



New Schemes in Electronic Publishing in Physics: Comments on the Workshop at CERN

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Abstract

We report on topics discussed at the 2nd CERN Workshop on Electronic Publishing: New Schemes in Electronic Publishing in Physics in March 2000 [[click here to access](#)]. The emergence of new models of e-publishing, from the experiences of e-archives and independent journals, and the initiatives from commercial publishers to face this evolution are described. A new definition of the e-journal, the different approaches and solutions proposed, future developments and open issues are also examined.

Introduction

The 2nd CERN Workshop on Electronic Publishing confirmed a successful formula: to bring together publishers and non-commercial publishers to discuss experiences as well as future developments. With approximately 80-90 people in attendance, the meeting aimed to focus on new schemes for electronic publishing in Physics. The analysis of current e-publishing shows substantial changes. Until a few years ago the almost monopolistic journal industry benefited from an unbalanced market, where an established journal was the only way for a scientific work to be disseminated and recognized, and the few academic journals could not really compete. The first electronic versions of journals were fully consistent with the paper version and they still are. This approach configures the electronic journal as a collection of articles, it maintains also a visual order (year, volume, issue). Despite its traditional pattern, the article is nonetheless retrieved within a dynamic environment (hypertext), so that the focus is not on the single issue anymore, but on the "document".

New Definition

The passage from a single document (the old "article", even if publishers still continue to call it that way, as noted by André Heck) [[1](#)] to a more complex, *dynamic* one, is the most innovative approach of electronic publishing and this changes the intellectual context, the environment for documents.

- The journal is not a collection of articles, but a collection of LINKS to documents or other electronic resources.

Deconstructing the Journal

In this new landscape there are two main landmarks: one is the CrossRef service born in June 1999 and the other is the use of the Link Manager Systems. CrossRef will link reference citations to the online content that those references cite, and already contains more than three million documents across thousands of journals linked through it. Its current members publish over 50% of the annual volume of journal documents indexed for INSPEC [2]. Being documents citable independently of any volume, issue, or page number, Robert Kelly of APS remarked on the importance of identifiers, which should be transparent, using a metadata structure. For e-first, he stressed the necessity to implement on the editor's site a Link-Manager system for inbound links to wrappers based on year, volume, (issue), and first page of the document. Some APS journals use electronic identifiers in place of page number. The APS Link-Manager [3] facilitates the use of links to on-line journals through a very simple URL scheme, based on the information found in a typical journal citation. With this program, issue numbers are not always necessary. The main functionalities of the APS Link-Manager are given on their site:

- Check if the URL contains the minimally required journal/volume/page (or electronic identifier) information.
- Check if the citation is valid.
- Check if the citation is on-line.
- Redirect the browse using the "Location :" directive to the proper URL.
- Try to give informative error messages.

In the potential Over and Underlay context the CrossRef agreement DOI based [4], will be a strategic "*trait d'union*" between some publishers. The Digital Object Identifier is a means of identifying a piece of intellectual property in a digital environment. It scores over the URL as it identifies the object and not the location. This gives it a permanency that the URL does not have. Springer supports DOI and recognizes its increasing importance, and will start a retrospective DOI assignment project soon. On the other hand, Elsevier is not using DOI. If available, they will include an e-print number, and when the document is published, the URL will serve as a *de facto* DOI.

Science publishing is going to move from a *deconstructed* journal to *constructed* databases or platforms utilizing the same Link Manager and Link Systems. These cross-sections of multi-publisher products will use filters for quality and relevance.

Customization and Partnership

The emerging model of the new electronic journal, attracts publishers and enables one to add functions and service, in a variety of "packages" and retrieval tools. Business reasons push to create appealing products, adjusted to the academic market; extended services made possible by the digital environment are offered in the perspective of a customized product. The concept of personalization

is, according to Elsevier, a reference point for the development of a business model in the immediate future.

Many options are available:

The Springer **Link Service**, recently enriched by **Online First**. Scientific documents are published in electronic form weeks before distribution of the print journal, even before the issue and the page number have been assigned. They are fully retrievable and citable by the DOI. Online First articles are equivalent to printed articles [5].

Physics Direct, a Vertical Portal (Vortal for Physics) with access to the full-text and links to documents or grey literature, as well [6].

Graphics is used extensively, with video and computer simulation (**The New Journal of Physics**) [7]; experimentation, not just repackaging print products, is advocated by André Heck with more visually-oriented publications.

If from a technological perspective much is possible, from a business perspective it may not be profitable. Hence, publishers' determination to protect their print subscription base, and the multiplication of strategic alliances between them [8]. Market demand forces cooperation. The forementioned CrossRef appears to signal the end of the pre-eminence of a single publisher and confirms that the pressure from the non-profit part is going to lead publishers to cooperate on behalf of the scientific community. In 1999, IOP endorsed SPARC (Scholarly Publishing and Academic Resources Coalition) and Physics Direct; another example, is a joint cooperation between Elsevier, APS, and AIP.

The efforts to provide added value, and the investment in technology, nevertheless have a cost. Springer emphasizes that the digital environment will not be cheaper, it will provide improved access to information.

Direct Communication

No longer pure container, mediating information through peer-reviewing, the new e-journal destroys the concept of fixed space and becomes an open space for discussion and sharing experiences. **WIRESRIPT** (Web Interactive REview of Scientific Culture, Research, Innovation Policy and Technology) [9] has a Forum section, based on the public domain message board system "**HyperNews**", which enables readers to post new material to the Web site and link their comment to articles and other material published in the magazine. The establishment of a *direct communication* between authors and the scientific community, in order to speed up the spreading of scientific information, is the aim of the new e-journal.

- Direct communication versus mediated communication

The experience of e-archives is, in this perspective, a fundamental one. It has broken the connection between publishers and peer-review and has shown the possibility of a free, online publication. The **Los Alamos Archive** [10] does not conflict with publication in a printed journal, it acts as an adjunct to the traditional publishing mechanism, speeding up access to papers and providing an archive.

A similar function is performed by **E-BioSci** [11] an initiative to provide a European platform for a wide range of high-quality electronic services relating to full-text access and retrieval in the life sciences. The spreading of archives, with different conceptual, organizational and technical foundations, poses problems of interoperability across e-print initiatives. A single interface is needed to reach over 120 archives, as pointed out at the Santa Fe meeting in October 1999.

Open Archives Initiative proposed two models for the archives:

1. Business model

2. Technical model

The first business model's features are a provider which aggregates more database from other sources and converges in the user's database. The second business model is structured by a gateway service, switching to the original archive. The first model could be defined as a centric model, the second one as a distributed model.

The technical model is based on the use of the DIENST Protocol(version 5.1) arranged by NCSTRL (Networked Computer Science Technical Reference Library) [12] and based on Dublin Core Metadata for minimal metadata with Dienst subset [13]. Soon this protocol will be replaced by the Open Archives Harvesting protocol.

Current developments at Cornell University's Website, are the Math Book Collection [14], also on Cornell's site the project of NCSTRL and the ERCIM Digital Library Initiative. The latter, the European Research Consortium for Informatics and Mathematics, was born to promote research and collaboration between research teams working in the field. This includes establishing links between on-going digital library projects and other initiatives in public and private institutions [15]. The goal of all these initiatives is to create a Metadata Library that could be used by many libraries, through the use of common protocols and metadata.

Quality control and Impact Factors

While publication in print through a publishing house was by no means a guarantee of high quality, it also meant slower publishing, since the journals always had the most thorough review process. The conflicting aims, speed of publications and quality of the papers, when not solved by a radical elimination of the peer-reviewing process, find a way in alternative models, such as a completely electronic process of submission and review. Differences, sometimes, stay in the publishing culture of disciplines. Physics has a strong tradition of exchanging preprints, biologists have no enthusiasm for unrefereed papers (bad information is dangerous). Even if such characteristics as author's qualifications, institutional affiliation, research methodology, will continue to be important in judging the quality of documents, factors other than ISI are going to be an alternative for Impact Factors. The actual readership, the downloading of articles, will be a new measure of use.

No more citation analysis, but focus on usage

Some authors are already referring to the numbers of downloads of their documents in their curriculum vitae. Another criterion for filtering, like the Amazon model quoted by Daniele Amati of SISSA, [16] for identifying best sellers in commercial publishing, might work for the scientific literature. In the future, central access points such as archives and patterns based on established usage of literature may not only facilitate research by providing fast access, but can also represent a quality filter.

Final Considerations

The way scientific information is packaged and disseminated plays a significant role in the formation of science policy and science research priorities. The Internet brought democracy to electronic information, but at the same time can seriously restrict access for those without the ready availability of appropriate technology. This is specially true for countries with difficult economic conditions. In Russia, as reported by Zhabitsky of the Joint Institute for Nuclear Research in Dubna [17], technical difficulties due to English/Russian web interface are complicated by structural problems including slow and unstable connection lines.

The potential of electronic publishing to transform scientific communication is already expressed in emerging models that redefine the position of user and the publisher. The new approach is towards a direct communication, and flexibility is the key to promote interoperability between digital libraries. The competition between modes of scientific publication is producing alliances between publishers, support of networking and interconnection, customization of products.

Future developments :

- Use of database technology of XML (eXtensible Mark-up Language).
- Linking services will provide the means for enhancing e-publishing.
- Libraries will be buying collections of information rather than titles.
- Bibliometric methods will include browsing and usage data.

Open issues:

- The protection, both archival and legal, of documents.
- Subscriptions.

Protection of documents is a core concern. The concept itself of "author" is going to change: the author as intellectual responsible of the document is placed side by side with other "authors", the one who a link is referred to, and the organizer of the same link, as well. The electronic journal and e-print archives picking up the basic idea of sharing information and scientific knowledge, do not contrast with the scope and the objective of intellectual property rights, it will take time to find a strategy for cooperating with commercial publishers.

A problem faced by all the commercial publishers is how to make financial sense from all the products they provide. The digital environment will not be cheaper, the publishers note the cost of investment in "value added" services, the same archiving process is very expensive, so even if the current subscription process will not last, no one knows how it is going to change.

Acknowledgments

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References

- [1] <http://cdsweb.u-strasbg.fr/~heck/>
- [2] <http://www.crossref.org/>
- [3] <http://publish.aps.org/linkfaq.html>
- [4] <http://www.doi.org/>

[5] <http://link.springer.de/>

[6] <http://www.sciencedirect.com/>

[7] <http://njp.org/>

[8] IOP with Deutsche Physikalische Gesellschaft (DPG), Dutch, Polish, Australian and Swiss Physical Societies joined as Associates

[9] <http://www.wirescript.com/>

[10] <http://xxx.lanl.gov/>

[11] <http://www.embo.org/>

[12] <http://cs-tr.cs.cornell.edu/>

[13] <http://www.cs.cornell.edu/cdlrg/dienst/protocols/OpenArchivesDienst.htm>

[14] <http://cdl.library.cornell.edu/cdl-math-browse.html>

[15] <http://dienst.iei.pi.cnr.it/>

[16] <http://www.sissa.it/>

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