

Technological innovations in scientific journals: the shape of things to come

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One of the things that we introduced since I took over as the editor of *IJDVL* was an eponymous scientific session in the DERMACON, the national conference of IADVL. It is conceived as a scientific session with discussions and presentations encompassing journalology, not only limited to the journal itself. This year, we had a panel discussion on the future of dermatology journals in India. The eminent panelists included the three immediate past editors of *IJDVL* and the current editor of the Indian Journal of Dermatology (*IJD*). An aspect that was stressed upon during the freewheeling discussion was the need to embrace emerging technologies in journal publishing, even if it meant getting out of the traditional format of journals, whenever needed. It was suggested that the predominantly visual aspect of our discipline can be made use of in bringing science alive, something that would never be possible within the confines of the traditional journals.

This set me thinking on the problematic of harnessing technology in journal publishing. There is no doubt about the need to utilize technological advances in our journals. However, technology per se is too vast for uncritical adoption. Some technologies may be beyond our reach for financial and logistic reasons and we have to be careful about the deleterious effects of some of them.

TECHNOLOGICAL INNOVATIONS

Scholarly communication is in a state of rapid change. It is in a liminal space of what was and what is there to be, a space of waiting and not knowing what exactly is in store. As a commentator has put it: 'We are leaving our traditional, print-based, subscription-based past behind and moving toward a digital future of openness, transparency, access and reuse.'¹

One movement that is a corollary to open access is to facilitate technology for having an open infrastructure for metadata. One example is DataCite, which is a global not-for-profit membership

organization that provides open infrastructure to identify, find, cite, connect and use research. It is quite similar to other open infrastructure research organizations like are CrossRef, ORCID etc. Where it differs from the latter is in its focus beyond published articles to include all the underlying information that is available, as well as a mechanism to easily link to the experimental design, the research data and the analytical tools that were used to generate the reported outcomes.²

Microsoft Word has developed new accessibility tools that can generate alternative texts (alt-text) for images and photographs. So, one need not only see images. One who cannot see them can hear them now, for example, someone using a screen reader or some such screen-to-text applications.

Another area where machine learning and artificial intelligence (AI) are being sought to be employed is peer review, as the publishing world grapples with an increasing burden of submissions and a not-so-growing pool of peer reviewers.³ Some notable examples are: Statcheck, Penelope.ai, UNSILO, StatReviewer, etc. Other than methodological controversies on reliability, there are several ethical concerns like algorithmic bias, latent motivations, inscrutable evidence leading to opacity, misguided evidence leading to bias and transformative effects leading to challenges for autonomy.⁴

Among the other areas of AI applications in scholarly communications as related to research artefacts that are going to be important in future are: Advances in entity recognition systems and semantic search and publishing.⁵

An important question to debate is: How is the world of scholarly publishing going to be affected by Metaverse, the new tool being developed by Mark Zuckerberg? Predicting where a new tool will take us is a fool's errand. Some consider the Metaverse as a new medium, comparable in

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some respects to audio or video or the networked worlds of Twitter or Pinterest.⁶ Every medium has its own properties and the point is to explore them. The moot point is: Can the Metaverse improve the number and quality of submissions to our journals, or is it going to be a purely commercial enterprise where social media plays a disruptive role for journals and creates a future hyperreality more problematic than the present reality?

Preprint servers, to which scholars and scientists can post preliminary reports of their research for public comment before submitting them for formal publication, are not intended to fill the same function as journals. While they are open to the public, submissions to preprint servers are presented not as established science for public consumption, but rather as tentative findings for open discussion, mainly among other experts in the field.⁷

A growing problem in the scholarly and scientific community is a population of opportunists who try to use preprint servers as a place to post pseudo-science and misleading public health information, or commercially exploitable data in case of the pharmaceutical or equipment industry, all under the garb of scholarly “publishing.” They submit articles to preprint servers in the hope of publicizing them, counting on both an uninformed public and an equally gullible press to treat the reports as if these were vetted and peer-reviewed science published in a medium that is willing to accept responsibility for them. Just as predatory publishers have recognized in the ‘article processing charge’ (APC) funding model an opportunity to lie and make money, dishonest authors and business interests have recognized in the preprint-dissemination model an opportunity to lie and achieve political or business goals (to the extent of causing large tweaks in the global share prices) or professional advancement.⁷

The problem with these new dissemination technologies that have sprouted during this pandemic era—social media dissemination exemplified by Meta and pre-print servers—are that these pander to the new age authors who would rather publish the day before finishing their work and care second to none about careful curating of data, that is the hallmark of old-school peer-reviewed journals, and give a short shrift to the accuracy of scientific truth.

All of this may result in a perpetuating infodemic (“an overabundance of information—some accurate and some not—occurring during an epidemic”⁸) that threatens to continue beyond the COVID-19. An unregulated outpouring of scientific information would combine an inordinately high volume of information (leading to problems relating to locating the information, storage capacity, ensuring quality, visibility and validity) and rapid output (making it hard to assess its value, manage the gatekeeping process, apply results, track its history, and leading to a waste of effort).⁸

One can indeed argue that the voices talking more and more volubly in favour of these new fast dissemination technologies

in scientific communication, and consequently undermining traditional peer-review, despite the countless instances of being wrong footed during the ongoing pandemic, all attempt to gain their credence from philosophical discourses undermining the authority of “facts” and “objective truth.” The propositions that “reality” is whatever we all agree it is, that there is no such thing as historical fact, that “objectivity” is merely a pretence used by the powerful to defend their interests, and that the putative search for “truth” is really just a tool of oppression, have been significant currents of postmodern academic discourse for several decades. (Of course, you have Foucault asserting that “reason is the ultimate language of madness”; earlier than that, there’s Nietzsche: “The real truth about ‘objective truth’ is that objective truth is a myth.”)⁷

Another new dissemination model is Octopus, which represents new platforms where researchers would publish all steps of their research cycle and receive feedback from other registered users on a regular basis.

But, what with all these proliferations of new models, the “death of a journal” seems to be a myth—a recent Google Scholar search came up with only 23 documents; just three articles bear that phrase in their titles.⁹

USER EXPERIENCE DESIGN/INFORMATION EXPERIENCE DESIGN

In the design of digital products, increasingly sophisticated, user-centered techniques applied to scholarly communications platforms and services is being observed, by leveraging the toolkit of UX (user experience) methods (fig.1).¹⁰ As of now, these methods are employed as user-centric window dressing and are often limited to concerns with web interface design. The way these technologies are used reflect the publishing industry’s preference for product innovations that focus on high-value transactions with dominant groups. There have been some recent arguments to elevate the thinking beyond the reductionist confines of user methods to the more holistic and inclusive approach of information experience

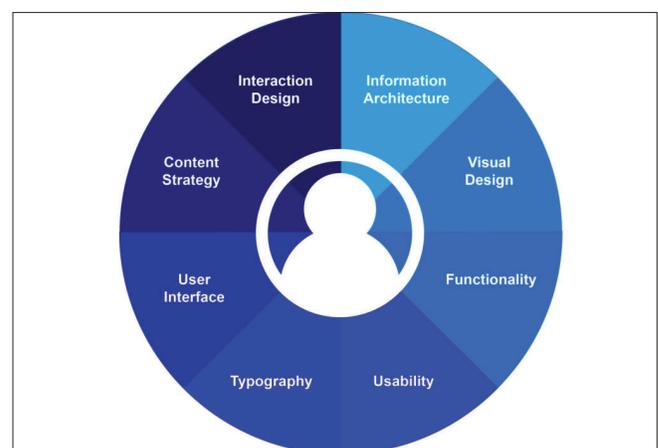


Fig. 1: UX Design Elements (by WriterJS, CC BY-SA 4.0, via Wikimedia Commons) [Courtesy: Carpenter 2022]

design.¹¹ However, only future will tell whether these will be mere value additions in the face of onslaughts to barriered publications in the form of open access, which seems an inexorable movement at the moment. It is a moot point if we remember that the use of UX in scholarly communications largely came into focus when resistance movements like ‘Sci-Hub’ came into being to remove stumbling blocks on the information highway.

FLIP SIDE OF EMERGING TECHNOLOGIES

As AI makes its foray into mainstream publishing, the ugly head of data mining rears. Data mining has become so widely prevalent that most of us have become resigned to the fact that privacy has long ago been sacrificed at the altar of a data-driven world.¹²

FIGHTING TECHNOLOGY WITH TECHNOLOGY

in a new twist to the age-old problem of academic fraud, modern plagiarists are making use of software and perhaps even emerging AI technologies to draft articles. A computer system, named Problematic Paper Screener, has been devised to screen out papers with ‘tortured phrases’—the weird computer-generated phrases, with which plagiarists seek to outwit plagiarism checker software. This might be especially relevant to Indian journals, as apparently the country of affiliation of most authors employing such tactics are from India.¹³

A related area where AI software is already playing a critical role is in identification of image duplication. This promises to be a standard editorial equipment in future, particularly in our discipline, where visual evidence is of paramount importance. But as someone has pointed out the danger of trying to fight technology with technology: “We are entering an arms race with AI-based tech that can lead to deepfakes.”¹⁴

HOW TO EMPLOY TECHNOLOGY IN A DIGITAL ENVIRONMENT

A core element of the methodology of employing technology in an environment that is getting rapidly more digital is focusing on the needs of users and ideally interacting with them in this process. But how often, when designing our offerings, are we putting the users in the centre of those decisions? Mostly, it is a top-down approach where, as providers, we imagine what the user should want, and not necessarily what is actually wanted by them.¹⁰

Thus, the guiding principle for the future should not be an uncritical acceptance of the movement toward technology for technology’s sake, and to embrace the technological developments in journal publishing in an organic fashion, in sync with the demands posed by the journal’s audience.

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