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Electronic Journals: A Biomedical Perspective

This paper will discuss the development and future of electronic journals from the perspective of the librarian and the scientist involved in biomedical research. The electronic age offers challenges for both professions and we must take the opportunity offered by new developments to voice our opinions and discuss options to enable us to have a more significant role in future developments in the area.

It is vital that library professionals voice their opinion with respect to electronic publishing, and do not allow themselves simply to be swept along on the wave of technology and become simply a tool of the information technology profession. I will demonstrate that in my area, the biomedical sciences, that librarians must work together with their users, and the publishers to ensure that electronic journals become a more efficient and effective means of scientific communication.

Technology may solve the librarians problem but it could easily destroy most of our jobs. There will always be roles for experts in information, and librarians must become all the more sophisticated in the way in which we tackle the electronic journal age.

The modern journal can be defined as a serial publication of international appeal giving researchers the means to inform others of their work in a standard form, usually in English, that can be accessed relatively easily and is widely archived thus establishing a record of the work. The current pattern of publication in scientific journals in the biomedical area has evolved over a long period and has become integral not only to communication within the scientific community but also to career progression and job satisfaction. The recently retired Director of The Walter and Eliza Hall Institute and current President of the Australian Academy of Science, Sir Gustav Nossal, stated in 1996 that he believed that the system of publishing in journals is so deeply entrenched in the biomedical sciences that it is unlikely to change quickly. Primary research papers in scientific journals remain the linchpin of the system. There are important conventions with regard to the ordering of authors and there are also substantial differences in the quality of journals recognisable in a variety of ways. The era of caring about the number of papers is over, citation analysis plays a substantial, if somewhat dubious role in promotion. From the point of view

of my employer institution, The Walter and Eliza Hall Institute of Medical Research scholarly communications represent the very lifeblood of both the individual scientist and the institution itself. The institute is Australia's oldest research institute and amongst the largest. The tradition of "publish or perish" is very much alive, but at the same time we make use of modern communications technologies to a significant extent and remain very open to the wider use of new and developing technologies. Nevertheless it is prudent to point out here that traditional publication patterns are deeply entrenched and by necessity the system of publishing electronically will be relatively slow to change in the biomedical sciences. The prophets of new technology ignore the realities of the present at their own peril and the future trends in electronic publishing come replete with benefits but also full of risks for the scientist and librarian. If we look at electronic journals in the context of a community of real life working scientists whose style and motivation I know very well, this may save us from getting carried away with electronic publishing as a total future concept. After all the relatively small number of current electronic only titles in the biomedical sciences must tell us something about this particular area of research. It has not rushed along as fast as areas such as the physical sciences and mathematics.

As Elsevier publisher, Robert Brines stated in 1996 "these are interesting times and it is difficult to predict how things will evolve". [1] This statement probably sums up very well the thoughts of all of us involved in this area. We must ask the question-will the scientific community still need scientific publishers? The key issue apart from conservatism and the profit motive of publishers is surely that print publication secures status. Tenure and promotion is still tied to print journals. The publish or perish scenario still exists. However converge of die is the message coming strongly from information technology developments. The electronic content needs to be accorded the same academic respect as print. This concept is a long way off, but how far really? If we consider that more has happened to advance the use of information technologies in the academic workplace in the past 10 months than in the past ten years who knows what will happen.

If we look at electronic journals from the scientists point of view we see some very different attitudes emerging. In preparation for this talk I conducted an anecdotal survey amongst a small number of Institute scientists. All agreed that time, ease of access and full text were essential in the context of electronic journals but all stated that they would at present rather come to a physical library and sit and read or photocopy an article

than spend the time at their terminal navigating large chunks of knowledge. In the biomedical sciences, on the World Wide Web, there is an ever increasing number of titles which include full text article access. So much of what purports to be electronic journals is at present only abstracts or tables of contents. This is frustrating for the scientist who has to actually consult a list and go into the web site to discover that although a journal lists itself as being electronic, is not in fact the case. Tables of contents and abstracts have for many years been covered by Current Contents and bibliographic databases such as MEDLINE and EMBASE in the biomedical sciences so much of what is on the Web repeats what is readily available, in our case networked on a very fast and easy to use OVID system. Scientists stated that when they can do a literature search from their desktop in just a few minutes and then come to the library in a welcome break from experiments and obtain the actual article why would they want to spend hours at the desktop with frustrating delays in communications time, searching and down loading from a number of different Web sites. The common adage of not wanting to take a computer to bed was expressed by a number of those surveyed.

As for publishing in electronic format this is not, in the biomedical sciences an option that our scientists have at present. For the purposes of funding and promotion they still need to publish in traditional journals which are indexed in Science Citation Index. A number were well aware of trends in other areas such as physics where it is contended that the traditional journal is seeing its last days.

The biggest challenge to publishers in this area is Paul Ginsparg at the Los Alamos National Laboratory who maintains an archive of more than 50,000 electronic preprints and articles. URL <http://xxx.lanl.gov/> Ginsparg recently received \$1 million dollars to consolidate the archive and expand into other areas of science. Ginsparg believes that this is the new paradigm and promotes the concept of a living fluid journal which closely reflects the way research actually works. He suggests that this is science shaking off the intellectual straight jacket of anonymous referees, settling scores and burying the concept of rival research. Of course he has his critics who believe that his ideas are fatal for science and could lead to scientist drowning in a sea of unreliable research. In an editorial comment in the journal Nature on 4th April 1996 it was noted that there are new problems being created both with the speed with which information can be transmitted over the Internet or put on a Web page, and the mutation in mentality that some individuals undergo when they get behind the wheel of their

computer.[2] The speed of publishing on the Web has led to cases where data has to be retracted because it has not been analysed properly. Similarly researchers have hastily posted data on the Web before its commercial potential had been considered. Scientists are old hands at shooting themselves in the foot by publishing before patenting. Nature suggests that Web submissions for publication be left to cool for a duration that is directly proportional to their scientific importance or potential for controversy. One could say this is a publisher speaking but when we realise Nature is one of the most prestigious and fastest publishers in the scientific world this gives us food for thought. As our scientists stated it is quality not quantity that is needed and until the concept of electronic publishing is given equal status they will continue to communicate and discuss electronically but not publish in a truly electronic format. Scientists agreed that developments such as the OVID collections of full text biomedical journals which provide full text of journals in the biomedical sciences which can be loaded on in house systems and linked to databases such as MEDLINE are of great benefit. By using the same software to be able to search and link directly into the original article cited greatly simplifies the process of wading through the literature. Companies such as OVID and Silver Platter are taking great leaps in this direction and we must not forget their significance in the electronic revolution.

Of course scientists and librarians both recognise that the frustrations of Web searching are disappearing with the fast emergence of mirror sites for the Web in Australia, thus eliminating some of the problems of distance and time.

An area of particular concern to individual scientists is intellectual property and copyright. In the electronic world such as that of Paul Ginsparg the author may become stronger in claiming work as their own although authors will also have to work harder to protect their rights as the electronic process takes over. Authors are urged to have a separate agreement with publishers in regard to electronic copyright of their work. Data protection and computer security are seen as risks. The flexibility for the movement of data makes it harder to identify the original author, the responsible person or the rights of the owner and publisher. Publishers of print journals typically pay neither the contributor nor the referees and their profit is made from the dissemination of the material. Scientists, as authors have great opportunities from electronic publishing. They can enter the data, proof read it and send the article electronically. The article can then be on the desk of a colleague

half way around the world for them to read at the start of the next working day. Compare this to the current time for paper publication.

Scientists, as users of electronic journals want something more than just scanned images of the journal pages. The Journal of Biological Chemistry is a fine example of an electronic title which is more functional than its printed version. URL <http://www.jbc.org> This has access to the abstract, complete text, and all the graphics of every article. It has sophisticated search facilities with titles, authors and subjects and keywords individually defined and searchable. It is very current and has HTML links to MEDLINE for related searching. Of course the fact that it was until recently free for the past 12 months made it particularly popular in our Institute.

For the librarian, electronic journals can at present be summed up at present by the term "decisions, decisions". What do we do to ensure we provide our users with the most sensible up to date access in this area and at the same time meet our budget requirements? In my case this is an area of enjoyment tempered by many frustrations. Remember how excited we were as librarians with the advent of journals on CD-Rom. This technology, we thought will save all our space problems, however publishers seem only interested in current years publishing in electronic form, both on line and on CD. In our library we made the decision early on to avoid journals on CD ROM and wait for on line technology. I am pleased with this decision as from what we saw of titles on CD in order to make them effective a huge infrastructure spending was necessary in order to make them efficient and effective. The problem of clumsy different search interfaces is still there. I mentioned before The Journal Of Biological Chemistry. On CD it was not user friendly but online it is great. Projects such a Red Sage at the University of California at San Francisco make me green with envy as they have been experimenting with full text biomedical titles and linking them with their Web interface to MEDLINE. The most exciting new development in this area saw the launch of the National Library of Medicine's PubMed free MEDLINE access on June 16 this year. At the moment this is free to the global Web community courtesy of the generosity of the United States government. It provides links to publishers sites for full text journals . Initially 24 titles are available , some free for this year, some by subscription only. This I see as the way of the future for the biomedical area. In our Institute we are about to begin participation the Elsevier Science Direct project. We have been chosen as the only southern hemisphere site for the early release trials. The eventual aim of ScienceDirect is to have all 1100

Elsevier journals available on an institutional basis only. Of course the major stumbling block to all these Web based journals especially in Australia, as I am sure here in Europe is the slowness of connections. This will change in time as mirror sites become more prevalent.

A major stumbling block facing librarians with the provision of electronic journals is economics. There is no way we can afford to pay more for journals in most cases. At present electronic access to most journals in our area is only available if we subscribe to the print copy. This seems to me to be counter productive to the whole process. It leads to more frustrations. First we access the Web site to the journal to be told we have to Register, then obtain a password. This password has to then be communicated to all our scientists wishing to use the electronic version. With each title requiring a separate password and with an increasing number of titles becoming available this is confusing for the librarian and the user. Just one more password! Users of course tend to forget or lose their passwords leading to many calls to the library. Of course once a journal becomes electronic it is also difficult to keep track of usage by scientists, thus making it impossible to gauge the relevance of part of the collection. We must rely on anecdotal evidence when reviewing our collections for the dreaded journal subscription cutbacks each year.

The Journal of Biological Chemistry mentioned before has priced its 1997 subscription as follows: \$US 1100 for the electronic version, \$1400 for print and \$2500 for both. For Australian libraries such as ours this poses a dilemma. At present we pay for an Airmail subscription so if we opted for the electronic version we would have the currency for a greatly reduced price. There would be other savings too, if you know the journal it is huge and we would no longer have to receive the paper version, with no more claiming, binding, reshelving and replacing lost volumes. This seems exciting but of course an electronic-only subscription presents its own management problems. What about archiving? How far back does the access go? If after a year we cancel the electronic version do we still get access to what we subscribed to? In the paper environment you would still have access to what you had subscribed to in the past-the volumes stay on the shelves. It is still unclear how this would work in the electronic environment. At a seminar I attended last month in Australia a group of journal publishers admitted they were avoiding the issue of archiving. You can well imagine the reaction of the librarians in the audience. Then there is the problem of user acceptance. Whilst some of our scientists embrace the e version concept there are still some who resist it. If there was only one title

for 1997 in the electronic version in an institution such as ours with a large number of terminals with Web access both in the library and in the building public access would not be a problem but imagine managing this in a University environment.

There has been discussion about these issues on the Med Lib discussion on the Internet and all librarians agree that JBC online is an excellent product with its sophisticated HTML version with links throughout the article, however some wonder whether scientists really want or need all these links. What we agree we think they really want is a fast way of access and printing of the article. Basically scientists do not like reading screens. They would rather print the article and take it away.

Publishers must recognise that basic need. For the scientist and indeed the librarian requiring document delivery purposes from a journal links are not essential. PDF and SGML are great developments. They allow text and graphic files to be viewed through standard Internet browsers and printed off through a separate non customised software package such as Adobe or Acrobat to provide an exact replica of the original typeset page in the print journal. Thus all features of the online journals can be provided on the WWW without the need for any journal specific interfaces. This gives us the standardisation we need and should provide just the impetus publishers need to allow the long awaited proliferation of full-text online publications.

Transmitting journals across networks on the Internet is of course a major advance but there are those who argue that we can never replace a visit to the library, to browse the journals, meet colleagues and discuss work. Librarians can either sit back and let themselves be dragged along or, do research and communicate with computer professionals, scientists and publishers and become an integral part of the whole scene.

In a dramatically titled article "The Death of Biomedical Journals" in the British Medical Journal in 1995 La Porte and others state that computers toll the death knell of biomedical journals as we know them. [3] They describe their development of the Global Health Network [URL <http://www.pitt.edu/HOME/GHNet/GHNet.html>] which they believe will revolutionise biomedical publishing which will incorporate the Ginsparg system of peer review in bio medicine. They propose that the quality issue can be overcome by rating articles though authors comments to enable some sort of impact factor similar to the ISI Impact Factor rating for journals. They claim that by counting the number of times a research communication is accessed by hyper text this would be fairer than the citation index process. This is an interesting scenario and one which should be discussed at length

amongst scientists, librarian and publishers as we all vie for our place in the electronic world along side the computer technologists. They invite scientist to join the discussion at the Global Health Net Home page .I found this article fascinating, if not rather dramatic, but they do have some sensible things to say such as "in general electronic journals have failed as they merely tried to take the print format and make it electronic, rather than creating a new, much more powerful and attractive format for biomedical research"- "we are not dealing with journal articles any more- we are dealing with research communications among scientists." They state that the terms "article", paper, and publication should die.

Perhaps we have all been wrong and if this is the way of the future where do we see ourselves as librarians. The depressing thing about this paper to me is that there are 9 authors-epidemiologists, consultants, engineers, psychologists and information technologists, but unfortunately no library professional. On the latest version of the Global Health Net Web page there is a link to a page entitled "Scientists Assassinate Journals" It seems this project is somewhat obsessed with the dramatic statement!

However in a paper I co-authored with Sir Gustav Nossal last year we agreed that in the near future paper and electronic journals will co-exist. [4]We must remember smaller publishers will not be able to afford the infrastructure , nor will all readers be able to use an electronic format. We must not forget the developing world who are a long way behind in telecommunications and computer technology. There will be an increasing distinction between profit and not for profit publishers. Electronic pre prints will continue to grow as scientific communication but we must continually question the use of these until there is some way of ensuring factual accuracy and the peer review process is universal.

Technology certainly both solves librarian problems and creates more. In the area of electronic journals librarians can use their sophisticated skills in knowledge management to ensure that our libraries become less like warehouses and more like a software system . We must realise that the value of our library will lie in the power of its sophistication and versatility. In the area of the electronic journal, librarians must promote their knowledge and skills, do research, communicate with computer professionals, library users and publishers to ensure we keep our institutions at the forefront of the electronic revolution.

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