

Mathematical documentation : towards a new ecosystem

This text presents the personal views of its author and not necessarily those of the EMS publications committee or of the EMS.

The advent of electronic publication has been changing our documentation practices for a quarter of a century, but compared to what has happened in the last few years, the change in the previous years has been a sort of analytic continuation from the previous era. During that period, journals have created electronic versions, some e-only journals have been created at the initiative of learned societies or groups of mathematicians, sometimes with scientific success, for example in probability theory. But this and the advent of freely accessible preprint archives have not deeply affected the definition of what a mathematical journal is. During that period also, we have heard visionaries explain how wonderful it would be when everything was freely accessible on the web, in Open Access (OA). It was also the time when electronic access has allowed publishers to « bundle » their journals more and more, selling them by large interdisciplinary batches. This was the major change in the business model and has succeeded because of many librarians' desire to maximize the number of publications to which their users had access. The financial and scientific drawbacks of bundling for the end users were not immediately apparent, but now they are.

Apart from the beautiful dream of having everything freely accessible one of the motivations of the OA movement has been to fight the financially predatory behavior of some publishers, based in large part on the bundling technique. Indeed, we mathematicians have criticized the publishers' bundling as much because of its cost as because of the deleterious effect it has on the average quality of publications. It essentially annihilates the influence of the readers' judgment and in particular the moderating effect which that judgment had on the creation of new journals.

In the last few years we have entered a new phase. The day of OA has finally dawned; it is supported by everyone and policymakers have been convinced that publicly funded research should be freely accessible for all as quickly as possible. But now that OA is no longer a dream, we must cope with the problems of reality : how to build an economically sustainable publication and retrieval system providing OA but also all the necessities of science, such as the creation of an organized corpus of validated and cross-referenced results in their final form, as our libraries have been providing for centuries, and the preservation of this corpus for the distant future. All these activities are essential for our work and that of our successors and have a cost, which however must not be grossly exaggerated to satisfy shareholders' greed. We must also build a system which is scientifically sustainable. This may seem provocative, since OA is supposed to boost research, but in reality it has its dangers. For example the multiplication of freely accessible potentially useful documents competing for our attention makes visibility more and more important, and with the growing greed of institutions for visibility they tend to rely more and more on evaluation tools which measure visibility and not the true scientific value (admittedly a lot harder to measure, but so much more important !) and when applied to promotions, hiring, grants, this leads to an ecosystem of science which many, and not only mathematicians, consider to be disastrous.

If we do not react strongly¹ to this trend, in less than ten years we will be evaluated by rating agencies which will induce universities to invest more in subject A and less in subject B because A has a greater impact factor and therefore will increase the visibility of the university (such agencies already exist, see [Academic Analytics](http://am.ascb.org/dora/)). This behavior is of course

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See <http://am.ascb.org/dora/http://am.ascb.org/dora/>

not new, but it will become much more systematic and, well, « scientific ». The more access is free the more visibility becomes a merchandise, a new object of greed. Also, if we do not help our libraries to adapt their role of preservation and help in the access to documentation, we may find ourselves in the hands of private academic data mining companies which will, for a fee of course, do for us and our students what librarians do now, only it will be on the basis of bibliometry. Major publishers are already investing in such companies. In the process, our libraries will disappear (see [Odlyzko's article](#)). The extent to which they are ignored in discussions on OA is truly amazing.

I believe that we need to consider overhauling the system in its totality: publishing ideas and knowledge, organizing their accessibility, preserving them forever, and evaluating the quality of research.

It is not enough to experiment with new business models, for example e-journals which can offer OA because they are managed by dedicated volunteers and supported by a generous institution or association. These experiments are useful but if they remain just that, they compete not only with commercial publishers, which is often a part of their purpose, but also with the academic publishers, so precious to us, and which are severely handicapped in this time of change because often they do not have the means, financial or otherwise, to make the necessary investments, while the big publishers do. These experiments also contribute to the proliferation of journals, and increase the need for time spent refereeing by researchers. There are already voices advising to replace referees, which are so difficult to find, by statistics of downloads. Do we really want that ?

We do need new business models, and experiments, but they must be compatible with a general vision. For example, few experiments in Mathematics involves some measure of scientific control by the readers, as the old subscription system did. It seems that for them the OA economy is entirely a supply-side economy, *à la* Reagan. From this point of view, OA is the Universal Bundle of publishing, and so it has the defects of bundles, but worse ! It is claimed that, like in the pre-OA era, the scientific quality is guaranteed by the refereeing system but in an OA world where it is so easy to publish, if the editorial committees and the refereeing system are of course still necessary, they are no longer sufficient. We need other regulatory systems to prevent the proliferation of journals and papers which are published for the sake of publishing, a practice encouraged by bibliometry.

There are many new propositions for the funding of OA publication. The least imaginative, which is a brutal and thoughtless adaptation of the classical « readers pay the costs » system to OA is the « Authors Pays the Costs (APC)» system, cleverly named « Article Processing Charge » by the publishers. In spite of protestations to the contrary, it will create a documentation bubble, and in addition puts the researcher under the scientific control of some funding authority, and in need to spend even more time in funding requests. It is also, in the end, quite expensive with the charges now requested. Unfortunately it is supported by an energetic lobby of publishers and some scientists outside Mathematics, used to it for historical reasons (colour pictures in the life sciences), see nothing wrong with it. Most mathematicians reject it as an outrage to freedom and a threat to the quality of publications, but some others disagree and believe that it is a viable model provided the financing system is tightly controlled and not driven by greed. I believe that in this regard the honest ones will unfortunately serve to justify predatory behaviors. More acceptable alternatives where institutions such as libraries, pay for services (refereeing, editing, attributing compatible metadata, preparing for long term preservation,...) rendered by the publishers are being experimented. Being more original, they are less well understood by politicians, but are developing well, in particular in the humanities (See [Freemium](#)) and should be studied by us. *In the new ecosystem, journals and documentation portals should have the support of a reasonable number of libraries or other public institutions, based on a positive judgment of*

users on their quality. This support should be conditional on the acceptance by the journal of a charter of good practice covering all the aspects of publishing.

This would help to pare down mediocre journals and in particular keep out « predatory publishers »(see http://en.wikipedia.org/wiki/Predatory_open_access_publishing) in which the APC guarantees no serious refereeing or long term preservation, but just posting on some website. If the Gold APC system prevails, and there is no enforcement of a charter of good practice, in a short time it will be extremely difficult to distinguish predatory, mildly predatory, not-too-serious, and serious journals. By serious of course I do not mean those with a high impact factor, but those who do their job seriously, from refereeing to metadata and contribution to a stable corpus and ensuring very long term preservation of what they publish.

The support could take the form of « crowdfunding » or subscriptions by consortia of libraries or institutions, again based on scientific judgment by competent people and not usage statistics. In this spirit, the French National network of Mathematics Libraries ([RNBM](#)) has negotiated a national subscription to all the journals of the EMS Publishing House and is negotiating a similar one with the French Mathematical Society. These subscriptions are funded by the CNRS but they could just as well be funded by a consortium of universities. Alternatively, universities could accept to devote an incompressible part of their budget to the support of academic journals offering OA, chosen by researchers. This should be encouraged by governments as a « good practice » for universities.

Other good practices concern the balance between in-depth scientific judgment (which has its dangers) and bibliometry (which is dangerous by nature).

In the new ecosystem, hiring and promotion committees as well as grants committees will make explicit in writing how much of their decision is based on an in-depth scientific judgment of the work and how much on the reputation or the impact factor of the journals in which it is published.

Libraries will make explicit in writing how much of their decision to buy, subscribe or unsubscribe is based on an in-depth scientific judgment by competent scientists and how much on the reputation or the usage statistics or impact factor of the journals.

Concerning the problem of referees, I propose that some institution (for example, the EMS) should organize rather large groups of journals (to preserve anonymity) which would every year publish a list of referees found particularly meritorious by the editors. Those distinguished in this way could use it in their CV as a valuable recognition.

In conclusion, the notion, implicit in the discourse of many advocates of the APC that we need to replace our existing system by OA and APC journals, and « there is no alternative » is part of the intoxication propagated by the APC lobby. The definition of future system of mathematical documentation is, I think, still for a part and for a little while in the hands of mathematicians but not through an explosion of new journals which would guarantee a chaotic transition. It is, rather, through a daily discipline in the decisions to publish, in the decision to post articles, pre- and post-refereeing on a free access archive with a long life expectation (remember that a lot of our research is already in OA thanks to those archives), in the time taken to referee, in the evaluation of research by reading papers and not by the reputation of journals, in supporting the journals with good practices, in particular for corpus-building and copyright freedom, in fighting energetically the author-pays system and the misuse of bibliometry and helping the libraries to make the transition and working to convince academic authorities that it is in their interest, and also a part of their remit, to support such a system instead of following the lures of visibility merchants and giving to them

money cut out from the documentation budgets (it *has* happened). Of course one of our main collective tools to do this is the learned societies which represent us, but our individual actions are crucial.

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