JOURNALS OF THE FUTURE: ORDERLY SHELVES V. NETWORKED INFORMATION

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What effect does the steady increase in the cost of serials have on a technological university library? What are the pros and cons of alternative methods of communication and how will these change the librarian's traditional role of 'information broker'?

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The University of Bath has supported the inflation of book and serials costs in its library over the past four years and Figure 1 represents a fairly typical picture to anybody who has been involved in academic library management over that period. Expenditure on books has increased by 20%, whilst expenditure on periodicals has increased by 57%. The situation is not one where serials have been squeezing books; the library has been given funding to meet its benchmarks for acquisitions: 2,200 current subscriptions and 10,000 books a year. Figure 1 therefore represents the real cost inflation of one (mainly) technological university.

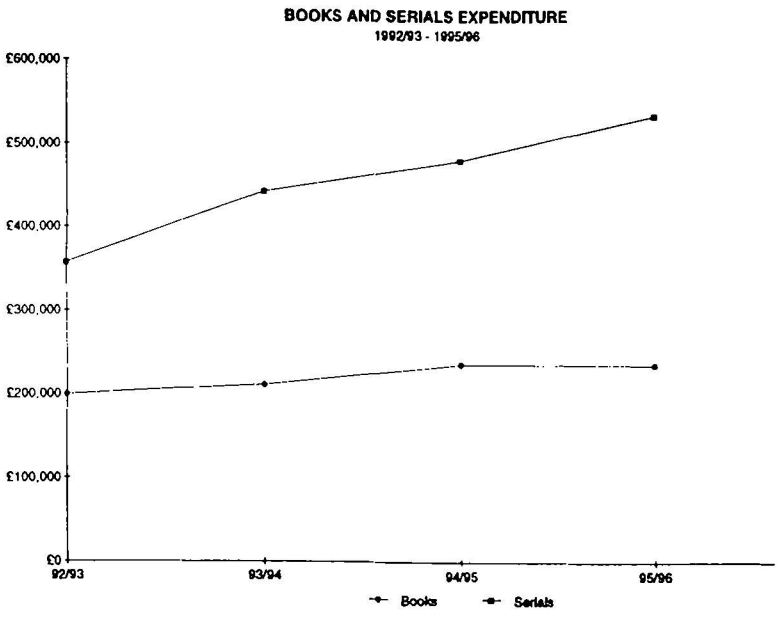

Figure 1

The distinction being made here is between cost indices and price indices; the Bath figures will not exactly parallel price indices such as the Library and Information Statistics Unit at Loughborough University's indices of the average prices of books in the UK and the USA, or Blackwell's annual Average Prices of Periodicals index. The Bath figures will also reflect the Library's purchasing decisions. There is a fascinating and little researched area here, I believe, namely, the extent to which the differing structures for collection management, such as centralised acquisitions as opposed to devolved decision making by subject librarians, affects the relative costs borne by the libraries concerned.

Any financial manager is going to look closely at serials, given differential rates of inflation such as these. Figure 2 represents the University of Bath Library's serials costs by subject.

Serials - average cost per title by subject: 1995/96

	£
modern languages	76
education	88
social sciences	99
architecture	116
management	161
mechanical enginering	273
mathematical sciences	333
chemical engineering	358
electrical engineering	385
pharmacy	533
biology	598
materials science	605
physics	697
chemistry	940
(overall average	277)

Figure 2

The average subscription is nearly £300 a year, but the variances are very large, from sociology at £100 per title to chemistry at nearly £1,000 per title. £1,000 is a lot of money; it would also buy a lot of on-demand document delivery, even at premium express rates. When individual subscriptions reach that sort of level librarians start doing mental arithmetic along the lines of: what proportion of the articles in this printed journal will be consulted? Well, we know that only about 20% will ever be cited and librarians strongly suspect that not even all of this 20% have been read by the scholars citing them. Would it be more cost-effective to offer a current awareness service supported by free document delivery for whatever the proportion of articles is that will be required for consultation? The librarians think about it, but on the whole, they do not then do anything about it, other than pay the next year's 10% increase on those titles that they can still afford.

Why do they not try the alternative? Partly because librarians and academics are a cautious lot and nobody wants to be the guinea pig and partly because the alternative, electronic, methods of delivering academic information still are not clear or road tested.

How then does the library manager view the emergence of the e-journal in relation to these quandaries? Of course the e-journal is just one of a number of developments, including: OPACs and the development of digital libraries; current awareness, indexing and alerting services with selective document delivery; online pre-print services; bulletin boards; e-mail and discussion lists.

I think I only need to explain the first one more fully, that is, OPACs and the development of truly digital libraries. The Internet and World Wide Web are a sort of Mad Max world of publishing, anarchic and uncontrolled, reflecting the psycho-babble of human diversity. Publishers and librarians are doing what they have always done: selecting and making available what they feel to be best, or of most interest to their customers. Ideas of cataloguing all the information on the Internet are as unrealistic today as those dreams of universal bibliographies were in the early centuries of printing. Already we can see developing digital libraries in the real sense of the word, pre-selected and cached collections of electronic information, often accessed from a traditional library OPAC. For a relatively developed example of this I would refer the reader to the library of e-journals mounted by the CIC Center for Library Initiatives in the United States,

whose 'Gopher Collection' comprised some 700 e-journals in February 1996.

Pre-print services are also a major factor for change, the most significant at present being the physics pre-print service from Los Alamos in Texas. Interestingly, however, at present such services still rely on good old-fashioned print on paper for their authority, even if the paper version does not come along until some six months later.

There are two general points to make in connection with all these developments, both central to the journal of the future. Firstly, today's electronic information services are largely based on read-only access to defined texts controlled by the publisher and/or author, but with networked information the potential for interactivity is always there. At present there is only unrestrained interactivity on e-mail and discussion lists, and these present a world of communication which is closer to performance or conference than publication. Secondly, we must expect these new services radically to change the nature of scholarly communication. Interactivity and pressure for currency both tend to lead in the direction of shorter texts, pre-prints, abstracts and the 'notes and queries' type of contribution. It is significant that so many of the new e-journal titles reflect this trend, for example, Letters Express from the Institute of Physics Publishing. Combined with full-text indexing these tendencies are changing the 'unit of information' from the traditional article or chapter to something much more bite-sized.

Having set this context for the networked services of the future, I would now like to focus on the printed academic serial in comparison with the e-journal and in doing so highlight a few of the management implications. Printed academic serials have, on the whole, an established hierarchy of reputation and most are subject to peer review. By comparison, the reputation of e-journals is unestablished, or is by reference to the previously established print version. Only a few e-journals are subject to traditional editorial controls such as peer review.

These first two points of comparison are central to the librarian's traditional role of 'information broker', a role which will doubtless become increasingly demanding. In the electronic future very few end-users will want to wade through the Internet searching for their own information, even if they can use programmes to do it. Most customers will still present themselves saying something like: "I've got two hours to spend on this, what should I do?", and most librarians will still do their best to help them. But presumably librarians, information workers and a few other categories such as state intelligence workers, will still have to face the challenge of trawling the oceans of information for what is worth harvesting.

Printed academic serials usually have defined, 'authorised' texts with clearly defined authorship. By comparison, the texts of contributions to e-journals may be subject to revision during or immediately after publication, and they may exist in several versions. E-journals are fertile ground for multiple authorship, propagated in part from the new interactive facilities, such as 'skywriting'.

These points of comparison represent major areas of challenge for the traditional librarian's functions of cataloguing and archiving. There is clearly a connection between the growth of the Internet and the rise of transnational, multi-authored publications, which, according to the Institute for Scientific Information, have increased from 10% of articles in their databases to 25% over the past five years, the years of the Internet. E-journals are increasingly complementing traditional authored articles with the interactive, discussion list function, something which can not be controlled by the traditional methods of bibliographic control. Furthermore, the rules for electronic copyright are unclear and any possibilities for their enforcement unconvincing. The message for the future is clear: tracking the authority, legality and integrity of the text will be increasingly challenging for information brokers.

There is little scope for the further development of printed academic serials as a form. By comparison, there is massive potential for added value with the newly developing e-journals, such as full-text indexing and the capability for display of three dimensional graphics. This comparison spells one message for library managers: the need for updated IT skills and for our staff to be able to teach those

skills to other members of our communities. In connection with this arises the obvious question of where networked information will be used. At the University of Bath we are rebuilding the library, putting in 350 networked computer workstations. Such developments are happening in academic libraries all over the UK. We have designed the refurbished building in such a way that a further 350 seats could be 'enlivened' and made computer workstations, but we have really no clear idea as to what extent they will be used in with the 700 traditional reading seats, or whether people will come to the library less, accessing the networks from outside the building for private study and coming to the library for group work and social reasons only. The future development of CAL (computer aided, or computer assisted learning) is crucial here. It is one use of central IT facilities that could potentially swamp the library/learning centres of the future. At Bath we are sure that the newly refubished Library and Learning Centre will still have an important social and peer-learning role to fulfil and that a large central IT facility will be useful for a good while for group work and IT skills training.

There are standard arrangments for the licensing of printed academic serials, mostly involving predictable and fixed costs. By comparison, e-journals are commercially uncharted territory. Currently the majority of e-journals are free, or free with the print version but librarians are apprehensive about possible future charging mechanisms, fearing uncontrollable costs.

It is clear that librarians shall face a far greater requirement for financial management skills and that they shall have to be more willing to take risks. The networked information services with which we are all most prepared to experiment at present are the fixed cost, subscription-based services. Librarians feel safe with these because they can gauge value for money by estimating in advance and monitoring unit costs per user, or search. This kind of calculation fits the cosy, bureaucratic world of civil servants and finance officers.

It is an odd fact that, at present, the vast majority of e-journals are free. Steve Harter of Indiana University estimates the proportion at 88%. This is partly because the publishers are using them, one way or another, as loss leaders to stake out their claims for the future mass market in electronic publishing, and partly because early examples have been published on a non-commercial basis, or for PR reasons. However, there is already extensive speculation about future possible charging mechanisms very different from those of the past. Amongst the models discussed for e-journals are: pay per access to title, by connect time; pay for pages read; charging according to popularity of the article. This last suggestions is particularly unpopular with librarians used to the subscription principle of 'the more subscribers, the cheaper the subscription'.

Printed academic serials are basically inert within the library, sitting on the shelf. Mutilation, theft and grubbiness are the best indications we have of use. By comparison, e-journals and the networked services to access them have an extensive capability for being self-monitoring and for the provision of management or market research in formation.

This point of comparison is really just a marker for the future, and I am not aware that anybody has researched it yet. All librarians know of the long history of attempts at methodologies for recording the in-library use of serials. Their lack of success is visible in the fact that at an earlier point in this paper I could only refer to citation counting for firm evidence of use of serials. Here I do no more than point out how e-journals and networks for access to them can be self-monitoring, with all the implications that this has for the publishers' market research and the library managers' management information.

The shelf copies of printed academic serials form an archive in each subscribing library. As yet there is no clear policy for the ownership of the archival rights to e-journals. This issue is crucial and fundamental to winning the trust of the librarians. Publishers and authors cannot be allowed to take this responsibility; obviously they are unaccountable if they fail to fulfil it. Even if it involves the expense of maintenance charges for keeping electronic archives within libraries, or some sort of "Escrow" arrangement underwritten by independent agencies, librarians are unlikely to trust dependency on e-journals for the scholarly record until there are

satisfactory arrangements in place for their archiving.

My final point of comparison is one which causes me some perplexity, that is, the relative speeds of publication and currency between the existing print and electronic journals. Nobody can deny the relative slowness inherent in traditional scholarly publishing, with editorial and production delays often compounding delays caused by queues of contributions for the better printed academic serials. Yet this seems to be one area where e-journals have not yet demonstrated their capacity for speed or flexible extent. Certainly peer reviewed e-journals such as *The Journal of Buddhist Ethics* are achieving submission to publication elapsed times of about two months, and of these two months as much as six weeks is taken up by the peer reviewing process. Perhaps the problem lies outside the publishers' control. The majority of volunteer reviewers are academics who will only do the reading out of term! Even so, two months can be a long time in the world of STM research and e-journals will continue to suffer a disadvantage in currency terms, unless the elapsed time can be reduced further. But the first horseless carriages only managed to match the speed of the horse, so I shall be patient and wait in expectation.

In conclusion, I am sure that e-journals are, along with the rest of the basket of networked information services, the basis for great improvements in the effectiveness and efficiency of future scholarly communications. In turn, however, the librarians and information workers will have to learn new skills in managing them, adapting to new roles as information brokers and information skills teachers, rather than monkish custodians of well ordered, but dusty, shelves.