

# 11 The Past, Present and Future of Open Access

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Open access (OA) broadly refers to free and unrestricted access to research outputs, such as journal articles and books that are available to everyone with no access fees. Over the past few years, OA has become a broad term covering essentially any research material that can benefit fellow scientists and researchers around the globe. Thus, OA may refer to anything from lab protocols, lab notes, source codes, computational tools, experimental figures and videos, to large datasets, genome sequences and even seed banks.

Availability of OA research data paves the way for immense benefits to the global community, such as (1) OA journal articles are more read and more cited than those with restricted access. (2) Open lab notes and protocols help increase the reproducibility, a nightmare in several scientific fields (psychology for example). (3) Availability of open data has provided timely disease diagnosis and has helped to accelerate solutions, for example in timely discovery of a globally spreading agricultural pathogen, blast fungus. (4) Freely available figures and videos are excellent material for lectures, making the latest knowledge readily available for students. (5) Making research data open increases the chances of getting research grants, as OA is increasingly required by funders around the world. Peer-reviewed scientific articles give researchers and scientists immediate access to the latest resources and its instant, valuable utilization. Therefore, from here onwards, I will focus only on OA journal articles.

Historically, the publishing of scientific manuscripts, especially ones with the detailed color figures, has been expensive. The general procedure of publishing worked like this: If some researchers want their article distributed broadly, they send it to one of the scientific journals. Then the journal would manage the review process, communications with reviewers, handle revisions and eventually a draft would be accepted. This draft is referred to as “peer-reviewed” draft. Then the journal would handle the typesetting, printing and the distribution of the scientific work. This procedure became an approved way of distributing reliable scientific work and science progressed very well.

But, with technological advancements, things changed. In scientific publishing, two things have really transformed, (1) digitization: now everything can be done electronically instead of printing, and (2) pricing: the publishers started increasing the

price of subscriptions to many of their journals. And so, as the physical barriers were being reduced (for instance, no need to go to library to read an article), the financial barriers were growing higher. Research has shown that journal prices have increased by almost two hundred and fifty percent over the past thirty years. As an example, the fifteen most researched academic disciplines have an average price of more than a thousand dollars for one journal (for one subscription for one year). This is an average and it can be as high as forty thousand dollars for some journals [1]. These two things have supported the need for data availability, especially for people working in low income countries where not enough funds are available for libraries to buy these expensive subscriptions. The irony in OA is exemplified by a recent article that talks about the global benefits of open science in low income countries, especially in Africa. But, since it is published in a pay-walled journal, this article that advocates OA is not OA itself [2].

The current publishing system, as described above, is under massive criticism. The journals are not producing the published scientific material. They don't employ the people who write the papers; they don't even employ the people who review the papers. Scientists are paid by the government from tax-payers' money to do research and distribute that knowledge. So, if years of work by a group of government-funded scientists is compressed into a paper and that paper is not made available to the public, it is against the basic concept of scientific progress.

The future, in my opinion, is that scientists should change their practices. Publishers depend on scientists' work and not the other way around. Scientists, despite being great explorers in terms of knowledge, have been very conservative in terms of changing their practices. This has allowed journals to not respond to the community pressure towards openness. Scientists should move ahead of their double standards. They cannot support OA and want to publish their paper in restricted-access high impact factor journal at the same time. I urge all readers to read and, if they agree, to sign the San Francisco Declaration on Research Assessment (DORA: [www.sfdora.org/sign/](http://www.sfdora.org/sign/)). It would be an excellent start towards breaking the monopoly and bias of the impact factor conundrum. A vast community of scientists around the world advocating OA on powerful social media platforms, such as Twitter, is a hope for change in the near future. OA preprint journals and the increasing number of research articles available on such platforms is another positive sign. I hope that the coming generation of scientists will adapt these changes and assure global availability of open research data.

## References

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