The virtual road to recovering trust in academic publishing

Time for more radical changes in science publishing

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Innovative technologies designed to assist the research community could help overcome mistrust in science publishers

Real life is often more colourful than the most imaginative drama. The unfolding scientists versus publishers saga is no exception. It features the discovery of fake journals; dodgy 'peer review' papers; an ideological war over open access; metrification; copyright claims; bloated profits; submission and conference boycotts; subscriptions cancelled.

Weapons-grade mudslinging between academics and scientific publishers has become common practice in the last ten to fifteen years. It is serious. People have been criminalised, and then committed suicide. Others have got rich on the basis of work funded by the taxpayer. But the fierce opposition may be receding, facilitated by technologies designed to improve the way the scientific process works, and providing scientists with tangible benefits.

Unequal relationship

The ongoing opposition between the two protagonists is like a match between many clones of David versus a handful of Goliaths. In the blue corner is the modern stressed academic. "Will perform science for food" read their funding-hungry tweets typed while trying to get the last experiments into a top-ranking journal. Well, top-ish.

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In the red corner: the oligarch of publishers. Milking the boom in online publishing for all its worth; locking up work they did not fund from its own creators. Then, selling it back to the world at inflated prices for a product—the humble PDF—that pays little homage to the skill and ingenuity of the original work.

If only it were so simple. Perhaps 10-15 years ago it was. But for all the mistrust that has built up in the research community against science publishers, some people are seeing real signs that the battleground is changing. "Over the last five years I think the story has changed considerably from all the gripes on pricing, open access so on. There's a different conversation going on," says Tracey Brown, managing director of Science about Science, a policy discussion and research advocacy organisation based in London, UK. "There's been a huge evolution in response to the increasingly interactive research climate."

Now, open access is on its way to being the new normal in science publishing. And technology looks to be the key driver. The publishing landscape is simmering with new spin-outs and start-ups, networks and funky web tools. Some will inevitably be successful, and could come to redefine how scientists interact with each other. They could even alter the way researchers interphase with the publishers that bring their work to the global audience. It could go as far as bringing a new trust to a relationship fraught with virtual fisticuffs.

Technology-driven publishing

The problems began with the internet. When digital publishing arose, the scientific community began to ask what value publishers were adding to the process. In theory, the web's early proliferation of blogging and publishing platforms should have resulted in the democratisation of the sector. Instead, the biggest science publishers' turnover went from millions to billions of Euro and the criticisms mounted.

Reforming the relationship between scientists and publishers is a work in progress. One of the ways to restore trust has been to try and improve on the peer-review system. While some like ScienceOpen bet on post publication peer-review, others prefer pre-submission peer review. The second approach has seduced Springer, headquartered in Germany. Springer journals work with Peerage of Science, which is a slightly different way of approaching peer review, based on a pre-journal submission peer-review system. And BioMed Central is working with another similar initiative called Axios Review.

Both of these initiatives can be described as standalone peer review platforms, and get the thumbs up from Bjoern Brembs, a neurobiologist at the University of Regensburg, Germany. "Journal-independent peer review is something I really like and there are a whole bunch of initiatives already offering this service." The Episciences Project is a similar effort, launched in 2014 by Jean-Pierre Demailly from the University of Grenoble, France, and mathematician colleagues which reviews preprint papers deposited on open archives such as arXiv or HAL.

Brembs has been a critic of mainstream publishers, and has signed up as an editor to a new initiative to increase trust in scientific publishing via study pre-registration, where publishers are bound to accept papers before results are in, thus preventing the bias in favour of positive results. He says it's too early to say if it's worked. "It's hard to say. The mistrust goes much deeper than that. Pre-registration will ever only work for a subset of works, and will take time for wide adoption, at least in the short term." He adds that the concept is being discussed and some articles have been published after pre-registration.

Time for more radical changes in science publishing

Yet, all of these improvements may not be enough. The science community is clearly hungry for new techs that are genuinely useful and not fancy-looking profiteering. When solutions that genuinely improve the overall scientific process come on-stream, the trust should return.

Some believe past friction among scientists and publishers has led to healthy discussion. "I think it's good to take a step back and ask 'Is this working? Is this the best it can possibly be?' and I think that discussion is being stimulated by new web and other related technologies," says Timo Hannay, managing director of Digital Science, a London, UK-based spinout from the German-owned Nature Publishing Group launched in 2010. Its aim is to change not just publishing but the way science is done by nurturing new software-centric startups.

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However, Hannay sees the fight as less between scientists and publishers. Instead, he believes it is more about the progressive and conservative forces in each camp. There are factions in each camp who pine for change and those that favour the *status quo*.

Importantly, he says, it is incumbent on publishers to understand researchers' needs. "Quite a lot of people in scientific publishing that don't really know about science, or doing science," says Hanney, who came to publishing from the lab bench. "It's important to understanding the needs of researchers and how they are evolving." To this end, he claims his company is investing in software startup businesses that are almost exclusively founded by researchers—and not by people straight out of business school. This is because the latter would not see the shortfalls in the software, for example, that researchers are using.

New adventures in publishing

However, Digital Science is not the only innovator in town trying to shake trust back into the scientists-publisher relationship. Back in 2007, two neuroscientists started [Frontiers](#). The project started out of frustration at having to hand over articles—including copyright—to publishers who do little more than publish a PDF. "We didn't trust publishers, so we wanted to build the ideal system," says Frontiers co-founder and CEO [Kamila Markram](#). It aims is to found a more community-oriented publishing operation; an open access publisher run by, and for, networks of researchers.

To restore trust altruistic notions can help. "As a publisher you have to think like a scientist, you have to deliver, you have to give back," adds Markram, who is also a neuroscientist at ETH Zürich, the Swiss Federal Institute of Technology. And giving back has included adding author- and article-level metrics. "We were the first to provide article level metrics, and now everyone is adopting them," says Markram. "The journal appropriated the whole impact game for themselves through the journal impact factor, so we wanted to bring it back to the research paper and the author."

Frontiers also further increased trust by deconstructing the peer review process to make it more transparent, going one step further than previously mentioned initiatives. They introduced open peer review, with reviewers being no longer anonymous; an approach also used, for example, for the [BioMed Central](#) BMC journal series. Article reviewers could no longer hide behind anonymity, to bring trust from transparency. Why should they not be acknowledged, Markram asks, when they are putting so much unpaid work in? They also required all reviewers to accept a paper before it was published. "As a reviewer you know you will be named on the paper, so you only want your name on good papers," Markram explains.

Despite this, most papers are published, 80% Markram reports. The acceptance rate is even higher than at mega journal [PLOS ONE](#). The latter adopts the 'impact-neutral review' where valid science is always published, and rejected on technical grounds only. The success of the *Frontiers* model, in 2013, led legacy publisher Nature Publishing Group to buy a 30% [stake](#) in *Frontiers*, making it look a somewhat less the renegade set up it was.

Scientist-centric solutions

Going one step closer in gaining the trust of the community of scientists, Frontier launched a new research network, called [Loop](#), in January 2015. The idea is that it avoids the 'walled garden' aspect of social networks—as is the case with [Academia.edu](#) and [ResearchGate](#)—where all the action takes place in one domain. Instead, Loop is designed to work across different websites; akin to the way [Google+ pops up](#) in web searches, and lets you know if your connections are also fellow subscribers to a channel on YouTube, for example.

"Loop is completely integrated into the *Frontiers* publishing platform [and now Nature.com] so we're really linking into an essential part of research life – publishing," says Markram. She explains that everyone from authors to reviewers can see the bio, publications and connections of peers in the network. For an example, see the Loop page of her husband, Human Brain Project supremo [Henry Markram](#).

What might make Loop different is that the software can be tagged onto other websites, such as library and university pages. And Markram says the first announcements on this will come in March 2015. "It's very simple and almost

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trivial, but it's never been done in this way before," she says. "Right now you go to Google, the university website, an article, but there's nothing coherent. We're trying to connect these different places, the goal being to maximise the discoverability and visibility of researchers." Time will tell if similar forward-thinking initiatives will proliferate.

Going the distance

Away from the peripheral publishers and startups, Tracey Brown of Sense about Science says that after years of criticism, mainstream publishers are taking the lead in new initiatives. She cites AllTrials, a campaign to have the data from all clinical trials to registered and reported, regardless of positive results, as an example that is supported by publishers PLOS and the BMJ. In this field publishers are really looking at whether traditional articles are really the best way to report on clinical trials , and for scientists to replicate results. "With the technological possibilities that are coming forward, in services such as big data they are leading the way rather than following."

Against the backdrop of this evolving landscape is the announcement of a merger between Springer and Macmillan Science, which publishes *Nature.* This will create a publishing giant with 13,000 employees and an annual turnover of around €1.5 billion. Cynics will see this as an obvious manoeuvre to consolidate their dominant position and complain that you cannot trust a company that turns over more than a billion euros a year. This leaves the spinoffs and start-ups merely as fig leaves to mask industrial-scale profiteering from the research machine. They will ask what is really different about a series of journals that accept 80% of submissions and then sells part of its shares to a major player.

In this context the issue of trust is more than ever on the agenda. Hannay thinks that publishers will soon find themselves in position of huge unknowns in their own industry's future. "The right way to do it is to adopt a scientific mindset, be intellectually curious, not afraid to experiment and have 'failures', with the confidence that you will come up with the answers in the end," he says. "Publishers need to be more like the scientists they serve and then we'll all be better off."

Mid-fight verdict: draw; reigning champion looks in favourable position to retain title.

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