2-2007

Brave New World, 2050: The Implications of Shifting to Electronic Collections

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Publisher Citation
Mays, Antje. "Brave New World, 2050: The Implications of Shifting to Electronic Collections". Against the Grain, vol.19:no.2 (February 2007), pp.72-75.

Biz of Acq — Brave New World: The Implications of Shifting to Electronic Collections

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Column Editor's Note: *The shift in academic and research libraries to electronic collections is discussed in the context of information access, costs, publication models, and preservation of content. Certain factors currently complicate the shift to electronic formats and challenge their widespread acceptance. Future scenarios are posited as the outcome of present circumstances, which the author describes. — **AF***

Information Collections in 2050: Two Potential Scenarios

Scenario 1: A research physicist is traveling with his solar-powered satellite device in hand and sets up the roll-up keyboard and large screen. The newest energy research is on a network shared by fellow-researchers. Members exchange data, and information flows freely among them. Thanks to his membership in the research society of the world's most distinguished libraries, the world of information is at his fingertips — crucial for anyone in business, the sciences, teaching, and any work dependent on knowledge. When the online materials do not provide the necessary historical background, he jets to the research library of his choice to visit the paying-members-only reading rooms and consults the old print materials (Bruccoli 2006). The printing industry has shifted focus from wide distribution and mass markets to high-end collectors' books destined for major libraries and private collections of the wealthy. Thanks to his vast technological and financial resources, this physicist's research is efficient and effective. His research enables him to contribute to his field, society, and the general growth of knowledge at large.

In the absence of general search engines, information is accessible only to paying customers and those fortunate enough to be affiliated with major research institutions. The information highway has become a commodity rather than infrastructure — at least those portions of it where meaningful content knowledge can be accessed. The general population uses generic search engines and can access articles that are provided at no charge to users. Since such articles are funded by advertising revenues and the information seeker is not the paying customer, the content may be objective, but is more likely to contain product endorsements. The non-affiliated individual can also choose pay-per-view to access information content, as resources permit.

While in earlier decades there were concerns about the digital divide and searches for solutions to the dilemmas it presented, the implications of unequal access to information are no longer discussed or even acknowledged.

Scenario 2: While information technology and means of content delivery have evolved similarly to Scenario 1, the cost of technology has dropped greatly, due to a constant flow of innovations and resulting increases in efficiency. Publishers have unbundled their content, recognizing that libraries previously priced out of the online market will subscribe to individual titles and thereby expand publishers' customer bases. Publishers now offer customizable licenses to direct subscribers and content providers. Database aggregators provide customized journal packages to libraries, and the "grab bag" is gone. Content providers have passed on their cost savings to subscribers in the form of stable and often declining prices. Information content is increasingly purchased in bulk through library consortia, which helps publishers and aggregators recover their costs, and creates a consistent baseline of information access for all potential library users. Innovation leads to ever-evolving business models, allowing libraries and information users to choose a resource mix that is meaningful for them.

As journals have been unbundled, electronic books have also been freed from earlier models of collection and use. While the serials marketplace has largely gone online, non-reference monographs are evenly split between print and electronic formats. eBooks are conveniently accessible from anywhere in the world, with user authentication; content can be loaded onto portable readers and refreshed via wireless connection to the library. eBook users include researchers, students, frequent travelers, the house-bound, and children who load titles on portable readers for homework or study. Still, as the most technology-neutral information medium, the print book has prevailed as the preferred format for many readers. A national library has been designated to collect and preserve at least single copies of the world's print resources, and to centralize the digital archive initiated by research libraries and nonprofit groups at the turn of the millennium.

This is a scenario that in 2050 allows greater customization of services provided by individual libraries to support their users' unique needs. Materials are purchased with users in mind, and formats are chosen based on subject area and users' information-seeking styles, as determined through extensive dialogue with patrons. Scholarly societies, commercial publishers, and libraries increasingly collaborate in constructing innovative business models.

Orwellian Twist: 2050, Global Style

In societies where freedom and the rule of law prevail, information technology supports education and genuine pursuit of knowledge; scholarly information flows freely within and among countries without impediment by third parties. Print and online materials are produced and distributed according to market forces. The prevalence of online information has resulted in strict codes of ethics, with costly penalties for breach, among researchers, writers, host sites, and scholarly societies. Rather than replace information published online, errors and new discoveries are addressed in subsequent publications and linked with clear trails of publishing and knowledge-evolution history.

In totalitarian countries, on the other hand, information technology is used primarily for citizen surveillance and subjugation, not as a knowledge tool. Access to technology and information in all formats is tiered, based on loyalty to the régime rather than on market forces and educational needs. Online sites are blocked if the slightest criticism of the régime is contained in them. Censorship of all formats of publishing is pervasive (Kalathil 2003). Books shipped from other countries are confiscated at the port of entry if there is any suspicion that their content could foment discontent with the régime. Information is governed by edict rather than market models. Citizens can freely access any form of information published by the government, but the intent is indoctrination rather than knowledge dissemination. When such governments wish to cover their tracks, they simply replace any existing content with more flattering narrative. No trail of knowledge history exists. Scholars and researchers are severely hindered in their professional growth, access to the latest information, and ability to contribute to the world of knowledge. Citizens are limited in their ability to piece together an accurate picture of existing knowledge. Their access to information from the outside world depends on communication devices and publications illegally obtained from foreigners. Such countries are intellectually, socio-politically, and economically isolated from the world of knowledge development, despite the global abundance of information technologies and content.

View from 2007: How might these 2050 Scenarios Come to Be?

While these 2050 scenarios are speculations based on current and ongoing information-industry developments, one thing is certain:

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libraries are increasingly shifting to electronic collections. Reference book collections are conveniently packaged into online products. Especially with serials, subscription cost inflation, evolving database pricing and purchasing models, and library users' expectations for routine off-site access to online content, make a transition to all-electronic collections both tempting and necessary. Yet these shifts bring urgent needs for digital preservation. Libraries, scholars, and publishers face a unique moment in the history and future of information; the question of who will steward our knowledge heritage begs a collaborative search for the most viable answers.

Books

Electronic reference databases are the most common form of ebooks. The focus is specific look-up rather than full-length reading, and users prefer to access reference resources from off-site. As a result, databases often replace the reference book series, as for example **Thomson-Gale**'s *Literature Resource Center* and *Grove Music Online*. Some eBook collections comprise combinations of print reference and a composite database of these titles' online equivalents, as with *Gale Virtual Reference Library*. Pricing models for these online reference collections vary according to publishers' packaging and flexibility for consortia. Libraries' long-range access to such packages will continue to depend on pricing and availability of affordable consortium packages. The business future of publishers and database producers is intertwined with the affordability of information technologies, knowledge dissemination processes, and libraries' ability to afford their resources.

Non-reference books are more likely to be supplemented than replaced by eBooks. Typical eBook uses include providing supplemental online copies for distance students, online alternatives to print copies that are on loan, and accessible alternatives for library users who are housebound but technology-savvy. Book print runs are smaller and smaller, which has led to increased business for out-of-print dealers. Will smaller print runs lead publishers to shift their resources, and invest in the technology and staff training needed to support online-only publishing? How will publishers price their online-only books, to remain economically viable? Burgeoning eBook approaches such as **Blackwell ECHO**, with its perpetual licensing for academic titles, may hint at future models (Blackwell 2007). Evolving publishing frameworks may eventually result in widespread adoption of eBook models that are unknown today.

Print book holdings and retention policies are threatened by space constraints in library buildings, and by the encroachment of rising serials costs into book budgets. In the future, will books be relegated to high-end reading rooms in a few large research libraries, with access limited to a small number of privileged researchers?

Serials

Publishers now face the cost of maintaining dual systems: print publishing (equipment, printing activities, shipping costs), and electronic publishing (investment in information technologies, database programming, interfaces with library systems and proxy servers, interfaces with aggregators' information systems). Their personnel costs involve simultaneous staffing of old and new processes, and training costs to help staff shift to technologically-driven workflows. Both publishers and libraries have an interest in making library subscription costs sustainable. Facing the need to preserve revenues, some publishers are reluctant to unbundle their content. Such subscription frameworks and content-licensing agreements could be lucrative for them in the long term, and could benefit libraries.

For libraries, the massive shift in publishing formats and the current flux in content packaging pose budgeting and archiving challenges. Other factors also complicate the shift to electronic formats.

1. The aggregation of electronic journals forces libraries to purchase "grab bags" rather than truly need-customized lists of electronic journals. Aggregation prices small libraries out of some database packages altogether.

2. Publishers' embargoes force libraries to purchase both print and electronic versions of journals where current content is crucial but not available online.

3. Severe budget constraints are commonplace. While serials budgets

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must cover two formats of embargoed journals, inflation poses additional encroachments into non-serial budgets.

4. There have been major shifts in budgeting practices. While the traditional expenditure pattern has been 60% serials and 40% monographs, some libraries with static budgets must spend 90% of their funds on serials and 10% on monographs (US Dept of Education). Budget ratios should be addressed strategically, based on long-term trends in library users' needs and evolving online content packaging.

5. As libraries' use of online journals increases, such print-related costs as handling, in-house processing, binding, and shifting may decrease. This may release funds for previously unaffordable databases and electronic journal collections.

6. As emphasis shifts from processing print to managing electronic formats, more staff time is freed for work with electronic collections. For some staff, the new tasks and technology-driven workflow pose daunting learning challenges.

7. As journal processing shifts from physical check-in and handling to acquiring, cataloging and managing electronic collections, increasing amounts of technical understanding are required. Incumbents of print-related positions often must learn areas completely new to them, and their managers must provide opportunities for retraining.

8. The collection management issue of content-driven selection vs. cost factors of existing content packaging may slow the adoption of electronic formats.

9. Program-specific academic accreditation agencies previously insisted on in-house journals collections. Many reviewers have become less restrictive because they recognize the value to faculty and students of access from offices, dorm rooms, and off-campus. Even within the same accreditation agency, attitudes can change in favor of electronic journals. "Access vs. ownership" and "content vs. format" become less important issues than "quality vs. aggregated electronic grab-bag".

10. Moving toward electronic collections has increased concern regarding archiving and long-term preservation of content. Initiatives to provide permanent vaults of electronic content have taken root. For example, the **LOCKSS** program designed at **Stanford University** provides a digital preservation model that libraries can join at FTE-based alliance-membership pricing. **Portico** is a similar digital archiving initiative (LOCKSS; Fenton, Reich, Bennett 2006).

2007: Signs of Seismic Shifts Technology's Increasing Integration in Daily Life and Work

The Internet's reach into routine commerce, education, government, and recreational uses of content has exploded exponentially around the globe since its humble 1960s origin with packet-switching networks, and its first use by the U.S. Department of Defense. As PCs and Macs were fitted with browsers, information transmission underwent a widespread transformation. With each new generation of computers, laptops, and mobile devices, the Internet became increasingly ubiquitous and integrated in daily life and work routines (Okin 2005).

Not only has the Internet transformed business processes, research, education, and the speed of worldwide information exchange, it has given rise to completely new publishing formats, pricing models, content licensing, digital rights management technology, and copyright law for online context. The Internet has also revolutionized journalism and information dissemination, with public participation in the debate of issues and topics of interest through blogs, RSS feeds, personal Websites, author-hosted scholarly Websites, and more.

Communication has evolved to include video/picture/text messaging and mobile Web email and information access. Cities have bought into the concept of the "wireless city"; cities, towns, and rural counties are increasing their broadband infrastructures. Satellite technology and its applications have vastly expanded from defense and military roots to global weather services, broadcasting, and telecommunication. For example, satellite phones and Internet hookup are common among the tech-savvy in desert countries. Satellite Internet has potential for areas underserved by traditional broadband ISPs, but its path to market is not without obstacles or limitations (Kawamoto 2005). The lines between technological conduits, content types, and uses of information are increasingly blurred with each new generation of information devices and infrastructures, and we find ourselves at a unique crossroads. Information technology and access to content can be opened up to the widest possible audiences as locales strive for seamless broadband and information-access infrastructures for all their citizens. Licensing agreements can become more collaborative and equitable, facilitating access to more users. On the other hand, the digital divide may deepen further. Cities and counties struggle with broadband and wireless pricing levels in litigation brought by major telecom companies that face competition from government-sponsored local initiatives. Other challenges will be faced by countries with vast undeveloped regions devoid of infrastructure as they struggle with the logistics of implementing satellite-based information access.

Licensing agreements and frameworks for content-access and content-sharing could become more exclusive among well-connected researchers and private networks, to the disadvantage of others. As more content shifts to electronic-only availability, what will prevent future generations from replacing content at will? What will prevent erosion of privacy, populace control via technological surveillance, or denial of access to meaningful information? Will technology be a tool used judiciously to disseminate knowledge, or will future global realities result in suppression of information, to prevent its use for criminal activity or other, similarly destructive purposes? What would be the social, educational, and economic fallout if information is suppressed? Will dissemination of information take second place to concerns for national and global security, or to the whims of authoritarian governments?

Workflow and Skills in Libraries

With the shift from print to electronic formats, tasks in libraries shift from processing paper to maintaining the structural integrity of data, verifying URLs, database and serial-content profiling, and managing network technology and equipment. These tasks require a technological skill base. Some incumbents of paper-based positions adapt to new knowledge requirements. Can we head off the human costs to those who cannot easily learn the new skills? Will outplacement and retraining be available to help technology-displaced workers make healthy job transitions?

Library Funding and Support

"Everything is online; do we still need libraries?" If libraries' parent administrations are seduced by the Internet's apparent promise of "free" online content which would obviate the need to invest in physical resources, will the role of libraries diminish in the future? (Herring 2001) Will libraries have an influential place in the information world? Who will use libraries? How will libraries be supported and funded?

Libraries also are at a crossroads. If they are managed and funded wisely, savings resulting from print-to-electronic shifts can be invested in staff training and upgrading of information technology. The potential for a grim alternative exists: public libraries with scaled-down reading rooms, computer access to databases but no magazine racks or book shelves, or academic libraries that are research centers for the well-connected, but closed to others.

2050 Revisited

In an ideal world, librarians would buy everything needed by library users, and selection would be determined by content and by matching access method to users' preferences. However, librarians are faced with competing business models, static budgets, and more questions than answers about the ownership of information far into the future.

Currently, many business models exist. Examples include:

- pay-per-view
- ad revenue, where the user is not the paying customer
- membership, self-funding, or voluntary membership group funding of online content and/or online content preservation
- open access
- institutional repositories
- scholarly self-archiving

How many of these publishing forms and information technologies will exist in 2050? Storage and bandwidth will decrease in price, but who will own them? What kinds of mechanisms will be instituted to ensure preservation of the integrity of electronic information,

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and to prevent a "revisionists' paradise"?

While online preservation methods are evolving, will print preservation retain a place of importance? Who will preserve at least one copy of the print materials that are being replaced by online content? In the quest to perfect digital preservation techniques, will online content recognition technology be as robust and timeless a means of preservation as the book has been for printed content?

Where are we headed? No one knows, for example, whether today's search engines will be free of charge or will even exist in 2050. What form and extent will open access, institutional repositories, and self-archiving have in the future? What shape will publication/purchase business models take? What attitudes will prevail toward the integrity of information and the preservation of original content? While the details of "brave new world, 2050" are unknown today, those with a stake in the world of information and scholarly communication have a unique moment in history to shape the future of library collections — for better or for worse.

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From the University Presses — Dissertations into Books? The Lack of Logic in the System

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Although the academy has been the progenitor of much creative thinking about systems and how they function — in such manifestations as general systems theory in the 1950s, cybernetics in the 1960s, catastrophe theory in the 1970s, chaos theory in the 1980s, and complexity theory in the 1990s — there has not been much effort to apply what **Peter Senge** called in his popular1990 book of that name "the fifth discipline," or systems thinking, to the study of the academy itself. But there is no doubt that the university is a very complex kind of organization indeed, and we need to understand better how all its multitudinous parts interact with each other and how "feedback loops"

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