

The changing face of scholarly journals

Madhu¹ has given a detailed account of a video journal and highlighted the need for developing a similar medium in India. When the *Journal of Visualized Experiments (JoVE)* was launched about a decade ago, there was some skepticism about it. Today, the video journal is not only an accepted format, but many longstanding as well as new journals include videos as supplementary content to the articles. However, the video journal is only one of the many formats of scholarly journals that have emerged since the turn of the 21st century.

The year 2015 was the momentous 350th year in the history of scholarly journals. In 1665, the first two scholarly journals, *Journal de Scavans* and *Philosophical Transactions* came into being. Since then, the scholarly journals have been playing a pivotal role in advancing research and scholarship.

In the early days, journals were published by learned societies. Through journals, the societies endeavoured to disseminate scholarly information to distant members who could not participate in the society meetings. Over the years, publishing journals has emerged as a lucrative business proposition with, as is known, major commercial publishers making huge profits.

The corporatization of journals has its merits, a major one being that journals are published following efficient editorial and scrupulous production processes. However, the skyrocketing journal prices in the 1980s triggered a 'serials crisis' that made them inaccessible to many institutions. Libraries attempted to offset this problem by forming library networks that shared resources through document supply and inter-library loan services.

When CD-ROMs grew popular in the 1990s, publishers explored this new medium for publishing journals. Interestingly, at that point in time, seven competing publishers collaborated to bring out their journals on CD-ROMs. Named as ADONIS, national libraries and documentation centres were the major customers of their journals on CD-ROMs. After purchasing the CD-ROMs, the libraries had to pay an additional fee for printing articles from them². Perhaps that was the first time the publishers got an opportunity to earn twice from the

same resource – once by selling the CD-ROMs and then charging for every article printed from them.

However, ADONIS did not last long because hovering around the corner was the internet. Since the internet could do whatever CD-ROMs did, and in a far more effective manner, it was only natural that publishers swiftly moved their e-journals to the internet. The advantages of the internet-based on-line journals were aplenty, except for the cost. While cost of on-line journals should have come down, it actually escalated at an even more exponential pace. With individual libraries not being able to afford the high costs, publishers attracted groups of institutions (consortia) with journal bundle offers – what came to be known as 'big deals' – enabling institutions to have access to a large number of journals.

Thus in the last two decades, the journal as a medium has rapidly changed from print to on-line and individual library subscriptions have largely evolved to collective consortia licensing. With on-line journals getting more expensive and thereby inaccessible, researchers began to examine the possibilities of alternative journal publishing models. The answer to this growing problem of cost-driven inaccessibility of commercial journals is the open access (OA) journals.

In the early years, spearheading this new breed of OA journals was the now hugely popular *PLoS ONE*. Presently, the Directory of Open Access Journals (DOAJ) lists about 10,000 OA journals. The Gold OA journals charge the authors an article processing fee (APC), but provide free access to the readers; *PLoS ONE* is an example of such a journal. Then there are the Platinum OA journals. Such journals are typically subsidized by institutions, voluntary works, grants, etc. There are no payments involved at either end – authors and readers. Journals published by the CSIR-National Institute of Science Communication and Information Resources (NISCAIR) are example of this model.

Hybrid journals have some articles in open access and the others are behind the paywall. This model has been under criticism because the publishers 'double dip' into the institutional revenues. Au-

thors have to pay for publishing the articles and their libraries have to pay for accessing these journals because all the articles are not open access.

Delayed OA journals are the regular subscription journals that are made available in open access after an embargo period. The *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* that makes available the journal issues in open access after an embargo period of six months is an example of such a journal.

OA publishing also saw the emergence of mega journals. As against print journals that have constraints on the number of articles that can be published in a journal volume, there is no limit to the number of articles that can be published in on-line journals. For example, *Scientific Reports* published over 20,000 articles in 2016.

However, one of the unintended consequences of OA journals has been the mushrooming of the APC-based predatory OA journals.

The last few years have also seen the emergence of the data journal. Examples of data journals are *Geoscience Data Journal*³ and *Scientific Data*⁴. These are peer-reviewed journals that aim to promote wider data-sharing and reuse datasets by publishing data articles.

If the data journal attempted to bring research data into mainstream as a recognized research output, the field of medicine experimented with the Wiki journal. For example, the *Wiki Journal of Medicine* is a peer-reviewed scientific journal in medicine and biomedicine⁵. The Wiki journal operates like any regular journal but has a unique feature, wherein appropriate material published in the journal is integrated into Wikipedia for added reach and exposure.

The year 2015 saw the launch of the overlay journal *Discrete Analysis*⁶. An overlay journal is one that does not publish its own articles, but links the articles already deposited in repositories such as Arxiv. Identified articles in the repository are subjected to peer review and following the success of the peer review, the articles in the repository are linked in the overlay journal. In summary, the journal overlays on the articles already deposited in the repositories⁷.

With the possibility of self-publishing, it is even being questioned if there is a need for journals as we know them⁸. Platforms such as F1000 (Faculty to 1000) are attempting to redefine scholarly communication by publishing first and reviewing later, thus contributing to the larger framework of open science⁹.

While scholarly research sans journals might appear to be far-fetched, there surely is a churning currently happening in the scholarly journal publishing space. The new types of journals that are evolving are by-products of the churning. It is possible that one of these, or an

yet-to-be-born journal format might put to rest the chaos and trepidations that are increasingly engulfing the journal publishing world. Perhaps they may all just co-exist.

1. Madhu, K. P., *Curr. Sci.*, 2017, **113**(4), 544–545.
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G. MAHESH

CSIR-National Institute of Science
Communication and Information
Resources,
14, Satsang Vihar Marg,
New Delhi 110 067, India
e-mail: gmahesh@niscair.res.in

Evaluation of research output

Evaluation of research output is essential for ranking institutions, and for assessing individual researchers. It is also essential to know whether the pattern of our nation's funding is on the right path. Metrics like the number of publications, and impact factor (IF) of journals where the publications appear, are commonly used as benchmarks. We consider these as unsatisfactory.

The use of IF of a journal implies that every paper published in it makes the same impact. Its use for assessing a particular research output has been seriously questioned by experts across the world, and is hardly ever defended in discussions. Unfortunately, it is still being used routinely by various institutes in India as a 'quantitative' measure for assessment of individual researchers. A more justifiable metric is the citations a paper receives; this metric is used by experts across the world along with its derivatives like the *h*-index.

There are, however, questions with respect to the *h*-index. As was noted by the present author¹, '*h*-index is just a count of every paper that cites us, but on a binary 1/0 scale. It does not distinguish between our paper being cited as one number in a group of numbers, and our paper being used as a template with extensive citation over a few sentences each at a few places in the paper. One number in a group of numbers implies a supportive "me-too" paper, and our *h*-index will improve if we do that kind of research'. The present author had tried to

distinguish supportive 'me-too' publications from those that were used as templates by others for subsequent research. Clearly, the latter kind of output is what the national funding desires.

Stephan *et al.*² have recently tried to classify papers as "non-novel", "moderately novel" and "highly novel" based on the time-profile of the citations they receive. This is a metric that can be easily made available, and would be better than just presenting the number of citations. We prefer, however, to consider and extend the idea of utilizing the manner in which the citation is done.

As research in the universities is encouraged with increasing involvement of Ph D students, we have to realize that students must meet statutory requirements for submitting their thesis in a finite time-frame. This includes that at least one paper must be accepted for publication in an established journal. Doing research to confirm the conclusions of an earlier paper provides an assured and legitimate route³. The publication that results from such 'supportive' or 'confirmatory' research would be cited if the conclusions of the earlier paper were 'highly novel' or, at least, 'moderately novel'. It could be termed as 'non-novel', and would be cited along with other papers confirming the conclusions of the same earlier paper. Such legitimate but 'non-novel' research would thus be cited as one in a bunch of numbers. Such 'supportive' or 'confirmatory' research is essential for Ph D students; it

is identified by the way in which it is cited. It does not have the value of 'incremental' or 'path-breaking' research, which results in additions to knowledge. Can we identify these from the way they are cited?

When any incremental research is cited, the paper briefly describes the increment in knowledge resulting from that research. Such research is therefore cited following a sentence, or a longish phrase, that describes the increment in knowledge. When a paper is cited in isolation (and not as one of a bunch of numbers), one can be assured that the research described in that paper is 'incremental'. Path-breaking research cannot be described in a phrase or a sentence; it would require a few sentences and would probably need to be explained and cited at a few different places in any paper that is a follow-up on this path-breaking research. As a corollary, a 'supportive' or 'confirmatory' research paper would be citing the 'earlier paper' frequently and exhaustively.

It is thus proposed that research output can be evaluated by the way it is cited. We have argued that 'supportive' or 'confirmatory' research output would be cited as one in a bunch of numbers; 'incremental research' would be cited following a sentence, or a longish phrase, that describes the increment in knowledge; and 'path-breaking' research would be cited frequently and exhaustively. It is proposed that details on 'all the extended citations that their papers receive' should