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Editorial article

New forms of publication. What is the place of printed journals?☆

Nuevas formas de publicación. ¿Dónde van las revistas en papel?

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Since the invention of the printing press by Johannes Gutenberg around 1440, we have not been party to such an astounding revolution in transmitting scientific knowledge as the one to which we are now bearing witness through electronic media. Printed journals, of such indisputable repute and such a long tradition,[1,2] are feeling threatened by electronic journals, many of them open-access, and by a wide range of Internet-related technological advances, which have done nothing more and nothing less than innovate and transform, profoundly and indelibly, the field of scientific publications.[3–5]

Biomedical articles remain key to conveying the results of a scientific study, and their status as a quality seal in the research process also has not changed. Even more constant is the objective of journals, centred on circulating findings and new knowledge as widely, as efficiently and in as timely a manner as possible. Printed journals have been keepers of these purposes, and have been more than fulfilling them for centuries. Indeed, some of the most ambitious objectives that printed journals established in the early days of their emergence in the 18th and 19th centuries, to replace epistolary correspondence between colleagues, could not be realised until the dawn of electronic publication. These objectives were availability of the full text for any clinic in any part of the world at any time, ease of searching for and retrieving studies, interconnection of articles and references, and full and permanent accessibility, in real time and at a reduced cost (the subscription cost).

The concept of electronic publication basically refers to the current practice of publishing online through the Internet. However, it is also used to report the development of new forms of production, distribution and user interaction with respect to texts produced by computers and new generations of computers, information systems, databases, digital platforms and other forms of interactive media. The compendium of possibilities and uses seems unlimited.[6–9] Among many other opportunities, at the individual level, new technologies offer high-quality continuing education, immediate accessibility of new knowledge and practical application without delay, participation at the forefront of international forums of debate, and, ultimately, a way to practice medicine based on integration and synthesis of the best and most solid evidence for each individual health issue.

Electronic publications have not only burst onto the scene in terms of publication related to primary sources (e.g. articles, books and monographs) and secondary sources (e.g. bibliographical indexes) of information, but have also spurred the development of virtual digital libraries. Various virtual health science libraries established in Spain's autonomous communities, for example in the field of primary care,[10] offer all their professionals remote access to centralised and homogeneous services and resources. The increase in the price of information resources, the enormous and rapid advance in information and communication technologies and Internet access to digital content are some of the reasons that have led ministries of health to invest in establishing regional virtual libraries. These libraries reduce spending and provide all healthcare professionals with access to the same resources regardless of their place of work, thereby managing to democratise access to information and foster equity.

However, biomedical journals continue to play a unique role in quality control in the circulation of information through published works, as well as in the maintenance of credit and credibility standards for members of the scientific community and the general public. Given the advantages of speed, efficiency, instant links to hypertext and hypermedia, interactivity and unlimited accessibility, which, ultimately, result in immediate circulation of research results, a growing number of scientific journals, while maintaining the peer-review system,[11] have established electronic versions. These coexist perfectly with printed journals under a hybrid system. Other journals, still a minority among the tens of thousands that comprise the biomedical literature, have adopted the electronic environment as an exclusive form of publication. However, it should be noted that this format is not accessible to users without suitable means, which are becoming more and more demanding and sophisticated (powerful laptop computers, smartphones and tablets with multitasking features and unlimited Internet access). Thus, a fair number of professionals, probably from remote settings or without sufficient means, may not have access to information from electronic resources, or may have trouble downloading videos, images or large files. Also, electronic articles and journals may be considered to be ephemeral and impermanent web documents, as their web addresses (URLs, i.e. uniform resource locators) may change or they may disappear forever from cyberspace.

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In addition, it is necessary to bear in mind the indisputable usefulness of reading printed materials, whether one reads a journal published in this medium or downloads and prints the electronic version of a particular document for study and analysis. It may seem curious, but the final method for unequivocally correcting galley proofs or printer's proofs is on a printed version and, in addition, by reading the text aloud, at the same time that it is collated with the original manuscript, if possible between 2 people to ensure double confirmation.

The relationship between accessibility and spread of information, and therefore impact and citation, has been clearly established.[12–15] The emergence of open-access (OA) electronic journals has also brought about another way of circulating information in a virtual space. This type of publication is arising in response to initiatives and statements signed by different organisations since 2002 supporting the Internet availability of scientific information as imperative, in terms of open access for all of humanity without any type of restriction.[16–18] In this regard, the open-access policy of the United States.

National Institutes of Health is noteworthy. Under this policy, an article resulting from any research funded by this organisation must be placed in the PubMed Central database immediately after being accepted for publication.[19] Also, placing publications in PubMed Central is an essential requirement for researchers to continue receiving public funds.[20] From the authors' point of view, in addition to meeting these requirements if this is the case, free open-access publishing provides several advantages such as high visibility and wide circulation of the study, practically immediate availability following acceptance, flexibility in terms of types of articles and documents accepted for publication, an unlimited number of pages for the length of the text (as well as tables and figures), ability to follow the repercussions of the article by tracking the number of times the document is visited and downloaded, and lastly and perhaps most importantly, the fact that copyright need not be granted to a third party but rather remains the permanent property of the article's authors. Copyright retention makes it possible to include pre-print and post-print versions of a publication on websites blogs, repositories and various files, which, in addition, facilitates circulation and possibilities of citation. It is also necessary to mention that publishing groups for OA journals (BioMed Central, Public Library of Science, Hindawi Publishing Corporation, MedScape, etc.) may use different methods for data on visits and downloads, or simply use none. This may compromise how the repercussions of a study are appreciated or comparison of results.

Naturally, the OA form of publishing should continue to involve a rigorous peer-review process although, in these cases, many journals opt for an open review system, in which authors and reviewers are aware of their respective identities.[11]

Publishing studies in OA journals involves having to defray publishing costs (when the manuscript is accepted), just as choosing to "release" or "open" an article in a journal that is not OA but includes this possibility in its publishing system (limited open access journals) involves paying an accessibility fee. The authors themselves or their centres tend to defray these costs through research funds, but the reality of "paying to publish" is still met with reticence and has many detractors, surely owing to the difficulty of funding under current circumstances of budget cuts. Some of the challenges of publishing in OA journals include involving scientific associations, healthcare institutions and governmental organisations in this new approach, encouraging the development of sustainable strategies for publication or a change in academic culture such that research studies are assessed more for content than for the bibliometric indicators of the journal where they have been published.[21,22]

Also, the advantages of OA articles versus restricted-access articles with respect to number of citations are obvious. For example, in a cohort of 1462 original research articles published in the *Proceedings of the National Academy of Sciences* between July and December 2004, OA articles had a likelihood of being cited 2.9 times greater than conventional articles at 10–16 months after publication.[23] The increase in citations related to the immediate availability of a study has been mentioned as one of the incentives for researchers when choosing an open-access journal.[24]

Indeed, the revolution of electronic publishing in an OA form makes it possible to manage multiple publishing-related matters, such as communication, distribution, storage, and reproduction, without needing any type of intermediary. Fundamental characteristics in terms of acquisition, circulation and accessibility of scientific knowledge also arise from this. In developing countries, the OA journal movement has represented an unprecedented opportunity to offer egalitarian access to scientific knowledge and banish the isolation and impoverishment of professionals and institutions, provided that there is Internet access. The OA environment increases the visibility of scientific output by making full texts available on personal websites and repositories of centres and hospitals. This greatly increases the circulation and repercussions of scientific articles and research in general.

However, the current landscape of OA journals is very heterogeneous. The appearance of journals created by small groups, isolated or not protected by the umbrella of well consolidated and prestigious publishers and national or international medical associations, could conceivably be largely motivated by the potential for business arising from the high costs imposed on authors to publish their studies in these journals.[25] Under these circumstances it would be possible for economic benefit to have primacy over the quality and rigour of the scientific content of the articles. By extension, the quality of the peer-review process could be called into question. It is doubtful that this type of open-access publication could pass through the filters required by technical committees in the process of screening journals for indexing in databases such as PubMed and ISI Web of Knowledge.

Lastly, many traditional journals, available in printed and electronic format, access to which is restricted by individual subscription or through university libraries and health centres, allow authors to "release" their article when their manuscript has been accepted for publication. In this case, an article would be OA at the authors' will, provided that the authors are in a position to defray the payment involved in making their document openly available.

With respect to the future of OA journals, their current proliferation accommodates those who prioritise an interest in publishing quickly and at all costs to further or consolidate their careers (and who pay to do so). This same future has a place for OA journals of undisputable prestige that are serious and rigorous, with quality and ethical requirements that are identical to those of traditional-format journals. With these proposals, the benefits and drawbacks of the new forms of electronic publication versus printed journals, once again, will continue to depend on each individual. For the moment, quite a few years having passed, the debate is useful, and affords a glimpse of a state of reasonable coexistence between the two formats, at least in the near future.

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