
Electronic Scholarly Publishing and Libraries

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0. Introduction

Let me begin with an optimistic note. I think the developments and advances in information environment around are a cause for optimism for those engaged in identification, organization and dissemination of information, whatever the format. We began with clay tablets, continued with manuscripts and print on paper and now are debating on cyber media of the day. What a change? The profession that was dealing with traditional book and journal format until recently has developed competencies to deal with e-publishing issues and trends and is acting both as librarian and cyberian as we have successfully embedded IT into our profession. What a transition, no doubt with challenges and opportunities.

1. Scholarly Communication

In order to appreciate the electronic publishing in scholarly communication I would like to begin with scholarly communication in its historical perspective.

Scholarly communication, like scholarly pursuits, has had humble beginnings. Handwritten manuscripts were there till the Gutenberg Revolution streamlined it with modern book in print on paper format. However, the Industrial Revolution found the book lacking the speed that was needed for diffusion of information in the new environment.

Thus was borne the journal. Thanks to Henry Oldenburg. It was more compact and had the speed that was the requirement then. By the nineteenth century the journal matured into its present shape of publishing papers citing previous related or impacting materials to offer a well-knit framework for scholarly communication.

With the march of time the problems with the Print journals (p-journals hereafter) became apparent on different counts. First, the mushroom growth of p-journals which created tremendous problems for the libraries as well as the patrons. Second, is a set of crucial problems pinpointed here in order of intensity?

- a. Time lag in submission and publication
- b. Editing-refereeing abuses
- c. Plagiarism

The third problem which put the scholars and libraries on tenterhooks is the commercialization of periodicals publication and the resultant price escalation, price discrimination and price disparities.

These maladies with journals prompted debates to suggest alternatives to journals. There were arguments favouring publishing individual articles and distributing them from depository centres. JD Bernal was the harbinger of this idea who pleaded for it in his classical work *Social Functions of Science* and later presented the model at the Royal Society Scientific Information Conference in 1948⁽¹⁾. But the journal by that time had established itself and thus withstood against its onslaught because of its certain recognised uses. And, alternatives at that time were not that useful or acceptable. However, the problems remained and dissatisfaction with this sort of scholarly communication was mounting day in and day out.

2. Electronic Publishing

Electronic publishing, as we are aware, is a phenomenon of the later part of the twentieth century and came in the wake of the advances in computer and telecommunications technologies. In this case the text or data is available on line and is read on the end user's computer. Contrary to publishing in print on paper it is digital in form and does not require any intermediary medium. Information is directly accessed from the host computer. Naturally, it is a paperless medium. It is also referred to as skywriting, web publishing or internet publishing. Harnessing the power of ICT and the resultant internet it has emerged as a competitive medium with the print on paper and, on the face of it, appears to be a better substitute for traditional print on paper.

The journal continues to be at the centre of scholarly communication, no doubt, now in a different format. The new electronic journal(e-journal hereafter) is of two types: one, electronic full text version of existing p-journal; the second, are the exclusively electronic journals available on line free or priced according to two models of payment — fixed price model and usage model. Thus the scholarly journals today can be placed under three categories:

- a. p-journals available in print on paper only — single format
 - b. p-journals with electronic versions — dual format
 - c. e-journals — single format.
- a. p-journals : Studies conducted for the last about four decades demonstrate price zoom of these journals to the extent that they are now becoming prohibitive for subscription. Price discrimination and price disparities too have been identified. The whole problem is now familiar to all of us as 'serial pricing crises. In addition these journals pose a number of problems of housing, maintenance and conservation. Their subscription, acquisition and payment is no less a tantalizing process. The number of these journals and their size aggravate further the situation for libraries beyond expression.
 - b. Dual format: In order to compete with e-journals and stay firm in the business a sizable number of journals are available in both formats giving libraries a choice to subscribe to either of the two formats or both. Here pricing models are yet to stabilize. Subscription to both the formats may bring some relief to the libraries but here too several managerial and technological difficulties need to be sorted out and settled.
 - c. e-journals: Here we come across two models. You physically acquire a journal, no doubt, in digital form using CDROM technology, and possess it. Or, you have on-line access, without any physical possession, to current files, archives, or both.

There is evidence that e-publishing is proliferating in the way the p-publishing did in the post second world war period. Proliferation is botheration both for providers and consumers of information. The problems the scholarship had to face in the wake of p-journals proliferation should serve as an eye opener for all concerned. Today the cyber media is a jungle of information irritating and confusing for the patron.

The phenomenon that has now emerged in electronic publishing is now debated from different angles. There are proponents like Stevan Harnad who spot various advantages of e-publishing over the traditional p-journals. Through his 'subversive proposal', influenced by the system developed by Paul Ginsparg for high energy physicists for archiving of high energy physics articles, he advocates for publishing of individual works on the net thereby sidetracking the commercial publishers⁽²⁾.

On the other hand there are others who are still skeptical about electronic scholarly publishing. Covi claims that there is a thinking that e-journals publish articles of a lesser intellectual quality and adds that these are “insubstantial and potentially transient”⁽³⁾. However, lack of adequate quality control because of lack of or poor peer-review feature in e-journals which has given rise to these apprehensions is now improving.

3. Electronic journals: Impact on libraries

Every new practice or product impacts prevailing environment and calls for change and adjustment. E-journals too have a strong impact on parties involved in scholarly communication circle. Thus certain challenging situations have surfaced and are strong candidates for consideration and solution.

A. Management :

e-journals have brought a big transition in library philosophy. It reminds us of equally significant transitions the institution has witness earlier from preservation to use and from reactive to active services. The new transition is one from possession to access. No doubt, it had begun since libraries realized that self sufficiency was a myth in the wake of information explosion, price escalation and diverse and mounting users' information needs. But it was a transition from individual possession to shared possession.

The management and operations set up for libraries in possession environment appear to be failing in virtual environment. Physical planning and planning of services that we have been scrupulously following for a long time now are to be redefined, reset and adhered to accommodate the new scenario. Financial management has a new dimension now. Budgets shall be prepared and operated for providing access without any physically tangible assets in return. Journals management system it self faces new problems in the wake of the emerging formats. A journal is brought out in volumes each comprising of a number of issues depending upon the frequency of the journal. Journals publish articles as and when they are accepted for publication. While it still maintains the idea of a volume as the articles are organized on the web page by year, there is no concept of 'issue'. Funding standards shall require new elements for estimation and expenditure. Organization and staffing patterns shall change.

B. Standards :

Manual operations and services established for print warehouses shall not hold well in virtual environment. Traditional standards of bibliographic description, organization and storage and retrieval are not applicable in the new environment.

Standards are essential for uniformity, consistency, economy and quality. Standards in

Information management is a recent phenomenon. Librarians, publishers and professional associations engaged in scholarly publishing and its organization for exploitation developed standards for different aspects of the system for print on paper format. The emergent e-publishing challenges these standards as unfit for this medium and call for new standards essential for searching and navigation in this media.

Several agencies concerned have been working towards evolving suitable standards for metadata and other areas. UNESCO and ICSU Press jointly convened a conference of experts on e-publishing in science in February 1996. Later American association for Advancement of Science also joined them in a Workshop on Developing Practices and Standards for e-publishing in Science in October 1998⁽⁴⁾.

Standards both for encoding as well as for metadata have been evolved over the years to meet the technological scenario of the day. SGML/XML and PDF are well known standards for encoding. European Group on SGML developed a standard Document Type Definition (DTD) called MAJOUR now adopted by several e-publishers⁽⁵⁾. W3C has developed Resource Description Framework (RDF) has been developed embedding metadata and presently OWL (Web Ontology Language) is taking its shape for making it visible semantically on the Web..

Then, we have standards for Metadata, both general and specific. These include AACR,

MARC etc. which have been there from quite some time now. The recent addition to these is the Dublin Core now maintained by Dublin Core Metadata Initiative. These standards support a broad range of purposes and business models. The 15 element metadata has been adopted as a universal standard as ISO15836 recently⁽⁶⁾. Michael Day's work 'Biblink: Mapping Dublin Core to UNIMARC' explains the use of UNIMARC in the new environment.⁽⁷⁾ Several agencies in USA such as EPA, FGDC have developed metadata to serve their ends⁽⁸⁾. Another group of publishers OASIS devised a "Minimum Data Set" for journal articles built loosely on MAJOUR⁽⁹⁾. Book Industry Communication (BIC) a UK cross-industry standards body jointly sponsored by the Publishers Association, the Library Association (now CILIP), the British Library and the Booksellers association undertook two projects to develop Electronic Table of Contents (ETOC) for serials and books.⁽¹⁰⁾

These efforts, no doubt, demonstrate commitment from all concerned, but universal standards are still lacking. This is but natural. Standards for universal application and adoption take time to develop and adopt. Moreover, it will be better to involve experts from round the globe in such activity of universal application so that standards are devised for international consumption and exchange.

C. Services/linkage

From quite some time now we have been boasting of a fundamental change in library services. Instead of user coming to the library, the library reaches the user with information. This paradigm shift was the outcome of the introduction of sophisticated current awareness and SDI services.

With the advent of e-publishing this concept is turning fully abloom. The libraries shall have to strive towards end user empowerment linking patrons with information without any intermediary agency. It ensures users access to information from homes or workplace at their own convenience.

However, to ensure recall and precision that we have been long pursuing as a professional doctrine, the library profession shall have to hone up its skills and competencies to work on the beats of the information superhighways to direct the users to quality information to satisfy their current, casual, comprehensive and catching up approaches to information.

Again, the concept of circulation services available in libraries of all hues from a long past now shall have to be redefined. Patrons' ways of access and exploitation need to be chalked out in this 'library without frontiers' scenario.

D. Archiving :

Libraries have been engaged in preserving their print materials always seeking new and novel techniques to be successful in the venture. Though the preservation duty was later relegated to the national library, yet to maintain their collections trim and longer libraries of all hues resorted to this practice on a different scale, particularly in the case of journals archiving. In the new environment individual libraries can not

continue with this practice with presently available facilities and technologies and new models of archiving have to be designed for cyber resources and those converted into digital form from print on paper to avoid space and maintenance problems. This corporate archiving poses a big challenge because of quantity and nature of these new resources.

There is no guarantee that publishers would retain back files online as it involved huge expenditure. Again there is a tricky question. Today you may be subscribing to an e-journal which entitles you to access to archival files as well. If you discontinue its subscription, you are denied archival access to this previously subscribed journal forthwith. This is contrary to p-journals where desubscription will not deprive you of the possession of back files. This is a major issue that libraries face quite often.

There is another major issue regarding archiving of e-journals. Do publishers have enough incentives to provide archival service or will it be left unto libraries. The amount of disc space required for archiving these journals is staggering as demonstrated by Metzner not long ago:

Academic Press has 173 journals on line in the IDEAL service. This amounts to about 20 gigabytes per year. It represents perhaps 4% of the STM literature. So one year of STM as a whole would be half a terabyte. Indexes would add more. ⁽¹¹⁾

Naturally individual libraries may not be able to undertake archiving individually; some sort of consortium arrangement appears to be advisable. Some progress has been made in this direction in different countries. The Andrew W Mellon Foundation, for example, has funded the JSTOR project to work on different approaches to digital archiving. It became an independent non-profit organisation since August 1995 with an ambitious programme which include the following⁽¹²⁾.

- To build a reliable and comprehensive archive of important scholarly journal literature
- To improve dramatically access to these journals
- To help fill gaps in existing library collections of journal backfiles
- To address preservation issues such as mutilated pages and long-term deterioration of paper copy
- To reduce long-term capital and operating costs of libraries associated with the storage and care of journal collections
- To assist scholarly associations and publishers in making the transition to electronic modes of publication
- To study the impact of providing electronic access on the use of these scholarly materials

There can be no two opinions that measure need to be taken to ensure archiving of e-published materials. Otherwise the irritation of missing a document will remain which we experience when we click for a document and the message reads:

Another development regarding archiving of electronic collections has been their maintenance by some agency which would require subscription to access archived collections. OCLC, for example, has taken an initiative to establish electronic collections online. They offer to archive the files of published journals at no cost to the publisher. But libraries will thus have to go for dual subscription; one, for the current to the publisher and the other to OCLC's ECO archives for accessing the archives ⁽¹³⁾.

E. Credibility :

People usually look with suspicion at new ideas and products. No wonder when the print journal was a new exercise Newton insisted that his Principia be published in book format rather than as a paper in a journal.

This is true of e-journals as well. People still give more credibility to p-journals over the e-journals. One of the reasons for giving low credibility to e-journals is the absence of peer-review control which is essential for maintenance of quality and credibility. However, situation is changing and we have several peer-reviewed e-journals and other are about to be in the queue, though the traditional peer-review mechanism has been found deficient on several fronts. We need a uniform, well-conceived and transparent peer-review mechanism.

There is another problem which prompts suspecting the credibility of these e-journals. Commercial search engine services are not committed to any social responsibility and thus their continuity is not secure. It is with this apprehension that EU launched the project Development of European Service for Information on Research and Education (DESIRE) which aims to build an information infrastructure for the European academic community with an ambitious programme of resource discovery which will be supported by subject based information gateways and exhaustive automatic indexing of existing WWW information sources in all subject areas.⁽¹⁴⁾

The third reason for their less credibility is attributed to low turn of articles in e-journals. Harter employed citation analysis technique to impact of e-journals on scholarly communication and concluded:

The overall scholarly impact of these journals on the disciplines is not great. Indeed they can not have a major impact until they publish many more articles annually than they presently do, while maintaining the present overall high quality of their articles. More authors would need to view e-journals as legitimate publication vehicles before e-journal can assume a significant role in the scholarly communication process⁽¹⁵⁾.

F. Maintenance of Quality :

e-publishing is easy and prone to many a vagaries both in content and presentation. The quality control here is of paramount importance. In p-publishing this is done by peer review practice though at times it has been found misused by unscrupulous practitioners. In e-publishing a better version of this peer-reviewing operation is needed to avoid casualty of quality.

What is needed is delving deep into this operation to identify and sidetrack its drawbacks. Attempts are in progress in this direction. Association of Learned and Professional Society Publishers (ALPSP) has done some spade work recently which may inspire improving the practice on a global scale.

It is in fact a very urgent aspect of quality control in e-publishing. Delay or negligence on this front may lead to "scientific misconduct".

Economic viability :

Scholarly publishing, journal format in particular, has been infected by commercialization and profit maximization intentions. This is the reason we have been witnessing burgeoning subscription rates for p-journals over the years making it prohibitive for many libraries to continue subscriptions liberally.

e-publishing so far has been showing a different trend and all concerned have a feeling that they will be relieved of economic crisis in scholarly publishing and communication as they face it today.

Bote and others have dealt with this issue at length reviewing the investigations of others as well.⁽¹⁶⁾ Odlyzko has also dealt with the economics of e-journals and predicts⁽¹⁷⁾:

Electronic journals will become almost universal but most of these will be versions of established print journals, and will be equally expensive. Free or inexpensive electronic journals will grow, but probably not too rapidly.

Another important factor to remember is that producing, accessing and exploiting e-resources require huge investments in real world resources such as hardware, software, internet connectivity, skilled human resources and a host of other physical and technological facilities. Studies to investigate these costs to establish real sense economic viability have thus a priority claim. Though many a journals claim to be accessible free, a thorough study is essential to validate this claim and its extent. You need computer hardware and software, net connectivity and other gadgets and facilities for this 'free' access. Most of the developing countries lack the infrastructure and thus the cyber access shall continue to be the hegemony of the 'haves' with deprivation for the 'have-nots'. Thus it continues to be the 'toy of the West'.

4. Developing countries' Scenario

While talking of e-publishing and its problems and prospects, a staggering situation of its poor impact and penetration into the scholarly world of developing countries needs a special mention. 80% of the world consists of developing countries and it encompasses more than 24% of the world's scientists. These countries are still suffering from information hunger. Language problem, price escalation of journals and other problems have distanced these countries from mainstream scholarship. We also come across the problem now well-known as the 'digital divide'.

However, the time has come when steps need to be initiated to reduce these communication and scientific information gaps. These countries have their own problems such as lack of communication facilities of modern telephone links and satellite etc. Similarly the country regulations of costs and taxes prohibit several countries to procure IT paraphernalia. Unless these countries are provided with communication infrastructure and IT literacy they would continue to be denied the blessings of e-publishing.

In India the situation is almost equally distressing. The country has made great strides in IT industry and has launched network programmes at different levels for e-servicing. Several libraries have on-line subscription features and thus exploit e-resources. The INFLIBNET needs a special mention here which has been launched, and is operating, with an ambitious programme. It is striving towards harnessing the benefits of electronic publishing in India. Other networks are also with a similar mission, no doubt at other levels. The task is enormous and cannot be perfected overnight.

Indian Academy of science took an initiative and organized a workshop in Bangalore in March 2002 to propagate e-publishing in the country⁽¹⁸⁾. A Digital Library of India project has also been launched which will cooperate with other country specific digital library initiatives as part of a universal library project⁽¹⁹⁾.

5. Conclusion

Emergence and spread of electronic scholarly publishing is there. Ostrich like approach will not do. The library and information professionals have to gear up themselves with new and novel competencies to serve as 'linking mechanism' between the sources of information and its consumer. Generations of professionals have been proudly performing this duty over the centuries. The present generation has to continue doing so with new skills and competencies required in the cyber environment. Respect for the traditional philosophy is no doubt good. But any insistence not to change with the changing times is a recipe for stagnation and decline. Thus we have to harness change, not resist it.

What is needed is a strategy from world organizations like UNESCO to launch ambitious global programmes and strategies to promote e-publishing and standards and guidelines for its quality and viability, as it did in the last half of the twentieth century through various programmes including UNISIST and NATIS.

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