Expanding Perspectives on Open Science: Communities, Cultures and Diversity in Concepts and Practices
L. Chan and F. Loizides (Eds.)

doi:10.3233/978-1-61499-769-6-129

Rethinking Openness: Challenges and New Approaches to Open Scholarly Journals

Andre Luiz APPEL[a,1], Maria Lucia MACIEL[a] and Sarita ALBAGLI[b]
[a] *Universidade Federal do Rio de Janeiro*
[b] *Instituto Brasileiro de Informação em Ciência e Tecnologia*

Abstract. This paper's main objective is to present and discuss some results of a research project in progress on issues currently in debate on open scholarly journals dedicated to the publication of research outputs on an open, democratic and transparent basis. It contemplates a brief review of the literature about challenges regarding openness of the current scholarly publication system and political-economic constraints to its democratization, to support the analysis of two case studies on open publication platforms - Research Ideas and Outcomes and Wellcome Open Research - based on information available on their websites. As results, we present an analysis of publication practices and policies in action on these platforms and their policies.

Keywords. scholarly journals, open scholarly journals, open access, open science.

1. Introduction

What should an open scholarly journal be like? To what extent and in what ways does it differ from the current journals format so far? What are the features which may distinguish a journal aimed to promote the concept of open in as many as possible aspects? To contribute to answers to these questions, the main objective of this paper is to present and discuss some results of a research project in progress on issues currently in debate on open scholarly journals dedicated to the publication of research outputs on an open and transparent basis.

The study was performed in two phases. The first phase was based on a review of the literature about challenges regarding openness of the current scholarly publication system and political-economic constraints to its opening. The second phase involved the development of two case studies on open publication platforms: Research Ideas and Outcomes (also known as RIO Journal or RIO)[2] and Wellcome Open Research (WOR)[3]. Given the evidences of practices highlighted in the first phase of the study, we developed an analysis of their publication practices and policies based on information available on their websites.

The development of new and more open publishing practices has evolved since the advent of the Open Access movement and is in tune with the emerging Open Science movement. According to Albagli [1] "the movement for Open Science must be

[1] Corresponding Author: Programa de Pós-Graduação em Ciência da Informação IBICT/UFRJ, Rua Lauro Müller, 455 / 4º andar – Botafogo, Rio de Janeiro, RJ, Brasil; E-mail: alappel@gmail.com.
[2] http://riojournal.com/.
[3] https://wellcomeopenresearch.org/.

considered within the context of the social movements that have emerged in the scenery of the changing conditions of production and circulation of information, knowledge and culture". It is motivated by greater efficacy of data and information sharing as a basis for the cooperative, cumulative generation of eventually reliable additions to the stock of knowledge, to putting new findings in the public domain which permit data and information to be concurrently shared in use and re-used indefinitely [2].

These movements may be framed in a broader perspective which benefits the understanding of knowledge and information – and all the infrastructure and means necessary for their creation, storage/conservation and dissemination - as common shared entities. This approach involves circumventing the commercial for-profit exploitation of scientific knowledge and information infrastructures to create alternatives under the principle of the commons, driven by social norms or regulations [3,4].

2. Emerging Challenges for Journal Publishing Regarding Openness

The literature reveals that, after 350 years of publication of the first scholarly journals – *Journal des Sçavans* and the *Philosophical Transactions of the Royal Society* –, scientific journals are now facing challenges regarding, on the one hand, the expansion of electronic means of publication and, on the other, the pressure to be more open. This implies the need to enhance reproducibility, to incorporate outputs beyond the research results enclosed in text-only format, such as data sets and early stages of the research cycle, and to incorporate new approaches of peer review and post-publication evaluation. Cope and Kalantzis [5] point to an epistemic disruption in the scientific knowledge communication system with repercussions on academic journals. It has been driven by technological, cultural, economic and (geo)political factors, favoring the adoption of platforms and practices for more distributed knowledge production and circulation.

One of the main challenges to the establishment of open publications relates to finding a suitable business model that allows for long term and sustainable funding beyond commercial and monopolistic exploitation. Cope and Kalantzis [5] raise concerns about the unsustainable costs and inefficiencies of traditional commercial scientific publishing, which lead to the expensive costs of subscription journals. It is also important to emphasize that commercial publishers have a focus on high profits, and that the subscription fee or cost per article does not necessarily reflect the production costs but also the journal influence [6]. Thus, a large proportion of the community (researchers and the public) cannot access the published research [7]. The rise of open access (OA) journals is challenging the business models of scientific journals [5] and is also demanding the development of more sustainable publishing models. Open access journals need financial sustainability, just as commercial journals need to adapt if they are to continue making a profit in the open access model. Some OA journals charge the authors a publication fee, also known as Article Processing Charge (APC), once the article is accepted for publication. Others, known as hybrid journals, still published under a subscription model, charge the authors to publish their article in OA.

Another challenge is the need for sharing research data along with the published article. Considering the growing amount of shared data, Brown [8] argues that due to

limited page space in an article to present data, it became necessary for scientists to organize, disseminate, and archive their research-related data digitally, and then link that data to the article. This practice is reinforced by Tenopir and King [9] who highlight that citation linking within and between articles and links from the article to external data sets represent some of the future trends of journals and article publication. Data sharing has been increasingly valued to enhance scientific knowledge credibility and certification without the intervention of discursive rhetoric of the authors when the research results presentation is limited to the article text [5]. Open access publishing does not necessarily reduce the closure in scholarly knowledge production and communication. It still "by and large perpetuate[s] the print analogue workflow of PDF, with all its intrinsic deficiencies as an open knowledge system" [5]. As with data, many findings are currently not published, such as small studies and software papers [7]. The open publication of diverse results throughout the research cycle may enhance collaboration besides enabling other researchers to replicate studies or to find new results without the need to re-collect data.

The standard peer review system is also being affected by new approaches to meet the demands for more open, transparent and rapid review processes and to increase the possibility of granting credit to all those involved in the process. Tracz and Lawrence [7] argue that the lapse of time since the article is submitted until the time it is published and the lack of transparency in the anonymous review process are some of the problems of the current system. Another problem highlighted by the authors is the waste of time involved in finding a journal that accepts the article, caused by inefficient reviewing processes. As an alternative, with the implementation of an open peer review system, articles are readily published if they meet the editorial standards and guidelines required by the journal and then become available for the referees to make public comments – an example of transparent review or the post-publication review as described by Ford [10]. This process should increase both the credit and accountability for peer reviewing [11] especially if the comments and reviews are published along with referees' Open Researcher and Contributor IDs (ORCID).

Journals dedicated to openness in the publication of research may also engage with alternative forms to assess articles' relevance and impact after publication. Regarding post–publication evaluation, Cope & Kalantzis [5] raise questions and concerns about the fact that this evaluation is centered primarily on citation or impact analysis, while many researchers advocate for the adoption of alternative metrics ("altmetrics") and article level metrics – such as article download counts or those collected from reference management tools and social media – as a complement to assessing article impact, and how it is being discussed, shared and used [12–14].

3. Political-Economic Aspects of Science Publishing

For over three centuries the commercial publishing industry has kept a monopoly of scholarly journals publishing, considering the high level of investments in fixed and circulating capital necessary for their printed versions. With the rise of new techniques for publication and dissemination of science, derived mainly from the advent and popularization of personal computing and the Web, these barriers to entry no longer made sense, since most researchers were then able to publish their findings by themselves.

By the beginning of the 21st century, with the spread of electronic publishing, Houghton accounted for an increase in competition in the publishing market, with a possible reduction of the monopolies, and a transfer of scholarly communication from the hands of commercial publishers into those of the creators [15]. Nonetheless, almost twenty years after this assertion, we keep facing the resilience of the traditional journal format and the prevalence of journals maintained by commercial publishers. According to Larivière et al. [16], only a few publishers – namely Reed-Elsevier, Wiley-Blackwell, Springer, and Taylor & Francis – are responsible for the publication of almost 50 percent of all papers.

Such resilience also tends to reproduce some flaws in the publication system of the print era. As stated before, papers' text and results are enclosed in PDF format, which represents a barrier to the processes of sharing and reuse of previous studies and data within the paper. Aligned with this, the transference of copyrights to publishers by authors also prevents the reuse of this paper in processes like Text and Data Mining (TDM) for knowledge-generation, automated screening for errors and automated literature searches that renew scientific discovery [17].

The transference of copyrights also led to the continuity of value exploitation by publishers. Throughout the print paradigm, publishers have invested in the commodification of scientific knowledge and information with their commercialization as marketable and tangible objects. Electronic publishing led to the dissipation of the exchange value of journals or papers as saleable goods, since "the publisher does not have to upload or produce an additional copy each time a paper is accessed on the server as it can be duplicated *ad infinitum*, which in turn reduces the marginal cost of additional subscriptions to 0" [16], leaving no parameters for the definition of subscription prices. Publishers thus have been operating towards pure rentier capitalism, by monopolizing a public resource then charging exorbitant fees to use it [18], taking advantage of the rights granted by authors. It is the consolidation of a regime of scarcity in which access to knowledge and information is controlled and limited, mainly by price, technical barriers and/or legal (copyright) constraints [3].

Some other persistent flaws are related to the minimal or inexistent possibility for the authors to manage or at least actively contribute to the review, editing and publication processes, which are still by and large mediated by commercial publishers. Scientists face the complete alienation from the dissemination of their creative work by giving up control and decisions regarding this process to publishers. This mediation is also achieved with intense exploitation of other scientists' labor for free, performing tasks such as peer reviewing, editing and editorial duties. Based on five studies addressing the economics of the scholarly journal system, King and Tenopir [19] concluded that researchers' time dominates the overall cost of scholarly journal communication, accounting for 79.5 percent. Those costs are not covered by publishers, the main profiteers of the system. They are paid by public investment, that is, by society.

The aim here would be to examine whether objective, technical, practical changes in ways of producing and distributing knowledge are being – or can be – combined efficiently into a changing culture of openness along the entire process of production while leaving behind the economic gridlocks of for-profit centered economic models.

4. Analysis and Discussion of the Selected Cases

Throughout this section, we describe the selected two case studies on open publications, pointing out their main editorial practices and the possible relations of these practices with the issues raised in this paper.

The selection of these two cases was based on the following criteria: (1) the possibility of publishing different types of research-related documents and outputs, beyond the regular article format; (2) the opportunity for authors to publish or register the full research cycle on a single platform (particularly in the case of RIO Journal), given the model of charging authors for publication and the variety of output formats; (3) open peer review as the default review system; (4) authors are responsible for the selection of reviewers or are responsible for conducting the peer-review process. These features are strongly related to a recovery of authors' control over the publication process.

RIO Journal (RIO) was launched in September 2015 with an innovative approach, creating a venue for researchers to publish the full process of their research cycle, from research ideas, proposals and methods to theses and research articles. RIO is maintained by Pensoft Publishers[4] along with many other open access journals sharing a common platform. Although RIO is a commercial for-profit operation, its founding editor declares it is not a profiteering one [20].

Wellcome Open Research (WOR), launched in November 2016, is oriented to the publication of articles and other types of documents that have at least one author who has been, or still is, a recipient of a Wellcome Trust Foundation[5] grant. It is maintained by Wellcome and operates over F1000Research - another open access venue - publishing platform.

In Table 1, we summarize some of the journals' main characteristics regarding publication, access and submission policies, which we discuss later based on the topics addressed in the literature review.

The ARPHA platform name is an acronym for Authoring, Reviewing, Publishing, Hosting, and Archiving, which emphasize its capacity to grasp the full publication cycle. ARPHA allows papers to be authored right up to the platform, with no requirement for external software, such as word processors or PDF makers. One of the advantages of this feature is that the reviewing process becomes faster, since there's no need for the reviewers to download the manuscript before and after evaluation. Another advantage relates to the processes of automated output generation in formats such as HTML, PDF and XML, as soon as the manuscript is approved by post submission editorial check. The F1000Research platform used by WOR does not offer writing manuscript functionality, and they can be submitted as Word (DOC or DOCX) or rich text format (RTF) files only. LaTeX users can alternatively submit via Overleaf[6], using journals' specific template. Since in both cases reviewing process is disclosed after publication, both platforms support article versioning. Regarding diversity of output formats, RIO presents a larger spectrum of formats (31) in line with its proposal to contemplate full research cycle publication. WOR allows the publication of only 11 different article types, but works with the concept of "living" articles, which allows authors to update their articles with novel relevant information to the findings.

[4] Pensoft Publishers are a publisher of scientific literature based in Sofia, Bulgaria. http://pensoft.net/.

[5] A medical research charity funding research into human and animal health based in United Kingdom. https://wellcome.ac.uk/funding.

[6] https://www.overleaf.com/.

Both publications work with an article-based (or continuous) publishing model and articles are made available as soon as they are approved by editorial/technical check or peer review. Both adopt open and public peer review. In WOR the authors led the peer review process openly, inviting reviewers after the article is made public. RIO Journal provides three stages of peer review: (1) author-organized, pre-submission; (2) community-sourced, post-publication; and (3) journal-organized, post-publication (optional). RIO also provides a pre-submission stage of review that may be conducted as an invisible college where the authors may invite colleagues, reviewers, linguistic and copy editors prior to submission for checking the manuscript.

Table 1. List of journal characteristics

Characteristics	**RIO Journal**	**Wellcome Open Research**
ISSN	2367-7163	2398-502X
Platform	ARPHA*	F1000Research**
Document versioning	Yes	Yes
# of diverse outputs	31	11
Peer review	Open (post-publication)	Open (pre-submission and post-publication)
Submission charges	-	-
Article Processing Charges	€ 50 - 550 (for single publications) € 430 - 4,250 (for "research cycle packages")	US$ 135 - 900
License for articles	CC BY or CC 0	CC BY
License for data	Exclusively CC 0	CC 0
Copyright retention	Authors retain the copyright	Authors or their institution retain the copyright
Altmetrics	Yes	Yes

Notes:
(*) Pensoft Publishers, http://arphahub.com/about/platform.
(**) https://f1000research.com/.

Given these platforms' characteristics, it is possible to highlight the importance of authors' interaction with the process of publishing their production, from the beginning of submission to the final confirmation and/or complementation of peer reviewed versions. With authors becoming fully responsible for the authoring and the reviewing processes, the level of alienation in the publication system is strongly reduced, hence they achieve the status of real owners of their production. In addition, the open peer review process grants credit to reviewers' work. Each reviewer contribution has its own DOI number being possibly cited or retrieved for other purposes.

Both RIO and WOR require authors to share the articles' supporting research data, either as supplementary material, under Creative Commons Zero licensing, or by deposit in a proper data repository. WOR presents extensive and detailed data preparation guidelines, and both platforms suggest specific repositories for deposit and ways to present or link the data in the document submitted to the journal. Such requirements enhance the replicability of published studies as well as allowing other researchers to share diverse interpretations of the same phenomena [5] or to disclose new analysis and conclusions over the same data.

Regarding licensing and copyright policies, RIO allows authors to choose between Creative Commons Attribution (CC BY) or Creative Commons Public Domain Dedication (CC-Zero) licenses, while WOR works exclusively with CC BY license. The authors remain as the copyright holders to their articles in both platforms.

Regarding business models, both platforms apply Article Processing Charges. WOR charges are based on word counts – with costs ranging from 135 to 900 USD – and since the authors are funded by Wellcome, the charges are covered with these funds. WOR charges represented 90 percent of the charges applied by its hosting platform, F1000Research. RIO, besides word counts, also charges according to publication type, ranging from 50 to 550 EUR. RIO also works with a charging mode called "Research Cycle Packages", which allows authors to publish a certain number of outputs along a research project. The most expensive package, intended for large collaborative projects, covers up to 15 publications and costs 4,250 EUR. This model resembles PeerJ "lifetime" memberships that allow, for example, five peer-reviewed publications per year. We could not find mentions to charges waiver policies in practice in either platform.

In addition to adopting business models that drop subscription charges and the enclosure of distribution and copyrights in favor of the application of article processing charges for publication with open nonrestrictive licenses, it is possible to highlight, regarding the selected cases, an effort to make the editorial processes more open and led by the academic community. The combination of practices such as open peer review led by authors, the adoption of open and flexible formats, standards for knowledge and information distribution, all beside the application of charges and types of publication that can meet the different interests of the authors, may contribute to the expansion and consolidation of what can be understood as an open publication.

5. Final Remarks

These case studies are good examples of how scientific journals can transform their editorial processes to incorporate more open and innovative practices regarding the publication of research outputs. It is becoming common sense that open goes beyond access, in order to also affect formats, evaluation, sharing, assessment, etc. As such, the concept of open journal is under development to accomplish new standards related to openness.

We highlight the need for the development of studies or initiatives favoring increased control of the scholarly communication system in the hands of scientists. The communication process is part of scientists' work, therefore it could only be fully concretized if its objectives are defined by those who perform it. Besides the creation and maintenance of open venues for dissemination of scholarly outputs, it is also relevant to guide the production and the workforce (including editorial staff, reviewers,

developers, etc.) to these venues, in order to stimulate a culture of availability and openness which supports open infrastructures. In this regard, we must highlight a lack of studies questioning the low rate of adherence or the persistent constraints to a massive adherence of the scholarly community to open initiatives, such as by publishing and reviewing exclusively in/for open access journals.

References

[1] Albagli S. Open science in question. In: S. Albagli MLM, Abdo AH, editors. Open Science, open issues [Internet]. Rio de Janeiro, Brasil: IBICT/UNIRIO; 2015. p. 9–25. Available from: http://livroaberto.ibict.br/handle/1/1061

[2] David PA. The Historical Origins of "Open Science": An Essay on Patronage, Reputation and Common Agency Contracting in the Scientific Revolution. Capitalism and Society [Internet]. 2008;3(2). Available from: http://dx.doi.org/10.2202/1932-0213.1040

[3] Kuhlen R. Knowledge is the water of the mind: how to structure rights in the "immaterial commons." In: Bollier D, Helfrich S, editors. The wealth of commons: a world beyond market and state [Internet]. The Commons Strategy Group; 2012. Available from: http://wealthofthecommons.org/

[4] Meretz S. The structural communality of the commons. In: Bollier D, Helfrich S, editors. The wealth of commons: a world beyond market and state [Internet]. The Commons Strategy Group; 2012. Available from: http://wealthofthecommons.org/

[5] Cope B, Kalantzis M. Sign of epistemic disruption: Transformation in the knowledge system of the academic journal. First Monday [Internet]. 2009;14(4):1–26. Available from: http://firstmonday.org/ojs/index.php/fm/article/view/2309/2163

[6] van Noorden R. The true cost of science publishing. Nature [Internet]. 2013;495(7442):426–9. Available from: http://dx.doi.org/10.1038/495426a

[7] Tracz V, Lawrence R. Towards an open science publishing platform. F1000Research [Internet]. 2016;5(130):130. Available from: http://dx.doi.org/10.12688/f1000research.7968.1

[8] Brown C. Communication in the sciences. Annual Review of Information Science and Technology [Internet]. 2010;44(1):285–316. Available from: http://dx.doi.org/10.1002/aris.2010.1440440114

[9] Tenopir C, King DW. The growth of journals publishing. In: Cope B, Phillips A, editors. The Future of the Academic Journal [Internet]. 2nd ed. Oxford, England: Chandos Publishing; Elsevier; 2014. p. 105–23. Available from: http://dx.doi.org/10.1533/9781780634647.159

[10] Ford E. Defining and Characterizing Open Peer Review: A Review of the Literature. Journal of Scholarly Publishing [Internet]. 2013;44(4):311–26. Available from: http://dx.doi.org/10.3138/jsp.44-4-001

[11] van Rooyen S, Godlee F, Evans S, Black N, Smith R. Effect of open peer review on quality of reviews and on reviewers' recommendations: a randomised trial. British Medical Journal [Internet]. 1999 Jan 2;318(7175):23–7. Available from: http://dx.doi.org/10.1136/bmj.318.7175.23

[12] Priem J, Taraborelli D, Groth P, Neylon C. Altmetrics: a manifesto [Internet]. 2010. Available from: http://altmetrics.org/manifesto

[13] Neylon C, Wu S. Article-level metrics and the evolution of scientific impact. PLoS Biology [Internet]. 2009 Nov;7(11):e1000242. Available from: http://dx.doi.org/10.1371/journal.pbio.1000242

[14] Tananbaum G. Article-Level Metrics: A SPARC Primer [Internet]. Washington, DC: Scholarly Publishing and Academic Resources Coalition; 2013 p. 14. Available from: http://sparc.arl.org/resource/sparc-article-level-metrics-primer

[15] Houghton JW. Crisis and transition: the economics of scholarly communication. Learn Publ [Internet]. 2001;14(3):167–76. Available from: http://dx.doi.org/10.1087/095315101750240412

[16] Larivière V, Haustein S, Mongeon P. The Oligopoly of Academic Publishers in the Digital Era. PLoS One [Internet]. 2015 Jun 10;10(6):e0127502. Available from: http://dx.doi.org/10.1371/journal.pone.0127502

[17] Tennant JP, Waldner F, Jacques DC, Masuzzo P, Collister LB, Hartgerink CHJ. The academic, economic and societal impacts of Open Access: an evidence-based review. F1000Res [Internet]. 2016;5:632. Available from: http://dx.doi.org/10.12688/f1000research.8460.3

[18] Monbiot G. Academic publishers make Murdoch look like a socialist. The Guardian [Internet]. 2011 Aug; Available from: https://www.theguardian.com/commentisfree/2011/aug/29/academic-publishers-murdoch-socialist

[19] King DW, Tenopir C. Some economic aspects of the scholarly journal system. Annual Review of Information Science and Technology [Internet]. 2011;45(1):295–366. Available from: http://dx.doi.org/10.1002/aris.2011.1440450114
[20] Rabesandratana T. A new journal wants to publish your research ideas [Internet]. Science | AAAS. 2015 [cited 2017 Mar 23]. Available from: http://dx.doi.org/10.1126/science.aad1696