



## MANAGING TECHNOLOGY

edited by Charles B. Lowry

### National Library Initiatives: The U.K. Higher Education Experience

by Derek Law

*Creation of internetworking infrastructure has long since taken on an international character and Derek Law's essay serves to inform us of just how variable the effort may be from one nation to the next, given differences in political traditions and institutional structures, not to mention the character of educational traditions. The Follet program in the United Kingdom has placed a premium on broad access by end users different from the somewhat market driven approach in the United States. It has also taken advantage of the opportunities provided by central authority which may seem unthinkable in the United States. At the same time common values and strategies are also evident, particularly the commitment to strengthening the information (read "knowledge") creating role of higher education and promoting training of students in advanced information skills as a direct benefit to healthy economic growth. Similarly, the goals of access without charge to institutional users and subscription based funding will be familiar to American librarians who continue to pursue these goals.—CBL, University of Maryland, College Park, Maryland.*

**L**ibrarians, library system suppliers and libraries have proved remarkably reluctant to accept the reality of end-user access and continue to devise systems in which librarians act as intermediaries as of right. This attempt to channel information through the library uniquely is doomed to failure and we would do well to recognize that. In the U.K. the Joint Information Systems Committee of the Higher Education Funding Councils (hereafter "we") is attempting to devise national structures for end-user access in higher education based on this premise. In describing those structures I hope that you will get some view of the underlying principles which are taking us forward to create the Distributed National Electronic Collection, which is being funded as part of our running budget but also through additional funds for the so-called Follett program.

Although various bodies in the U.K. had been working towards the concept of the electronic library, the report from a group led by Sir Brian Follett and commissioned by the Higher Education Funding Councils (the bodies for Scotland, England, Ireland, and Wales through which government funds for Higher

Education are channeled) has persuaded our funding councils to release several tens of millions of pounds which are being managed by a small committee charged with developing the electronic library within the United Kingdom.

It used to be the proud boast of the former Office of Arts and Libraries that our national information policy was to have no national information policy. Small nations such as the United Kingdom or the countries of Scandinavia have a huge advantage over the United States. We can practice systematic national planning and introduce services, training, and documentation on a countrywide basis. To experiment with and change the whole system is not an opportunity offered to very large decentralized or federal countries. In considering how to develop services we need to be very conscious of a European dimension. It is not necessary to be anti-American to be pro-European, and Higher Education has felt very strongly that we want to have a base of information skills relating to networked services which will allow us to support European industry and commerce. Within my working career the United States has prevented the export of advanced computing equipment and software to the U.K. on commercial and political grounds. It is very easy to imagine that data might be similarly treated for the quite proper reasons of protecting American research and American industry in such knowledge-dependent areas as biotechnology.

After many years of working with data we in Higher Education are also quite clear that the major costs of electronic services are the ownership rather than the acquisition costs. It is therefore in areas such as training, centralization of data handling, documentation, and support that the greatest economies are to be made. It seems clear that this is best done through a nationally planned strategy.

We also firmly believe that the state has a responsibility either to provide or by statute to require others to provide, the core infrastructure which will enable everyone to have access to electronic information resources. In that sense the Bangemann Report prepared for the European Union by Martin Bangemann, the Commissioner responsible for telecommunications, was a great disappointment since it leaves the development of networks entirely to the market. Since the market has no sense of social responsibility and is interested only in profit this approach may well disfranchise all but the affluent and metropolitan members of the community. Already in Europe we can see a huge discrepancy in the quality and availability of networks. Instead of enfranchizing the less favored regions we run the risk of reinforcing existing discrepancies if the Bangemann approach is adopted.

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## **U.K. HIGHER EDUCATION: THE POLITICAL IMPERATIVES**

Higher education in the United Kingdom has been under significant pressure for several years. The government's decision to redesignate polytechnics as universities without any additional resource for the research work central to a university's mission coupled with the doubling of student numbers in higher education has led to a 40% cut in the unit of resource, that is the amount available to train each student. At the same time the government has shown a touching but misplaced faith in using technology as a substitute for labor and has been happy to fund programs aimed at the delivery of teaching and research electronically.

Libraries have been able to take advantage of this. The combination of a visit to Educom, proposals for an electronic libraries program, and the setting up of Sir Brian Follett's working party to look at methods of assisting library provision have given a timely boost to the profile of libraries as major players in the new electronic environment.

### **The Follett Report**

The recommendations of the working party were accepted and have covered a number of often unremarkable areas. A major building program to release pressure on accommodation has been funded. A sub-group has prepared a report on regional co-operation and this is likely to be implemented. Some £50 million was allocated to the cataloging and preservation of special collections in the humanities. Receipt of the money was conditional on providing access to the collections, itself a novelty for some venerable institutions. The report recommended the convergence of libraries and computer centers and perhaps 60% of universities now have the two under some form of common management.

But most visibly the Follett Implementation Group for IT (FIGIT) was set up. FIGIT has launched some 60 experimental projects and has a further dozen under consideration.

### **FIGIT**

The FIGIT committee consists of 10 people selected to represent various elements of the Higher Education Community. Despite this, the committee is not a representational one but consists of a tightly knit group whose aim is revolution rather than consensus, intervention rather than democracy. The program aims to deliver services not research and to do this over the system as a whole rather than for the favoured few. It has been described as providing for the trailing edge of technology rather than the leading edge and it costs relatively little. The management program was passed to the Joint Information Systems Committee (JISC is the committee jointly charged by the Scottish, English, Welsh, and Irish funding councils with managing JANET and the services mounted on it), which already had a substantial program of electronic services and all activities related to the creation of a national electronic collection have been brought together as the e-Lib program, at least in terms of marketing and publicity.

The JANET network and its services are funded centrally from the grant to Higher Education made by the government. The sum is tiny—some £30 million—compared with the total education budget. However it is large enough to provide significantly greater benefit than we would gain from giving each university a few thousand more pounds. About £23 million of the money is spent on the physical network, connecting every university and research institute and providing the international

links to other countries. That leaves some £7 million for the provision of services and for research and development. Links to both the United States and Europe are both relatively low speed and expensive to upgrade. This may be expressed starkly as giving us a choice to spend our money on content or bandwidth. We have then developed a two-pronged strategy of increasing the capacity to cache data, of building mirror sites and as a corollary of protecting the data we create within the U.K.. Cache sites simply capture the international traffic and store it for a brief period. This assumes that the best guide to what will be used is what has been used. Data are kept for a few days and future requests simply look there first before using the international link. A mirror site takes a deliberately chosen piece of data and keeps a permanently updated copy in the country. Perhaps the best example of this is the Visible Human Project. These images are very large, but much in demand by medical and health science students. We are therefore discussing with the National Library of Medicine setting up a mirror service in the U.K., simply to keep transatlantic traffic levels within bounds.

### **Objectives**

The group has a variety of objectives. Underlying them is the wish to create a regular output of graduates skilled in the management of electronic information. Made familiar with electronic tools at university they should take the relevant skills and requirements into the workplace and progressively reskill British industry, commerce, and public services by example.

We are also determined that the universities will continue to be providers and not just consumers of information, creating a vibrant intellectual economy which challenges the mind rather than the wallet. Information and scholarly communication are our bread and butter, and the universities must interact with all parts of the electronic process and not simply be consumers.

The program also aims to seed cultural change within the university system. Universities have existed for centuries and are notoriously resistant to change, while at the same time being at the forefront of intellectual progress. A very positive approach is therefore required to embedding cultural change within the institution.

We are determined that the program must be universal in reach and content, addressing the needs of all disciplines and not just big science. We need also to provide low-hanging fruit so that everyone from the newest undergraduate to the most senior professor will find relevant, stimulating, and timely material on the network. It must also be aimed at the equipment which people actually possess; dumb terminals and 286 processors remain more prevalent than Pentium chip personal computers.

The program should help to democratize information and research by making available to all universities resources previously available only to the privileged few. The so-called golden triangle of Cambridge, London, and Oxford will still possess the richest collections, but will be able to share those riches. For instance, we have funded one project to allow the University of Aberdeen, our most northerly university, to make available digitized images of bestiaries.

There have been many experiments on making electronic information available. After five years experience we are all too conscious that the real technical issues lie in scalability and operational standards. We are running over 20 services and 50 projects. The real challenge is to keep these available day in and day out to literally tens of thousands of users.

The difference which we are trying to make mirrors the classic distinction between mechanisation and automation, between doing the same job faster and doing the job differently. Our aim is to allow everyone in higher education to work smarter not faster, to explore new concepts and new ideas rather than mimic what we have at present.

Finally, we want to share all of this. There is great pressure on us to charge for all that we provide, or at the very least to charge external users. We are resisting this at least as far as our colleagues in universities in other countries are concerned. We hope to benefit from your experiences and services and to share ours with you. We wish to trade freely rather than erect barriers. If the day comes when charging seems inevitable we wish to be one of the last countries to do this and not the first.

## **POLICY ISSUES**

It is also worth considering some of the policy issues which have been exposed in developing our services. It is a cardinal principle that information must be free at the point of use. Where commercial information is provided it is either paid for from central funds or by the institution or by some combination of the two, but never by the end-user. We want to encourage and stimulate use as a strategic national goal. On the whole suppliers do not lose. There is already anecdotal evidence of increased subsequent use. As students become employees they are beginning to seek the same electronic resources they used daily at university. We have had and do have major debate over the price to be charged to institutions for such services but always on the premise that services are free at the point of use. In practice most are wholly free and are paid for by "top-slicing" the higher education budget as described above. Only for the commercial bibliographic products are sites required to make a payment.

We are committed to subscription-based or licensing models and will not fund transaction based models. There is always another alternative product and only the most arrogant of publishers believe that they have a true monopoly. In fact there is some evidence that our policy is beginning to affect the use of products from those publishers who are not willing to accept this model.

It is a central tenet that resources are to be provided for all disciplines. A Datasets Steering Group has been set up to conduct a planned program of procurements for all subject areas and it is already planning up to two years ahead. That group conducts product evaluations which involve the relevant academic and library communities in identifying the best buys for the subject.

We have a goal of the commonality of interfaces. The concept of a common command language for material as varied as the census, word-processing software and bibliographic data is an evident nonsense. On the other hand, by grouping material together in locations by type, whether bibliographic, full text or numeric, we have been able to go some way towards providing common interfaces to the various datasets. Perhaps the next major challenge for the policy is, however, to encourage better and more friendly interfaces.

A related point is our present policy of delivering information to everyone. This means delivering to the poorest sort of terminal, currently defined as a VT100. Inevitably this frustrates users with more powerful equipment. As a result, we are about to conduct a census of terminals in U.K. higher education to decide whether it is now possible to move the definition

upwards without depriving access significant numbers of users with old equipment.

A concomitant issue is "ownership costs." This may seem self-evident but acquiring or creating a dataset is only the first step. Much of our service expenditure goes on maintenance, support, help-desks, documentation, and training. Nor should this commitment be reduced significantly. We have found that excellent documentation and training produced nationally to professional standards more than pays for itself in terms of encouraging growth. As usage grows there is also a need for constant upgrading of equipment, but this is the price of success and one which is willingly borne.

Finally we are very conscious that work is going on elsewhere. We have developed strong links with the Coalition for Networked Information in the United States and with Australian universities. Many of our projects also work within the European Union's Framework Program. We are eager to work with European colleagues, preferably at a program rather than a project level, in order to gain maximum benefit with the inevitably limited resources which we have at our disposal.

## **The e-Lib Program**

A brief description of the components of the e-Lib program illustrates how far beyond the traditional boundaries of the library they go. The program now has five activities between which there is, of course, overlap. However the strands do cohere reasonably well. The first seven services provide the infrastructure, support, and training which underpins much of the activity.

## **INFRASTRUCTURES**

1. **AGOCG**—The Advisory Group on Computer Graphics provides a single national focus for computer graphics, visualization and multimedia. Based at Loughborough it carries out software and hardware evaluations, runs workshops and seminars, and assists sites in the introduction of key technologies. It offers a useful technology watch service.
2. **Cache Service**—sites simply capture the international traffic and store it for a brief period. This assumes that the best guide to what will be used is what has been used. In practice early results show that a modest investment in servers produces the equivalent of a large increase in bandwidth. The recent effort in the United States to build "Internet II" for higher education understands the value of this strategy of caching instead of building capacity to meet peak load.
3. **Centre for Network Research**—Even a modest investment in electronic services will be better made in knowledge of how they are used. A small unit is funded at City University to study who is using network services and why.
4. **CHEST**—Is based jointly at Bath and De Montfort Universities. It is responsible for the negotiation of software and data purchases on an a national basis, either through purchase or by licensing. By mobilizing the total purchasing power of the Higher Education Community, large discounts are acquired.
5. **CNIDR**—A review study of CNIDR (Clearinghouse for Networked Information and Resource Discovery) and of InterNIC has just been completed to consider how we might use these American ideas in a U.K. context to make generally available information on network developments and standards, and to provide advice and leadership on local system design.

6. **MAILBASE**—Based at the University of Newcastle this organizes the Listserv activity in the United Kingdom. Its brief is wider, however, and it also sets out to organize the communities which will operate listservers. It has had notable success in this field, not least with university administrators.
7. **UKOLN**—The Office for Library Networking which acts as a sort of strategic thinktank and research and development center.

### DATA CENTERS

As an act of policy, five datacenters have been set up. Protection of existing data is important. Computing media have gone through astonishing transformations in the last 30 years and, unless there is a systematic attempt to future-proof research results, they may effectively be lost. We have therefore set up these centers to deal with these and other issues. As part of this whole process we are also determined to ensure that we have an adequate national skills base. Dealing with very large datasets of all sorts will be a key skill in future and we are determined that the U.K. should not be reliant on others for those key skills.

1. **AHDS**—An Arts & Humanities Data Service has just been authorized and will be based at King's College London. This follows a major feasibility study and the service will broadly be based on the experience of the Essex Archive.
2. **BIDS**—Based at the University of Bath this is the only substantial commercial service. It provides access to a range of bibliographic datasets, including the Institute for Scientific Information (ISI) citation indexes, Embase and Compendex. The *International Bibliography of the Social Sciences* has also just been added.
3. **EDINA**—This service was launched recently and, based at Edinburgh University completes our set of five datacenters. Initially it will provide access to BIOSIS Previews, Chadwyck-Healey's PCI file and Palmer's Index to the Times.
4. **ESRC Data Archive**—The Archive is jointly funded by the ESRC (Economic and Social Research Council), the JISC (Joint Information Systems Committee) and the University of Essex. The oldest national center, founded in 1967, its function is to acquire and preserve research data in the social sciences and humanities and to make them available for analysis and teaching. About 5,000 datasets are held currently.
5. **MIDAS**—Based at Manchester University, this service is one of very large datasets, most notably the U.K. 1981 and 1991 Census, continuous government surveys such as the General Household Survey, macro-economic time series databanks and scientific datasets. There is a full range of support services for the data.

### RESOURCE CENTERS

1. **Conflict Studies**—A fascinating project at the University of Ulster which takes advantage of the world famous collection of grey literature on the Troubles from the Linen Hall Library in Belfast and is making it available over the network—including images of the wall paintings for which Belfast is now famous.
2. **Eurotext**—This program at the University of Hull provides access to teaching materials on Europe.

3. **HENSA**—This is the shareware archive. It is in two parts with Unix numerical and statistical software offered from the University of Kent and p.c. software from Lancaster University.
4. **IHR-Info**—The Institute for Historical Research has set up a service based on its existing paper publications. These essentially record the work of the history community in the UK. They list research work in progress, seminars, abstracts etc.
5. **NISS**—This set of services is based at the University of Bath and concentrates on current information ranging from yellow pages to newspapers. It aims to promote an electronic information culture through providing access to useful collections of current information. It also acts as a gateway to other services and resources and provides information through the NISS Bulletin Board.

### RESEARCH AND DEVELOPMENT

Some 50 projects are funded here and they are too many to be listed in full. Details are available from the UKOLN server at <http://ukoln.bath.ac.uk/elib/intro.html>. The scope covered is substantial and varied. A distributed document delivery service has been set up and some work is also occurring on the development of software. Several electronic journals are being supported, ranging from the so-called superjournal project involving publishers, to a fascinating journal on archaeology which is a truly multi-media product. Digitization is being supported with work on copyright material such as the *Gentleman's Magazine*. Other work is looking at on-demand publishing and short-loan collections for students. Copyright is a real problem here and we are commissioning other work on this area. Some groups wish to create software to manage the problem; other more hawkish views wish to reclaim copyright and keep it within Higher Education since publishers seem to have forgotten that publishing exists to support teaching and research and appear rather to believe that teaching and research exist to support publishing. We are also funding projects to support pre-print archives on the Los Alamos model, to see whether the present mould of scholarly communication can be changed. Finally a great deal of money is committed to training—or more accurately retraining—to ensure the cultural change which is the underlying and integrating theme of Follett.

### RESOURCE DISCOVERY

1. **BUBL**—Hitherto the one service funded by JISC has aimed at universal coverage. The BUBL Information Service offers an Internet current awareness service, together with organized, user-friendly access to Internet resources and services with the combined gopher/WWW subject tree being a particular feature. It is organized from Strathclyde University. More recently pressure has increased for a subject based approach and this has been acknowledged in the funding of several subject based resource discovery services. These have a common theme and a common set of standards. It is not believed that attempting to catalog everything on the Internet is reasonable. Instead we wish to make available a limited set of resources of importance to a discipline, catalog and abstract them, ensure availability, and provide documentation and support. In an inversion of Gresham's Law that bad money drives out good, we believe that good information will drive out bad. High quality informa-

tion, properly cataloged, reliably available, properly documented, and supported will be preferred to information of unknown provenance and quality, infrequently available and without support. There is no commonly accepted standard for resource discovery and so with the ROADS project we have decided to support IAFA templates. This may or may not prove the right decision but is also intended to ensure that we are seen as a major player with a right to a place in the fora where standards decisions are made. The subjects then covered are:

- **ADAM**—Based at the West Surrey Institute this looks at the quite unusual set of resources required by groups as varied as fashion design students and jewelry craftsmen. Visual images are a major element here;
- **EEVL**—based at Heriot Watt University supports the engineering community;
- **OMNI**—is based at the National Institute for Medical Research and covers Medicine;
- **RUDI**—covers Urban Design and is based at Hertfordshire and Oxford Brookes University; and
- **SOSIG**—is based at the University of Bristol and is the longest standing service, covering the social sciences.

### NEW INITIATIVES

A new initiative has been launched for the acquisition of national site licences for journals. Academic Press, Blackwell Science, and the Institute of Physics Press have signed up for a pilot project, thus making several hundred journals available electronically. Work is being undertaken by the BIDS center to provide a common search and validation engine, and we believe that this development is significantly in advance of publisher-led experiments.

As mentioned above we intend to set up several subject based pre-print archives. The contest for these closed in early January and the results will be announced at any time.

Work has just begun on defining a national image center. Higher education produces thousands of images each year ranging from medical and dental through to art and design. We are concerned that these should be retained within and made available to the wider academic community. We hope that the plan for such an image service will emerge within about one year. It is likely to follow the distributed model of the Arts and Humanities Data Service.

Some government data has proved very difficult to acquire. In particular, mapping data have proved very intractable, but we are in the final stages of making Ordnance Survey data available for the U.K. This will give a much wider audience than the historic one of geographers.

Negotiations are also under way for the creation of a national higher education OPAC linking the library catalogs of the collections of the major academic research libraries which form the CURL (Consortium of University Research Libraries) group. This will have some value for researchers, but the intention is to link it to new distributed document delivery services which will serve different parts of the country or different subject areas and ensure that maximum value is obtained from the investment that higher education makes in its library collections. Links will also be created with the records of the collections cataloged under the initiative mentioned above to support special collections in the humanities.

Work is being undertaken on archives. These are a mainstay of humanities research, but their location is not self-evident. Collections of German books will exist generally where there are good German departments, but there is no intuitive way of working out the location of the papers of Gladstone or Byron. A national server is being considered to link access to collections. The whole issue of archival preservation is also under discussion following a seminar to explore the issues.

The British Universities Film and Video Council has been transferred to JISC and will offer exciting possibilities for working with off-air recordings and multi-media material.

And so this leads us to the underlying goal of building the distributed national electronic collection. It is clearly at this point incomplete and it will take several years to have all the elements in place. Some services will succeed and others will fail; we shall have disappointments along the way. But the objective is clear, to create a central core of material which is centrally defined but meets user needs in all disciplines. The user will then have a limited need to search for materials outside the core. We will spend our resources on developing that core rather than on cataloging anything that might ever be used on the Internet. In doing this we hope to prove a variant of Gresham's Law. While bad money may drive out good, we hope that quality assured data, available reliably, and excellent nationally prepared documentation will remove the need to use unknown data of unknown validity available intermittently and unreliably.

### CONCLUSION

The analogy is perhaps unfortunate, but what we are consciously doing is the equivalent of giving away drugs in the playground. We see it as our responsibility to educate graduate students who are dependent on electronic information and who will go out into the industry and commerce of our country spreading the electronic revolution.

We are creating a distributed library. That poses its own challenges but also opens up new possibilities of serving the community. The housebound, the disabled, ethnic minorities, and remote communities can all now have the same opportunities which are offered to those in affluent metropolitan areas. Studies show that what the public wants from networks is education more than entertainment. Education becomes democratized. We can visit and experience the rain forests or the Tivoli Gardens using virtual reality; we can study anatomy a thousand kilometres from a hospital or visit the Vatican archives without leaving Bielefeld. The program has begun by providing content and there is now a rich network environment in the U.K. The remaining challenge is to embed that information into a traditional culture and to change it into a culture equipped to face the challenges of the next century.

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*In the next issue Mark Hennebusch will give a retrospective on the topic of "Z39.50 at Ten Years: How Stands the Standard?."*

*Individuals interested in contributing guest columns should send a précis of their proposed essay to: Charles B. Lowry, Dean of Libraries, Editor, "Managing Technology," JAL, University of Maryland at College Park, 4121 McKeldin Library College Park, MD 20742-7011. Or, phone: (301) 405-9127; Fax: (301) 314-9408; <clowry@deans.umd.edu>.*