The Impact of Networks on Libraries

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Introduction

What I want to do is to talk briefly about networks and their technology, as they are now, and then move on and look at their development in the near to medium term. More importantly I want to look at what their impact might be on libraries and our services and policies. I also think I have to qualify my paper by adding that my perspective is first and foremost that of an academic librarian, though I hope that what I have to say will be just as relevant to all. Finally I should also add that my own institution has really come late to network technology, unlike many universities who have a long involvement with the Joint Academic Network, JANET, we have been busy building systems which are more localised and more within our own control.

Network Technology

Networking is a very loose term that has been used in diverse ways in the library profession. I think we are using the term here to mean using digital communication technology to provide distributed access to a mixture of services, resources and facilities. So that within that definition a network could comprise, at one extreme, just a single computer with a multi user operating system and some terminals and, at the other extreme, the whole global structure of interlinking national networks.

The best known and most common network configuration is the single computer with several terminals attached to it, which in the library context will often provide access to the library system, to an OPAC, or a text retrieval system or whatever. This is proven technology. It has been established and installed in many large library systems over the past decade, perhaps using different components but essentially doing the same job and I do not feel a need to dwell on it. However before dismissing such library automation networks totally, I think it has to be acknowledged that many of the interorganisational networks now available owe their existence, in part, to the development of co-operative cataloguing and similar systems in the seventies and early eighties. Thus services such as BLCMP, LIBERTAS and so on are now capable of providing a mixture of functions such as interlending, information retrieval, bibliographic data and so on which go beyond the scope of their original purpose.

So what can networks do? Put simply networks allow us to share things, to share equipment, to share resources and, importantly in our context, to share information – so that several users can access the same data and if required, amend it or delete it, or move it from one point to another. There are two types which are usually differentiated; these are wide area networks or WANs and local area networks or LANs.

Wide area networks tend to join different institutions or organizations – and will commonly use public communication channels. They have traditionally underpinned services like online information searching, co-operative cataloguing systems, – all of which, as I have mentioned, are a means of connecting a number of users to one central resource or another. They can also imply the linking of networks at the

national or international level, which in the UK is illustrated by the Joint Academic Network, JANET, which has been established to link the major academic research institutions and which in turn links to US services such as the Internet and Bitnet and increasingly European networks.

JANET has provided a vehicle for the development and provision of a range of services over the networks, which Peter Stone has classified (1) as, on the one hand, services for libraries and, on the other, services for end-users. He talks of the former including:

- Access to bibliographical databases and record supply; examples might include services such as Blaise and OCLC;
- Interlibrary lending and document supply; well over 50 libraries are now connected to JANET for OPAC access, though trying to establish a national network of interlending through these will always be inhibited by the different systems in place;
- Information retrieval and online searching; JANET is now very commonly used as a means of accessing PSS services and hence DIALOG, DATASTAR etc.
- Professional communication; the use of Email in the academic library community for exchange of experience etc. has grown tremendously, and not merely on a national level but on an international scale.

This library usage is complimented by a number of services aimed more specifically at end-users, again involvng many US and North American institutions. These are backed up by an array of American services and there are literally thousands of lists based on Email serving every conceivable subject. It becomes easier and easier to establish a resource and distribute it to any number of other places, so that a whole infrastructure has been built up of researchers communicating with reseachers. Examples of such services might include:

- The ESRC data archive at Essex
- Census data at Manchester, Newcastle and Bath Universities
- Public Domain Software at Lancaster University
- Distance learning at the Open University in Milton Keynes

One important development in the UK has been the loading of the ISI database at Bath University, the BIDS service, allowing subscribers unlimited use of the database from any terminal connected, including those in university offices as well as those in libraries.

Local Area Networks

More recently we have seen the emergence of the Local Area Network or LANs as a way of linking a number of discrete computers. There were originally designed to share peripherals such as printers, or disks or whatever, though they have eventually become established because of their relatively high data transfer rates, upwards of 10 Megabytes/second, meaning that they are able to interchange substantial amounts of data with ease.

As with many aspects of technology the division between LANs and the networks of the '70s and '80s is becoming blurred, but it could be argued that it represents the difference between the older technology operating at relatively low speeds, and the high speed technology of today. As PTTs upgrade the capacity of public networks, then these too will begin to mesh with LANs, though it is equally likely that LANs in turn will move to even higher capacities through technologies such as optical fibres.

The use of LANs in libraries has not been high; there is little recorded in the literature and what does exist relates more to office automation and similar uses. This has changed recently with the development of

CD-ROM Networking, for which LANs are admirably suited. CD is merely a convenient way of distributing large databases and their integration into a local area network provides a means of multiple and distributed access to the CD. The use of CD Networks has gained pace over the past two to three years, with many types of library installing systems including universities, colleges, schools and public libraries; a recent survey undertaken at South Bank Polytechnic showed that over 60% of academic libraries were planning to install or had already installed a CD-Network. They have perhaps been less prevalent in other kinds of libraries, maybe because many of the source disks are simply inappropriate, but I suspect also because some commerical libraries tend to emphasise the role of the intemediary in information searching, which might well imply a reluctance to invest in services aimed directly at end users.

Just to conclude this section, you could suggest that a highly developed library of the near future may well provide access, over a local network, to a mixture of databases, both bought in and locally produced, containing the full text of bibliographic documents, data and images. And the storage media will include conventional disks, CD-ROM, and increasingly high volume optical disks. There will be gateways to wide area networks to provide national and international links. And the services will not be merely library based but will include access to corporate data, management information systems, community information systems and training and education packages. We are also likely to see the growth of networks being used for developments like records management and on demand publishing whereby an organization's documentation is digitized and kept in one central resource, so that users can draw down from the relevant file server the information they require and then print it out. This is certainly a strategic development we are interested in at South Bank for the delivery of course material and inhouse publications.

The Impact on Services

So what of the impact of all of this on the library, its staff, its services, its structure and its policies? What I want to do now is consider these issues under three distinct headings. The impact on acquisitions and similar policies, the impact on users and finally the impact on the library structure and its staff.

Acquisitions Policies

The amount of information now published which is capable of being delivered across a network is such as to provide the librarian with a considerable diversity of choice. We are being left with decisions between subscribing to hardcopy journals or abstracts and indexes, purchasing CD-ROMs, searching online on a pay-as-you-go basis, or subscribing to services like the BIDS service. It is perhaps not for me to try to give guidance on these issues, I suspect librarians are going to have to look at the balance of costs, the added benefits that technology might bring, the extent to which they can bring their customers with them, and take decisions accordingly.

These possibilities are compounded by a number of subsidiary issues. For example take CD-ROM; although CD-ROM has emerged as a prime means of delivering databases, it is interesting that we have not really seen many major abstracts and indexes come out on CD, although they are beginning to emerge, at very high prices. What has emerged are CDs which are a consolidation of smaller databases, often comprising single disks or specialist databases for niche markets. And we are also seeing the emergence of databases which are totally electronic, and have never really existed in any other format.

If there is an advantage in CD-ROM services from a financial point of view, it is

that they parallel conventional printed services to a large extent. Fixed subscriptions are much more familiar, and easier to handle and easier to budget than online information searching and there are no consequent staffing costs for intermediaries. This probably explains why, in Polytechnic libraries at least, expenditure on online services has remained about static for a decade, whilst CD and other non-mediated services have been taken to with alacrity.

Also all electronic services do have one significant advantage over conventional publishing, that is, they are very easily monitored. Thus many networks now have cumulating statistics which provide an analysis of level of usage over certain periods, which can prove very powerful in the decision making processes of acquisition and retention. There is also the opportunity, though it may be infrequently taken up, of qualitative assessment through the provision of outputs such as transaction logs and other monitoring systems. Thus electronic publishing makes the task of deciding which databases to provide and assessing the relative effectiveness of those database, that much simpler.

Another problem which arises is the fact that, although the user is being provided with an astonishing wealth of information, much of it probably does not relate explicitly to the conventional collections held by the library. This is likely to be the case as long as the majority of the tools available are essentially indexing services which can only ever act as pointers to the full document. Full text databases, of which there are many now available, do not present such problems, and even abstracting publications with full abstracts appear to be being used as primary source information, although this is merely a subjective view. The obvious consequence is the greater emphasis on inter-library lending which, though apparently expensive, can provide good value for money. An alternative is to make the CD-ROM index collection a better fit with the source journal collections. Some databases now allow holdings to be identified at the retrieval interface, so as to point the user to local collections, whilst newer services are emerging which are specifically designed to match a common subset of a particular type of library. It is possible to speculate that at some stage libraries may look to develop services which are very specific subsets of many databases but which accurately reflect their own collections.

Licensing

One of the inhibiting factors in the uptake of networking technology is the problem of establishing appropriate agreements with publishers to network their products. In some cases publishers have established licensing arrangements which do cope with the possibility of multiple users, though at some cost. Often these licenses will be priced in bands depending on the number of possible concurrent users, say one user, two to eight, over eight and so on; others may jump from single user to unlimited multiple users. The librarian will need to make judgements on the cost effectiveness of such agreements and take decisions accordingly.

However, such straightforward contracts are not always the norm. Many CD-ROM publishers for example are small, with no knowledge of copyright agreements or licensing techniques and hence find it difficult to establish a view. In many senses the electronic publishing industry is still in its infancy.

From the publishers point of view there are a number of concerns. Firstly the fact that part of the database could be downloaded in its entirety with no real control thus undermining potential sales of the data, or secondly, that, using appropriate software, it may well be possible to connect into the resource by dialling in from a huge number of dispersed sites. These problems have the added dimension that the suppliers often do not own the

copyright of the information they have and hence need to negotiate or refer decisions elsewhere.

There will always be tension between publishers, particularly electronic publishers, and libraries as copyright owners seek to protect the legitimate investment they have made in developing products, whilst libraries seek to maximise value and useage.

Impact on the User

If there is a major criticism of network provision it is that, for the end-user, searching through a mixture of databases can be complex, cumbersome and diverse. With their origins in computer software, wide area networks have tended to carry forward a confused jargon of logons, logoffs, system responses, and so on, all of which are capable of not only confusing a novice user but putting them off altogher. CD-ROM networks have fared better but the advent of multiple database systems, each database having its own search engine, has further complicated developments – so that to make full use of the electronic resource, users need to understand a variety of search languages and techniques.

The main problems with interfaces could be summarised as follows:

- Problems of attachment. Users should be able to expect to attach to a system with a very limited number of keystrokes in addition to any sign-on passwords. I have to say that I still find JANET complex from this point of view and better front-ends are required to make sense of it.
- Lack of standardisation. There is a real need for a standardised approach to database searching, and this is well known and well documented but little implemented. The earliest attempts such as the European Common Command Language were never really successful, and one must suspect that its successors, and there are a number proposed, will meet a similar fate.

There are at least four possible standards under consideration, these being:

Search & Retrieve or Z39.50 (ISO Standard)

CD-RDx (CD-ROM Read Only Data Exchange)

SFQL (Structured Full-Text Query Language)

DXS (SilverPlatter)

All of these share a common approach in attempting to separate the search interface from the database itself, in a client/server architecture, so that the same interface can be used to access a number of different databases.

But there are problems here. It should be remembered that network facilities will not merely be concerned with providing bibliographic references but with a learning process requiring a variety of commands. Moreover the effectiveness of an interface in retrieving information is likely to be a selling point as products emerge based on exactly the same data, though there is the counter argument that these standards ought to lead to a new generation of interface products.

- Search Complexity – the more powerful systems have become the more the tendency seems to be to introduce a higher level of complexity. Retrieval functions such as truncation, Boolean searching, implied or not, search set building and more innovative functions such as hypertext, although capable of providing a highly successful retrieval system, are also capable of baffling the inexperienced user and in my view some of the more successful bibliographic products are those providing a very simple emulation of searching an alphabetical catalogue.

> Similarly, graphic interfaces, pull down menus, Windows can all simplify the search process but only as long as the icons and screens are well designed and capable of interpretation by the naive user.

There are two other ways in which these interface problems can be addressed. The first is the acquisition of raw data in tape format so as to load into a local text retrieval system of the library's own choosing. That way the interface is standardised leaving a common approach to all data for the end-user and, given the falling costs of computer storage, this is fast becoming a viable alternative and indeed is now being recommended by some CD and database suppliers. The alternative of course is a greater emphasis on user education. Fortunately the network delivery of electronic information lends itself as a convenient tool for training. Laboratories can be hooked into networks for simultaneous database searching or computer-based learning packages provided at point of use. I think we also need to implement aggressive user training programmes particularly as access to resources is devolved beyond libraries into the body of the organisation and user support will need to shift from the immediate environment, from enquiry desks to more remote hot-line support, and user education and training programmes will need to be developed to a much higher level.

To summarise we are moving to what has been variously termed the information resource network, the electronic library or the virtual library all of which imply access from a single screen to a vast information source and we will need substantial and continuing research and development to design this to best effect.

The Impact on Structures

I now want to move on and look at the impact of networks on library structures; it is commonly held that the impact of IT on organisations is that it breaks down some of the existing divisions between different functions (2). As networks are used to deliver an increasing mix of services, (ranging from conventional library catalogues, to information resources, to computer-based training), resulting roles can become confused. For example, technical support staff can find themselves in a user support role, in the sense of configuring help screens or trouble shooting technical problems, whilst user support staff need an understanding of the technology itself in order to better support the users themselves.

To illustrate, as an aside, we are busy planning a new library at South Bank and one critical issue that has arisen is the way in which we should provide support to 80-100 workstations which will form the resource and information centre. What has emerged are the tensions that exist between those staff providing, servicing, establishing and implementing the information networks and the traditional academic or subject librarian role. Online information services never really posed these kinds of problems, because essentially they were mediated by librarians and their technological requirements were quite small, but as soon as you move to delivering a high percentage of your services and systems over a network, then it does raise questions of ownership and responsibility.

But this is merely at the library level, at corporate level there is just as much potential for overlap particularly in organisations which are information oriented such as technical, academic or research centres (3). Where the network is likely to be delivering not only external and bibliographic data, but internal and hard data such as the management information system.

The network becomes the information carrier, and requires heavy central control and standardisation to be effective, whilst many of the inputs, the file servers, may

well be devolved, and usage certainly is. One structure that has evolved suggests the merger of all support and information services into a corporate information service, and we have seen this in a number of Universities and large organisations. But this is only one possible route; in a paper by Woodsworth (4) the point is made that, as technology develops and changes, it may be that many alliances need to be formed and to be broken to cope with the emergence of new services and developments, of some of which we are not yet aware. The emphasis will be on project development and management and will involve considerable cross divisional work, including alliances between organisations and in the public and private sectors.

The impact on staff themselves will also be high. Staff at all levels will need to cope with significant and continuous technological and organisational change and will require constant re-skilling to keep up to date.

In conclusion, the development of networks is challenging many of the shibboleths of library and information service provision and our ability to respond to these will be critical in determining our future role in the information world.

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