

INFORMATION MANAGEMENT

REPORT

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The internet removes temporal and spatial barriers and enables information professionals to offer information services to remote users 24 hours a day and seven days a week. Users experience 'instant satisfaction' when they get 'instant access' to networked information sources such as bibliographic databases, full-text electronic journals and electronic document delivery services. The access paradox of 'single source-single user' for printed information sources can be overcome by providing remote access by multiple users to the networked copy of the same single source. Libraries are increasingly opting for collection management practices that are based on the 'just-in-time' approach rather than the 'just-in-case' approach that has been prevalent over the years. Members of the Association of Research Libraries (ARL) in the USA are now spending as much as 25% of their total material acquisition budgets on networked information sources and services. This article reviews some of the current trends in information management (ownership vs access, disintermediation, and personalization) and emphasizes the impor-

tance of providing personalized information services along with a discussion of some of the issues involved.

Ownership vs access

Currently, the collection management practices of library and information centres are increasingly slanted towards access rather than ownership. Ownership usually dictates the use of centralized information management models whereas instant access to networked information sources and services requires decen-

tralized/distributed ones. Information managers are no longer responsible solely for their locally held physical collections. They have to assume further responsibilities in order to provide access to a wide variety of networked information sources that they do not necessarily own. This necessitates the development of cooperative or consortial collection management practices involving other information centres, publishers and/or aggregators.

Economic models based on centralization are replaced with those based on distributed and personalized information services. For instance, in a centralized model an information

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The International Newsletter for Information Professionals

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manager has to decide once a year which printed journals to subscribe to, calculating that those journals would satisfy the information needs of most users, make a one-time payment and have them used as often as possible. For unsatisfied information needs, traditional interlibrary loan or document delivery services are available. Yet the use of such services is usually not encouraged, nor are they very convenient to use. Compare this with licensing full-text electronic journals where the economic model is based on such criteria as the frequency of use, number and types of users and sites (e.g. students, researchers, 'walk-in' users, simultaneous users, distance learners), and perpetual access to back issues. Moreover, if users wish to get access to full-texts of journals that are not licensed, different payment schemes (e.g. pay-per-view) are usually in place for electronic document delivery services.

Information managers have to sign separate licences for a large number of electronic resources and develop separate use, processing, maintenance and storage

policies. No longer do they have the luxury of determining their own information management policies. Instead, they are 'interdependent' on their colleagues as well as on information producers/providers and library consortia to develop and coordinate their own policies.

Disintermediation

While distributed, networked access to information sources and services gives users 'instant satisfaction', it also eliminates face-to-face communication between users and intermediaries. For example, reference services are usually provided through a single reference desk in a traditional library. This does not serve the needs of remote users at all. Similarly, remote users would prefer electronic document delivery services rather than visiting the library to get photocopies of journal articles. It is of no use advising them to come to the library in person to use reference services or the printed journal collection. Once users got accustomed to instant access to networked sources, they would look elsewhere for instant satisfaction. Intermediated services can mostly be provided by means of centralized information management models whereas disintermediated services can be offered through distributed models. Remote users can easily get instant access to both sources and services spread around the network without intermediation.

The impact of networked access to information services and disintermediation is also reflected in use statistics of ARL libraries. For example, the total number of interlibrary loan (including document delivery) transactions of 125 ARL libraries almost doubled between 1991 and 2000 whereas the total number of reference queries decreased 12% and the total number of materials borrowed decreased 6% during the same period (Kyrillidou and Young, 2001). Such statistics indicate that libraries are getting more dependent on each other while, at the same time, users tend to go to libraries less often for in-house services. They seem to prefer instant access to networked information sources and electronic print (e-print) archives.

The trend towards remote access and disintermediation is observed elsewhere, too. For example, the number of intermediated searches performed at the Turkish

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KM in the Public Sector

There was a marked shift in the urgency and tone of the discussions and debates at TFPL's public sector CKO Summit this year. Twenty-three of the UK's leading knowledge practitioners from public sector organizations gathered at the Bath Priory for two days of discussion and debate. 'This Summit is very different from most KM events – the guests are hand picked, there are no presentations and the issues to debate are submitted by the participants', explained the organizer Nigel Oxbrow, TFPL's Founder and Chief Executive, 'but the learning and value generated through the facilitated discussions are superb.'

'Last year there was considerable discussion about what was to be done', said Ciaran Morton, Executive Vice President for Dialog, sponsor of the event, 'but this year people were engaged in numerous projects and initiatives, and enthusiastic to share and learn from each other's experience.'

This value of the interactive nature of

the Summit was echoed by one of the participants: 'Once again, thank you for an excellent Bath Summit. I think the sense of enthusiasm and commitment from old and new faces alike really does demonstrate that the Bath Club is one of the most important developments in public sector knowledge management of the last few years', said Sharon Jones, Strategy Unit, UK Cabinet Office.

The participants discussed issues such as the role of information governance, the importance of integrating the many different and separate knowledge and information initiatives, measuring impact and ROI of knowledge sharing. The outcomes of all the discussions are published by TFPL as an executive report 'Knowledge Strategies for the Public Sector'.

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Academic Network and Information Center (TANIC) between 2000 and 2002 has been halved. In 2002, the total number of on-site searches performed by users themselves was equal to one-third of what it was in the year 2000. Yet the Center has witnessed, during the same period, a 13-fold increase in the use of its Web-accessible medical database (www.ulakbim.gov.tr).

Personalization

In order not to deter remote users, information managers try to offer some services through the Web nowadays. Although it is important to have remote and disintermediated access to networked information services, users simply need more than that. They wish to customize their information environments and be able to get personalized information services. 'Personalization is the process whereby a program "follows" what a user does on a web site and tries to "match" the user's behavior by providing information related to what the user has previously done' (Kotwica, 1999). Active and passive methods of personalization are both used. Information display environments, content and information services can be personalized. Several technologies are used to gather data about users, ranging from fill-in profile forms to cookies, to click-stream analysis/web usage mining systems and collaborative filtering (Bonett, 2001).

Users can take an active role and collaborate with information managers by explicitly describing their interests to make use of personalized 'alert' or table of contents (TOC) services. Alternatively, the interests of users can be identified by analysing their previous use patterns and behaviours that are stored in cookies. For instance, profiles of users of an electronic commerce web site can be created unobtrusively by simply analysing the items that they retrieve and display on the screen during their visits. Such a system can keep track of five types of actions. If the user buys the item displayed on the screen, this is interpreted as strong positive feedback. If she simply browses without buying, this is interpreted as weak positive feedback. On the other hand, if the user explicitly skips an item when presented or if she removes the item from the list, these actions are interpreted as negative feedback and strong

negative feedback, respectively. If the user simply does not get to an item on the list, this is interpreted as 'no change' in her 'interest representation'. These feedback values are used to update the user's profile unobtrusively (Mostafa, 2002, p. 10). Online bookstores such as Amazon.com use similar techniques to update users' preferences and recommend further titles.

Users can personalize their information display environments by setting some parameters. They can make their favourite databases, e-journals or bookmarks always visible on the screen and change the display layout as they wish. News portals, banks and libraries offer such personalized information display environments (e.g. MyYahoo, MyCNN, Wells Fargo and MyLibrary).

Currently, information retrieval systems display standard content to all users regardless of their access methods (e.g. remote vs on-site) or privileges (e.g. student vs faculty). Yet the content can be personalized if individual users are recognized by the system when they log on. For example, authorized users can enjoy more privileges (i.e. access to full-text e-journals, electronic reserve collections or electronic document delivery services). On the other hand, unauthorized users getting access to the system from off-campus machines may not even be informed of the availability of, say, web access to full-text e-journal or e-reserve collections.

Providing personalized information services is perhaps the most advanced application of personalization as such. Such services can be offered using both 'pull' and 'push' technologies once the mechanism to create and update user profiles is in place and the individual user is recognized every time she logs on to the system. Some banks already offer personalized services such as electronic fund transfers. Many phone companies already feed personalized information on share prices, weather forecasts and match scores to the GSM numbers of their customers. Similar services can also be provided by information centres. Users can be informed of newly acquired books or current additions to the full-text article database in their areas of interest by analysing their previous transactions (e.g. books checked out or articles downloaded). Unless recalled by another user, they can renew their library books

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'profiles of users of an electronic commerce web site can be created unobtrusively by simply analysing the items that they retrieve'

'libraries can incorporate these personalized additions and keep multiple individual copies of e-books in their collections'

'Libraries usually evaluate user data in aggregates and later destroy it'

'no use telling them that the library's web site and its circulation system are not "interoperable"'

through the Web. Users can be informed of the availability of recalled books. The PDF copies of articles obtained through electronic document delivery services can be sent to users' email addresses.

Personalization of collections and services on the basis of individual preferences and privileges requires the use of more sophisticated techniques. Information about users should be kept and updated as long as they continue to use the system. Although libraries can provide personalized information services similar to those of Amazon.com, they are reluctant to do so for security and privacy reasons. Lynch (2001) points out that 'circulation systems typically break the link between a patron and a book that has been borrowed when that book is returned' and thus libraries lose the opportunity of providing more personalized services. Libraries usually evaluate user data in aggregates and later destroy it. Lynch also emphasizes the fact that it is quite difficult to implement personalization in a distributed information environment as personalization 'occurs separately within each system that one interacts with' and 'investments in personalizing one system (either through explicit action or just long use) are not transferable to another system.'

Recently, personalized electronic books (e-books) have emerged. Users can add their own annotations or hyperlinks to the existing text and would like to see them there whenever they use the same e-book (Ohene-Djan and Fernandes, 2003). As the use of e-books in library and information centres increases, it remains to be seen if libraries can incorporate these personalized additions and keep multiple individual copies of e-books in their collections. This would mean that the number of objects that the library has to deal with would multiply several orders of magnitude as each copy of an e-book should be stored along with a number of personalized annotations and hyperlinks. More sophisticated database management systems would be needed to handle different 'versions' of the same e-book and to recognize several 'owners' of each e-book as they log on to the system.

Although personalized e-books came into being within the last decade or so, the idea of personal libraries containing 'associative links' among different information objects in the database is not new. Bush (1945) had predicted that such personal

libraries complete with personal annotations and links could be built. In his seminal article entitled 'As we may think', he called this personal library 'memex' (memory expander) and gave a detailed description of its components (building, indexing, creating links among information items, underlining certain parts of text, etc.). Memex is considered to be the predecessor of the current World Wide Web that is based on hypertextual links as envisioned by Bush some 60 years ago. We are able to build personal libraries of e-books similar to Bush's memex (Ohene-Djan and Fernandes, 2003). The challenge today is to build personalized libraries in a distributed environment involving several digital collections. This would certainly involve much more than just sheer computational power and large bandwidths.

Issues

We can safely predict that the number of personalized information services offered will increase tremendously in the near future. Users managing their money from afar using bank web sites would certainly appreciate it if they could renew their books using the library's web site. It is of no use telling them that the library's web site and its circulation system are not 'interoperable'. In the near future, users will not be content with simply renewing their books through the Web. They will ask if they could download the contents of every book (e-book or otherwise) that they are interested in that the library owns or provides access to. They will demand electronic document delivery requests to be delivered to their desktops or personal digital assistants (PDAs). The Institute for Scientific Information (ISI) has already advertised that it will incorporate personalized alert services to its Web of Knowledge (Personalization, 2002). The British Library (BL) recently signed an agreement with Elsevier Science and Adobe to provide print-quality copies of articles delivered to users' desktops (British Library, 2002). The agreement allows BL to supply PDF copies of journal articles from over 1700 key Elsevier titles. Users will pay a fixed annual subscription fee (£500) plus downloading (£4.50) and copyright charge (variable) for each article that they download (Kraan, 2002).

Users will soon demand similar services from all library and information centres.

Libraries providing traditional services up to now should therefore start making plans to transfer those services to the Web. In addition, they are going to need to develop new, personalized services that will enable remote users to get instant satisfaction.

Libraries contemplating offering personalized information services should have a sound network infrastructure as well as access to personal, local, regional and wide area networks. Security and privacy mechanisms should be thought of as part of the network infrastructure and standards should be developed in order to function in a distributed environment. Personalized information services should be provided on the basis of predefined user rights and privileges. Such services offered by libraries should be integrated with those offered by other institutions. For example, personalized information services should be an integral component of an electronic university: systems used by the library should be interoperable with other on-campus systems (registrar's office, financial systems, health systems, etc.). They should also be integrated (and interoperable) with off-campus systems such as other e-learning institutions and electronic banks. For instance, users should be able to transfer money from their bank accounts to the library's account to pay for, say, electronic document delivery services.

More sophisticated budgeting, pricing, use and training models that are required to deliver direct and personalized services to individual users should be developed. The 'one-size-fits-all' approach is not going to satisfy the information needs of ever-demanding users for long. There will always be novice users who are at the bottom of the learning curve and need some 'hand-holding.' Although not inexpensive, some remote training sessions can be delivered through the Web using customer relationship management (CRM) software (also used for e-reference services).

To borrow the analogy that was used in the report of the Committee on Information Strategy for the Library of Congress (LC) to describe the Library's current cataloging practices: developing personalized information services requires a 'relationship-centric' approach to information management rather than the 'resource-centric' approach that has been prevalent

(Committee, 2000; cited in Lagoze, 2000). As Lagoze (2000) noted in a somewhat different context, 'the resource-centric descriptive model upon which current cataloging practices are built, whereby discrete descriptive records are associated with fixed information artifacts, is incompatible with networked digital information. This new context has radically different information entities, decentralized information production and management, and troublesome questions about authenticity and trust. It requires a model that can flexibly express the relationships between resources, abstract concepts, and multiple descriptions of those resources and concepts' (Lagoze, 2000). One should also add 'relationships between resources and users' to the list given above, if we are to offer personalized services in a distributed environment.

Instant satisfaction is only possible with the availability of instant access to networked resources and services. If information professionals are caught unprepared for this new era of personalized information services and our services are not instantly accessible through the Web, libraries may easily be bypassed by remote users. Some other 'smarter' institutions may emerge to supply those services. More demanding users will then 'take their business elsewhere', and we should also be concerned that there are already enough potential users who think that libraries cannot provide such services anyway. We need to transform information services and make them visible and accessible through the Web as expeditiously as possible.

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INFORMATION MANAGEMENT NEWS

'also provide access for UK researchers to the Internet2 facilities in the USA'

JISC Announces UKLight

In a new initiative to ensure that Britain can retain its position as a world leader in research, HEFCE (Higher Education Funding Council for England) is investing £6.5 million in an initiative known as UKLight, which will put the UK on the global optical networking stage. UKLight is an international collaboration between JISC (Joint Information Systems Committee) and SURFnet, based in the Netherlands. The UK will join several other leading networks creating an international experimental testbed for optical networking. These include STARLIGHT in the US, SURFNET in the Netherlands (NETHERLIGHT), CANARIE (Canadian academic network), CERN in Geneva, and NorthernLIGHT, incorporating the Nordic countries.

UKLight will connect JANET, the UK's research and education network, to the testbed and also provide access for UK researchers to the Internet2 facilities in the USA via the STARLIGHT initiative. The

management of the programme will be provided by UKERNA (the UK Education and Research Networking Association), who manage JANET on behalf of the JISC.

Recent worldwide advances in networking technology are enabling a transition to the next generation optical network that will make available ultra-high bandwidth to its users. These developments will radically transform the landscape of the information economy and present new facilities and opportunities to both the network research and development communities and to those responsible for service provision and delivery. Researchers whose work relies upon fast and efficient computer networks will be able to stay at the forefront of their research, particularly in areas such as particle physics, radio astronomy, and high-performance computing.

Professor Peter Clarke, Particle Physics Research Group, University College London comments: 'UKLight is excellent for the UK.