NIH, CDC, FDA, ARHQ) - Health
- DOC (NIST, NOAA) – Geography, oceans, meteorology
- Department of the Interior (USGS) – geology, mapping
- Department of Defense
- Department of Energy (OE)
- Department of Transportation (FAA, FHWA)
- Department of Homeland Security
- USDA
- Department of State (USAID)
- Smithsonian

Though there are differences between the two statements, they indicate a tripartisan approach by the two legislative houses *and* the executive government. It is hard to over-estimate the effect of this development. Maybe half the world's research will become publicly accessible within a year, and the Internet will become the 'commons' of the world for scientific and scholarly publication. If such a change were to be translated to Australia, it would be supported by Labor and the Coalition in both Houses of Parliament, and the universities would be one of the agencies directly affected, so *all* their research would have to be made open access, not just the projects the ARC and NHMRC fund.

The Chinese response

China is predicted to overtake the USA in publications in a few decades. Chinese institutions are enthusiastic about open access (of their articles, and those of others), and there is no Communist Party dislike of them. Language remains a problem: Chinese language is the only remaining major competitor for English in scientific circles. However, it is difficult to discern a Chinese policy direction in open access, apart from the desire to regulate the social side of the Internet, and it is not clear what an eventual Chinese response to OA might be, apart from knowing that open access to non-research information is not highly regarded, as evidenced by the 'Great Firewall'. China supports few open access journals.

Analysis

Despite being predicted over ten years ago, open access to all the world's articles is still some way off. Why? The reasons are complex, but the short answer is simply that the conditions for a paradigm revolution were not present. In any other areas affected by the internet, change has taken place in a predictable fashion. However the reason is to be sought in the super-profits reaped by the scholarly journal publishers. They pay nothing for their import, pay relatively little for their processing, and have a captive clientele. The financial bonanza is not to be given up easily. Publishers have been resisting the Internet consistently, to string out their super-profits as long as possible. The end-result is however predictable: open access will become the norm. There is no parallel with the music industry as all inputs are provided without expectation of financial gain. This has been aided by the complaisance or researchers, who been socialized into being not interested in dissemination, just in research.

The Green Road

The Green Road, as described by Stevan Harnad, is based on researchers depositing their publication as open access, regardless of or taking cognisance of publisher legal impositions. The hope is that when sufficient significant authors adopt deposition of their publication in a repository, traditional publishers will have to adapt their business models. There will be less incentive to pay journal subscriptions that have increased far faster than the cost of living index.

Since voluntary adoption of this activity has consistently failed to date, attention has turned to mandatory deposit – in other words, researchers are required by their institutions to deposit as part of the employment contract. Few Australian universities have adopted such mandatory policies, though globally 165 universities and 54 funders are registered as having something approaching such a policy in ROARMAP. Again the hope is to achieve a tipping point.

However, the Green Road is based on a concept of creating a revolution by

- a. Providing very low cost open access through self-deposit and use of institutional repositories,
- b. A good grasp of the legal situation, and of possible publisher responses,
- c. Awareness that institutions (as employers) have the legal right to mandate deposit of articles in their repository, and
- d. A plan to reach a technological change tipping point

The Gold Road

The conventional opposite of the Green Road is the Gold Road. Non-researchers (such as librarians) prefer this path. Here the concept is that publishers will change their business model, abandoning their subscription-based model (funded by readers, meaning libraries) in favour of an open access model,

making all publications immediately readable by all. The costs can be met by subsidy, government grant or author-side fees (again paid by the author's institution).

The reason non-researchers like this path is that it looks just a tweak on the traditional model. Who cares how the publisher tail on the research dog is funded? We still have journals, they still do the same thing, maybe they do it cheaper, so why does where the money come from matter? It is this attitude that resulted in the Finch Report recommendations, without paying attention to the strategy. Indeed if the Finch report had proposed subsidy for a publisher to change business model, rather than for researcher publication costs, it would not have attracted some much criticism, nor have been so damaging.

Currently, there are around 8500 open access journals in the world (DOAJ, 2013). The number is growing fairly fast though they are still the minority, and still do not contain all the profitable high prestige journals. Figure 1 show the growth rate; the USA is well represented in first place at 1273 journals at present, but remarkably China is not following the trend with only 36 and 43rd in rank. Australia is 20th with 124 OA journals. The number offering hybrid open access (in other words optional open access for your article if you pay extra) is harder to estimate, but not a very significant statistic. The fees range from around \$100 to \$3000/article.

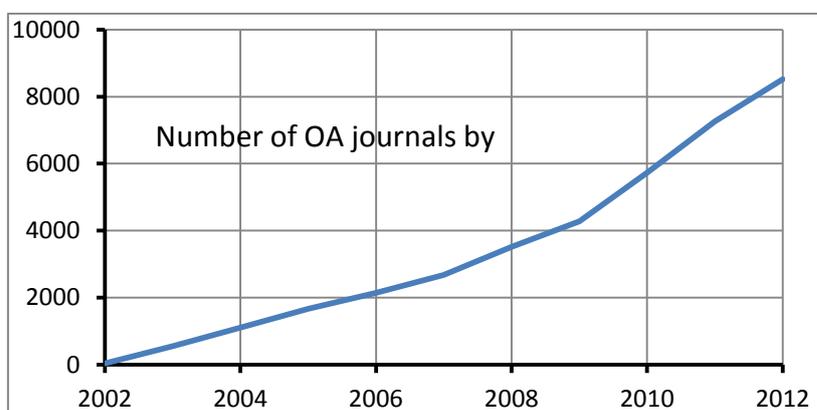


Figure 1. Number of registered OA journals in the Directory of OA Journals (DOAJ)

The Finch Report is a chaotic response. It is based on:

- a. The emergence of sufficient fully open access journals,
- b. Their financial viability and the exploration of new business models,
- c. Their ability to compete with established subscription journals,
- d. A vague feeling that journals need to be supported and the Green Road is no solution at all, and
- e. No coordinated plan to reach a tipping point.

The Titanium Road

Let us turn to the original thesis. On the Internet, publication costs are low but still exist. Dissemination costs are close to zero. This is a benefit of the Internet that science and scholarly institutions everywhere should benefit from. The article publishing industry gets its product of articles for free (almost, apart from some postage and editorial services) and gets its quality control from referees for free (again, apart from some postage and editorial services). Its main costs are

- Typographical and editorial services which are hardly needed in an era of computer literacy, and are arguably sometimes damaging to the accuracy of published articles;
- Dissemination through a website (ICT costs and hosting costs);

- The costs of archiving and preservation; and
- The production of and dissemination of unwanted and unread paper copies of a journal.

So the Internet in its blind way is fighting back. Some authors are making their research publicly available whether publishers want or not. How is the topic of the next section. I have described this activity as the ‘Titanium Road’ (Sale, 2010), as it is a super-lightweight route, firmly based on the philosophy of science and Kuhn’s concept of scientific revolutions (Kuhn, 1962). I should note that some argue that the Titanium Road is really just the Green Road as it remains based on author activity, but I consider this argument over-simplified. The activities described are very different, as are the opportunities and the dynamics.

Australian response

The sensible Australian response would be for every Australian university to recognise the value of open access, and to mandate for all their staff (who, being employees, are required to comply) to make all their research outputs open access as soon as possible but no later than six months after publication. Deposit in an institutional repository would be the default, though publication on an open access journal would be acceptable.

The Internet fights back

Mendeley

The first phenomenon that caused the author to think carefully about the Titanium Road was *Mendeley*. Mendeley is a service that allows researchers to upload collections of citations and papers to the cloud, and on demand format references for articles they are writing. For modest use Mendeley is free. As used by some, Mendeley is similar to EndNote for collating a set of references, and Mendeley themselves does not seem to have realized all the game-changing aspects of their software.

Significantly, Mendeley can allow others to be admitted to one’s own group and to access one’s article collection (introducing the idea of a global research group). This means that a researcher might do what they normally do in collecting references and articles, and by admitting people to his or her group providing free access to the collection. Virtually no more work than he or she would otherwise do, storage in the cloud, global access. Not quite open access for the public, but open access as far as researchers go!

The realization of the impact of this development caused the author to write a series of four essays, entitled *The Titanium Road*, which are available on open access (Sale, 2010). As I saw it this was neither author self-archiving of articles to repositories (the Green Road), nor publisher provision of open access (the Gold Road) but something else – researchers extending their normal work to create open access by default.

ResearchGate

Not long afterwards the author noticed and joined *ResearchGate*. The most succinct way to describe ResearchGate is as Facebook for researchers.

Researchers can ‘follow’ (‘like’ in Facebook) other researchers, and *vice versa*. A researcher can upload their publications which thereby become open to all followers. Co-authors can upload their own publications and ResearchGate analyses the list of co-authors and asks you to confirm this is one of your publications, when it joins your set as well as the original uploader.

ResearchGate also computes an index of activity which is a greatly simplified one-number rating for your research output. This motivates many to try to push their number up as a metric. Very significantly, it also allows for the upload of research datasets under similar conditions: they become open access datasets, available for re-use under Creative Commons licences.

Again, what we are seeing is that researchers who are computer-savvy and use software tools to organize their research, are rewarded. In my own department I was one of the first people to sign up to ResearchGate, but other members of the department have also joined, with no pressure from me. The total breakdown is

- 1 Emeritus Professor (this author)
- 2 Employed staff
- 10 PhD students

One implication is clear. Younger researchers are active in using social media, and in using ResearchGate. They are also open about their publications, in a way that older researchers are not. As Kuhn (1962) remarked, sometimes one has to wait for a generation to die before a paradigm revolution is complete.

Apple, iBooks and e-books

The third strand in my personal Titanium Road epiphany came when I attended a two-hour course in how to write an iBook. iBooks are Apple's take on interactive ebooks, though with a nod to industry standards they have a huge amount of Apple-specific features. One reads iBooks on an iPad (of course, what else?) iBooks may contain videos, expandable pictures, sound, hyperlinks, self-test questions, indexes, glossaries and many other widgets. Third party suppliers add even more, including feedback to the author on quizzes. iBooks can be uploaded on iTunes for free, if they are open-access. Think iBooks = iArticles, though there are some desirable developments that Apple hasn't yet made.

While the iBooks format (.iba) is based on an emerging industry standard (.pub) it goes far beyond this. You can save an iBook as an epub, but it loses interaction. An iBook is not just a novel you can read on an iPad or another tablet; it is an interactive experience. After you have experienced an iBook, you might reflect why scientific articles are so sterile and stereotyped. The answer is simple: they are grounded in 19th century technology, and generation after generation of scientists have been socialized into complying with the format, the textual emphasis, writing in the third party and passive voice, static monochrome images, and innumerable other practices that have outlived their use-by date, but are perpetuated by the scholarly publishing industry. This article is itself an example, and I hope to produce an iBook version of it to show the difference.

Writing an iBook is not a trivial task. Not that any of the technology or interaction with it is difficult – it isn't. Rather, the process is similar to that of recording a movie. The author has to develop a story (perhaps even generate a storyboard) and assemble a lot of components: text, images, movies, tables, and other widgets. The publication is conceived mentally and only assembled, when everything is to hand. Of course, it is possible to make one or more trial assemblies, but the idea of writing an iBook or iArticle by starting out and editing it as you go is infeasible. Perhaps that is too strong: it is a waste of time and researchers tend not to waste time.

The interesting idea is that university researchers will be driven to produce iBooks or similar for their teaching activity. The iTunesU website is already rapidly growing in interest and downloads. It might transform university education. If researchers are used to producing iBooks for teaching, how satisfied will they be with the tired 19th century scientific article? The short answer is 'Irritated. Why cannot I

publish the way I want to?' Publishers are not ready for such a transition, though I think it inevitable. Young researchers will not have an allegiance to print for much longer, despite the increasingly desperate attempts at socializing them. For example, PhD candidates are exhorted to publish at any cost to enhance their thesis. One idea is that they are thereby socially validated, but equally it is asserted that they show they can conform to the contorted prose (and limited media) of scientific articles.

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