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Introduction: digital information, an overview of the landscape

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As seasoned information professionals it is easy to think that we have a reasonable understanding of the way in which the world of information and associated technologies is moving. However, the world is changing fast and many of our core beliefs and understandings will, without doubt, be impacted by these changes. In the words of Clifford Lynch:

Digital technologies have opened the door to a host of new possibilities for sharing knowledge and generated entirely new forms of content that must be made broadly available. (ARL, 2009)

Take, for example, the way in which users search for information. Only a few years ago, librarians would advise that the starting point for all literature searches should be an abstracting and indexing (A&I) service, or a reference publication such as a handbook or encyclopedia. While this advice is still given in appropriate circumstances, all librarians know that everyone (ourselves included) uses an internet search engine such as Google, Google Scholar or Yahoo! as a first port of call. We know this by talking to, and observing, our users, and recent research by the Centre for Information Behaviour and the Evaluation of Research (CIBER, 2008) has validated it.

In 2009 the UK Serials Group (UKSG) ran a student competition. Entrants were asked to write a short submission on how they used libraries, electronic resources and the internet; the winner was then invited to run a workshop at the 2009 UKSG conference. The winner

was Claire Duddy, and her workshop was a runaway success. Duddy wrote in a subsequent article for *Serials*:

As a librarian (in-waiting) even the idea of a ‘quick and dirty’ search with Google is an illicit thrill. It is almost too easy: shouldn’t there be some effort involved in finding useful, valid information? And if librarians use Google, aren’t we just undermining ourselves? It is a difficult thing then to admit: Google is my first stop for all my information needs, whether I am researching my dinner or my dissertation.

However, she went on to say:

Librarians who accept the importance of Google in their users’ academic lives are easier for users to relate to. They can also help to encourage research that takes in a wide variety of sources and types of information. We can promote internet searching and Google alongside more traditional literature searching and A&I databases; the use of a wide range of searching skills and information sources can be encouraged and developed . . . the choice is not between Google and libraries. Both have their strengths and weaknesses. (Duddy, 2009)

We should be reassured that while Duddy does indeed start with Google, she then goes on to utilize more specialist information retrieval tools. However, there are clearly many students who do not. Professor Tara Brabazon from Brighton University has coined the phrase ‘Google is white bread for the mind’:

Google offers easy answers to difficult questions. But students do not know how to tell if they come from serious refereed work or are merely composed of shallow ideas, superficial surfing and fleeting commitment. (Frean, 2008)

Brabazon is undoubtedly correct. However, there is another important factor when considering the effectiveness of a Google search – and the figures are staggering. Williams estimates that ‘the surface web is about 177 terabytes while the total web is about 91,000 terabytes, so the total web has 500 times more content than is openly accessible’ (Williams, 2009).

It is arguable that many people are simply unaware that there is content available on what is known as the 'invisible web' or 'deep web'. The invisible web contains the content not surfaced by the search engines, content that is often only accessible on payment of a toll or subscription fee. Even those who are aware of the invisible web, and who have access to subscription content through an affiliation to a library, are unlikely to start their search there. Google is ubiquitous and, indeed, the use of Google is so popular that 'to Google' is now a verb, and entered the *Oxford English Dictionary* in 2006. This means that information professionals have a huge task in helping users to find and use the content on the invisible web. It is a core belief of the information professional that access to high-quality information is at the heart of research and the knowledge economy. Graham Stone, in Chapter 6, further examines the complexities and challenges of resource discovery in the digital era and asks what the future holds for libraries and librarians.

The academic library of the future

There is little doubt that the role of the academic library is changing in the digital age. A recent feature on the future of libraries in the *Guardian* newspaper stated: 'Academic libraries are changing faster than at any time in their history. Information technology, online databases and catalogues and digitised archives have put the library back at the heart of teaching and learning and academic research on campus' (JISC, 2009).

Such media attention is welcome and raises the profile of libraries. Over the last decade huge strides have been made in the provision of and access to information by libraries. Most major journal publishers now provide their entire portfolio in digital format and the transition by libraries from printed journal holdings to electronic journals (e-journals) is rapid. The traditional journal package as we know it is also evolving. Blogs and wikis, links to research data, RSS feeds and online peer review are all becoming commonplace. Book publishers are catching up, and electronic books (e-books) are becoming an important element of library collections. Scholarly book publishers increasingly publish both print and electronic versions of their books, although this does not generally apply to textbooks. Amazon – a major player in the mass

book market – is rapidly signing deals with publishers to make e-books available and providing access to readers via its Kindle e-book reader. If we also consider the huge amounts of older and rarer research materials being made available online by local and national digitization initiatives, the vast scale of the rich information resource available to scholars and researchers becomes apparent.

Our digital heritage

In Chapter 5 Alastair Dunning examines the many issues and technological challenges surrounding the digitization of library heritage collections. There is little doubt that a major future role for academic (and other) libraries will be to disseminate the world's heritage literature and artefacts to a wider audience than just scholars and researchers. However, we must recognize that we do have powerful competition in the form of Google. Google's mission is 'to organise the world's information and make it universally accessible and useful', and it has many millions of dollars to devote to the cause. The Google digitization programme is already well under way, digitizing out-of-copyright books in scores of major research libraries around the world. Dr Rolf Griebel of the Bavarian State Library, a partner in the programme, commented on his library's participation:

With today's announcement we are opening our library to the world and bringing the true purpose of libraries – the discovery of books and knowledge – a decisive step further into the digital era. This is an exciting effort to help readers around the world discover and access Germany's rich literary tradition online – whenever and wherever they want. (Google, 2009)

But Google is not the only show in town. Libraries are also involved in significant digitization programmes and it is heartening to see the extent of national commitment to the provision of digital information. In the USA, the Library of Congress is leading a nationwide digitization effort to scan ageing brittle books – some of which are often too fragile to be handled by researchers – and make them freely available. The programme is sponsored by a \$2 million grant from the Alfred P. Sloan Foundation and it involves over 100 libraries, universities and cultural

organizations (Library of Congress, 2009). In Europe another initiative is under way: the European Digital Library – Europeana – is aiming to link users directly to digitized heritage content accessible in a Web 2.0 environment. It hopes to expose national content to new audiences and all levels of learning, and extend the knowledge and understanding of each nation's heritage (EDL Foundation, 2007). In the UK, JISC has funded a £22 million digitization programme, which has run in two phases. The first phase saw collections such as the British Library Archival Sound Recordings and British Newspapers 1800–1900 digitized. In the second phase Historic Polar Images, Radio News Archive and the British Cartoon Archive, among others, were made freely available online (Sykes, 2008).

As Alastair Dunning points out in Chapter 5, many challenges remain to be addressed in terms of sustainability of digital collections and application of international standards, but the message for libraries and publishers is clear. The way forward is to continue the digitization of our valuable heritage materials, and also to work towards improving the flow of digital content into wider arenas and allowing users to interact with the digital data.

E-journals, e-books and other e-stuff

E-journals

Journals have always been one of the most important types of resource for scholars. They have also constituted the major spend on materials in most academic libraries. Currently there are about 21,000 peer-reviewed journals published worldwide, containing about 1.4 million articles each year, and the world market for scholarly journals is estimated at £5 billion. According to Mabe (2006), the number of journals continues to grow year on year by about 3% and the number of articles grows at approximately 3.5% per year. Amazingly, these figures have been relatively consistent over the last 200 years. However, that may be about to change. Robert Parker, Managing Director of Royal Society of Chemistry (RSC) Publications, recently told members of his Library Advisory Board that submissions to the RSC are up 47% in 2009. The society published 35% more articles in 2008 and it will publish 30% more again in 2009. Ian Russell, in Chapter 3, goes into more detail regarding the growth of research output. The increasing

output from China and India is already challenging publishers. Russell says: 'We can expect a truly dramatic increase in the quantity, quality and impact of Chinese research. Many observers believe that India is around five years behind China.'

But the ever increasing output of scholarly journals and articles has created, and will continue to create, a major problem for libraries. The so-called 'serials crisis' – the inability of library budgets to keep up with the proliferation of published journals – has been an enduring topic in the library literature for many decades.

Librarians and publishers do need to find a solution to the current dilemma. It is important to the survival of both parties that scholars continue to have access to the research literature. At a strategic level, academic institutions should also be concerned. A recent research report from the UK's Research Information Network (RIN, 2009) shows that even at the current level of spend, e-journals represent good value for money. Users in UK universities downloaded some 102 million articles in 2006–7, at an average cost of 80 pence per article. However, even more importantly, the spend and the use of e-journals in an academic institution correlate with research outcomes. The research found that per capita expenditure and use of e-journals is strongly and positively correlated with the number of papers published, the number of PhD awards and the number of successful research grants awarded to an institution. Given that funding bodies worldwide use such metrics to establish institutional funding levels, vice-chancellors do need to take heed. It is up to librarians to ensure that their voices are heard by higher authorities, and this will continue to be an important role for library consortia and library professional bodies at a national and international level.

There is however, another possible solution.

Open Access

While libraries have traditionally focused on the purchase of journals, the electronic environment has opened up new possibilities. Electronic publishing offers authors the possibility of making their publications freely available on the internet. This is known as Open Access (OA) and it is gaining momentum among both librarians and authors.

There are a number of OA models. Harnad (a major protagonist of OA) identifies two types – 'green' and 'gold' (Harnad et al., 2004). In

gold OA the publisher makes the entire e-journal available on the internet free of charge – finding revenue streams from sources other than library subscriptions (e.g. library membership fees or payments from authors). In green OA an article is published in a conventional, subscription-based journal, but the author subsequently makes it available online, via either personal or institutional web pages or in a repository.

The growth of repositories is a worldwide phenomenon. Many academic institutions around the globe now have their own institutional repositories (IR), which contain the research output of their scholars and researchers, including journal articles, book chapters, theses and research reports. Providing that the IR complies with the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH), the publications can be discovered by anyone using a generic web search engine (e.g. Google, Yahoo!). In many institutions it is the responsibility of the library to manage and populate the IR, which means that generally the library bears the cost of the ‘publishing’ activity – particularly in terms of staff costs. There are also a number of international discipline-based repositories, the best known being arXiv¹ for physics and PubMed Central² for biomedical sciences.

If OA publishing continues to grow, the impact on publishers and libraries will be considerable. There could come a time when libraries decide to cancel journal subscriptions because a significant proportion of articles published are freely available online. Indeed, research by Norris, Oppenheim and Rowland (2008) shows that in some subject disciplines well over 50% of all published papers *are* already freely available. But whether it is traditional publishers or librarians via their IR who publish materials, there is still a cost associated with the publishing and someone will need to foot the bill.

The future of the journal

Having examined some of the issues surrounding the publishing and provision of journals in the digital environment, it is perhaps time to ask whether the journal, as we know it, is fit for purpose. Already it is apparent that there is no longer a necessity for every library in the UK to retain printed back-files of journals and older books. The UK Research Reserve Project is working on a national UK store, based in

the British Library, which will hold journals no longer required by higher education libraries, retain them permanently and make them available to researchers.³

Library space is an important issue, which is under scrutiny in many academic institutions. Storage space for printed books and journals is expensive, and more and more space is required year on year. Some institutions see the opportunity for returning freed-up space to lecture rooms and laboratories, others have decided to retain it within the library and create more social, exploratory and group learning space – for example, the Learning Grid at Warwick University (Edwards, 2006).

As libraries continue to remove bound back-volumes of journals from their stacks, what of the current issues of journals that now are predominantly available as e-journals? Will the current system of journal publishing survive? Journals themselves are merely the wrappers for articles, and as publishers increasingly encourage users to access their titles from their own platforms, surely these are looking more and more like databases of articles. The fact that the article metadata is also being released to search engines so that they can be discovered more easily also means that the unit of transaction is becoming the article – not the journal. Publishers, journals editors and possibly some academics would argue that it is the journal title which provides the prestige of a publication.

For decades academia has been obsessed with methods of calculating the quality of journals such as citation rankings and impact factors. These methodologies provide the basis for measuring the research excellence of academic institutions in many countries. If we were to move away from the concept of the journal as the package, how would quality be measured? This issue is already being addressed by the Public Library of Science (PLOS). It is devising an article-level metric for its journals, based predominantly on usage (Binfield, 2009).

However, many publishers are moving into the Web 2.0 space, and more and more journals are providing RSS feeds, blogs and wikis – and even links to background research data – for their authors and readers. Is this a last-ditch attempt to create reader loyalty to the title? Or is it that the journal really is an efficient way of disseminating peer-reviewed information and data? Ian Russell in Chapter 3 clearly thinks it is. Rick Anderson in Chapter 2 is not so sure.

But one thing is certain: the scholarly journal industry has evolved

over a long period of time; alongside libraries it has become the custodian of quality control, and industry standards have been developed to ensure discovery, access and linking. It could be argued that a world without such standards would quickly develop into anarchy, and discovery and access for scholars would be very difficult.

E-books

Colin Steele in his coverage of e-books in Chapter 4 states that: 'The challenge for 21st-century scholarship, which includes e-books, is to implement an infrastructure for the digital world untrammelled by the historical legacies in the frameworks and costings of print culture.' However, it is clear that we have not yet reached that Utopia.

Whereas journals have traditionally supported research activity within academic institutions, books have traditionally supported learning and teaching. Course textbooks, reading-list materials, scholarly monographs and reference materials have all been important library acquisitions for the student body.

The e-book market has been much slower in maturing than the e-journals market. In his book *Print is Dead*, Jeff Gomez (2008) traces the history of the comparatively slow introduction of the e-book. Librarians and users have been challenged by the plethora of e-book readers, the difficulty of reading books on screen, lack of interoperability between publisher and aggregator platforms, and the business models associated with e-book provision.

Librarians are keen to expand their e-book collections. In 2006 the Higher Education Consultancy Group undertook a survey of UK university libraries on behalf of the JISC E-Books Working Group (HECG, 2006); 89 out of the 92 university libraries which responded said they were either 'eager' or 'very eager' to develop e-book collections. In addition, librarians told the consultants that they wanted: multiple and concurrent access for users (not one copy, one user); an easier way of discovering what e-books are available; and easy access for their users (not lots of different platforms and interfaces).

It is extremely difficult to obtain accurate and up-to-date statistics on e-books. However, in August 2009, Michael Smith, Head of the International Digital Publishing Forum, reported that e-book sales were up 149% on year to date. He went on to say: 'For me the most interesting

thing is that these figures are likely soft, and the true market performance of e-books is probably stronger given that this data is for the US only' (Eltham, 2009).

One exciting new development which may very well impact on the availability of books for library users is the Espresso Book Machine (EBM). This is a print-on-demand machine that takes a PDF file and prints, collates, covers and binds it as a single paperback book in a matter of minutes. The machine is designed for the library and bookstore marketplace, and the first one was installed in the New York Public Library in 2007. The first one in the UK was launched in 2009 at Blackwell bookstore in Oxford: 'signalling the end, says Blackwell, to the frustration of being told by a bookseller that a title is out of print, or not in stock, the Espresso offers access to almost half a million books' (Flood, 2009) (and this will increase to over a million by the end of 2009).

Clearly, publishers see the growing demand from libraries for e-books and, as can be seen from the above statistics, many are now providing both their current titles and back catalogues in e-format. They are also responding to the student and consumer demand for e-books to be read on mobile devices such as the Sony e-book reader, Amazon's Kindle and now the iPhone.

However, there is one category of e-book which publishers still remain reluctant to make available: that is the e-textbook.

In the UK, the JISC E-Books Working Group – which oversees e-book consortia activity – has been in repeated dialogue with publishers to persuade them to make their e-textbooks available to libraries – but to little avail. Publishers' overriding concern is that if they allow libraries to make e-textbooks available, the student market for textbooks will decline significantly. So, in 2007 funding was obtained to undertake an ambitious project, the National E-Book Observatory Project (JISC, 2007) – which would make high-demand reading-list texts free at the point of use to all students in the UK for a period of two years and monitor the use of those titles and the impact on publishers' sales. The key findings from the project were highly insightful. Students used the e-textbooks in huge numbers at all times of the day and night, rarely reading linearly, but skimming and dipping into the content; most reading was done on screen. However, the most significant findings were that the availability of the e-textbook did not impact upon the

circulation of printed textbooks in library collections, and online availability had little impact upon publishers' sales. It is to be hoped that, following this project, publishers will be keener to sell e-textbooks to libraries.

The public library of the future

In a recent *Top Trends* blog on the future of public libraries, a long list of key influences on public libraries was posted. This included: sustainability; pricing (free versus user pays); trustworthiness of information; the value that the local community puts on information/knowledge; the pace of technological change; and democratization of information (Web 2.0, etc) (Macmanus, 2009). It is unlikely that anyone would disagree with this list. Public libraries always seem to be in the news with negative articles on library closures, reduced budgets, fewer staff and reduced spend on books. The pressure on public libraries is a worldwide phenomenon. A librarian in the USA contributed to the blog, writing: 'Unfortunately, the economic situation, e.g. sustainability (in California, at least) is starting to really rise to the top. In the short term, libraries will need to do more with less money, fewer staff, reduced hours, while at the same time demand is at an all time high' (Garza, 2009).

In the UK there have certainly been public library closures. Figures from the Chartered Institute of Public Finance and Accountancy (CIPFA) show that in 2005–6 there were 56 fewer central and branch libraries and 58 fewer mobile libraries than in 2001–2. But such bald figures hide the fact that urban and rural demographics change over the years and many libraries have extended their opening hours to accommodate evening and weekend activities and services. Moreover, CIPFA figures for 2007 show that there were over 337 million visits to over 4,700 public libraries, 315 million book issues, 64 million visits to library websites and a budget of over £1 billion (Harrison, 2008). However, it might be argued that public libraries do have an image problem. In the UK the House of Commons Culture, Media and Sports Select Committee agreed that 'a significant barrier to library use was shabby buildings, whether inside or out' (House of Commons Culture, Media and Sports Select Committee, 2005). There is no doubt that attractive buildings that are pleasant to visit and work in can enhance the

position of the library in the local community. Childs (2006) points out that imaginative design in a number of recent new-build libraries (e.g. Peckham, Bournemouth, Cambridge) has caught the public's imagination.

When there is a debate about their future it seems to focus on either the traditionalist view of the 'book lobby', who maintain that libraries should be all about books and not much else, and the 'diversifiers', who believe that libraries should be more than just about books and should broaden their offering to encompass computing, multi-media, social space and learning programmes (Holden and Ezra, 2009). The reality of the situation is that public libraries should respond to the needs of the local area and the local community. In a deprived urban area, after-school homework clubs, internet access and literacy/language programmes might be appropriate, whereas in a remote rural area the service might wish to attract volunteers to help extend opening hours and provide a much-needed social and meeting space for local people. At a more strategic level, the (UK) Commission on Integration and Cohesion (2007) identified libraries as key partners in helping to promote integration, helping to dispel ignorance and prejudice about other cultures. There are many successful examples of such work, such as Manchester's initiative with the Pakistani community or Leicester's work with refugees as library volunteers – services tailored to reflect the local situation. A recent report from the British trade union Unison concludes that library service providers should work with their communities to shape services together:

Libraries rest on a bed of goodwill from local communities. They are valued and trusted. But much more could and should be done to involve both the staff and the local communities in the shaping of the service. This should involve current users, the 'Friends of the Library' and support groups, but should also develop means of reaching out to those who currently do not use the library as well. (Davies, 2008)

There is clearly no 'one size fits all' model for public libraries of the future. Many, worldwide, are developing exciting and innovative 21st-century services for their communities. Some are becoming more like Starbucks – providing coffee shop services alongside internet access and traditional books and reference services. Others are working with

minority groups or with teenagers in their area and providing support and even sometimes work experience for them. Book clubs, homework clubs, premises for local interest groups all abound. An article by Wooden (2006) examined the four areas of public library activity that resonated most with both the public and funders alike. These were: providing safe and productive activities and services for teenagers; helping address illiteracy and poor reading skills among adults; affording ready access to information about government services; and ensuring even greater access to computers for all. Perhaps a little unusual, but certainly a way to raise interest in public libraries, is a wonderful idea from Scandinavia which has recently been introduced to some UK public libraries – borrowing a person! To quote *The Times*:

Instead of books, readers can come to the library and borrow a person for a 30-minute chat. The human ‘books’ on offer vary from event to event but always include a healthy cross-section of stereotypes. Last weekend, the small but richly diverse list included Police Officer, Vegan, Male Nanny and Lifelong Activist as well as Person with Mental Health Difficulties and Young Person Excluded from School. (Baker, 2008)

Because public libraries do have a special place in the hearts of the general public it is likely that, in one manifestation or another, the concept will survive. But in the words of British Member of Parliament Lyn Brown in 2008:

It seems to be that the original core purpose of libraries for information, education and culture still holds firm. But the world around continues to change at an ever increasing pace and libraries must embrace that social change and constantly adjust the manner, methodology and public face of how it continues to deliver this core purpose.

(National Literacy Trust, 2008)

National libraries of the future

National libraries are generally funded by governments, firstly to act as repositories for the books, journals, heritage materials and grey literature published in a country, and secondly as centres to support research. This section focuses on new challenges faced by the British

Library, as a case study. However, these challenges are common to all national libraries around the world. How do they continue to collect and preserve information and knowledge that is no longer produced on paper, but in digital format? And how do they continue to meet the expectation that scholars and the general public will have access to that information and knowledge in perpetuity?

The British Library is one of the world's most significant research libraries, with a collection of more than 150 million items, including 14 million books, 920,000 journal and newspaper titles, 58 million patents and 3 million sound recordings.⁴ Its historical treasures are numerous and include the Lindisfarne Gospels, the Magna Carta and many other important historical texts, maps and documents. The British Library is also a magnificent example of how a research library can meet the needs of many other diverse user groups, becoming not only a place for the serious scholar, but a cultural history centre and a support centre for small businesses. A visit to the building is a wonderful experience: inspiring architecture and good frappuccino either from a café in the courtyard, or, in poor weather, from an inside café. The British Library runs a programme of fascinating exhibitions which make its special collections accessible to the general public. At the time of writing, the British Library is providing an exhibition called 'Henry VIII: Man and Monarch', providing access to key documents from the life and times of the bloodthirsty king whose reign changed the nature of England. The British Library also offers stimulating workshops, activities and resources for teachers and learners of all ages. It supports entrepreneurs through its Business and IP [intellectual property] Centre, which provides not just published material but also courses, podcasts, webcasts and other events and services to support small and medium-sized businesses in the UK. Its website provides access to a range of digitized material and receives 67 million hits each year.

The British Library clearly operates at many levels. 'At the core it represents the collective memory of the nation by retaining for posterity the intellectual output of British publishing' (British Library, n.d.). Legal deposit is the legislation that requires publishers and distributors in the UK and the Republic of Ireland to send one copy of each of their publications to the Legal Deposit Office of the British Library within one month of publication. The British Library adds to this core collection by purchasing research-level material from around the world.

The purpose of this is to be the library of ‘first instance and last resort; last resort for those whose primary access is their university, company or public library and first instance where the Library is the sole convenient source for the research material they require’.⁵

The Library, then, has to care for its collections, and 190 professional staff are dedicated to preserving the print collections. It has also to provide access to the collections in its readings rooms, which are in the beautiful new building at St Pancras, London. The building was completed in 1997 by Colin St John Wilson, with generous public spaces and seats for 1480 readers. Despite the Library being housed in a state-of-the-art building, capacity in the reading rooms has been an issue of controversy. The author Christopher Hawtree reported that he had to ‘perch on a windowsill’. The historian Lady Antonia Fraser complained: ‘I had to queue for 20 minutes to get in, in freezing weather. Then I queued to leave my coat for 20 minutes [at the compulsory check-in]. Then half an hour to get my books and another 15 minutes to get my coat. I’m told it’s due to students having access now. Why can’t they go to their university libraries? It’s become a social gathering.’ (Alberge, 2008).

These comments illustrate one of the problems facing the British Library in the modern world. It is required to satisfy differing expectations and to provide access to a wide diversity of users. Students and researchers all need and expect access to scholarly materials. In the physical world a 15-minute wait is cause for complaint and in the digital world research indicates that users also show ‘impatience in search and navigation, and zero tolerance for any delay in satisfying their information needs’ (CIBER, 2008).

In her introduction to *The British Library Strategy 2008–2011*, the Chief Executive, Dame Lynne Brindley, sums up the challenge of providing researchers and students with the critical mass of digital content they demand:

The environment in which we operate has arguably changed more in the past two decades than in the preceding two centuries, driven particularly by technological developments. Such change is gradually transforming traditional scholarly dependency on the physical library as a major source for meeting research needs into a complex network of options, with varying levels of accessibility, authoritativeness and depth.

(British Library, 2007)

The British Library must therefore not only continue to increase its collection of print material through legal deposit, but also extend its collection building to digital content. The idea of legal deposit dates back several hundred years and is well suited to print publications, but it does not work well in the e-environment. With an increasing volume of important material published in e-format, primary legislation for extending legal deposit to electronic publications has been in place since 2003, but progress towards the secondary legislation has been slow. There are a number of reasons for this. First, there is the issue of the place of publication. In the print world it is fairly easy to identify the place where an item was published, but when material is published on the internet, traditional boundaries are removed. An item published in one country can be easily accessed elsewhere, and other countries may want to archive it and their users may want to access it.

The second issue is the funding, the development and, more crucially, the sustainability of the robust technical architecture required to archive and preserve huge amounts of digital information. The technological issues lie not only with the infrastructure but also with the processes that will allow the content to be read by future generations. Technology transfers in recent history have illustrated the problem. For example, information stored just a few years ago on floppy discs might well by now have become corrupted, even if a machine could still be located to provide access to the stored information. The issue of technical obsolescence has to be addressed if the British Library is not to amass a collection of bytes that cannot be read.

Perhaps the most challenging issue is how the British Library provides access to this vast array of born-digital content. The role which national libraries undertake in preserving material for the long term does not equate to making that material available over the internet. The British Library does indeed provide open access to its catalogue and it has also digitized and made available online much of the material in its out-of-copyright collections. Moreover, it has digitized and made available other collections where copyright still applies, notably many thousands of pages of newspaper archives and many hours of audio recordings. Although these digitized collections are available on the internet, they are only accessible via an authentication system. This means that only UK higher and further education institutions that sign

a licence with the British Library have access. These collections are not available to the general public or to the lone scholar.

The crux of the problem is how to provide remote online access to material still in copyright while protecting the interests of the rights holders. Recently, Dame Lynne Brindley pointed out:

We are in danger of an escalating arms race between geeks/hackers and tech savvy young people and businesses focussed on lock-down – the music industry has shown the difficulties of DRM [digital rights management] based strategies. Let's put equal imagination into workable new business models! And we should be aware of trends towards more open innovation models – in software standards, in publishing, in education courseware and in source code. The required innovation balance is not a straightforward one.

(British Library, 2009)

Finding the balance is not easy because the users and creators of information have completely different expectations. Researchers and students increasingly expect that the British Library's collection of the 'world's knowledge' will be available not only by visiting the reading rooms, but also remotely to their desktops. Authors and publishers expect to earn money through the digital distribution of their content. Will the balance be found and will the British Library (and other national libraries) be able to embrace new technologies and connect users in innovative ways with the content they need? Or will use of the library's collections, whether paper or digital, require the time and resources necessary to visit the reading rooms at St Pancras?

The librarian of the future

If this is the way academic, public and national libraries are evolving, what does that mean for the role of librarians? While in many libraries footfall is declining, the use of the digital library is soaring. Students, researchers and the general public no longer need to come to the physical library to consult printed documents, but they do still come to find quiet study space, to work on group projects, to seek the advice of information professionals or just to meet friends socially for coffee. Most libraries now, while continuing to provide facilities for face-to-face

interactions with users, also provide services for remote users. This may be via an ‘ask a librarian’ chat line, e-mail, telephone or online tutorials. With dwindling shelf space devoted to printed items, and with remote assistance and support for users, we can but wonder about the future of the physical library – but what of the staff? It seems clear that as long as universities, colleges and schools exist as physical entities there will continue to be a requirement for information to inform and support learning, teaching and research. And the general public appears to have a growing appetite for information, from freely available sources on the internet to quality-assured information from reputable publishers.

At the beginning of this chapter we discussed the importance of both the surface web and the deep web. Unless all information becomes ‘toll free’ (and that seems unlikely in the short to medium term) then there will continue to be a need for e-resource acquisition, organization and management, as well as information literacy training – and these require staff. Furthermore, evidence from the library satisfaction survey LibQUAL+ shows that staff and students value support and assistance from information professionals very highly (Stanley and Killick, 2009). So, while the role and skills set of the librarian will alter radically and many of the traditional activities of librarians will disappear, there will almost certainly be a requirement for staff in the digital information universe. However, librarians should heed the words of Chris Batt, CEO of the Museums, Libraries and Archives Council, speaking as long ago as 2000. He said that librarians needed to step up to the mark in the digital age and that ‘there needs to be a fundamental shift in how librarians are trained and how they perceive their roles’ (Batt, 2000). Information professionals need to be committed to changing the relationship between information and the people who want it. We will need new skills, new organizational structures and new partnerships. Change is already under way but clearly more work remains to be done.

The bookshop of the future

The novelist Susan Hill recently wrote, ‘Whenever I hear people shouting, “Save the village store”, I wonder if they have been in one lately, and the same goes for bookshops’ (Hill, 2006). Times are tough for bookshops, in particular for independent bookshops. The business is

often inefficiently run, with understocking, overstocking and limited shelf space. It is difficult for them to compete with the large chains, supermarkets and in particular with Amazon, as each tries to undercut the others. The most recent Harry Potter novel has a published list price of £16.99, but Amazon is selling it for £4.99 and it was reported that one supermarket was selling it for £2.99. It would seem that Amazon is the 'big gorilla' in the booksellers' market. It can sell more books more cheaply, it does not have a shelf-space problem, it can site its warehouses in low-cost areas, and does not need to rent expensive retail outlets on the high street.

Changes in technology which provide the ability to sell cheaply have impacted on the bookselling business before. Charles Edward Maudie founded his circulating library in London in the 1840s and in the following 20 years it expanded to become a dominant force in the UK book trade. Like Amazon today, Maudie took advantage of the new technologies of the time: rail, steamship and the postal services. Like Amazon, Maudie was also able to sell cheaply. For the annual fee of one guinea, the customer was entitled to the loan of a volume which could be exchanged as often as one wished, and this was at a time when the average three-volume novel cost a guinea-and-a-half (£1.57). Maudie enjoyed a near monopoly and could claim huge discounts of around 50% from the publishers. This monopoly was finally challenged with the abolition of the three-decker novel in favour of the single-volume, six-shilling (30p) novel.

An interesting thing about Maudie's model is that the purchaser leased rather than bought the book. This model is one already in operation in the DVD market. For example, LOVEFiLM allows subscribers to choose from a library of over 65,000 films. The DVD is delivered by post the next day, and can be kept for an undefined period of time, with no late-return fees. Once the users have finished with films, they return them and another film of their choice is sent the next day. Membership fees are low, around £3 to £15 per month and the number of loans is unlimited. A similar model might work with e-books, providing that the right technology, digital rights management and e-book reader were available.

Is it possible that the Kindle and other portable e-book readers are going to provide alternative models of access and purchase and, in the process, make booksellers obsolete? These devices are already lighter

and thinner than the typical paperback and provide mobile access to books, newspapers and journals. By using the keyboard of some of the more sophisticated e-book readers, users can add annotations to text, just as they might write in the margins of a book. And because it is digital, they can edit, delete and export their notes, highlight key passages and bookmark pages for future use.

Arguably, there will still be a market for illustrated books, the books we want as artefacts, but perhaps the paperback novel will go the way of vinyl record. Enthusiasts will use printed books, but the general public will prefer the convenience and portability of the e-book. They will be able to download titles from Amazon and other internet booksellers, just as they now download music to their iPods. Consumers will no longer have to think about how many books they can conveniently fit in their briefcases or suitcases; they will be able to carry a small library on a handy portable device when travelling.

Stephen Moss interviewed a number of independent booksellers for a report published in the *Guardian* newspaper in 2006 (Moss, 2006). Almost all of the booksellers interviewed recognized that if they were to have a sustainable future they could not just rely on selling books. One interviewee said: 'We're not just a bookshop. We're an information centre and a hub of activity.' An urban bookseller said: 'The moment I saw this shop and the market, I knew it was better than Brick Lane [in London] for a bookshop because it's a community street', and a rural bookseller said: 'People also realise the social importance of having a bookshop in a small town. It does more than sell books.' Wherever they are situated, these booksellers see that their future lies in becoming a part of the community, and offering services as well as selling books. Services may include the obvious, such as a coffee shop and book readings, but bookshops may also become centres for specialist information and training. They may also become providers of print on demand facilities. *Time* magazine called the Espresso Book Machine (described earlier in this chapter) the 'Invention of the Year' (Flood, 2009). Publishers and booksellers alike see the huge potential of a machine that collapses the supply chain, increases backlist sales, and matches supply with demand.

The publishing industry of the future

The publishing industry has developed its business models around printed books and journals as the major vehicle for the distribution of information. Timo Hannay of Nature Publishing has written: 'The web is the most disruptive influence on publishing since the invention of movable type . . . And now we have at our disposal the most powerful information dissemination tool in publishing history' (Hannay, 2007). Ian Russell in Chapter 3 also alludes to the disruptive influences on publishing in periods of rapid change. The internet has indeed turned publishing on its head, and publishers of all types are torn between the desire to protect the established models and the desire to experiment with the brave new world of the internet. The creative industries are essential to the UK's future competitiveness and it is estimated that by 2020 they will generate over 11% of gross value added (GVA), which is the difference between output and intermediate consumption for any given sector, used in the estimation of gross domestic product (GDP), and is a key indicator of the state of the whole economy. How is this business to be stimulated and expanded in a world which expects information to be delivered over the internet, and often for free?

Journal publishers were the first to make a transition to e-publishing, and most academic journals are now published in electronic form. Journal publishers were the first to migrate to the internet for two reasons, the first being that their predominant business model is sales to institutions and not to individuals. Institutional libraries pay for print subscriptions and make those journals available to their patrons. Thus the print model is easily transferred to the electronic world. The second reason why the journal has migrated so quickly to the internet is that it is simply a 'wrapper' for collections of self-contained articles. Online access and technology are capable of providing fast searching and direct access to the article.

There are three unique aspects to the journal publishing business. First, the publisher does not pay the authors for their content. Academic authors write for recognition, not money. Second, journal publishing operates in a market which is not normal. Each journal is unique and no one journal can substitute for another. Thus, journal publishers may compete for authors and for market share, but they do not experience the direct competition that generally happens in other

markets. Third, customers generally pay in advance, usually annually, before the product is created or distributed.

Journal publishers, especially the large ones, who are able to provide a critical mass of quality content supported by cutting-edge technology, are in a very strong position. However, despite these strengths, the journal publishing industry does face threats. There is a groundswell of opinion that the outputs of scholarly research, funded by public money, should be unrestricted and open to all users on the internet without financial or other barriers. This is known as Open Access (OA), as discussed earlier in this chapter and by other contributors to this book.

The debate between the pro-OA lobby and the scholarly publishing industry has been fierce, with the publishers defending their business model and pointing out the value they bring to the process in terms of organizing peer review, editorial review and, of course, the organization of articles into discipline-specific journals. On the other hand, there are those who argue that, in the age of the internet, the role of the scholarly publisher is no longer required. Indeed it is true that all the functions of the publisher could quite easily be undertaken by the author and his or her peers. In the age of the desktop, typesetting is not required, social networking could facilitate a new form of peer review and articles could be distributed from authors' websites.

Taken to its conclusion, such a model for the publication of scholarly material might very well create anarchy. Journal publishers would go out of business and researchers would not have the motivation to publish. They would not receive the registration and recognition provided by the current publishing system. If they did continue to publish, there would be hundreds of thousands of journal articles each year, distributed across thousands of websites. Users would have great difficulty in finding articles or understanding their provenance.

OA proponents have suggested that there is still a role for publishers in this model – the role of providing 'overlay services'. In this model, the journal publisher is no longer the distributor of content but becomes the provider of specialist peer-review services such as interfaces to articles deposited in institutional or subject repositories, guaranteeing that they have passed the journal's quality standards. This model offers small comfort for the shareholders of the large publishing houses. The change from being the distributor of unique content to that of being one of many firms competing to provide editorial services is not compelling. No

wonder that the journal publishing industry is so keen to refute the potential benefits of 'green' OA. Nonetheless, it would seem that the future will provide increasing amounts of literature openly available. Copyright has been a barrier in the past, but now around 80–90% of publication channels allow authors to deposit papers on their own websites or in a repository after an embargo period following publication in a journal. Some journal publishers have gone further; *Nature*, for example, does not demand copyright from its authors but merely a licence to publish, leaving copyright with the authors or their institutions. Publishers also recognize that universities want to showcase their research outputs, and some are already offering universities metadata, so that institutional repositories can point to articles that are on the publishers' websites. This has the advantage, from the publishers' point of view, of allowing institutional repositories bibliographic information and metadata, while firmly keeping control of the PDF versions of articles.

However, a more ordered future might see publishers and academia using technology to widen access to scholarly material and innovating scholarly discourse.

For example, some publishers have been fast to seize the opportunities provided by social networking and Web 2.0 technologies and have moved into that space themselves. Nature Publishing Group launched one of the first scientific social networking sites with Nature Network in 2007. This site allows scientists to build networks of contacts and talk about research and scientific issues; its functionality includes blogs and interactive forums for the exchange of ideas. The Royal Society of Chemistry has recently acquired ChemSpider, an OA online database of structure-searchable chemical information, which allows researchers to collaborate and share data. Nature Network and ChemSpider are free to use, and allow their publishers to engage in a radically new way with customers and communities of scientists. In a world of globalization, Web 2.0 technologies perhaps provide scholars with a means of personal contact that they have not had since the early learned societies of the 17th century, when communication between scholars depended on the attendance of meetings rather than communication through publication (Wells, 1999).

The debate about OA looks set to roll on for many years and this is not surprising, given the business at stake. As Steven Pearlstein has written:

There is nothing more amusing than watching business interests work themselves up into righteous frenzy over a threat to their monopoly profits from a new technology or some upstart with a different business model; the monopolists (or their first cousins the oligopolists) try to present themselves as the champions of the consumer, or defenders of a level playing field, as if they had not become ridiculously rich by sticking it to consumers and enjoying years in which the playing field was tilted to their advantage. (Pearlstein, 2006)

Journal publishing is not the only area of the publishing industry that will change. Publishers of reference material have been close on the heels of the journal publishers in the move to the internet. Reference publishing business has transferred well to the internet, because of its business model, largely sales to libraries rather than to the individual, and because its format works more effectively when published as a database. Database organization and web functionality mean that reference entries can be much more easily searched than is possible in the print world. An example is the *Oxford Dictionary of National Biography*. In the print format it is 60 volumes of 56,862 entries. Entries are organized in the usual alphabetical order, and the user needs to know what they are looking for in order to find it. With web technology the online version of the *Oxford Dictionary of National Biography* is always fully up to date, and it can be searched in seconds. Searches can be organized by the name of an individual, but also by place, a particular sphere of activity, or within a particular time. Such a search might take years using the 60 volumes of the printed book.

However, despite the wonderful functionality of the reference database, the future of the reference publisher is not certain. There is a significant threat in the form of Wikipedia. Will publishers of subscription material on the invisible web be able to compete with the visible and free Wikipedia?

While journal and reference publishers have made the transition to online publishing, other sectors of the publishing industry have been slow to make the move or have actively resisted it. One of the main drivers of resistance is the lessons learned from the music publishing industry and the fear that electronic books will be illegally downloaded, shared and pirated (Pearlstein, 2006).

Most resistant to a move to electronic platforms are the textbook publishers. The bulk of their revenues come not from libraries but from

individuals. Libraries want to buy e-textbooks, but this demand has been resisted because ‘free at the point of use’ access via the library might destroy the traditional model, which is sale to the individual student. There has also been, until now, little demand from the public for e-books, but it would seem that the emergence of e-book readers such as the Kindle and the Sony e-book reader or the next generation of such devices may well provide the publishing industry with its ‘iPod moment’. The iPod is ubiquitous and music is generally acquired by download. This has meant a huge change for the music industry and a radical change in the business models it uses. Currently, where Amazon has books available in both print and e-book format, the electronic versions have sales of 35% of the same books in print (Schonfeld, 2009). Andrew Marr has written: ‘But it’s clear enough that after all the waiting and the over-hyping, the e-book is arriving. Before long you are going to see them being carried nonchalantly around’ (Marr, 2007).

Some publishers have seen other benefits of the move to the electronic medium. Victoria Barnsley, the CEO of Harper Collins, pointed out that the e-book offers publishers an end to unwanted inventory, no more returns, no more out of print titles and greater value attached to obscure titles (Barnsley, 2008). She sees not only the advantages of electronic publication in terms of publishing administration, but also the possibilities of Web 2.0 technologies for a new type of publishing, which she describes as the ‘circular model’, with authors and readers interacting with each other as part of the publishing process. An example of this is the online publication of Doris Lessing’s *The Golden Notebook* project. Seven readers kept public journals on their thoughts while reading the book, and other readers commented, generating an ongoing discussion in the novel’s on-screen margins. As fascinating as this project is, the business model that would sustain such publishing is as yet uncertain. Barnsley said it would be difficult to establish a profitable pricing model when most consumers were used to free digital content, but nonetheless predicted that ‘within say 10 years more than half our sales will come from digital downloads’. She has been quoted as saying that the Kindle, with its wireless connection, will enable impulse shopping: ‘Imagine watching Cranford on the TV, and immediately downloading the complete works of Elizabeth Gaskell – instant bedtime reading’ (Barnsley, 2008).

Another book publisher ready to experiment is Bloomsbury

Academic, which has announced a new 'Science Ethics and Innovation' series edited by Sir John Huston. The series will be available free for non-commercial use over the internet under a Creative Commons Licence, with the publisher estimating that the cost of publication can be recouped through sales of hard copies that will be printed via print-on-demand and short-run printing technologies. The publisher Frances Pinter estimates that Bloomsbury will have to sell around 200 copies of a highly technical monograph, priced at around £50, to make a profit, and believes it will take two years to judge whether the model is financially viable. Pinter has pointed out that if publishers do not experiment with such models, academics will bypass publishers (Page, 2009).

It would seem that whatever the area of publishing examined, journals, reference materials, books or newspapers, the internet is disrupting long-established business models and means of distribution. Take, for example, another relatively new start-up enterprise – Mendeley. Founded by three German academics and now based in London, Mendeley allows authors to 'drag and drop' research papers into its site, which automatically extracts keywords, cited references, etc., and creates a searchable database. Mendeley say that instead of authors waiting to be published and for citations to appear, they could move to a regime of 'real time' citations, thereby greatly reducing the time taken for research to be applied in the real world. The site already contains over 4 million scientific papers and 60,000 people have already signed up (Mendeley Research Networks, undated).

Some publishers' response will be to invest in preserving the status quo rather than in adapting to the changing world. For others there are undoubted opportunities to monetize new web technologies and formats such as the e-book. However, as discussed earlier in this chapter, the biggest threat to traditional publishing comes in the form of Google. Not only is it digitizing books in their millions, it is also challenging the publishing industry in other areas. Google Scholar, which searches peer-reviewed abstracts and articles from academic publishers, is challenging the established publishers of abstracting and indexing databases. Those established databases are sold on subscription to libraries, and users need to authenticate in order to use them. How much easier it is to use the freely and easily available Google Scholar – often good enough and in time. Google Maps not

only challenges the traditional map publishers and vendors of geospatial data, but also creates dependencies on Google because it powers many map-based services, embedded on third-party websites. What happens when a company creates these dependencies and then takes the content away, or decides to charge for it?

Google has also recently launched Knol, a website which at first glance is a challenge to Wikipedia, but is trying to go a little further. The articles on Knol can have multiple (but named) authors, which, under Google's structure, is called 'moderated collaboration'.

Final thoughts

Perhaps all stakeholders in the current traditional information landscape have some lessons to learn from Google. On its corporate information web page Google lists ten things it has found to be true. The first of these is 'Focus on the user and all else will follow', and to this end Google ensures that:

- the interface is clear and simple
- pages load instantly
- placement in search results is never sold to anyone
- advertising on the site must offer relevant content and not be a distraction.

Will traditional publishers and librarians focus on the user and find that 'all else follows' or will many fail to find new methods of access, dissemination, distribution and business models to support them? The danger is that they do not, and that Google becomes a monopoly. Do we want one single organization controlling the whole information environment? Google claims that 'You can make money without doing evil', but a monopoly is a dangerous thing. If librarians and publishers do not adapt, evolve and survive, there is the danger that Google could not only become the ultimate organizer of the world's information, but also the ultimate controller of information, the censor and the spy.

Cory Doctorow commenting on Google recently wrote: 'There's no dictator benevolent enough to entrust with the power to determine our political, commercial, social and ideological agenda' (Doctorow, 2009).

That would seem obvious, but what is not so obvious is the

organization of a public intervention that would provide governance, regulation and ensure *order*.

Notes

- 1 <http://arxiv.org>.
- 2 www.pubmedcentral.nih.gov.
- 3 www.rluk.ac.uk/node/85.
- 4 www.bl.uk/aboutus/quickinfo/facts/index.html [accessed 28 September 2009].
- 5 www.bl.uk/aboutus/stratpolprog/coldevpol/index.html [accessed 28 September 2009].

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