TOWARDS THE ELECTRONIC LIBRARY: MEETING THE CHALLENGE

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The road towards the electronic library is paved with challenges. Key issues for library managers include: intelligent decision-making based on an appreciation of technology trends; collaborative development of electronic information products with their suppliers; appropriate staffing for user support; formation of productive links with other service departments; integration of the Internet in service provision.

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Introduction

It is a pleasure to have the opportunity to come back to Ireland to speak at this gathering. My name is John Cox and at the moment I manage the Information Service at the Wellcome Centre for Medical Science. In a month's time I shall be coming back to Ireland to take up the post of Head of Library Automation at University College Cork.

I was delighted when Swets asked me to give this talk. What will follow will, of necessity, be a selective, personal and local perspective. Selective because of the limited amount of time available. Personal because I have chosen to focus on those issues which have long been close to my heart. And local inasmuch as I shall speak about experiences at the Wellcome Centre for Medical Science where I have worked for the past two years. So I hope you will forgive me if I say little about topics such as budgets and money in favour of some wider issues.

Wellcome Centre Information Service

It seems appropriate to provide some background by telling you something about the Information Service at the Wellcome Centre which has seen a rapid migration towards electronic media in recent times. The service is fairly new so it has had less experience of a transitional phase between printed and electronic resources. For example, we have few printed abstracting and indexing services. As a new service we have skipped this stage of information provision and not suffered noticeably for it, a fact which raises questions about the long-term future of these tools. The Service opened its doors to the public at the beginning of 1993. The Information Service serves a wide range of audiences from the staff of the Wellcome Trust itself to the biomedical research community and to the general public. The Service aims to reach local and - especially through the Internet - national and even international audiences.

Clearly our user base is diverse. This diversity stems from the subject areas we cover. The Information Service is part of the

Wellcome Centre for Medical Science which aims to help medical science to flourish in a number of ways. Part of our remit is to promote an interest in medical science among the lay public. A particular interest is in encouraging school science education and in attracting young people towards a career in medicine. Another major area is the study of government science policies and the provision of better access to information about biomedical research funding. Our aim has very consciously been to focus on areas where information provision has been limited rather than to duplicate the work of other information services.

Needless to say, each of these subject areas requires access to a diversity of information sources. While we started out with, and maintain, a substantial collection of printed resources, we have found that CD-ROM and other forms of electronic publishing have been the fastest growing media in our collection in terms of purchase and usage. Our spending on databases has risen from roughly £7000 two years ago to £24000 today. That is similar to what we spend on books.

Main collection usage

Databases are our most heavily used resource, as shown by a survey we carried out a while ago. The survey took place over a whole month and shows use of databases ahead of other media by some considerable distance. All users were covered by the survey which revealed that many school children and members of the general public are very comfortable with using electronic information resources. The onus is clearly on managers of information services to ensure that a service is provided which matches the evolving skills and expectations of users. User habits are certainly changing fast and we have got to keep up!

Electronic information resources

So what computerised information sources do we provide? The Internet is an obvious medium through which we can reach national and international audiences. We therefore publish a database service called WISDOM which at present consists of four databases and is used

about 1600 times a month by people we never see - our virtual user community.

It is good to meet our users and to get them into the building, however. To serve these users, and also to answer enquiries from those who contact us in other ways, we subscribe to roughly 50 databases. These resources are delivered through a variety of media. While CD-ROM is still the most common medium, we also make extensive use of magnetic disk and online resources. Not only that, coverage embraces bibliographic, full-text and computer-assisted learning resources. With a diverse user base and range of resources, we operate in a challenging environment as regards the management and exploitation of electronic information services.

Key challenges

Having set the scene, I would like to focus on what seem to me to be some key challenges on the road towards the electronic library. I shall look first at how developments in technology affect decision-making about service provision and shall then move on to the importance of maintaining good relations with the suppliers of our electronic information products. Staffing for user support is a key issue with some important themes to be explored. There are opportunities for collaboration with other service departments in the organization if we are prepared to take them. Finally, there is the challenge posed by the Internet as a medium for finding and publishing information.

Technology developments

Among the greatest of these challenges is the attempt to keep up with technology developments. I do not believe it is possible for an information service manager to function effectively today without a familiarity with what is happening technologically and a curiosity about what is likely to happen. We are charged with making decisions which require considerable investment and which are expected by top management, probably unrealistically, to be of fairly long-term validity. In doing so, we need to take our time and to have an eye on the past as well as the future. Experience teaches us that technology has a habit of going full circle over a number of years.

One of the fastest-moving areas has been data storage media. There are few certainties in this area but one of the better bets has been the viability of magnetic disk storage. It has been around for a long time, with storage capacity growing at a rate of 60% in recent years, and was our choice when installing a database network last year. Although this necessitates a certain amount of work, not to mention technical expertise, in transferring data from CD-ROM to magnetic disk, all our most popular databases are now on hard disk. The benefits are in much faster searching performance and in using technology which has a clear future as well as past. On the contrary, what can you do with a tower of single- or double-speed CD-ROM drives? In terms of database networking, at least, CD-ROM is a classic example of transitional technology. We see it as a medium for delivering rather than searching our main databases. This would have been unthinkable not too long ago but has been facilitated by gigabyte disk storage.

Nevertheless CD-ROM could become viable in future for storing more than the once-impressive 600 megabytes. The race is on to bring a high-density CD-ROM onto the market. At present it looks as if we shall see an eight-fold increase in storage capacity to 4.7 gigabytes by the end of 1996 and there is talk of 10 gigabytes or more later. This would indeed open up new storage possibilities, resulting in true multimedia information products on CD-ROM, rather than the limited efforts we have seen so far. Much though I look forward to this, however, I do not relish the budgetary implications of purchasing new CD-ROM drives, since I understand that the new standard may not be compatible with the old. Although we have a number of older CD-ROM drives at Wellcome there is little temptation in this transitional environment to upgrade to the newer generation of six- or eight-speed drives, no matter what the marketing people tell us!

Another area where we are being asked to take the plunge is Internet delivery of databases. A recent example is SilverPlatter's Internet Subscriptions Option which offers the possibility of subscribing to popular databases, using powerful client software at a fixed annual cost. A few years ago I would have given my right arm for this, having battled at various stages with poor command languages, unpredictable online search costs and the perils of maintaining a local CD-ROM collection. Looking at the Internet Subscriptions Option, what more could one ask for? Life is never so straightforward, however, and I wait to be convinced of the viability of this type of product from SilverPlatter or other vendors. We do not know enough about the capabilities of the Internet yet, but we do know that it can be incredibly slow, data can be lost in transmission and servers can decide to shut you out when you need them most. All of these things used to happen in the days when I did lots of online searching - will history repeat itself?

Search interfaces are another area where much has been promised but things are only beginning to happen now. Those of you who have been around a little while will recall the intention to create a Common Command Language for online databases in the mid-1980s, implemented in my recollection by the ESA-IRS host. Online hosts had seen the folly of asking searchers to navigate their databases through a variety of command languages. The idea was to establish a single interface. Unfortunately it never transpired and CD-ROM came along with a much wider range of interfaces than even its online predecessor had managed. The first half of the 1990s has seen much talk of protocols such as Z39.50 and SilverPlatter's Data Exchange Protocol. In each case the promise is that we should be able to search all our online resources through a single interface of our choice. The day is perhaps coming closer but progress has been very slow and working products are only beginning to emerge. We can expect to search, and to ask our users to search, databases through many different, and in some cases dire, interfaces for a while yet. Having said all that, however, I think that the World Wide Web holds great promise. It has attracted millions of users to the Internet and many suppliers of library systems and databases have been actively developing Web interfaces to their products. Although these interfaces may lack the full functionality of their predecessors this is a very welcome development.

As providers of electronic information services we always face the pressure to move to the latest and greatest operating environment Yet we are expected to splash out plenty of money to do so,

not just in terms of the cost of the software itself but also of the hardware needed to run it effectively. While Windows 95 offers a number of attractions, not least the Plug and Play facility, which promises to take a lot of the pain out of installing CD-ROM drives and other peripherals, the truth is that, after years of struggle, we have learned to live with Windows 3.1. By all means let us move over to Windows 95 but only when we can make the necessary investment and when the bugs have been ironed out. This will probably be well into 1996, however!

In short, technology forces us to address many issues but managers of electronic information services must try to take considered decisions on their own terms and based on experience of previous technologies.

Liaison with publishers

If we want to get the products we need it is vital to maintain a productive dialogue with the publishers of electronic information products. We need each other and I have generally found publishers to be co-operative on issues of product development.

Here are a few areas where I think dialogue has long been, and continues to be, essential. Delivery media have gone through a full circle in the last ten years from online through CD-ROM, then local magnetic disk and more recently online again via the Internet. The problem medium in my experience has been local magnetic disk storage. As mentioned earlier, this has for some time been technologically viable, superior in retrieval performance and a better long term investment than CD-ROM. I have spent many frustrating hours in the past year negotiating with some of the CD-ROM publishers we deal with, trying to persuade them a) to license the use of their data on hard disk and b) to charge us a fair price for this.

Lack of consistency, and indeed of policy, was the most obvious theme to emerge, and has generally been an issue throughout the history of networking CD-ROM databases. Some publishers had no qualms, and even asked us to tell them how the hard disk system worked so they could point other customers in the same direction. Others were happy to let us use hard disk provided that we paid them a surcharge. But why

should we? After all, they were simply being asked to supply the same data to us through the same medium, CD-ROM, as before. Still others wanted time to develop a policy, while two publishers ruled out the idea immediately they were approached.

It took me almost a year to get my way with eight out of ten publishers, who eventually decided to work out a sensible policy to accommodate technological progress and customer need. A clear and consistent approach from publishers to licensing issues, particularly with regard to networked access, would be a great help to those of us charged with providing local access to their products.

I mentioned interface quality earlier as an area which leaves a lot to be desired. It is essential that information professionals maintain pressure on suppliers to deliver what we want. In fairness, many database publishers are highly receptive to feedback - indeed some depend on it. A good example in my experience is Ovid Technologies which is always seeking to improve the advanced interface it offers to MEDLINE and other databases. There are, however, some publishers who are making good money out of poor quality products and we are letting them away with it. Data quality is also vital. Database users often believe without question what they see on the computer screen. Although there has been much more emphasis on improving the quality of data, plenty of mistakes can still be found in electronic databases. In the UK, the Centre for Information Quality Management has been established as a clearinghouse for database users to report problems, and we should use this facility.

Staffing for user support

While the technology is important, the human resource remains the critical element in delivering electronic information services. It is necessary and vital to invest heavily in user support and this demands the right staffing level and mix of skills. I was fortunate in that a staffing structure had not really been established when I started work at the Wellcome Centre. It was soon evident that we needed to build a team with a balance of skills. I believe that an information service must make provision for computer support within its own ranks. The demands of maintaining so many

Internet and networked local databases are too great to be met by a single corporate computing department, especially when users rightly expect electronic information services to be up and running all the time. Subject knowledge remains the lifeblood of user support when it comes to selecting and searching databases and ensuring the fullest exploitation of electronic and, of course, printed collections. One of the most important roles of subject specialists in an information service today is to judge exactly when to use printed or electronic media or a combination of both to answer a user's query. All that really matters is that the query is satisfied accurately and efficiently and that staff feel confident about using whatever medium is necessary. The third layer of staffing is administrative support. This remains as vital as ever in the electronic information service since the availability and accurate description of resources underpins the service.

We now have a team in which that balance exists in the sense that we have staff members each of whose work focuses predominantly on at least one of these three areas. What is emerging strongly, however, is that these areas are not mutually exclusive. Versatility is the keyword for information service staff nowadays. The days of appointing one systems librarian to look after a library's computing functions are long gone. It is no longer possible to think of "computing" as a separate activity within the information service since all our information activities are now computerised. All staff need to have a good knowledge of computing such that they are able not just to use a PC and a network but also to have at least a basic understanding of how they work so that routine problems can be put right quickly for themselves and for users. Equally, systems staff need to be clear about the subject areas and administrative applications of the information service. We have consciously involved administrative staff, too, in meeting the increased demand for customer-oriented activities such as user support and enquiry work.

It is therefore vital that all staff are familiar with each other's roles and can speak a common language to help each other out. This has implications for staff training. Of the three categories of training we provide, the last one on

the list, team building, is perhaps the most important. In part, the weekly staff training sessions we hold every Tuesday morning can make a contribution to better teamwork. These sessions are led by one member of the team who focuses usually on a particular database, subject area or perhaps a more general issue.

In-house training needs, of course, to be supplemented by courses provided externally. We call on external help not just to develop the skills of individuals in the team, however, but also to improve the ways in which the team as a whole can function together as a collective unit and to try to avoid falling into the trap where there are, for example, 'computer people', 'information people' and 'administrative people'. We have held a series of 'team days' on which we have taken ourselves away from the usual work environment and examined all our roles in delivering the Information Service and how they complement each other. We have also drawn up a forward plan for developing the Service and all staff have participated in this planning activity. The aim has been to give staff a clear sense of direction and of teamwork, both of which can easily be lost in times of rapid change.

Interdepartmental collaboration

It is important, of course, that the Information Service should know where it is going and that staff should be collaborating productively within the department. The delivery of electronic information services has opened up opportunities for service departments in an organisation to build bridges between each other and work more closely together, often in a converged service model. Convergence has not taken place at Wellcome but projects such as the development of World Wide Web pages have recently brought the Information Service, Information Systems and Publishing departments together.

This does not mean that tensions do not exist between service departments. We are still working out where the role of each of us begins and ends in a number of areas. I do not expect that we are alone in this! We need to work out a sensible deployment of each other's resources when it comes to providing support for the technically demanding environment of electronic information service delivery and to work together

to extend access to our database network to other parts of the organisation.

My hope is that we will develop increasingly productive collaborations. Our roles are complementary inasmuch as information cannot travel far without a sound networking infrastructure, while databases cannot be exploited productively without guidance on information content and structure. Certainly I would say that the results of our collective efforts are potentially much greater than the sum of our individual parts and there is plenty of scope for productive brain-picking on both sides.

Making sense of the Internet

I have already mentioned the Internet and nowadays it would be hard to imagine not doing so in any talk on electronic information services. Whether we like it or not, the Internet has arrived in force. The challenge for libraries and information services is to integrate it into our work. We need to exploit the Internet productively both as an information source and a publishing medium. The keyword here is productively.

As an information source the Internet is not what information people are used to. It is totally disorganised and the quality of information varies tremendously in terms of content and currency. In addition, the range of information is changing all the time as services appear and even disappear. This makes the integration of the Internet into information services a major challenge, far greater than CD-ROM and other services which have had a high impact in recent times.

There are some highly valuable pockets of information out there and people with skills in organising, finding and evaluating information have never been needed more. Even Bill Gates recently commented that it must be a great time to be a librarian! There is a prime opportunity for us to help users make sense of the Internet, but we need to invest the necessary time in developing our own subject expertise and in training users.

We can also do ourselves a favour by becoming involved in projects like OMNI (Organising Medical Networked Information). This project is funded as part of the Electronic Libraries Programme in the UK and is creating a catalogue of Internet resources in biomedicine which have been quality assessed, described and indexed to facilitate subject retrieval. I mention it here as an example of how librarians can and should take the lead in making the Internet a more productive resource for finding medical information.

The Internet also offers tremendous potential for information services as a publishing medium. There are supposed to be 30-40 million users and we have an opportunity to deliver information services to some of them or, at the very least, to tell them what we have to offer. At the Wellcome Centre we have published a database service called WISDOM, which includes databases on research funding sources, job vacancies and science policy. Through it we are able to reach 1600 users each month, more, in fact, than the number of visitors we get in the Information Service itself. As was our intention, WISDOM has enabled us to move from being primarily a London-based service to a national one with users scattered around and even outside the UK.

This has worked very well for us but means, however, that we need to support a virtual user community, and Internet publishing has generated a lot of e-mail correspondence. It has brought into sharper focus the need to provide good support documentation and also to meet our users by exhibiting WISDOM at external meetings. Certainly we find ourselves in a very different user support situation and the staffing and financial resource implications have been considerable. We are in the process of developing Web pages to describe our activities and we shall need to make sure that we publicise our resources in a way which means that we can satisfy demand from remote users.

Some conclusions

I would like to conclude by highlighting the most significant messages that occurred to me in preparing this talk about the challenges we are facing as we move towards the electronic library. The thing that strikes me most of all is that it is like walking a tightrope between past, present and future service needs. Firstly, user expectations are changing. Although there are still lots of dyed-in-the-wool technophobes, a far greater number of people in all communities, including school children and the general public,

are becoming comfortable in using computers to find information. This has obvious implications for information service delivery, both in what we offer to users and in how we support them. Staffing structures now need to be far more integrated than previously in order to deliver the right level of user support. Versatility and teamwork are keywords for information service staffing today.

Predicting future directions has undoubtedly become more difficult as technology changes faster but it is important to remember that the latest is not necessarily the greatest. We can gain

some measure of control if we liaise with those who supply our electronic information products. Dialog of the database searching variety is vital, and so is dialogue with a small D. On a local basis we must strengthen the lines of communication with other service departments and aim for mutually productive collaboration in electronic information service delivery. Finally, the Internet presents us with both a great challenge and a great opportunity. It is up to us to try to take some control over it rather than be controlled by it.