Beyond electrification: innovative models of scientific and scholarly publication*

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Abstract
Starting from the assumption that what is nowadays called “electronic publication” still mostly emulates traditional publishing models in digital environments, this paper examines some of the technical requirements and consequences of potential models of genuine e-publishing. The vital role of “open” strategies (in a technical perspective as well as for economy in publication) is stressed and a concluding view is given on the semiological and political context of choices to be made in this regard.

Context
The following observations and suggestions, even though they may be relevant well beyond open access (OA) publishing, are substantially rooted within the OA publishing community. Therefore, a quick glance at this context is required to introduce the issues considered here. The working background in this instance is the German Deutsche Forschungsgemeinschaft-funded project, GAP (German Academic Publishers, www.gap-c.de), which has the overall mission of stimulating and supporting scientific communication and helping to “return science to the scientists”. GAP tries to build an open cooperation framework for bringing together academic initiatives for electronic publication in OA models and it aims to contribute to innovative models for “publication”, assuring quality and providing impact assessments of scientific content. In order to reach these goals, one of the major activities within GAP is setting up shared and distributed technical facilities (for instance a shared web-based workflow engine). The project thus puts specific stress on technical aspects of “openness” that have the potential to be relevant for non-OA players too.

In order to better understand this aspect, a closer look at the entire information cycle may help to clarify some of the technical issues related to true electronic publication.

The information cycle: conventional, electronic and digital perspectives
In the traditional information cycle the basic operations carried out by authors, reviewers, publishers and the scientific community in all digesting activities (receiving, quoting, annotating, etc.) are based on just two elementary cultural techniques: reading and writing (with some help from printing technology), as illustrated in Fig. 1.

In the so-called “digital” information environments we know today, most of these steps are simply emulated in an electronic environment, making use of such solutions as Microsoft Office or LaTeX and “publishing” the results, mostly using the quasi-standard format PDF (which still remains vendor controlled!). The basic assumption of this article is that in order to explore the qualitative potential of web-based publication platforms we need to go beyond this step of mere electrification. My aim is to exemplify some of the technical and functional questions we need to resolve before being able to take this extra step.

Before going into detail it may be useful to return to Fig. 1 and think about what its stages might translate to in a digital setting such as we can conceive of today. “Authoring” then would mostly translate to generating some kind of structured XML (Extensible Markup Language), eventually coupled with XSLT (Extensible Stylesheet Language Transformations) code for rendering this content in different contexts. “Reviewing” would be the equivalent of some sort of digital annotation — the interesting aspect being the degree to which this would be public for both reading and writing. “Publishing” will most probably boil down to providing a reliable version of the digital content, together with a suitable identifier. On the reception side, it remains uncertain whether the output will still be “read” in the conventional linear sense, and we will certainly see novel modes of quoting and annotating such digital publications.

Fig. 1. The traditional information cycle.

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Functions, too ls and standards

In order for such future models of digital publication to work at all, a whole set of functions needs to be transposed to digital working environments, and probably the most effective way of doing this is to establish relevant standards as well as technical supporting platforms.

Some of these standards seem to be fairly well established and effective, or at least accepted to a degree that may be qualified state of the art. This is the case with document metadata that are now widely expressed in the Dublin Core (DC) standard as well as with methods for publishing and exposing such metadata via the open archives initiative (OAI) model. Both models are well established to a degree that does not require further mention.

In the next section I will develop one example of standards (for document identification and modelling) that need to be transposed effectively to a digital working environment in order to enable true e-research via genuine digital publication models — and I will skip other potential examples such as authentication and authorization functions.

The way documents are modelled in a digital environment, and means for identifying these over time, are absolutely crucial for digital science to work at an elementary level. In the traditional publishing environment, documents were easily referenced using bibliographic metadata and pagination if micro-structures within these documents needed to be quoted. Bibliographic metadata were sufficient to locate the resource within the library service area and pagination was a universal referencing scheme in traditional, basically linearly organized publications.

In a genuinely digital model of scholarly communication, both these parameters are likely to be challenged fundamentally. As long as issues of document identification (which can no longer be resolved using bibliographic metadata) and document integrity (which have quite a few implications for transparent version management) remain unresolved, identifying an electronic document will be like spotting a moving and changing target.

Regarding document identification, solutions seem to be at hand with digital object identifiers (DOIs) — but several questions regarding both the perenniality and the transparency of this approach remain to be answered. Also, it remains uncertain to what extent scientific publication should actually be trusted in a document identification framework largely governed by the major traditional publication stakeholders. It is thus uncertain to what degree the attribution of uniform resource names (URNs) should be a public infrastructure service and which institutions could be given such a task.

Regarding document modelling, the situation is even more complicated, since in digital environments there is almost no common understanding of which elements constitute even a simple textual document (words?, paragraphs?, chapters?) and how to formalize these elements in a digital environment, let alone how to deal with genuine multimedia publications that are definitely outside the realm of traditional document metaphors.

Thus, document models derived from textual concepts such as TEI (text encoding initiative) or DocBook will definitely reach their limits once they need to be applied to genuine digital multimedia publications. Thus, even if we find means of identifying digital document resources, we definitely do not know how to reference their internal structure in the future. And very little imagination is required to realize what obstacles such shortcomings will continue to place on the path from electrified print publishing to novel models of digital publishing.

Semiological aspects of e-publication

Still, even though the aspect of technical functions, tools and standards may be essential, the understanding of the semiological aspects separating hermeneutically oriented scholarly traditions from empiricist scientific disciplines is probably equally vital for shaping future digital publishing environments and their economic parameters.

In this respect, the information model governing the STM sciences — a model that has so far dominated the ‘open access’-related discussion — is relatively simple and is based on the assumption that the research work is done outside the publication context (e.g. in laboratories), and that publication is the equivalent of reporting this research work which is essentially exterior to the reporting medium. The signifiers used within this secondary communication setting are regarded as a kind of container used to transfer “results” that have no intimate relation with the way they are published. In this context, open access to networked print-analogous material is both vital and sufficient: relatively little innovation is required as a consequence of this simple carrier–content model; the practical consequences of electronic publishing are limited in this field, as it is still mostly restricted to the emulation of traditional journal publishing in networked settings (even though things change in that area, too, as a result of the growing number of dataset publications — but the consequences of this transformation do not affect the semiological issue I am trying to identify here).

The situation is fundamentally different in the hermeneutically driven humanities and parts of the social sciences, where research cannot be as easily dissociated from its linguistic “packaging” since it is essentially using the same linguistic signs as are used for communication about this work, and very often the objects of research again are language entities. As a result, in this context research and discursive “packaging” cannot be dissociated, and the robust carrier–content models that are popular in the STM sector seem over-reductionist and inappropriate — this field. In such a situation, with complex document models and publication formats that are heavily intertwined with core research operations, the introduction of genuine electronic publishing creates extremely interesting options and challenges.

In this context, “open access” to networked print-analogous material is not a critical issue; instead, access to the publication source material and
processing/ reasoning methods is required. This creates a major challenge, since the hermeneutic methods used in the humanities for generating questions and hypotheses are rather tricky to implement in a digital context. However, if current efforts are successful in this area, quite substantial innovation can be expected from the sector once electronic publishing evolves into a serious substitute for traditional means of publishing. Still — tragically! — almost all financial resources needed for such innovation reside in the STM sector.

Conclusion: five assumptions regarding the context of “technical” decisions

My first assumption regarding what might seem to be merely technical decisions in the shaping of future electronic publication landscapes is that there are no “innocent”, purely technical, decisions in scientific publishing, and that purely “political” initiatives with no awareness of the implications of technical choices are naive, dangerous . . . and common in the open access context.

The second point — closely related to the first — is that control over content has little value without control of the means to access, manipulate and use that content.

Thirdly, scientific communication needs continuity and can hardly cope with permanent shifts of technical paradigms that affect document models, formats and identifiers. We therefore need major efforts to be made to standardize and stabilize today’s moving targets in document technology.

Furthermore, I assume that purely commercial perspectives leading to proprietary choices can do a lot of harm in this respect and probably will not produce innovative approaches. This applies to Elsevier and Springer as well as to Adobe and Microsoft (to name just a few examples).

Finally, I think we need to design a separate technical and political agenda for open access to scientific communication in the humanities and social sciences, and this agenda cannot simply be derived from what colleagues are aiming at in the STM sector.

Editors in Europe: EASE and its predecessors

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Lest we forget: a short account of the European Association of Science Editors (EASE) and how it came into being.

The story of editorial associations apparently starts in North America, where the Conference of Biological Editors was set up in 1957 as a result of initiatives by the National Science Foundation and the American Institute of Biological Sciences. The Conference was renamed the Council of Biology Editors (CBE) in 1965 and at a CBE meeting in 1966 another association, the Association of Earth Science Editors (AESE), was born.

With the CBE example before it, UNESCO began in 1965 to encourage the formation of similar associations in Europe. The European Association of Editors of Biological Periodicals was duly initiated in Amsterdam in 1967 and the European Association of Earth Science Editors (Editerra) in Paris in December 1968. To its members’ great relief, the biological group changed its unwieldy name to European Life Science Editors (ELSE) after its first general assembly in London in 1970 [1]. An editorial in the Editerra newsletter in July 1976 noted that “cooperation between the two Associations is now very close. This is essential if individuality is to be retained and duplication of activities avoided.” A little individuality was in fact sacrificed in 1977, when Earth Science Editing became Earth & Life Science Editing.

In the same year Nancy Morris, Secretary of Editerra since 1974, was persuaded to take on ELSE as well, and it was largely due to her marriage-broking efforts that Editerra and ELSE began to discuss a merger of the associations, not just their newsletters. The wedding eventually took place at a joint assembly in Pau, France, in 1982, when EASE acquired its present name. (Incidentally, CBE was again renamed in 2000 and is now the Council of Science Editors. AESE still has its original name.)

Publications

Editerra and ELSE both sent members an occasional circular or newsletter. Under Editerra’s first Secretary, Arie A Manten, some 32 circular letters were issued in five years. As well as the expected lists of members and reports of meetings, these circulars also contained a large number of drafts for a proposed Handbook. In 1975 Earth Science Editing, a more professional- looking publication, began to appear twice a year. This became Earth & Life Science Editing from number 4 in 1977. Numbers 4 and 5 kept the subtitle “newsletter of the European Association of Earth Science Editors” but ELSE’s name was added to number 6 in 1978.

The next change was to publish three times a year, starting with number 12 in 1981. With issue 27 in 1986 the newsletter became European Science Editing, bulletin of the European Association of Science Editors, and in February 1997 it began to be published with volume numbers and continuous pagination for the year. The new numbering started with volume 23, with the first issue of Earth Science Editing regarded as volume 1. Since February 2001 European Science Editing has been published four times a year and in 2002 it was designated a journal. At editorial board meetings the Chief Editor now fines anyone who utters the word “bulletin”.

Arts & Social Sciences Interface: a journal of the European Association of Science Editors (EASE)

Perhaps the most significant development since 1982 has been the publication of Arts & Social Sciences Interface, a journal of the European Association of Science Editors (EASE). The need for such a journal became clear with the publication of the first issue in the year 2000, which was entirely devoted to the subject of electronic publishing. Since then, the journal has been published four times a year, with a focus on the latest developments in the field. The journal has become an important resource for researchers and practitioners in the field of scientific communication, and has helped to shape the direction of the field in Europe.