

Open Access E-journals: Past, Present, and Future

Las revistas electrónicas en acceso abierto: pasado, presente y futuro

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Resumen

Comienza este artículo trazando el origen y desarrollo de las revistas electrónicas en acceso abierto, cómo surgieron, se fueron definiendo y a qué necesidades respondieron. Se explica cómo se produjo la transición del mundo impreso al electrónico en el diseño y concepción de las revistas; y se señala exactamente cuando se produjo el despegue de este tipo de publicaciones. Para describir la situación actual de las revistas se recurre a los datos proporcionados por el directorio de publicaciones electrónicas Ulrichs y al directorio de revistas en acceso abierto DOAJ. Se calcula el número de revistas circulantes y se ofrece un retrato del perfil editorial de las revistas a día de hoy. Se descubre la existencia de un patrón editorial distinto (lengua, país de edición, tipo de editorial) en las revistas electrónicas de acceso abierto, frente a las revistas que se editan en el mundo y, sobre todo, respecto a aquellas que gozan de mayor prestigio como son las indizadas en los Journal Citation Reports. En las revistas en acceso abierto existe un mayor protagonismo de los países y lenguas no anglosajones; asimismo se detecta una extraordinaria atomización de las editoriales que difieren de aquellas multinacionales que monopolizan el mercado de la comunicación científica. Se concluye reflexionando sobre los retos y amenazas que se ciernen sobre este tipo de publicaciones: sobre cómo se irá diluyendo el mundo impreso, cómo se financiarán las revistas, cómo evitar la extensión del fraude con las revistas pirata y, se anuncia la emergencia de un nuevo modelo de comunicación científica.

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Abstract

This article begins by tracing the origin and development of electronic journals in open access, how they emerged, how they were defined, and what needs to be answered. It explains how the transition from the printed world to the electronic came to be in the design and concept of journals; and notes exactly when the launch of these types of publications occurred. To describe the real situation of the journals it uses data provided by the directory of electronic publications Ulrichs and the directory of journals in open access DOAJ. It calculates the number of journals circulating and offers an editorial profile portrait of the current journals. It discovers the existence of a distinct editorial pattern (language, country of origin, type of editorial) in the open access electronic journals, versus the journals published worldwide and especially in respect to those with greater prestige that are indexed in the Journal Citation Reports. In the open access journals there exists a greater role for non-Anglo countries and languages. Also, it detects an extraordinary fragmentation of the editorials that differ from the multinationals that monopolize the market of scientific communication. It concludes reflecting on the challenges and threats that hover over these types of publications: about how the printed world will fade, how these journals will be financed, how to prevent fraud expansion of pirated journals, and declares the emergence of a new model of scientific communication.

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1. Introduction

Going to a birthday party is always a great pleasure, but to celebrate 20 years since the first Spanish open access electronic journal is an honor for me and a worthy event for a big celebration. And I say this is an honor because I've dedicated approximately the same amount of time to studying journals as ways of scientific communication. I began to investigate Spanish scientific journals from the 1990's and just defended my doctoral thesis in 1996, one year after the creation of RELIEVE. To be invited to this party is like going to my own party. But it is also an event for various reasons. First of all because it is good to know that the lifespan of journals usually is more than short. They are born easily (simply put with much will and enthusiasm), they survive with difficulty and die promptly (the market of science is very competitive). Still, it is more meritable to be a Spanish journal: in our country the obstacles for this selfless profession are immeasurable (the shortage of resources and finances), but as bad as these shortages are, the worst thing is that incentives and awards for the workers of scientific editions have never existed. Therefore, they live in an environment so adverse, it's almost miraculous, and certainly is due to the existence of people who make strenuous efforts and carry out this unrewarding task in order to maintain a method of free scientific publishing (Aliaga & Suárez 2002, 2007, Aliaga 2014)

But it is also the business that is brave, creating a journal in a new fashion (electronic) and with "open access" that is free for readers. In the 1990's, the electronic environment was not yet a common method of publication and

reading. Going against the prevailing norm in academics which gave everything printed a halo of credibility that negated the electronic, especially in the areas of social science and humanities. It is obvious that 500 years of "homo-typographicus" left a footprint and cannot be forgotten quickly. The free publication in turn generated distrust in the product; there was no basis for this suspicion, but the academics, accustomed to publishing in journals that could only be accessed by personal or institutional subscription, could have doubts about the editorial credit of these companies whose financial foundations were so uncertain.

Ultimately, the only thing possible to be praised is the extraordinary vision displayed by the promoters of RELIEVE, and of the risk they assumed. They were at the global forefront of scientific publication. Remember that the first electronic journals, in the strict sense, began in 1990: *Postmodern Culture*, *Bryn Mawr Classical Review*, *Psycoloquy*, *the Electronic Journal of Communication*, *the Journal of the International Academy of Hospitality Research*, *the Public Access Computer Systems Review*, *EJournal*. And if we focus in the educational area which pertains to RELIEVE, one of the first electronic journals with open access was *Educational Policy Analysis Archives*, created in 1993 under the patriarchy of Arizona State University. For once, and although Spain didn't offer the best culture for these initiatives to flourish, the founders of RELIEVE pioneered this new publishing forum and created a journal with both an electronic format and free access (Figure 1).

Figure 1. The RELIEVE journal in 1995



2. The Past: The Birth of Electronic Journals and Open Access

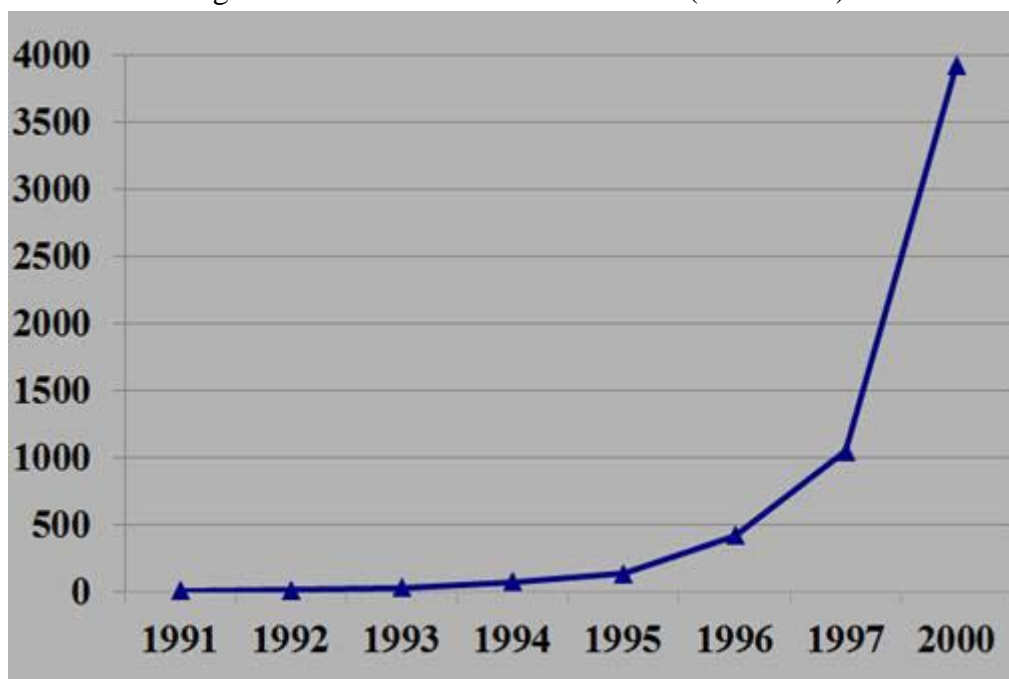
Yet, in 1995 the concept of electronic journals was still somewhat ambiguous (Lancaster 1995), since it referred to any journal that adopted the electronic format embracing both the accessibility of online sites as well as distributing in CD-ROM format. Subsequently, the concept outlined had been restricted to those journals in electronic format accessible through the network. It is true that, from the beginning, a distinction could be made between the journals that were created ad hoc through online access and those that were online versions of printed journals. The “pure” electronic journals were journals of a new kind, designed and fully created by, for and in the electronic environment, more innovative in its content, formal presentation, management structures, and productive systems. They were fleeting in time (many created and many failed early). Few were able to last, however one of which that did was RELIEVE. In return, the printed journals with online versions, much more conservative in their design and presentation, were the most stable and whose solvency was backed by a long career. These journals had won social recognition granted by the scientific

community, and were protected by the public scientific evaluation system.

The first experiments with “purely” electronic journals began in the 1980’s. They addressed the prototypes that had not survived the incubation period because of the insuperable technological barriers that still existed (telecommunication networks: scarce, very basic and slow, poor visual quality...) and the most important, which no longer exists, a large enough community of authors and readers who demanded these new products. Consequently, the first electronic journals were a place for enthusiasts of new technology in scientific communication, who published in them more out of their faith in this new model of communication than out of the effect that sharing their articles could have among readers, or the void academic awards that might have come from them.

The establishment of electronic journals was not possible until the internet advanced toward new benefits, especially the appearance of the World Wide Web, in which the first server was created in CERN in 1990. The start and exponential growth occurred during the second half of the 1990’s (Figure 2). For example, if in 1996 there were 500 electronic refereed journals, by the year 2000, there would already have been more than 4,000 (Figure 2).

Figure 2. Growth in Refereed Journals (1991-2000)



Source: *Directory of Scholarly Electronic Journals and Academic Discussion Lists Association of Research Libraries, 2000*

It is not surprising that electronic journals were gaining ground. They offered very desirable advantages. Even though they have been duplicated excessively, it is advisable to remember these advantages:

- Promptness: in every level of the system of publication, both at the level of selection and evaluation of the manuscripts and at the level of the material production. Today, works can be published in only a few weeks. Before, this would not have been possible (sending manuscripts through the mail for evaluation, composition, editing, printing in paper, distributing...)
- Unlimited Storage Capacity: The printed media's abuse of power that had determined communication has come to an end. It is possible to publish supplementary material from the analysis of the information. In addition, a journal can publish its own records of the field research that is stored in its server's files. Apart from assisting with the use of information from other scientists, this could put a stop to some unethical behaviors (fabrication, falsification,

manipulation...) and improve peer revision worldwide.

- Hypertextuality: Expanding the capacity of reading documents: one can navigate internally within the same document, website, or even the internet in its entirety with extraordinary ease and immediacy.
- The use of audiovisual media to transmit or explain the research results (sound recordings, videos).
- Unlimited expansion: There are no restrictions, to the expansion of this content to everyone. What is important is designing it well so that the search engines can adequately recover all of the published items.
- Simultaneity in the search
- Control of use and evaluation of the impact: This will permit the adaptation of the products toward being the users' necessities and demands, apart from assuring copyright laws and protecting themselves
- Meaningful reduction of publishing costs: Even though initially some thought that

electronic publishing was practically free, today we see clearly that this is nothing more than wishful thinking. Electronic scientific texts have to be evaluated, and once selected they must be edited, designed, and stored in servers for their permanent preservation and continuous expansion. Now, the reduction in costs is evident (approximately 50% with respect to printed journals). What is saved from manuscript management, in both composition and editing, as well as from printing in paper, distribution and physical storage is considerable.

- Flexibility in both searching and purchasing, with the ability to access and buy only the desired contents (journals, issues, articles).
- Interaction between all the agents involved in scientific communication (authors, reviewers, editors, readers).

The growth of electronic journals produced a parallel growth of those that were open access. Although the international movement toward open and free access of scientific publications solidified in the twenty-first century with the statements of the *Budapest Open Access Initiative* (2002), the *Bethesda Statement on Open Access Publishing* (2003), and the *Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities* (2003), the availability of full-text documents had already peaked at the end of the twentieth century (Figure 3). Without a doubt, this influenced the practices of self-archiving that physicists and computer technicians had been running on ftp files (anonymous File Transfer Protocol) at the beginning of the 1970's and later, in the arXiv repository

Figure 3. Growth in the Number of Full- Text Sources



Data sources: Donald T. Hawkins and Mary B. Glose. *Fulltext Sources Online*. Medford, NJ: Information Today, 2002

From the point of view of the physical design of the journals, the transition process from the printed world to the electronic was neither discontinuous nor a product of a radical break as was able to be presumed for the peculiarity of the new format. What now occurs with journals is similar to what occurred during the step from handwritten to printed material in

the fifteenth century with the rise of printing, in that a translation or mere repetition is produced in electronic format of typographic designs, formal models, and logical structures of current printed content.

It is natural that this phenomenon occurred in the first couple years. Due to the novelty of the new technologies and the ignorance of the new

possibilities that opened both for the presentation and display of information such as for the search, access, and retrieval of content, the journals in the initial periods looked very similar to the printed ones. In the case of the journals that had already been edited on paper, there was slow migration from printed format to electronic. The first phase only dealt with opening the web and listing the basic information about a journal (field and coverage, subscriptions, instructions for authors, summaries of the issues, summaries of the articles). In the second phase, they now began to put up a full text of the content on the Internet, but no more; it was about putting online what previously was printed.

And finally, after this process of transition, the journals, especially those sponsored by the multinational directors of publication (Elsevier, Springer, Kluwer, HighWire Press...), began to take advantage of all of the benefits offered by electronic means in the new century: hypertextuality with links to internal and external resources at the specific journal (links to authors' personal pages, pages of authors affiliated with institutions, bibliographically cited references well within a journal, data bases where they appear indexed, articles that have cited work, other published works in the journal about the same topic, or other published works in other journals about the same topic), internal search engines (authors, titles, key words, year, affiliation), options for automatic exportation from standard bibliographic reference and complete with each article in readable formats by any bibliographic data base manager, establishment of an informative alert system assigned to any reader or subscriber that you want to be able to receive punctual information by e-mail over new published issues, new articles that have appeared on the same topic, articles that subsequently cite the selected job, etc..., and the ability to comment and respond in a quick manner to the published works, or even rate them with different criteria.

At the same time that the new format was consolidated and accepted by the scientific community, the open access electronic journals suffered from a slow process toward recognition. As we moved forward, the electronic publications, first, and those that offered open access, second, were received initially with some suspicion from the scientific community. This reaction was in part because of the conservative reaction against the new, but also for the suspicions that the scientific method was not applied with the necessary rigor, especially pertaining to peer review. Time had to pass before journals like PLOS (Public Library of Science), the standard-bearer of open access pay to publish model, or journals sponsored by BioMed Central, the most reputable editorial of the pioneers of the movement, were joined with journals promoted with big editors (many of whom are a part of the OASPA (Open Access Scholarly Publishers Association), demonstrated that it was possible to apply strict systems of evaluation, similar to the traditional journals, and could even compete with them in scientific impact, which is the factor that today decides the academic reputation. In Spain, some of the electronic journals like RELIEVE, received definitive recognition when they created evaluation systems of the scientific journals, measured by the citation count like in IN-RECS (Delgado López-Cózar et al. 2005, 2010; Jiménez et al. 2008). They demonstrated an elevated level of acceptance on the part of the scientific community, even greater than those scientific journals that had traditionally had a high reputation in their fields.

3. The present: Analysis of electronic journals in open access

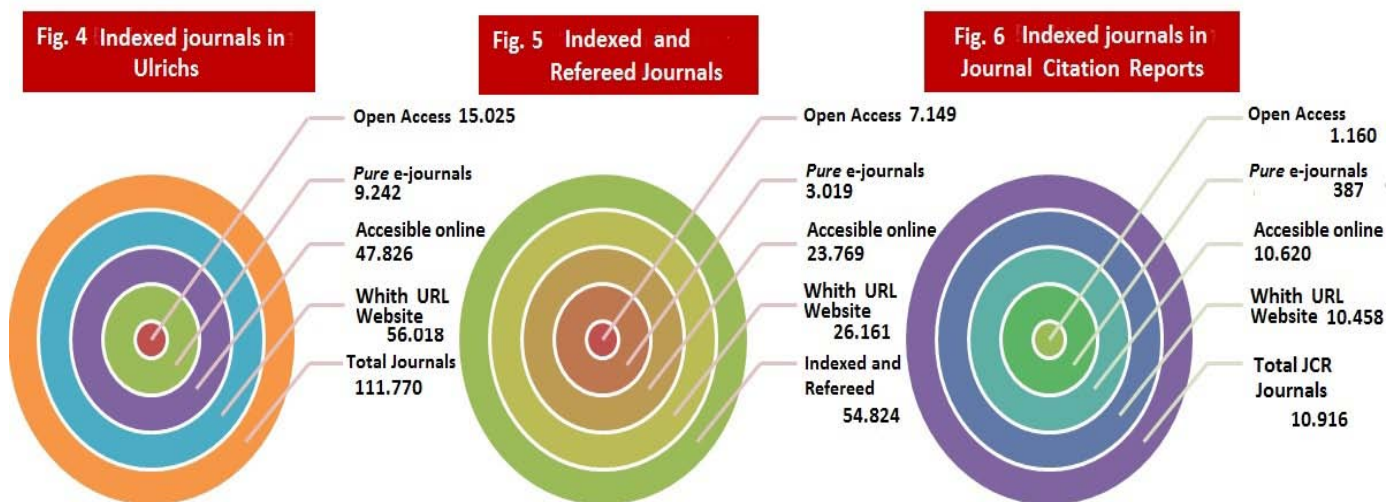
In order to know what the actual state of open access journals is, we must review the data that gives us the three principal systems of scientific information referring to journals: Ulrich's Periodicals Directory (the main directory of published periodicals in the world), DOAJ (Directory of Open Access Journals), and the Web of Science, which

remains the base of international bibliographic reference data and contains the journals with the best reputations and scientific prestige.

Today, Ulrich's index has 111,770 journals of scientific or academic nature (consulted 02/06/2015). Given the difficulty that exists to actually control the number of journals circulating globally, that figure should be taken as an approximation and not as fact. From this general data we can conclude for our own purposes that something less than half of the journals are accessible online but it does not even reach the 8% that are exclusively online; the open access journals are a minority (13%) (Figure 4). If we limit the figure to the journals that appear indexed in a database

(79,331) and those that are refereed, therefore those journals that have some consistency and scientific publishing solvency, the figure drops to 54,824 (Figure 4). If we compare the data of online access journals with the open access journals, we find similar proportions, even if the proportion of "pure" electronic journals lowers the total 5.5% (Figure 4). What is radically different is the writing of journals that are included in the "prestigious" rankings of the JCR (Journal Citation Reports). There, the percentage of journals with online access rises to 95%, which the percentage of open access journals lowers to 10.6%, and that of "pure" electronic journals lowers to 3.5%.

Figures 4 to 6. Number and type of scientific journals according to various sources



With these results in mind, it can be inferred that the doubts that loomed about online journals have disappeared today. Although it is still surprising that half of the scientific journals that are in circulation in the world continue to be in paper, the percentage rises to almost 99% for those that are indexed in the JCR. It seems that the printed form is still associated with reputation and scientific solvency of a journal, and its persistence does not relate to the changes of the last two decades in the reading habits of scientists (Tenopir et al. 2009). This study demonstrates

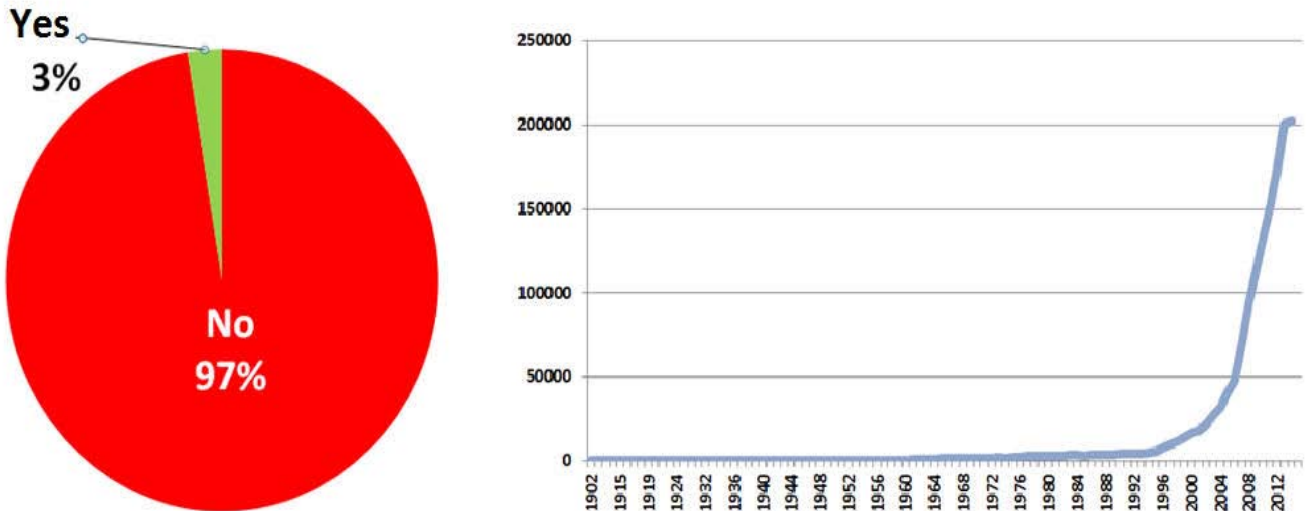
that even with the access to articles produced mostly by electronic methods, the readers still print these articles because they prefer to read them in paper.

Open access to journals is growing, but still the number of electronic journals in this alternative form remains marginal, a little more than 10% of circulating journals. Identical figures are obtained from the Web of Science (Figure 7), that of the 58,791,645 documents that are currently contained within this data base, 1,484,643 are open access, representing 3% of the total (Figure 7).

However, a considerable increase can be seen in the last decade, which is where the changes have occurred, justly corresponding to the

expansion of the open access movement. In 2014, 13% of the documents were open access.

Figure 7. Documents in open access in the Web of Science (1900-2014) Percentage and evolution



To form a complete picture of the journals currently in open access, the best thing to do is to draw upon the DOAJ, the directory that since 2002 has been listing the journals that are open access in a systematic method (Table 1). The dominant language of open access journals is English, which precisely coincides with the percentage of journals that are published globally in this language. Without a doubt, the number of journals that are published in Spanish and Portuguese are well above what would correspond to these languages. The distribution of journals by countries in either the order or the proportions does not correspond with the distribution of journals circulating globally. The weight of the United States and the United Kingdom is well below what their role is in publishing journals. The preferential position occupied by Brazil and other developed or underdeveloped

countries speaks clearly of the fact that the open access journals are produced fundamentally in what is the scientific periphery of the world. This same thing is noticed when looking at the list of key publishers. The big multinational publishers (Elsevier, Sage, Willey...) are absent; only Springer appears in the list but with a very reduced number of journals with respect to those it has sponsored. We are, therefore, before alternative publishers that were born from the open access movement, unaffiliated with the dominant publishing system of scientific publication in the world. In conclusion, the image that is projected of open access journals is that of an alternative world, in the margins of the dominant scientific communication. This is why there are generally still misgivings and doubts about its scientific credibility.

Table 1- The open access journals in the DOAJ: Language of edition, country of publication, editor and type of license

Language	Country	Editors	Type of License
English	7.220 USA	1.237 Hindawi Publishing	495 CC BY 2260
Spanish	1.743 Brazil	951 BioMed Central	255 CC BY-NC-ND 866
Portuguese	1.121 United Kingdom	664 Scientific Research Publishing	119 CC BY-NC 740
French	697 India	594 MDPI AG	103 CC BY-NC-SA 278
German	318 Spain	556 De Gruyter Open	102 CC BY-SA 63
Italian	266 Egypt	492 Dove Medical Press	98 CC BY-ND 41
Turkish	173 Germany	341 Bentham open	98 Not CC-like 37
Russia	170 Romania	307 Springer	97 None 15
Others	1.940 Italy	307 Medknow Publications	80 Publisher's own license 11
	Iran	279 Libertas Academica	53 OAPA 1
	Turkey	269 PAGEPress Publications	48 CC-BY-NC-SA 1
	Canada	267 Internet Scientific Publications	46 BY-NC-ND 1
	Colombia	257 Frontiers Media	45
	Switzerland	222 Copernicus Publications	37
	Poland	206 Universidad Nacional de Colombia	34
	France	182 Canadian Center of Science and Education	34
	Mexico	158 Universidade de São Paulo	32
	Argentina	157 Tehran University of Medical Sciences	30
	Chile	145 Co-Action Publishing	28
	Australia	121 Hans Publishers	26
	Indonesia	117 GERFLINT	24
	Pakistan	116 Asian Network for Scientific Information	23
	Nueva Zelanda	116 Wiley	22
	Russian Federation	104 Universitat Autònoma de Barcelona	22
	Croatia	100 IACSIT Press	21
	102 countries	1.953 University of Bologna	20
		+ 1000 editors	

4. The Future: Challenges, Opportunities, and Threats of Moving towards an Electronic World with Open Access

4.1 The end of the printed world and the Gutenberg era

I believe that today it can be predicted without fear of being wrong that in the scientific world, the days of printed journals are numbered. They have yet to be abolished completely because the generation that was

born and educated on the typographic system is still active. The massive eruption of information and communication technology in all of the social fields has thoroughly permeated the scientific community like no other. The proliferation of reading devices (e-readers, smartphones, tablets...), each time of better quality, along with the improvement in storage capacity and internet speed, and the documentaries benefits, increasingly sophisticated electronic journals, will certainly

relegate to printed journals. The new generations, all native to the electronic audience, have been born with a screen in their hand. They will certainly leave the *Gutenberg galaxy* if they haven't already. We cannot put a date on when this will occur, but it is soon. Who still remembers the printed encyclopedia?.

4.2 The unstoppable growth of open access

Despite multiple barriers, which are a product of the shameful economic interests existing in the world of scientific editing and communication, the implementation and extension of open access is unstoppable. Björk et al (2010) calculated the percentage of open access documents at 20%, Gargouri et al (2010) at 24%, Archambault et al (in 2013 raised it to 43% and to 50% in his updated study in 2014 (Archambault et al 2014). Meanwhile, Orduña et al (2014) calculated that around 40% of the documents indexed in Google Scholar (between 50,000 and 80,000 documents) could be downloaded for free. By one way or another (whether the path be green, gold, silver, platinum or any color that appears in the future) this growth will not stop in the upcoming years. The factors that will contribute to it are the following:

1. Is there anyone in the world that is fundamentally opposed to free universal access of published scientific knowledge? This is one of the politically correct principles that plays into its own movement. It is difficult to confront it, even for the commercial publishers who, from the beginning, were those who saw more damages to their legitimate monetary interests

2. New information and communication technology (editing and processing of texts, internet, new web 2.0 platforms) encouraged and facilitated it. In fact, the new technology gave way to a new communication model from that of the Gutenberg Galaxy to the Web Galaxy. While in the Gutenberg Galaxy the foundation (paper) and the means of reproduction (printing) determined the spreading and use of the mode of publication and distribution depended completely on the

editor, in the Web Galaxy scientific communication is universalized and interconnected with the scientists (the idea of a global village), providing them with absolute autonomy in the production, editing, and spreading of their knowledge.

3. The Scientist's Psychology Itself. From Merton we know that the scientist drives his agenda just as much in the direction of searching for knowledge (the passion of knowing and the satisfaction of solving problems) as he does in his search for recognition (registering the property of his ideas and the priority in his discoveries, obtaining work rewards-promotion, funding-, and social benefits-reputation and prestige); as our dear Ramón y Cajal called the "anxiety of fame". As well, a wide and open circulation of their publications decisively contributes to said recognition insofar as it increases the spreading, impact, and influence of their scientific contributions

4. Pressure to Succeed in Scientific Publication. In the world of postmodern science in which we live, scientists are judged by their yield of published works. In every country, the systems of scientific evaluation, concerned with justifying the numerous investments in research and trying to facilitate and objectify the same processes of evaluation, are employing bibliometric measures to keep track of the impact of the publications. Scientists are aware that facilitating open access to their publications will improve their own visibility and impact (as mentioned previously from the "Open Access Citation Advantage" http://sparceurope.org/oaca_list) and consequently, they will assure success in their careers. For this reason, they are changing their behaviors about publication (Abbott et al 2010), which results in an incentive for open access.

4.3 The support of open access online journals: who will pay the costs?

Traditionally the economic model that supported the publication of journals was very clear. Either, the journals were financed directly by public institutions (universities,

research centers, administrative organizations), scientific societies and professional associations that used the exchange as a manner of distribution, or through subscriptions (personal or institutional, where university libraries were the original clients) and income resulted from advertising.

Stating the fact that nothing is free and past initial euphoria of the birth of the electronic format created the vain illusion that the publications were made at almost no cost, it is asked with severity, who should deal with maintaining open access for online journals? Will the reader pay? The traditional subscription model, although now technology allows for people to read not the entire journal, but rather an individual article. Will the author pay? Many publishers warned of the depletion of the traditional subscription model have avoided the problem by mutating their business model and combining subscriptions with payments from the author. Now it is the author, if he wants his document to be published as open access, who must pay. PLOS One, the leading open access journal, published approximately 31,500 documents under this modality in 2013. With more than \$1,000 per article, you do the math, a genuine steal. Of course a genuine “golden path” like this is how to get rich in a short time; a model that tries to be imitated by hundreds of journals...It should not be forgotten what the acronym PLOS (Public Library of Science) signifies: How sarcastic! Will the non-profit organizations pay? I am referring to the scientific societies, professional associations, universities, bodies of administration, foundations that will, as they have always done, disinterestedly finance the journals that they sponsor.

The change in the business model for the editorials of the scientific publication will not be a “business” for the state and the public or private bodies that finance the research. They will continue as before, generously financing the research and its publication: if before they were funding the subscription to the journals through the budget of the libraries, the universities, especially now will be directly

paying the bills that the authors present for publication. Everything stays in house: we only changed the negotiating.

It is evident that in the future, different business models are going to coexist, generating even a hybrid model that permits access to all the existing possibilities and by having will allow access to content.

4.4 A serious threat to the credibility of electronic journals in open access: The Pirate Journals

The technical facilities and the reduced costs of production with which the electronic publications of today can be assembled; costs that are able to be transferred directly to the author so that the same payment of the production process explains the proliferation of electronic journals in open access in every country and discipline. This, coupled with the pressure that scientists feel publishing in “international journals” and the unscrupulous editors that are willing to satisfy these desires, gives us all the ingredients for an explosive cocktail. We have seen in the recent years an alarming bombardment of emails that announce the birth of published journals in the English language in whose titles include terms such as “international journal...” or “American journal...”, that offer quick publication and are recognized in Exchange for a modest price, justified for putting the work in open access. With the potential market of thousands of scientists in the world, the business was perfect. The alarm extended and lead to the elaboration of lists of journals named “predators journals” (Jeffrey Beall <http://scholarlyoa.com>) and with that spread a cloak of suspicion over the electronic publications in open access. Does the payment for publishing affect the rigor of the peer review process of published articles in journals of open access? Is the peer evaluation in these journals rigorous and serious or is it put in a crude manner? Is it published because it is paid for? Do the monetary interests influence the scientific decisions? Are these editorials set up simply in order to obtain fat profit

without consideration for the quality of the science that they publish?

It is in this context that a controlled experiment by John Bohannon (2013) is performed in order to discover if these bad editorial practices exist in the journals in open access. He constructed an article, with authors, methodology, alleged results, and sent it to 304 open access journals. The results speak for themselves:

- 61% of the journals accepted the falsified article (157 journals)
- 59.6% accepted or rejected the article without any revision (152 journals)
- 52.2% of the journals that accepted the work (82 journals) didn't make any revision. This data is overwhelming.
- Only 17% of the journals applied a substantial revision to the work

The majority of the journals that appear in the Beall list showed the worst behaviors: they were those that accepted the article the most: they duplicated the rate of acceptance (70%) compared to the indexed journals in DOAJ (Directory of Open Access Journals) and they were the most accepting of the article without any revision (56% compared to 45%). The conclusion is obvious: the name of “predatory and unscrupulous journals” (I would add corrupt and unlawful) comes naturally.

This public assignment of scam journals was one of the best contributions of Bohannon's work. But, it had an important result: it put into question the system of control that exercised the main directory of open access journals in the world that is DOAJ. Why did so many journals that had demonstrated such a deficient peer review process appear in DOAJ? Did DOAJ check the editorial practices or were there limitations in reviewing political editorial declarations? This usually is the problem that many journal editorial systems have depending on the parameters linked to editorial quality: they are only able to evaluate statements but not truths. It is said that something is being done, but how is it actually done? How does it work? It is difficult and expensive to verify it. Also, this affected

OASPA, an association that brings together the major commercial editors of the world with open access journals. Some of the journals also are seen as affected. The consequences were the deep revision of the systems, the control of selection, and the evaluation of journals.

In whatever case, it is important to highlight that the results are only able to be extrapolated from the selected sample, i.e. the 304 implicated journals. Therefore, it is not possible to say that the majority of 10,000 open access journals that circulate adopt the bad practices that are denounced here. But, incidentally, there has never been such a wide sample used in studies of this type. The shadow of doubt, that always fell like the sword of Damocles over the electronic open access journals, that would demonstrate that their editorial processes were equivalent to those of traditional journals, has extended itself again over those and the movement. How will it affect them? It is too soon to know, although the damages have been multiple.

4.5 The alternatives to scientific journals: The emergence of a new model of scientific communication?

The eruption of the internet has provoked a substantial transformation of communication habits in general, and scientists in particular, to the extent that anyone with computer equipment (computer and internet connection) and a minimal understanding of word processing programs or editing web pages can publish whatever content they want and put it at the disposal of everyone who has access to the internet. In this sense it can be said that the internet is revolutionary: it gives a voice and a loud voice to those who previously didn't have it, and on the other side, has made a domain public that previously was private. The appearance of the internet entailed a radical subversion of the mechanics of editing and publishing that we have known for more than 500 years. The invention of the printing press led to the creation of a technology that brought the appearance of new tasks (composing and assembly, printing, marketing and sales) and

jobs (writer, word corrector, printer, editor, book merchant, bookseller, distributor) essential for the document that the author created to be delivered to the reader. Taking that into perspective, if we look at the development of technology of the edition since the invention of the printer to the surge of the internet we can find a common thread; the progressive popularization of these technologies and the gradual elimination of existing mediations between the creation and the consumption (author/reader). The popularization of the personal computer, word processing, and of printers in the last two decades of the 20th century permitted the authors to be able to self-edit their texts. For the first time they could write their composition, assemble it, and even print their texts. With internet the cycle of editing is complete. It is understood as the operation that permits one to produce a document and finance it, with the distribution even passing through the hands of the author. From this moment, at least potentially, the author doesn't only create his work, but also has at his disposition the ability to provide it with corporeality want and disseminate as he deems appropriate.

Recently the emergence of large bodies of knowledge such as repositories are both thematic or institutional where authors can constantly deposit their works together with the development of academic search engines (Google Scholar) that index automatically to everything that one can find in the academic web (repositories, university websites, research centers, libraries, information bases) and they are used increasingly by scientists to look up information, making possible a new model of scientific communication for the publication and spreading of the results of their research. Furthermore, the emergence of what is called web 2.0, with its multitude of communicative tools (blogs, microblogs, social networks), which amplify the spreading of the published documents by multiple channels, have been assumed to be the cherry on top of new communicative system (Torres-Salinas & Delgado López-Cózar 2009).

However, to say that new communication technologies allow the author's absolute autonomy with respect to all of the traditional agents of the communication circuits is not to say that this would be the option that would introduce it immediately. Editing fulfills its function: it has been serving as a filter capable of eliminating the impurities and adding value (quality in both content and format) to the edited. This is its strength. Internet can satisfy the communicative function that publication possesses but not the functions of record, validation, accessibility, and recognition that conventional scientific publications fulfill.

Moving away from a closed world with prior control (*ex ante* peer review) towards an open world with control afterwards (*ex post* evaluation where scientists can comment, discuss, mention, review, reference, label, share, value: grade, enjoy, vote) or openly uncontrolled (chaos) is difficult to imagine right now. Can order exist in chaos? Would we be able to accept the existence of a documentary Darwinism that eliminates what is irrelevant and points out the new and meaningful on its own? Many questions with unclear answer.

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To know more / Saber más

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