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E-Co-operation

The habit of library co-operation

Libraries and librarians have been pre-disposed towards co-operation since before the word "electronic" was coined and so it should come as no great surprise that this has provided an almost instinctive motivation when faced with the new challenges of the electronic information environment. Indeed libraries were some of the early adopters of "new technology" and library automation already has a forty year history. Perhaps the best examples of this come in standards work whether classification schemes such as UDC or record exchange formats such as MARC. Such co-operation has fostered the emergence of such services as international inter-lending and document supply, a much under-regarded triumph of the negotiating skills and standards work of librarians[1].

At local level, individual and numerous efforts have been made to share collection development policies; union catalogues of all sorts remain a typical goal; common staff training programmes are widespread and shared information on journal cancellations is also widespread. Even common access rights for staff if not students are steadily spreading. But there is a feeling that this achieves little but equality of mediocrity. The Research Support Libraries Programme[2] (RSLP) in the UK has recently announced a study into barriers to deep resource sharing, that is the treatment and management as a single collection of the collections of several institutions. However while collection size remains a virility symbol for most institutions, it seems unlikely that that really deep co-operation will flourish. Unless and until institutions outsource their library collections and services to a third party in the shape of a metropolitan library, it is difficult to see anything other than marginal resource sharing.

At the same time as these cautious steps have been taken research has become an increasingly collaborative international activity. Studies have repeatedly shown that in the last decade multi-authored papers have grown in number while at the same time the number of co-authors from the same institution has steadily declined as a fraction of the total.[3] The first papers with over one thousand joint authors have appeared. Such research must stand on a common base of research knowledge and it can be no coincidence that this has happened at a time when networks and electronic information have expanded, even as most libraries continued the ever gentle decline into discreet but distressed poverty.

Electronic co-operation seems to some librarians then to offer possibilities for avoiding many of the issues which dog traditional resource sharing. The fear of being swamped by non-institutional users, of resources becoming unavailable to the main user group and of opening hours all disappear in the great universal twenty-four hour pond which constitutes the Internet. But the reality is inevitably more complicated than the rosy-tinted aspiration. This chapter will look at two types of e-co-operation. Firstly the use of electronic tools better to manage and share existing, effectively

paper based, resources; secondly to consider sharing electronic information resources and services which exist only in electronic form. In both cases barriers as well as opportunities exist.

Sharing collections: the barriers

Co-operation has proved possible in the relatively confined world of paper-based libraries. It proves much more difficult in an electronic world with many other stakeholders. Although great progress has been made in areas such as electronic preservation and metadata standards a whole variety of other issues from network topology to intellectual property rights dog the development of truly shared and co-operative endeavours. The most fraught area perhaps because the newest is that of new "born digital" material, whereas libraries continue to make progress where electronic tools are used to foster the sharing of existing paper resources.

One difficulty lies in the still incomplete state of catalogues. The Full Disclosure[4] study estimated that the number of items still requiring retroconversion in libraries was fifty million. Sadly, the Library & Information Commission, which commissioned the report, has been replaced by a government agency called RESOURCE, with an expanded remit covering museums archives and libraries, but with little apparent interest in engaging with this or other major library issues. More happily other agencies are attempting to fill this vacuum and a more recent study[5] undertaken for the British Library, the JISC (Joint Information Systems Committee) and the RSLP has proposed the creation of a National Union Catalogue. This seems likely to go ahead, at least in the serials area, where records are notoriously poor.

The British Library has also taken a recent and more positive approach to sharing. Its Co-operation and Partnership Programme[6] seeks to create groupings locally and regionally as well as nationally. It is funding a number of studies and projects with this in mind. At a more strategic level the Higher Education Funding Councils have joined with the national libraries to set up a strategic review group[7] looking at the future of collections and access to them nationally, including preservation issues. It is intended that this group will expand to cover the public library sector, thus taking on some of the strategic role abandoned by RESOURCE.

Another interesting consortial approach which claims to be about collection sharing – although it appears to have more to do with interoperability and access - is The European Library (TEL) Project[8]. This links the national libraries of Finland, Germany, Italy, the Netherlands, Portugal, Slovenia, Switzerland and the UK with the Instituto Centrale per il Catalogo Unico in Italy and the Conference of European National Libraries. With a grant of 1.2 million euros, the project will make recommendations on interoperability, while the partner libraries have all committed to making digital collections available at the end of the pilot stage. The libraries use different standards for cataloguing, indexing and preserving materials and reaching a consensus on the way ahead will be no small task.

Electronic Journals and the revolt of the Academy

Commercial electronic products can be inimical to resource sharing. Once paper materials had been published by a library they were available to all. While the same can be true of consortially purchased materials, electronic products bought by single institutions can have very restrictive licensing conditions, which prevent non-members of libraries from using them. The definition of library and indeed universities and other membership institutions is blurring. Although co-operatives have operated in metropolitan areas for many years with a whole panoply of acronyms from BRASTACS to CALIM, this has tended to operate at a fairly superficial level ranging from staff training to reciprocal access. Deep sharing of collections, which allow the

material in a group of libraries to be treated as a single entity has not really happened. There are many possible reasons for this varying from the statutory to institutional rivalry. However a number of studies have been commissioned in 2001 to explore these issues and to find the real nature and extent of the problem. The results will be awaited with interest. The position has not been helped by the commoditization of information and its consolidation into an ever smaller number of major media conglomerates on the one hand and a deeply hostile set of attitudes to what were seen as reactionary and restrictive practices by libraries on the other.

For some time concern has been expressed by librarians over the cost of journals in general and the price, terms and conditions associated with electronic journals. One of the first attempts to address this was the formation of SPARC[9], the Scholarly Publishing and Academic Resources Coalition. With the motto "Returning Science to Scientists" it set out to create a new stable of attractive low cost scholarly journals which aimed to use technology to cut costs and promote access. It has grown steadily and in 2001 will open a European office[10], to try and spread the benefits of cheaper journals more widely.

There is a marked and growing dyspepsia with electronic journals. Despite the hype they can remain difficult to use. One study found that 55% of the e-journals in its sample could not be accessed on the first attempt, with more than half the failures due to problems with the journals themselves, while about one-fifth of the journals had incomplete archives[11]. In the UK the first NESLI deal with Academic Press included an agreement that should the deal not be renewed the files would be archived with the community. In the event this has happened and the community is left not only with a huge file with no obvious home, but an incomplete file since the publisher has felt unable to provide any of the images or tables for copyright reasons – thus one suspects rendering the file practically unusable.

One of the most encouraging features of the last twelve months has been the awakening of the scientific community from its torpor on the future of scientific communication. A recent letter in the Guardian correspondence columns[12] raged against "scientific feudalism" as practised by major STM publishers. The Public Library of Science is a groundswell activity initiated by Varmas, the originator of PubMed Central. Some 23,000 scientists in over 160[13] countries have signed the petition which declares that from September 2001 the signatories will publish only in journals which offer free access to their published articles six months after publication and which have their (biomedical) articles archived in PubMed Central. Whether or not this initiative succeeds huge progress has been made in that thousands of academics and not just librarians recognise a major issue to be addressed.

The Open Archives Initiative and e-print servers
For some time a small band of zealots led by figures such as Ginsparg and Harnad have argued for the creation of public domain archives of scientific research. These initiatives were typically based on the concept of large international centralised but discipline based sites. After several years when this attempt to break the dominance of commercial publishing over scientific research has seemed to have a limited effect on commercial scientific publishing, the Open Archives Initiative[14] has given the concept a new lease of life, although now with a burgeoning of institutionally based e-print servers. Essentially the Initiative offers interoperability and cross-platform searching for electronic pre-prints. Such servers are typically managed by libraries and since this co-operative activity relies on the adoption of common standards rather than the creation of common facilities it may have greater prospects of success.

Co-operation, Funding and Charging

Co-operation between different library sectors is an inescapable way forward. Such working is not, of course new. For many years Local Information Plans (LIPs) have played a much neglected part in trying to foster co-operation. But they have perhaps proved rather static and need increasingly to look at much deeper levels of resource sharing as well as sharing information about resources. Yet over much of the country, shared and publicised access, at least for reference use, would represent a significant step forward in local co-operation. New technologies have made some ambitions simpler and more accessible than hitherto. For example local websites linking OPACs are now a realistic possibility. This can operate either at the simple but effective level of the M25 Group linking higher education libraries in the London area, or at the deeper level of the CAIRNS Project in Scotland, which allows cross-platform searching.

Co-operative acquisition and shared purchase are two other somewhat traditional and perhaps neglected activities. In British higher education the practice for a decade now has been to seek national site licence deals, a practice begun by CHEST on behalf of the Funding Councils and latterly carried out by NESLI (National Educational Site Licence Initiative). At the same time as NESLI deals have become less and less attractive - for a variety of reasons - there has been a separate growth of interest in regional cross-sectoral deals based on the MAN (Metropolitan Area Network) structure. Areas as disparate as the West of Scotland and the West Midlands have begun discussions with publishers on deals of this nature. Most of the agreements to purchase specialised material, whether organised by subject or date, seem to have fallen into desuetude. However projects such as the Glasgow University based GAELS project seem to imply a renewed interest in deep resource sharing.

National deals have been characteristic of the 1990's, but even as their acceptability appears to be diminishing in the UK, countries such as Canada are embarking on this process with major national initiatives. In essence such deals offered publishers little but reduced income in return for reduced sales and reduced administrative overheads. Major publishers are beginning to approach regional deals rather more eagerly, since these open up the possibility of increasing income by adding new groups such as schools to a consortium, thus getting at least some income from sectors where full price sales would prove impossible.

Perhaps one desirable funding model for national negotiating agencies would be to provide national templates for regional deals. There seems little merit in each region of a country spending large amounts of time negotiating individual contracts given that information on terms and conditions will quickly spread round the system. It seems at least theoretically possible that pricing based on a formulaic model could be negotiated nationally, allowing regional consortia to determine which constituent groups will accept a deal and using the formula to calculate the cost without the need of protracted and expensive negotiations.

Regional trading companies and consortia are beginning to emerge in the UK based on the Metropolitan Area Networks. Hitherto the MAN structure has been dominated by technical considerations. However as they become settled structures there is much more interest in how they can be used effectively. The cross-sectoral state-wide consortia common in the United States or such as CAVAL in Australia, is beginning to be looked at with interest.

Local digital libraries are the most interesting way of bringing together a range of cross-sectoral resources. The Glasgow Digital Library is one such model. Although funded by the Research Support Libraries Programme of the Funding Councils, it is a cross-sectoral project which includes public, Further Education and Higher Education libraries and has set out to create a completely new library in Glasgow with access to

new resources of relevance to the entire local population. Other such libraries are being planned and there is as yet no single standard model which is emerging - although the concept of collections free at the point of use does appear to be an important basic requirement. Similar developments are beginning to emerge in the West Midland s and the North East of England.

The nature of what to include may be eased by the more relaxed attitude of publishers to intellectual property rights. Organisations as varied as the British Medical Journal, Elsevier and the Association of Learned, Professional and Society Publishers have all eased restrictions on authors, broadly allowing them to post individual articles on local websites. It does not take much thought to see the output of local authors as a key building block of local digital libraries. Conversely, some publishers such as Elsevier, an undoubted industry leader, remain wedded to the notion of fixed access points[15] (ie your pc in your office), apparently flying in the face of the trend towards more mobile computing devices.

Universities and E-Universities
Of course most libraries are part of larger organisations. The nature of these parent organisations is also changing dramatically in the face of globalisation with co-operation an increasingly prominent phenomenon both encouraged and enhanced by the development of networks. One example of this can be seen in the massification of higher education.

Universities in the west of Scotland tend to be thought of as local universities. 40% of their student intake comes from within 35 miles. Strathclyde University has about 20,000 students and about 15,000 of them come from the heartland of Scotland. That is the traditional core business, but the university is branching out in all sorts of ways. Increasingly, and typical of the sector it is a global university. There are a further 40,000 students who come to the university for an examinable qualification every year, bringing the student base to 60,000 people. These students come from over 100 countries, some of them in residence and some of them working abroad doing sandwich years of various sorts, as well as many people from the surrounding area seeking to update their skills or find new ones.   The university market has been globalised. Strathclyde University is not untypical with such arrangements as a business school in Shanghai, shared degrees based in Malaysia where pharmacy students undertake two years of training and then come to Scotland for their third year and a European Masters degree in business in which the students take modules at four different universities and move around Europe doing it. It is a joint degree, jointly awarded by all four universities. This is very different from the sort of university of even a decade ago.

And the same blurring is true locally. Strathclyde has a joint postgraduate law school with the University of Glasgow, joint social work and journalism departments with Caledonian University, and some joint nursing degrees with Bell College. It is very difficult now to say where the boundaries of the university stop. When one comes to issues like site licensing of journals, that then raises all sorts of interesting issues as to what constitutes a site. Students increasingly work away from the university. Building programmes in universities have not kept pace with expansion. We rely on de facto distance learning, on students not turning up at the university for significant periods of the week, because there is nowhere to put them. We rely increasingly on students studying in residence halls and at home. Anybody who has tried to use a modem from home with its wonderful 56 kilobyte capacity will understand why many students would prefer to go to the growing number of community learning centres with broadband technology and broadband capacity.

Students will continue to go to local places. Increasingly, students will be undertaking legitimate study in libraries which are not part of the institution. At the same time, a typical university will have literally hundreds of staff and students at any one time off-site who quite legitimately want to gain access to the resources which have been purchased and paid for. The concept of the university being a bounded physical place in which students work and study has disappeared.

There has been a growth in the concept of e-universities. Not only has this been seen as a way for existing universities to broaden there student base, but as a commercial opportunity for new companies. Consortia of universities such as Universitas21 and the European Consortium of Innovative Universities have appeared internationally while in countries such as the Netherlands and the UK national initiatives have been launched. Commercial providers started well and those such as the University of Phoenix have earned excellent reputations. However the market has proved tougher than expected. Pensare, the e-learning company which developed the technology for the Duke University MBA Cross-Continent programme has filed under Chapter 11 of the US bankruptcy laws, in the light of the general financial freeze facing dot.com companies. Unext, one of the major companies in the field has downsized its educational operations. Quisic (formerly University Access) has pulled out of education to concentrate on the corporate market because of lack of funds, thereby affecting plans for courseware development both at the University of North Carolina and the London Business School. FTKnowledge, part of the Pearson Group has also been moving away from stand alone e-learning products. All of this reflects the fact that the market is developing much more slowly than the enthusiasts had predicted.[16]

Nevertheless, the growth of shared web-based courses seems inexorable. Even if this were not likely for commercial reasons, both the Higher Education Funding Councils and the European Union have set aside massive funding to promote such developments. Inevitably this will involve libraries in a range of activities from the creation of some parts of the courseware such as reading links with hotlinks to texts or other resources, to the preservation and cataloguing of the courseware itself.

New opportunities for libraries
Hitherto most electronic co-operation between libraries has concentrated on the mechanisation of traditional and well understood practices. Shared or consortial library systems; shared or co-operative acquisition of commercial products and shared work on standards. But we have now moved to the brink of exploring quite new forms of co-operation.

Co-operative Digitisation
Much writing ranging from nostalgia to scare-mongering has either predicted the death of the library in the digital environment or tried to open up quite new avenues of activity.[17] This tends to be on the lines of Lesk's view[18] that "Libraries must focus on access and service, not buildings and volumes". Much of such thought is predicated on the growth of commercial rivals ranging from search engines to publishers. In reality, search engines can only ever be as good as the cataloguing of the resources, while there has been a consistent tendency to ignore the unique, the ancient and the public material which represents much of a library's acquisition and work and which will rarely be taken up by the commercial sector. Therefore a growth in interest in collectively created public sector and semi-commercial resources is a very welcome development. Projects such as SCRAN[19], which open up cultural resources from museums, galleries and archives as well as libraries, have been much admired. The £50 million set aside by the New Opportunities Fund for the digitisation of resources has brought together a large number of cross-domain consortia, which will produce enormous quantities of digital content from the public sector. This is perhaps

potentially the most enriching feature of e-cooperation. Rare and inaccessible materials from all over the UK will be made universally accessible either free or for nominal sums. Although the scale of such digitisation is remarkable, other major multi-million pound programmes, notably in the Higher Education sector, have already digitised substantial collections under both the Non-Formula Funding (NFF) programme and the RSLP programme. "Born digital" collections are rarer. One project looking to develop this is the Scottish University Libraries SAPIENS project[20] which is exploring the creation of Scottish scholarly journals on-line. Other projects to catalogue in some detail material such as company reports[21] represent real "value-added" to users.

International Co-operation and Timeshift

Most co-operation is based on some kind of geographical contiguity. Although some sectoral or subject co-operation has taken place it has always been limited. An interesting new area of co-operation is then found thanks to time-shift. The London School of Economics in the UK and McQuarie University in Australia have announced a joint twenty-four hour IT support service[22]. Others are known to be examining similar initiatives for library reference support. This would appear to offer exciting possibilities for the provision of 7x24 services to users, who will increasingly operate in different times and spaces from the physical library with its typical twelve hour opening period.

There are many international co-operative projects, notably in the field of digitisation, but these tend to be limited in scope and content. Lesk has noted[23] that where commercial publishing ventures tend to concentrate on full text, fairly complete and often image-free resources, the library material is often scattered, represents exhibitions, is heavy on pictures and light on text. He suggests that by concentrating on little – used out of copyright material libraries may remove all of the issues to do with intellectual property rights, but offer collections which are still of little interest. This is perhaps an over-cautious view. On the one hand the act of assembling scattered materials into a coherently available collection makes the material more useful, while on the other hand there is much evidence that the very act of digitising or cataloguing into an OPAC greatly increases use of previously neglected material.

Information arbitrage

Very little effort appears to have been made by librarians to explore the concept of information arbitrage. Users show a surprising naivety when faced with the Internet. There is a simplistic assumption that because it is easy to find answers there, these are correct answers. There is also a tendency to assume that resources are both comprehensive and based in North America. Thus has grown the group for which Plutchak has coined the mellifluous phrase "The satisfied inept"[24]. Although the inadequacy of search engines is almost a commonplace, it has come as a shock to many to discover how partial search engines are. The search engines have recently come under proper scrutiny. Rather to everyone's surprise it has become apparent that they address only a fraction of the then estimated 720 million web pages. Coverage varied from a best of 34% for Hotbot to a worst of 3% for Lycos.[25] Within that, up to 5% of links were "broken" although "pages that timed out were not included in these statistics"[26]. Less remarked has been the concept of cybercolonialism. One of the best examples of this is the History Channel's series on the mid-nineteenth century war between the northern and southern states of the United States called "The Civil War", which is shown throughout the world, apparently unthinkingly assuming that there has only ever been one civil war in one country.

Much library effort has gone into the creation of portals, which will attempt to identify relevant and appropriate resources and quality assure them in some way. Much of

this effort is co-operative. However all of this effort is aimed at assessing the quality rather than the availability of sites. Indeed the whole issue of the evaluation of digital libraries and digital information remains at the stage of identifying terminology and concepts[27]. No discussion appears to have taken place on whether a form of the Pareto Principle (the 80/20 rule) might be relevant. In other words is a "perfect" site available only 20% of the time superior to a less complete site available 80% of the time. It is again a commonplace in Europe that North America becomes a virtual country in the afternoon as local traffic grows and slows response times to unacceptable levels. Identifying and providing access to mirror or alternative sites to the east rather than the west may provide better quality responses. In commercial terms seeking to purchase access to off-peak resources on the other side of the globe should be explored. There is a substantial opportunity for librarians to explore the provision of independent, authoritative and right information.

Conclusion

To paraphrase Ranganathan the development of electronic media and new forms of co-operation amongst libraries creates an environment where a role offers itself in the provision of the right information in the right format at the right price for the right user at the right time.

[1] . Law,D. Access to the world's literature: the global strategy *Library Review* 47 (1998) pp296-300

[2] The RSLP homepage may be found at http://www.rslp.ac.uk

[3] Lesk, M.   The organization of digital libraries in Stern, D. Digital Libraries: Philosophies, Technical Design   Considerations, and Example Scenarios   New York, Howarth, 1999

[4] Chapman, A., Kingsley, N. and Dempsey, L.   Full Disclosure: Releasing the value of library and archive   collections (LIC research report 10) London,LIC,1999

[5] Stubley, P. Bull,R. & Kidd,T   Feasibility study for a national union catalogue. Prepared for the Joint   Information Systems Committee ….. (by the University of Sheffield), 2001

[6] The Library Co-operation Website is at http://www.bl.uk/concord/brief3.html

[7] Smith, G. & Milne, R. Towards a national strategy for research support   *Library Association Record* 103 (2001), pp417-418

[8] This project is described at http://www.europeanlibrary.org

[9] A description of the project may be found at http://www.arl.org/sparc/

[10] ACOSC Digest of Scholarly Communication News, June 2001 posted on LIS-SCONUL, 1st June 2001

[11] Harter, S.P.& Kim, H.J. Accessing electronic journals and other e-publications: an empirical study   *College & Research Libraries* 57 (1996) p454

[12] *Guardian* May 28th 2001, letter from Alex Lankester

[13] Up to date information may be found at http://www.publiclibraryofscience.org/

[14] Van de Sompel, Herbert   The Santa Fe Convention of the Open Archives Initiative   *D-Lib Magazine* February 2000 Vol 6 No 2   13pp

[15] Wissenburg, A.   The future of journals publishing? 2p. (2000)   http//www.kcl.ac.uk/depsta/iss/cit/news/newsletter/issue3

[16] Bradshaw, Della   A bankrupt idea's great future   Financial Times p9 May 28th 2001

[17] For example, Lombardi, J.V.   Academic Libraries in a digital age   *D-Lib Magazine* V6No10 (2000) 10p.   http://www.dlib.org/dlib/octoberoo/lombardi/10lombardi.html

[18] Lesk, M.   The organization of digital libraries in Stern, D. Digital Libraries: Philosophies, Technical Design   Considerations, and Example Scenarios   New York, Howarth, 1999

[19] The SCRAN homepage may be found at http://www.scran.ac.uk

[20] http://cdlr.strath.ac.uk/projects/projects-sapiens.html

[21] Project details may be found at http://www.score.ac.uk

[22] LSE Information Technology Services Newsletter No 43, Summer 2000.   http//www.lse.ac.uk/Depts/ITS/newslett/nl43_s00/contents.html

[23] Lesk, M. Practical Digital Libraries: Books, Bytes and Bucks   p.261 San Francisco, Morgan Kaufmann, 1997

[24] Plutchak, T.S. On the satisfied and inept user *Medical References Services Quarterly* V8 No 1(1989) 3pp

[25] .Lawrence, Steve and Giles, C. Lee   Searching the World Wide Web   *Science* 280 pp98-100,1998

[26] . *ibid.*

[27] Saracevic, T. Digital Library evaluation: toward an evaluation of concepts   *Library Trends* 49 (2000) 350-369