the library in the twenty-first century

new services for the information age

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LIBRARY ASSOCIATION PUBLISHING
LONDON

Published by
Library Association Publishing
7 Ridgmount Street
London WC1E 7AE

Library Association Publishing is wholly owned by The Library Association.

First published 2001

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library.

ISBN 1-85604-375-4

Typeset from author's disks in 11/13 Elegant Garamond and Humanist 521 by Library Association Publishing.
Printed and made in Great Britain by MPG Books Ltd, Bodmin, Cornwall.

Preface

Libraries are one of the marks of civilization. A nation uninterested in the truth of its past, unconcerned with developing its citizens' potential and inimical to freedom of expression, does not need libraries. Libraries may be maintained in the collective mind, as in oral traditions, or may have physical presence in the city, town or village. They may be large or small. What they contain may, indeed should, be contradictory, puzzling, at times shocking, frequently outrageous. Above all, their contents must stimulate the mind, provoke original thinking and suggest new ways of looking at the world.

But libraries are under threat. If the world is really being built on information and knowledge, transmitted almost instantaneously from any place to anywhere, what role is left for yesterday's fusty mausoleums of print? Perhaps they will survive as museums, becoming just one stop on the country-house tour, preserved in the state in which they were left as the world moved on and now trampled through by thousands of feet on their way to the teashop. And what of the profession of librarianship, is that any better? It bemoans the poor public perception of librarians, yet never quite shakes it off. As a House of Commons Select Committee put it recently, 'The image of an imposed silence has been perpetuated, and the most pervasive image . . . is the hissed "shh" in response to the slightest noise' (House of Commons, 2000). Already the library seems to belong to a bygone age.

This book was conceived because, after years of working in libraries, I have come to believe that there is a real danger that libraries and librarians will be left behind. I believe in libraries, but I fear for them. They have so much to offer, yet could so easily become backwaters.

I do not intend to engage in polemic or special pleading. Rather this is an attempt to understand what a successful, relevant, dynamic library must be in the Information Age and to communicate that, inevitably partial, understanding to others. It concentrates on technological change, because that is where the biggest challenges lie. No one needs reminding that we live in an increasingly digital world or that information is at the heart of economic and social development – however defined, the Information Age is now very much a reality. While all organizations, from manufacturing firms to voluntary support groups, are rethinking their strategies and approaches, it is surely stating the obvious to claim that those that have long been involved in information processing are likely to be among the most profoundly affected. Libraries, among

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What is a library?

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The end of libraries?

> The traditional library, consisting of books and work tables, may give way to a cultural monument, largely unused but maintained at public expense out of collective guilt.
>
> (Shuman, 1989)

Introduction: The onward march of technology

Hardly a day goes by without further evidence emerging of the revolutionary changes across all sectors of society being introduced by the impacts of information and communication technologies (ICTs). The word 'revolutionary' is used deliberately to convey the idea that this is not a process of gentle evolution, nor even one of carefully planned change. Revolutions involve massive change, the adoption of totally new paradigms, the loss of much that has been taken for granted and the introduction of innovations that were never thought possible. Instant, pervasive access to the world's information from the home, from the workplace and even while on the move raises questions about the structures that have been developed to organize and make available information in the past. Why does the world still need libraries? Are they not the 21st century's equivalent of the 19th century's canals – an intermediate technology to be consigned to near oblivion, canals by the railways, libraries by the world wide web?

Daniel Bell's *The coming of the post-industrial society* (Bell, 1973) is often cited as the foundation text for this view, the first comprehensive analysis of the changes that are destroying industrial society and are replacing it with the post-industrial, variously described by epithets such as 'information', 'knowledge' or 'learning'. Bell wrote that 'knowledge and information [have] become the strategic and transforming resources'. His contribution has been recognized as 'the dominant context for thinking about information and society' (Schement and Curtis, 1995) and, while some have criticized the coherence of his theories – Duff (1998), for example, concludes that 'his theory fails as a synthesis . . . failing to assimilate each of the elements properly (and leaving) some parts of the theory overblown and others underdeveloped' – his place in information society development is assured.

Many writers since Bell have echoed his theme, and many have stressed that what is happening is not simply the effect of a single new technology but the convergence of a variety of technologies – which together may be termed 'digital' – that provide the opportunity to develop new forms of relationship between people and organizations, largely independent of time and place. It is little more than a century since the telegraph displaced the ocean liner as the fastest way to do business across the Atlantic. De Kerckhove (1997) writes thus:

> Whether we call it the Net, the Internet, or the Information Highway, the growing synergy of networked communications is, with the exception of language itself, the communication medium par excellence – the most comprehensive, the most innovative, and the most complex of them all. . . . In the mega-convergence of hypertext, multimedia, virtual reality, neural networks, digital agents, and even artificial life, each medium is changing different parts of our lives – our modes of communication, entertainment and work – but the Net changes all of that and more, all at once. The Internet gives us access to a live, quasi-organic environment of millions of human intelligences perpetually at work on anything and everything with potential relevance to anyone and everybody.

Castels (1998) echoes these thoughts:

> Networks constitute the new social morphology of our societies, and the diffusion of network logic substantially modifies the operation and the outcomes in processes of production, experience, power and culture.

Libraries can seem to be falling victim to these pressures, casualties of the revolution as their role changes beyond recognition and the appropriateness of keeping such an antediluvian term as 'library' is called into question. After all if 'connected intelligence' (the title of de Kerckhove's book) underpins the future, is there any place for old ways of recording and organizing intelligence, knowledge or human memory? Would it perhaps be best if librarians and information scientists bowed to the inevitable and found themselves new skills and new niches in the information society?

> Five years ago, the library at my laboratory used to occupy several large rooms and employ 30 people. It has been replaced by a digital library that is now ten times bigger – and growing fast. This digital library is staffed by only 12 of the original librarians who are now amongst the best html programmers in the company. This digital library has become an essential part of our lives and the work output has gone up tenfold in 10 years.
>
> (Cochrane, 1999)

That this is a time of rapid change is clear, and people throughout the world are becoming used to a plethora of information, presented to them by multiple channels (TV, cinema, radio, telephone, print in various forms) and in a variety of formats. 'Information objects' – a convenient term to describe books, journals, newspapers, electronic documents, multimedia packages and so on – can be accessed in many different ways. Increasingly they are being delivered direct to the user either using telecommunications for electronic objects or more traditional – but notably non-library – methods such as post for objects ordered online or over the telephone.

So, at the outset, it should be stated that libraries as we have known them are under threat. It doesn't look like it. To enter any academic or public library in almost any part of the world is to be greeted by a scene not that different from that which would have met a visitor half a century ago. Admittedly the serried ranks of card catalogue cabinets have been replaced by computer screens, but the bulk of the space is still occupied by books and journals on shelves, by reader tables and by staff areas where books are issued and returned, new books acquired and added to the collection, and reader enquiries answered. What is more, despite some decline in usage statistics in some sectors, libraries remain overwhelmingly popular. The public library, we are constantly told, is among the most heavily used of local public services, while the academic library attracts ever-growing numbers of student users. But underneath all this activity the ground is shifting and it may be opening up. Hardison (1989) put it this way:

> We are coming to the end of the culture of the book. Books are still produced and read in prodigious numbers, and they will continue to be as far into the future as one can imagine. However, they do not command the center of the cultural stage. Modern culture is taking shapes that are more various and more complicated than the book-centered culture it is succeeding.

The loss of the core business

Yet even that analysis may be too complacent. Change is incredibly fast – the PC is little more than 20 years old, the world wide web less than ten. The threats are significant, and their impact on libraries as they currently exist could be devastating – their core business could be about to disappear. Consider the following ten points:

1 Electronic paper

Experiments with electronic paper have reached a stage where commercial exploitation is about to occur. Undoubtedly the first attempts will be rather

crude – as were the first attempts at manufacturing paper itself – but improvement will be rapid. Electronic paper will look like ordinary paper to the naked eye; it will be read by reflected light; it will require little power, so that battery life will not be an issue; its content will be rechargeable by download from the Internet; it will be used to create personalized books, the 21st-century equivalents of the Filofax. Xerox announced in 1999 that its version of electronic paper, based on a display technology called 'gyricons' – thin layers of transparent plastic containing tiny beads that change from black to white when subject to a charge – was ready for its first commercial exploitation (Xerox Palo Alto Research Center, 1999). Each sheet can be re-used thousands of times, and applications will include use in place of normal paper through printer-like devices, use in place of traditional computer displays and use for portable devices, where the image's stability – meaning it does not need to be refreshed constantly – will greatly reduce the battery power needed.

2 New publishing models

Scientists, engineers, social scientists and researchers in the humanities, who together provide the vast majority of content for academic journals, are now making serious use of alternative publication methods, based on electronic archives and pre-print services. The Open Archives Initiative, set up to encourage self-archiving systems, has developed the 'Santa Fe Convention', a base of standards and principles that enable scholars to publish their research immediately in electronic archives which, in effect, they control and which do not need intermediaries like libraries. As Van de Sompel and Lagoze (2000) state, 'the explosive growth of the Internet has given scholars almost universal access to a communication medium that facilitates sharing of results', while 'the slow turn-around of the traditional publishing model (is) an impediment to collegial sharing'.

3 Online bookshops

Bookshops are more successful than ever before. They fall into two types. The high street bookshop is taking business away from the public and academic library – by providing a wide range of *new* books that customers are encouraged to *own* as opposed to the grubby specimens libraries reluctantly allow them to borrow, by providing pleasant surroundings including comfortable armchairs where customers can linger and by providing ancillary services like coffee shops with a large choice of lattes, cappuccinos and espressos to attract an affluent clientele. At the same time, Internet bookshops are providing access to an enormous range of discounted stock that they deliver direct to the customer's door.

What is the lesson for libraries from the idea that Amazon.com's founder implemented? Jeff Bezo realized that not only does the Internet allow a retailer to interact directly with a customer wherever that customer happens to be – and particularly in the comfort of home or office – and not only can an online retailer offer stock before acquiring it from the wholesaler, but as the business grows it does not have to invest more in bricks and mortar: 'If a chain of 1,000 stores wants to double sales . . . it has to open *another* thousand stores, with all the land and manpower costs that that entails. But once an online operation gets past the fixed cost of its Web site and distribution channel, it can handle bigger sales with very few extra expenses' (Levy, 1999).

4 E-commerce

What is true of online bookshops holds good for the wider world of e-commerce. Of course, as yet it represents only a fraction of the total economy, but it is growing rapidly and it is reasonable to suppose that once people become used to e-shopping for one commodity they will have few inhibitions about adopting it for others. Given the efforts being made by banks to switch their customers to electronic accounts, which are far cheaper to service than either high street or postal accounts, the knock-on or trickle-down effects are unlikely to be much delayed. But even more important than e-shopping by consumers is business-to-business e-commerce. There are clearly problems with selling some goods to consumers over the Net – limited take-up of online grocery shopping is at least partly due to people's natural desire to be able to examine the product before buying – how many people want their fruit and vegetables selected by a spotty teenager? But where e-commerce does seem to score heavily is in the service sector, the very sector that most libraries occupy. Finance, travel and, of course, information are particularly suited to transactions in cyberspace. The demise of bank branches in villages is at least in part due to this trend.

5 Digital television

As yet digital television has made only a limited impact. If it becomes truly interactive, and e-mail via television services was launched in the UK during early 2000, then again people will build up a habit of accessing information through this medium. The range of applications for digital TV is limited only by our imaginations. Once the set-top box is linked to a telephone line to achieve interactivity, with the downpath having vast bandwidth, the whole nature of television programming could change. No longer would there be 'channels' broadcasting programmes at set times; instead there would be a databank of available programmes for each viewer to choose from at will. The video

recorder could become just one more piece of discarded intermediate technology. Where will libraries fit into such a world – if at all?

6 Integrated learning environments

Learning environments are being developed that deliberately integrate all kinds of learning support. Whether these are to be found in schools, in colleges, in universities, in local learning centres or in cyberspace, they are built on the foundations of modern pedagogical principles which imply that the student is at the centre and is learning actively rather than absorbing information passively. Support no longer means a separate library but rather the integration of largely online, multimedia resources into the learning experience. The role of the librarian, as expert in information sources, becomes an integral part of the role of the tutor. Librarians may, and do, claim that they have a vital role to play as a part of the tutorial team, but remarkably few teachers are on record as stating a similar view. And how many librarians are qualified teachers? Is it not more likely that teachers will develop their own information expertise?

7 E-universities

E-universities are now being pushed hard by government with all sorts of experiments under way. The University of Phoenix (**http://www.uophx.edu/**) is usually cited as the first large-scale example of a virtual university, but there are many more examples around the world and most traditional libraries and colleges are experimenting with online delivery. An advantage is seen in the ability to remove many of the barriers of time and place – advocates of this route suggest that each student will be able to choose to study at his or her own time, place and pace – that in effect the student will be in control, and in control remotely.

> Thirty years from now, the big university campuses will be relics. Universities won't survive. . . . Higher education is in deep crisis. . . . Already we are beginning to deliver more lectures and classes off-campus via satellite or two-way video at a fraction of the cost. The college won't survive as a residential institution.
> (Drucker, 1997)

Libraries have a very poor record of supporting distance learners (with a few honourable exceptions, which will be discussed later). They are expensive edifices that university leaders may be tempted to regard as no longer central to their institutions' missions. Hardesty (2000) reports from the USA:

> Access to electronic information is now so ubiquitous in higher education that this past summer an officer of a regional accreditation association sent a letter to academic library directors in his region posing this question: Is a library an absolute prerequisite for a degree-granting institution of higher education, or is it, instead, an indicator of some increasing level of quality above an accepted minimum?

And MacDougall (1998) has observed:

> . . . the worst threat will be that of the unenlightened senior administrators and managers who completely ignore the importance of information provision in the rush to register students and minimise or reduce the unit cost. The impoverishment to the student and society will be immense. It is sad to report that there is some evidence to suggest in Europe that this has already happened. In the headlong rush to provide economical distance education courses there has been some lack of interest in providing the student with a clearly costed quality information support environment. In such cases the packs of information and spoonfeeding as substitutes for rounded information services seem to be accepted.

Will the e-university in effect spell the end of the university library?

8 Mobile communications

The explosive growth of mobile telephone usage can be seen as an indicator of one of the most likely technological developments of the next few years, namely the replacement of place-based by place-independent telecommunications. Without suggesting that fixed-line and wireless technologies will not have a future, what is clear is that more and more products – by which we must mean information products – will be delivered over mobile communications channels. WAP (Wireless Application Protocol) devices were launched in the UK in late 1999, enabling access to the Internet albeit with relatively low bandwidth and a requirement for specially marked-up content (using WML – Wireless Mark-up Language). However, once XML (eXtensible Mark-up Language) becomes widely adopted it should be possible to extract data from standard web pages for delivery to WAP devices. The expectation is that WAP phones will be used for online news and financial information, some e-commerce applications, e-mail and specialist information services. It is quite likely that WAP phones, or rather their successors (GPRS – General Packet Radio Service – is probably the next technology in line although the Japanese *i-mode* technology, which allows continuous Internet access, is another contender) will become the main way in which users surf the Internet. In April 2000 major global telecommunications companies bid £22 billion – something approaching 10% of the

size of the UK's total national debt – for the next generation of mobile communications licences, equivalent, on optimistic forecasts, to about £14 per month per expected subscriber over a ten-year period. This illustrates the anticipated value and anticipated market penetration of the services to be delivered. The major limiting factor for some time will be the size and other constraints of the screen on which information can be displayed, although of course it will be possible to store data and copy it on to a desktop device and no doubt new technologies will remove even this limitation.

9 Print on demand

There has been a trend among publishers in recent years towards 'print-on-demand' approaches, especially where titles are expected to sell slowly and/or in small numbers. Digital printing technologies are now mature enough to enable a book to be printed from an electronic file when it is required, rather than in anticipation of demand. The technology is not entirely stable yet, of course, and the products do not have the sophistication of full-colour reproduction and designer bindings – otherwise presumably there would be no one left publishing 'just in case'. However the economics of this approach are attractive:

- Cambridge University Press estimates that it loses sales of well in excess of £1 million a year, and possibly several million pounds, by being unable to fulfil orders for books that have gone out of print but are unlikely to justify a new print run (Holdsworth, 2000).
- Dorling Kindersley is reported to have lost £14 million on unsold stock produced as tie-ins to the Star Wars 1999 epic *Episode One: The Phantom Menace*, believed to be a major contributory factor in the company's takeover (Bury, 2000).

While the implications for libraries are as yet unclear, it does look as if serious competition could arise from this source. Some booksellers are currently able to offer a limited service of this type and it must be expected that this will increase. A major factor in determining the impact on libraries could be the penetration of this approach in the student textbook (academic libraries) and popular fiction (public libraries) markets.

10 The unknown

Finally, there is the threat of the unknown. In the 1960s, when it became apparent that libraries could use mainframe computers for their administrative