

The Crisis in Scientific Publishing: A Holistic Perspective About Background Issues Associated with Predatory Publishing



A Crise na Publicação Científica: Uma Perspetiva Holística Sobre Questões de Fundo Associadas às Publicações Predatórias

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Scientific publishing itself seems to be in crisis.¹ While different publishing models exist (Table 1), the rise of open access (OA) journals has apparently unleashed ‘predatory publishing’, which has been targeted recently in *Acta Médica Portuguesa*² with a clear reference to Jeffrey Beall who apparently coined this term.³ Certainly, ‘predatory publishing practices’ have become more than the typical nuisance of daily spam mails. Many are ordinary scams, while the remainder seems to be from dubious or low-quality publishers, although some boast more than just one PubMed listed journal. In this regard, it is useful to look first at some key economic aspects (i.e. supply and demand or the financial dimensions in the publishing business) and second, analyse some inherent academic issues, such as the need to publish and the credibility crisis in science.

Economically, after the second World War, ‘entrepreneurs built fortunes by taking publishing out of the hands of scientists and expanding the business on a previously unimaginable scale’.⁴ Pergamon Publishing, until it was sold to Elsevier, went from 40 journals in 1959 to 400 journals in 1991. The economic model was one of creating more supply and subdivide one journal into three while libraries would have to subscribe to them all to offer universal coverage. In 1988, Harvard Library spent half a million dollars more on research journals than budgeted for. That meant that journal publishing was not competitive, but rather a sector offering a ‘for-profit oligopoly’.⁴

While predatory publishing is supposed to have made \$75 million in 2014,⁵ Elsevier alone had revenues of £2.5 billion in 2017, with a £913 million operating profit which translates into £2028 per every article published.⁶

Beall held a conservative view that only the traditional publishing model was truly successful, and he was outspokenly hostile to almost any form of OA publishing, a model

he likened to an anti-corporativist movement.^{3,7} For him, OA articles were usually of low quality, while monetary transactions between authors and publishers corrupted the system and opened the door to predatory publishers.⁷ Interestingly, Beall’s supervisor accused him of ‘dangerous nostalgia’, disagreeing that scholarly publishing as he saw it, ever existed.⁸ Indeed, it is helpful to understand the present-day different business models of scholarly publishing (Table 1) because often substantial confusion surrounds the concept of open access publishing.

Regarding academic aspects of supply and demand, the infamous ‘publish or perish’ dogma reigns; and the driving force to publish includes many factors other than the dissemination of results, such as advancing one’s career, pressures created by evaluations, or reports and webpages in need to be filled with scientific achievements. Interestingly, a substantial number of researchers from high-income-countries publish in predatory journals, even from prestigious institutions.⁹ There is obviously a demand and thus unsurprisingly so, a market for low(er) quality journals. Their unbeatable attraction is low publication hurdles and often enticingly low prices.

Beall’s black-and-white, good-and bad dichotomy in scholarly publishing between tradition and OA publishing certainly seems over simplistic, given the larger crisis which has rattled biomedical science itself. The ‘replication crisis’ has hit hard¹⁰ because many studies were impossible to reproduce which created persisting doubts about the validity of a lot of research. The research endeavour itself has become an industry which produces vast amounts of sloppy and low-quality results which, nonetheless, are looking for an outlet. Is it thus not likely that low-quality, poor research makes it into low-quality, perhaps predatory journals? “Scientists publish too much”,¹¹ as illustrated by the discussions

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Table 1 - Publishing models: types and examples

Type	Publishing model	Example†
Traditional publishing	Not-open access: (a) commercial publisher (e.g. Elsevier, Springer Nature) although journal may be from learned society; (b) non-profit, like scholarly institution (e.g. University press). Financed via subscription.	- The Lancet: Subscription Single: €225; Pay per view: US\$31. - Nature: Subscription Single: €227; Pay per view: US\$32.
Open Access (OA)	Freely available online to the reader. Publication and production costs are paid by author or by sponsors. Gratis = access free of charge (free to read), Libre = online access free of charge plus some additional re-use rights. Can be a for-profit (e.g. BMC journals belong to Springer Nature).	Article processing charges: - PLoS One: US\$1495. - PLoS Medicine: US\$2900. - BMC Medicine: €2395. - Frontiers in Medicine: US\$1900. - MDPI, J. of Clinical Medicine: CHF650. - Hindawi, Advances in Medicine: US\$750.
Gold OA	Author pays article processing charge	Publishers: PLoS, BMC, SpringerOpen, MDPI, Frontiers, Sage, Hindawi, many others.
Platinum OA	No fees incurred, several business models, including subsidized/sponsored	- Bulletin of the World Health Organization. - Acta Médica Portuguesa.
Green OA	Publication and then self-archiving with open access to archive. Restrictions like embargo (delays) may occur. Often, the final, published version is not archived.	Journals can be checked at SHERPA/RoMEO.
Delayed OA	Usually after an embargo period of 6-12 months.	- NEJM, research articles after 6 months - EMBO Journal, after 12 months
Hybrid OA	Open access after author or institution pays charge to commercial publisher to allow open access.	- The Lancet OA charge: US\$5000 - Nature Communications OA charge: US\$5200

Information and prices obtained from the websites of each respective journal (accessed 2018 Apr 18).

† Institutional subscription prices can be thousands of Euros per year. Self-archiving of journals can be checked on the SHERPA/RoMEO website [Accessed 2018 Apr 13]. Available from: <http://www.sherpa.ac.uk/romeo/browse.php?colour=green>.

All mentioned journals are indexed in PubMed. Hindawi, MDPI and Frontiers were all on Beall's list of 'predatory' publishers at some time. BMC: BioMed Central; PLoS: Public Library of Science, MDPI: Multidisciplinary Digital Publishing Institute; NEJM: New England Journal of Medicine, EMBO: European Molecular Biology Organization.

about the one to two million articles published each year with astonishingly high figures for false research results.¹²

Subscription-based journals can also be mediocre¹³ and the most highly regarded journals have many issues too. The Nobel laureate Randy Schekman was critical in stating that the "pressure to publish in 'luxury' journals encouraged researchers to cut corners and pursue trendy fields of science...".¹⁴ The implicit message is that untrendy research, whatever its quality, may be very hard to publish in top journals.

Even rigorous peer review, held as the pinnacle of quality control in top journals, has issues. The Editor-in-Chief of The Lancet, Richard Horton, wrote that "the mistake, of course, is to have thought that peer review was any more than a crude means of discovering the acceptability - not the validity - of a new finding... But we know that the system of peer review is biased, unjust, unaccountable, incomplete, easily fixed, often insulting, usually ignorant, occasionally foolish, and frequently wrong".¹⁵ The former Editor of the BMJ, Richard Smith, goes even further and calls peer review a 'sacred cow' ready to be slaughtered, based on little evidence that it is able to find errors and that "most of what is published in journals is just plain wrong or nonsense".¹⁶ Given the private, confidential nature of peer reviewing, while it may facilitate decisions on acceptability, it is hard to carry out scientific enquiry into its validity.

Predatory publishing has been defined "on the assumption that well-meaning academics are duped into working with them — tricked by flattering emails from the journals inviting them to submit a paper or fooled by a name that sounded like a journal they knew".⁹ Although there is some evidence that some senior scientists or less well-trained scientists from Low and Middle Income Countries (LMIC) have been fooled, this still suggests that the highly educated, intelligent, professional scientist, able to secure funding, to perform and analyse complex studies, to write them up clearly, often in a foreign language (English), is then too naïve and unexperienced for the simple task to spot a 'predatory' publisher. A major journalistic investigation in Germany revealed recently that some scientists might be too naïve and be tricked, but others appear to "have taken advantage of the lack of editorial oversight to report their results quickly and without the risk of rejection".¹⁸

Certainly, the ideal is to strongly discourage any poor scholarly publishing while trying to maintain good quality standards. Academic training should include critical scientific reading (and writing) within the broader context of the use of digital literacies as social practices where publishing takes place in an academic community of practice.¹⁹ Such literacies include language (e.g. print, texting, hypertext literacies), information (e.g. tagging, search, information and filtering literacies), connections (personal, network,

participatory and intercultural literacies) and (re-)design – remix literacy.¹⁷ Furthermore, information literacy includes the capacity to evaluate the credibility of a publisher or journal.^{1,8,13} In this task, libraries could be most helpful and should have a prominent place,¹³ providing training and up-to-date information, to ensure that students master the necessary skills for their lifelong learning goals, able to assess the reputation and legitimacy of a journal, as well as evaluating the pros-and-cons, the merits and downsides of (future) publishing in this or that journal. Information Literacy training should also help biomedical authors understand the strengths, weaknesses, opportunities and threats within the 21st century publishing community.¹⁹

Where does all this leave us? Unquestionably, scholarly publishing and biomedical science itself are going

through a crisis, but the economic roots of this are deeper and wider than often realised. Excessively blaming predatory publishing for this may be misleading and distracting. The optimistic view should be that understanding change in terms of economic and academic supply and demand, and understanding the context of academic publishing as a digital practice, requiring certain digital literacies, involving help from academic libraries and librarians, will assist academic publishing, and this may put 'predatory publishing' in the place it deserves. Possibly, it may then be seen as a fringe phenomenon, perhaps more as an important symptom or a consequence rather than the leading cause of the credibility crisis. Over-simplistic views may be distracting us from what may be really necessary to change in the research endeavour in general and scientific publishing in particular.

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