3-19-2015

Living the Library of the Future: A Reminiscence

M. Keith Ewing
St. Cloud State University, kewing@stcloudstate.edu

Living the Library of the Future: A Reminiscence

By Keith Ewing

The following are the speaker notes associated with slides in a PowerPoint presentation at the Macalester College Library Technology Conference, 19 March 2015, St. Paul, Minnesota. Alas, the presentation was more "off-the-cuff" and deviated substantially from the speaker notes.

Slide 1

Just a moment while I finish the setup.

Audio: acoustic modem connection

Slide 2

Title: Living the Library of the Future: A Reminiscence

Introduction: Librarian since 1979; public libraries in Texas and Illinois, academic libraries in Illinois, Japan, Minnesota; at St. Cloud State University since 1984.

Slide 3

Growing up in the 1950s and 1960s images of the future were tightly woven into the cultural, social, political, and economic fabric of the time. We were watching Hanna-Barbera's Jetson's on television and reading Arthur Radebaugh's "comic" strip *Closer Than We Think* in the newspaper. Of the two, the comic strip was the more influential; it helped shape expectations of what the future could be—from "push-button education" to … (Image: Novak, Matt (2012) "Technicolor visions of the future," The Paleofuturist, April 2012. Available online at http://www.bbc.com/future/story/20120425-technicolor-visions-of-the-future.)

Slide 4

… an "electronic home library" projected on the ceiling. The text describes projecting "microfilm on the ceiling" with "an electronic voice to accompany visual passages" and a "television recording device" (predicted by RCA's David Sarnoff). The cartoon also predicts 3-D video. Radebaugh's Closer Than We Think strip was syndicated from 1958 to 1963; his last strip (Jan 13, 1963) featured the "Family Computer." (Image: Novak, Matt. (2011) "Arthur Radebaugh's Shiny Happy Future," *Smithsonian Magazine*, Nov 2011. Available online at http://www.smithsonianmag.com/history/arthur-radebaughs-shiny-happy-future-127216952/. See also Rosenbaum, Jared, and Rachel Macknow

(2011) Radebaugh: The Future We Were Promised. Available online at http://arthur-radebaugh.blogspot.com/.)

Slide 5

Radebaugh, who was an artist by training, a sometime inventor, and an industrial designer at the end of his career, was followed Athelstan Spilhaus, a geophysicist, oceanographer, and dean of the University of Minnesota's Institute of Technology. His "Our New Age" cartoon strip ran from 1958 to 1975 and was syndicated in over 110 newspapers; the strip was cited in *Time* magazine and noted by John F. Kennedy. I remember reading the strip when I was growing up in suburban Washington, DC. (Image: Novak, Matt (2012) "Sunday Funnies Blast Off into the Space Age," *Smithsonian Magazine*, 27 Jan 2012. Available online at http://www.smithsonianmag.com/history/sunday-funnies-blast-off-into-the-space-age-81559551/)

The above excerpt predicting intelligence enhancing drugs shouldn't be mistaken for drugs like modafinil, recently dubbed the "crown prince of smart drugs" (Cox, David (2015) "Is modafinil safe in the long term" Guardian (UK), 31 May 2013. Available online at http://www.theguardian.com/education/mortarboard/2013/may/31/is-modafinil-safe-in-long-term.) nor the early experiments at the time with LSD.

Slide 6

Spilhaus's prediction about libraries came 27 years after Vannever Bush's seminal article "As We May Think" appeared in The Atlantic (July 1945). Spilhaus doesn't suggest how the contents of the Library of Congress or the British Library are made available on the computer. Bush noted that "our methods of transmitting and reviewing the results of research are generations old and by now totally inadequate for their purpose." Bush went on use the Encyclopedia Britannica as an example of potential for compression, for compactness—noting that the bulk of the Britannica "could be reduced to the volume of a matchbox," then goes on to famously note that "a library of a million books could be compressed into one end of a desk." Bush does not anticipate a network of connected computers.

Perhaps my favorite quote from Bush's article, and perhaps more prescient, is that "even the modern great library is not generally consulted; it is nibbled at by a few."

In the same year as Bush's visionary article, scholar Robert Binkley noted that "There is taking place in the techniques of record and communication a series of changes more

revolutionary in their possible impact upon culture than the invention of printing." (Robert Binkley (1945) "New Tools for Men of Letters." Yale Review, 24: 529-537. The article was submitted in 1936 and published in 1945.)

Binkley was of course referring to "the telegraph, the telephone, radio, teletype, television, methods of textual and pictorial reproduction by photography, near-print, textual duplication through hectograph, the mimeograph, the multigraph, offset printing, and finally the then comparatively unknown technique of photomicrography." (Vernon D. Tate (1947) "From Binkley to Bush." The American Archivist, 10(3): 249-257.)

Vannever Bush's vision was limited by his understanding of the technologies of the time—his Memex machine depended upon microfilm texts; Binkley and Tate were similarly limited. Standing on the shoulders of those who came before and nonetheless constrained by the technologies of his time, Spilhaus predicted technologies and applications that came true, but surpassed his imagination--rather than the Library of Congress or the British Museum, a network of digital libraries, including LC and the British Library and a network of academic and national libraries, publisher archives, and open access repositories are providing significant pieces of a complex puzzle.

Slide 7

As a college student starting in 1968, I became one of the "captive audience."

"For most academic disciplines, the library was truly the center of the academic enterprise in many ways. Knowledge was contained in books and journals that were collected and housed in libraries. Faculty conducting research and students completing class assignments and writing term papers had to go to the library for the raw materials of that work." (Miller, Rush G. (2015) "Call to Action: Creating Tomorrow's Libraries Today" Choice, April 2015, p. 1262-3. Available online at http://www.cro3.org/content/52/08/1262.full.pdf.)

As I moved into graduate studies at the University of Oregon and The University of Texas, I came to understand that I was in a "period in which library research became a much larger, more decentralized enterprise, and in which library researchers completed their emancipation from the main core of reference and bibliographic tools." (Andrew Abbot (2008) "Library Research and Its Infrastructure in the 20th Century," Windsor Speech at the University of Illinois. https://www.ideals.illinois.edu/bitstream/handle/2142/14401/windsor_abbott.pdf.txt?sequence=4.)

The only way to know what was in the library hadn't changed over the previous 90 years—searching the card catalog and digging through the many disciplinary indexes to journal literature. This was time consuming, a practice relatively unchanged for more than 100 years, and assumed you either knew what you wanted (either an author or a title), or you could find something you wanted using the subject catalog. Of course, card catalog subject headings rarely matched the journal index subject headings, and neither matched my language. "User friendly" was not a library concern.

At the start of my first year, Miami University opened the bookstacks for browsing; before 1968, the stacks had been closed and books were paged. The stacks had translucent glass floors and a floor-to-floor height of barely 6'6", but the opportunity to browse the miles of stacks was exciting—and confusing (the library had a mix of Dewey and LC classifications, depending on when the title was acquired; recon was on-going)—it was easy to get vertigo staring down seemingly endless ranges of card catalog drawers or shelves of books; some became lost in the maze. I loved browsing the stacks; in some ways I liked browsing the stacks more than I liked going to class.

The same year I went off to college:

- Data General Corporation introduced the Nova computer with 32 Kb of memory and selling for $8,000. The simplicity of the Nova inspired Steve Wozniak's Apple I computer of 1976.
- F. Wilfrid Lancaster published the first edition of his classic text *Information retrieval systems; characteristics, testing, and evaluation*, among the most influential texts on information retrieval.

For my first graduate degree at the University of Oregon and my second at the University of Texas, the card catalog and the stacks were largely unchanged.

Slide 8

Finding books other than those owned by Miami, Oregon, or Texas, required slogging through bibliographies and the NUC. About the time I graduated in 1972, the Miami was among the first libraries to participate in OCLC (Ohio University was first in August 1971). OCLC wasn't designed for ILL, but librarians seemed to quickly understand that for known items they could use OCLC to determine which libraries owned it.

Just before I graduated from Miami, in late 1971, both Lockheed Dialog, SDC Orbit, and MEDLINE, went online after nearly six years of government funded development.

Database offerings were limited—education (with indexes to the ERIC microfiche), agriculture (with indexes to government agricultural research), and medicine (automating the former MEDLARS system used to create Index Medicus). As a comparative religion major, none of these databases would have helped me had I known about them.

Graduate research in the library at Oregon differed little from the methods at Miami. The big difference was getting to know the Asian bibliographer who helped identify new resources or resources at other university libraries (mostly Berkeley, Washington or UBC) through OCLC. The problem was that Oregon was largely an isolated location, except for Oregon State, and while it had a very good collection, particularly for my interests in Asia, it could take 2-3 weeks to borrow (for a fee) a book from Washington or Berkeley—and then I could have it for a week.

Unbeknownst to me, the number and variety of databases in SDC Orbit and Lockheed Dialog were increasing. The library world was about to change.

Slide 9

By the time I went to library school at the University of Texas, I'd completed two degrees and started a third (in Japanese literature). I chose Texas because of their strong computing program; I was yet to understand how, but I knew computing would play a larger role in how libraries would change.

First, we learned to program—using punchcards (Hollerith cards; Image from Mimecast: https://www.mimecast.com/blog/2011/02/why-is-email-so-complicated-part-221-the-legacy-of-punch-cards/) to author alphabetizing and cataloging programs and create practice databases that occupied shoeboxes and consumed hundreds of cards (and woe to the individual who dropped their shoebox).

Second, we learned how to search SDC Orbit and Lockheed Dialog using a DECWriter and TI Silent 700 portable computer terminal with integrated acoustic coupler that used thermal paper that became brittle after a couple of years and where the text disappeared if exposed to light for too long. Despite the limited number of databases available and that almost all databases were limited to citations, we thought we were in researcher heaven.

Most of the actual hardware, software, networking, and infrastructure issues remained outside our understanding.

Slide 10

When I started working at the University of Illinois at Chicago Circle (now UIC) in 1980, mediated searching was the order of the day—and patrons had to pay. A typical ERIC search with 50 citations would cost about $25; many other databases were far more expensive. We used the same TI Silent 700 portable terminal that we'd used at Texas; four years later at St. Cloud State, we used DEC Writer with a 300 baud acoustic modem. At both schools Lockheed Dialog and BRS AfterDark were the primary database services.

My worst search experience was making a presentation to the St. Cloud Rotary Club in maybe 1986. We only had a single portable acoustic coupler, 150-baud, about the size of a large shoebox; an IBM personal computer running DOS 3.2, and a video project about the size of a small steamer trunk. The setup was okay, but the baud rate slowed the presentation considerably—it was like pouring molasses outside on a cold day in mid-winter in International Falls. Somehow, the Rotarians were impressed--perhaps as much by our willingness to lug so much equipment for what was meant to be a 30 minute presentations as by the presentation itself.

Slide 11

Dialog and SDC were the dominant market contenders for online database services; BRS came a little later. Each provided an overlapping set of databases providing mostly bibliographic information and here and there some limited fulltext information—mostly business statistics (e.g., Predicasts PROMT and Disclosure) and patent filings. Fulltext services, such as Mead Data Central which launched LEXIS in 1970 for the legal professions and law schools (a marketing approach) and NEXIS in 1973 for news articles (later sold both databases to Reed Elsevier in 1994), were largely beyond the budgetary reach of most academic libraries.

Slide 12

While the use of computers in libraries had grown by 1980, particularly in back-room processes for managing library collections—such as LCS (Library Control System developed at Ohio State and used to replace a previous keysort system (see Susan J. Logan (1987) "The Ohio State University's Library Control System" http://kb.osu.edu/dspace/handle/1811/50010), CLSI (Computer Library Services, Inc., developed by Bela Hatvany (who later developed SilverPlatter), and DoBIS (Dortmund Bibliothek System largely supported by IBM), which was implemented while I worked at the Austin (TX) Public Library in 1978-79, all of which had powerful technical

capabilities, but terrible user interfaces—public use was largely limited to computer labs for word processing (remember WordStar?). Public access to information remained limited to card catalogs (or COM (computer output microfilm) catalogs) and printed indexes.

Mediated services using Dialog, SDC, and BRS databases were widely available, but access was constrained, largely by the costs passed on to users.

I do miss the loss of some delightful neologisms—like perfery: the tear-off edge of the paper with the holes for the tractor-feed.

Slide 13

In addition to Boolean logic, database searching required us to be inventive and tenacious with vocabulary and to learn new applications of algebra. Armed with a knowledge of search logic and syntax—each system had its unique commands and syntax—and some modest programming skills, as well as a host of arcane acronyms and reference titles, some introductory cataloging knowledge and perhaps some library history, recent library school graduates felt well-prepared to enter professional careers and begin creating the future we'd seen in comics years earlier.

When I arrived at St. Cloud State University in the fall of 1984, the future we'd read and talked about in library school remained in the future. Collection building remained the order of the day, although in public services information literacy, mentioned as early as 1936 (Louis Shore, "Library Instruction for Teachers," Peabody Journal of Education 14(3): 128-133. JSTOR; see also Carl White (1940) "The Place of the University Library in the Modern World.")

Slide 14

It was still the age of ownership and collection building, although some of the first hints of a new age—the age of information access—which had actually started in libraries with the development of Marchine Readable Cataloging standards the 1960s, were becoming apparent. In 1980, the first edition of the Red Book, released by Sony and Phillips, established the specifications for the physical parameters and properties of the compact disk and the associated device to read the digital encoding. The Green Book, developed by Sony and Phillips and released in 1986, built upon the Red Book and defined the format for interactive, multimedia compact discs.

CD-ROM technology was a transitional technology that transformed libraries. In 1986, the first Dialog-On-Disc databases, such as the popular and overly used ERIC ("My

professor told me to use something called ERIC." "What's your topic?" "I'm looking for articles on the failure of French nobility to accept Louis XVI's reforms which led to increasing class conflict.") and Compact Disclosure, as well as the first Silverplatter databases, such as ERIC, LISA, and PsycLit, became available with relatively easy to use "guided search" interfaces (we felt that Dialog-on-Disc had the better interface and Silverplatter had the broader range of databases) that made unmediated, direct user access possible.

While we invested in CD-ROMs, we understood that CD-ROMs were not optimal. Initially, each disk required a separate workstation—which meant that some workstations had lines of users waiting and some workstations were available but didn't have access to the needed database. In Fall 1986, St. Cloud State contacted Online Computer Systems in Germantown, MD—a small company that was developing CD-ROM networking software. The version we received—a beta version with the serial number 000002—confused us. We knew next to nothing about local area networks—we learned on the fly—and when the first menu came up with "Dummy1," "Dummy2," and "Dummy3" the three of us trying to get the system going wondered how the developers knew the three of us were sitting there. Within two years, we had a CD-ROM network with 18 networked drives; it would grow to 24 networked drives.

CD-ROM technology, as a means to provide access to bibliographic databases, or to distribute fulltext content for journal archives, was a dead-end. But it wasn't completely 無駄 (muda; Jap: no good, in vain, futile); as a learning experience in networking, in public access to guided searching, and better understanding user needs and behaviors it was invaluable.

Slide 15

In 1991, at the peak of the CD-ROM network craze, Mark McCahill and his team at the University of Minnesota released the gopher protocol, a TCP/IP application layer protocol for organizing, distributing, searching, and retrieving strongly hierarchically organized documents over the Internet. Unfortunately, Gopher's hierarchical structure, which some adapted to library classification systems, often meant numerous levels of links (the average was about 8 levels of links, but could reach as many as 20 levels) before arriving textual content.

WAIS, which launched the career of Brewster Kahle and was strongly influenced by Z39.50 protocol developed for networking library catalogs, along with Archie, Veronica, and Jughead search engines made gopher sites more widely accessible. Infotrac2000, an aggregator database on CD-ROM which had indexed cartridge microfilm for fulltext

articles, was among the few to move to the Gopher environment. But in February 1993, the University of Minnesota (in a proposal by Shih-Pao Yen) announced that it would charge a fee for licensing the gopher protocol—by the time the University revised its decision and offered the gopher protocol under a GNU General Public License in 2000, the gopher protocol was largely obsolete. At Gopher Con 3 (for notes from the conference, see http://www.informatica.co.cr/internet/research/1993/0511.htm), in the Spring of 1993, the talk in the halls outside the conference presentations was about the Hypertext Transfer Protocol—which had started development in 1989 under the leadership of Tim Berners-Lee. The question openly discussed was "Could gopher adapt?"

Slide 16

Quietly, in late 1989, while everyone remained deeply enamored of CD-ROM networks, and nearly simultaneous with gopher development, Tim Berners-Lee, inspired by Ted Nelson's Xanadu project, which coined the term hypertext, and Vannevar Bush's vision of Memex, submitted his draft proposal for the Hypertext Transfer Protocol. This image is the diagram that accompanied the proposal. At the time, few recognized the breadth and depth of disruptive change that was about to occur. In 1991, Berners-Lee released his first version of HTTP (v. 0.9) in 1991. (Image: http://www.computerhistory.org/internet_history/internet_history_80s.html)

I knew a little about Apple's HyperCard program—one of our Library offices developed a training program for Woodcraft Industries based largely on HyperCard. It was great experience for the grad students that worked on the project, but the effects were not felt on campus. While not attracted the HyperCard, largely because of the proprietary nature of the HyperTalk programming language, I did start trying to learn more about hypermedia.

Slide 17

The first Web browser , WorldWideWeb, came out in late 1991; it was never really widely released. In late1992 I downloaded Samba, a browser designed for Macintosh (I had a Mac256 at the time). I was immediately intrigued; a month later I downloaded Viola and had to learn more. Despite reading about HTTP and HTML and understanding them in theory, I was absolutely clueless about HTTP and HTML in practice, so I set about trying to find out more. What I knew from the start was that this was far more interesting than Gopher. Two months later, I downloaded the first release of Mosaic and was hooked. I had to know more—from a post on PACS-L (the Public Access Computer Systems listserve—to which I started subscribing in early 1990, shortly

after returning from 3 months in China) I learned about a 2-week "Web Management" workshop at the Library School at Syracuse University held in the summer of 1993—with David Lankes and Joe Ryan as instructors. It may have been the most rewarding professional development experience of my career up to that point.

Mosaic changed the Web from a researcher's tool to a popular commodity. It was more popular more quickly than beanie babies. The only problem was finding content. Mosaic would list new Websites on its front page every day. One of the early listings was a link to an update of sumo matches and rankings created by Jerry Yang—and I loved it. Within a year, Mosaic had become Netscape. A couple months later…

Slide 18

… in early 1994, about the same time we were bringing our first Web server (a Sun SparcStation) online, Jerry Yang and his fellow grad student at Stanford, David Filo, created Jerry and David's Guide to the World Wide Web—essentially little more than a modestly hierarchical list of sites. A few months later, Jerry and David's Guide became Yahoo! – Yet Another Hierarchical Officious Oracle. The "search" in the early years searched only the directory of sites.

Then in 1994 came WebCrawler developed by the University of Washington (which also developed the popular PINE email client), the first search engine to search for any word on a Web page. WebCrawler began a parade of Web search tools, including AltaVista (developed by DEC (Digital Euipment Corporation)), and HotBot, and Fast (later to be All the Web), and InfoSeek, and Dogpile, and Ask Jeeves, and Lycos, and Firefox (which was Netscape), and….

(WebCrawler was bought by America Online in 1995 and later sold in 1997 to Excite., then sold to InfoSpace in 1997.)

Slide 19

Then along came Google. Simple design. Improved spider/robot/harvester yielding more results. Google became a verb. The search market was turned upside down. Suddenly, everyone wanted to be Google-like—single search box, seemingly comprehensive results displayed in a magical relevance order. Who cared that your search returned 12-million results; the first page or two provided many links to good enough content—some of which was actually spot-on.

Most academic and public libraries rapidly focused on the information search, rather than on the content. This doesn't mean we stopped buying books, although some have

recently done so (e.g., the University of Texas at San Antonio is consciously moving to an "online only" library—not unlike when Evergreen State University tried to be a "microform only" library back in in late 1960s). Most libraries created some guides for evaluating Web sites and expanded information evaluation to include Web sites, but we were going astray.

N. Katherine Hayles (Duke) wrote "Deep attention, the cognitive style traditionally associated with the humanities, is characterized by concentration on a single object for long periods, ignoring outside stimuli while so engaged, preferring a single information stream, and having a high tolerance for long focus time. Hyper attention, by contrast, is characterized by switching rapidly between different tasks, preferring multiple information streams, seeking a high level of stimulation, and having a low tolerance for boredom." (Hayles (2007) "Hyper and Deep Attention: The Generational Divide in Cognitive Modes" Available online at http://www.jessicapressman.com/CAT_winter2013/wp-content/uploads/2012/11/Hayles-attention.pdf.)

This seems slightly hyperbolic, but I don't completely disagree. Many people, however, attribute this outcome to Google; I don't.

What all of this did prompt in libraries, however, was a reconsideration of our physical holdings.

Slide 20

Everyone was caught off-guard. Vendors began moving their databases from CD-ROM and gopher to online, Web-based services. Some vendors were less prepared to manage the change—SilverPlatter was acquired by Wolters Kluwer and became part of Ovid Technologies. And moving online allowed vendors to include the fulltext—no more index to a microformat cartridge. Users were thrilled by the immediacy of access; some authors somewhat less so—and some online content disappeared. Libraries began to cancel print subscriptions to pay for online databases.

InfoTrac became Expanded Academic ASAP. It quickly became obvious that every library in Minnesota maintaining its own license to access these databases was extraordinarily expensive. Under the visionary leadership of Bill DeJohn, Minitex initiated on one side a legislative drive for funding support and on another a drive for cooperation and coordination among libraries for a "common" subscription. I participated on the earliest Minitex Electronic Information Resources (MEIR) group that helped launch ELM: The Electronic Library for Minnesota.

Each library needed more than ELM could offer, so each library acquired databases beyond ELM, often focused on one or more vendors. OCLC FirstSearch, EBSCOHost. ProQuest began buying database creators and other vendors. Vendors began moving from providing aggregated databases to discipline databases, and some discipline organizations began making their databases available on proprietary platforms. Then corporate consolidation started: Cambridge Scientific was acquired by ProQuest, ABC-Clio's databases were acquired by EBSCO. ERIC and PubMed moved to the open Web and allowed no-cost searching, and more recently added no-cost access to much fulltext.

We focused on replacing Readers Guide and Science Citation Index, Chemical Abstracts and newspaper indexes. We even stopped Reader's Guide to Periodical Literature. Then we started looking at reference titles—Encyclopedia Britannica, the OED, the shelves of Standard and Poor's publications, the seemingly infinite Gale Series: Contemporary Authors, NCLC, TCLC. Questions at the Reference Desk declined; use of the physical tools in the Reference Collection slowed to a trickle.

JSTOR effectively and efficiently rendered microforms moot. Project MUSE effectively changed how scholarly journals were disseminated. Journal publishers consolidated—sharks acquired smaller fish; Elsevier with ScienceDirect, Wiley, and Taylor and Francis have come to dominate the market. Elsevier became the target of considerable blame for the "serials crisis." And from the start there was the "Big Deal"—vendor packages of journal titles (later expanded to book titles) for a "reduced" price.

Now we needed a tool to link from a database that indexed an article to a vendor that provided the fulltext. Thankfully, Herbert van de Sompel wrote a PhD dissertation on the topic of context sensitive dynamic linking of scholarly information resources, which formed the foundation of the OpenURL protocol—of course, we had to acquire and manage a tool that did this.

Suddenly, without quite understanding how it happened, we lost control of our collections. We accepted this with aggregated resources like ASP and Expanded Academic, and we too readily accepted it from publishers through the "Big Deal." Our library collections were becoming increasingly homogenized, at least with our increasingly online licensed collections. Meanwhile, use of our print collections continued to decline.

Users became frustrated by the dizzying array of databases. They asked, Which database do I use? Good enough became too good. So libraries acquired search services that used the z39.50 protocol to broadcast searches across multiple databases from multiple vendors. Some of use created different search options around disciplinary clusters of

databases. We used WebFeat at St. Cloud State; others used Serials Solutions or MetaLib from ExLibris. User satisfaction with these services was never high—they were slow, search syntax was not consistent across vendors or databases, and results were mixed. We looked for better, less confusing, more comprehensive search options.

Slide 21

Then ebooks appeared. At first it wasn't to replace what we had, but to supplement, to provide wider access. Project Gutenberg, a volunteer project to rekey text of classic books printed before 1923 even before we knew much about the Internet, opened the door. Then came Eastgate with its hypertext original books and netLibrary with its recently published license for academic non-fiction books (later acquired by OCLC, then sold to EBSCO). netLibrary became a model for ebrary and the Eboook Library. Then, it seemed like everyone wanted to provide online books. Then, netLibrary was acquired by OCLC then sold to EBSCO, making those early contracts difficult to follow and sustain. But netLibrary raised other new questions: about the concept of "loan" to a user, about "interlibrary loan," about access and ownership. Again, Bill DeJohn proposed a visionary idea, a "shared" collection, long before libraries or vendors were ready.

There was an explosion of business models—from outright purchase with an annual access fee, to license, to rental, to purchase a number of reads (views), to open access. And a proliferation of ebook formats—Microsoft's compiled HTML and Reader, Sony's Broadband ebook, Apple iBook, DjVu, PDF, epub, eReader, Kindle, Nook, Mobi, and Open eBook.

More recently, opening selection to users through patron-driven-acquisitions, has benefitted users but weakened control over collections and budgets. It's a great advantage for users, but without some controls and limitations it's a real threat to collection integrity.

University libraries in Florida, working through Ingram, take a collaborative approach to ebook acquisition. And the SUNY system is pursuing an open textbook initiative. Could we undertake a similar models here in Minnesota?

Slide 22

Google Books and Google Scholar opened a Pandora's box of issues—from copyright challenges to fulltext searching of monographs to what appeared to be a frontal assault on libraries. Copyright constrained Google, but did not bring it to its knees.

HathiTrust—now with a membership of more than 100 libraries—initially worked with Google to digitize collections, then took a route to assert quality control and to conform more tightly to Copyright laws; it did not protect HathiTrust from lawsuits. In the meantime, Google expanded with a full application suite, Google Classroom, and a host of other assets.

Slide 23

Armed with research grants from IMLS and NSF and Mellon and other foundations, several of the larger research libraries initiated digital library projects—digitizing some of their rare books, their historic photographs, selected items from their archives, and, working with disciplinary organizations, selected research works. We realized that many academic libraries and cultural heritage organizations here in Minnesota did not have the staffing, skills, or resources to initiate a digital library project on their own.

So, using a collaborative model, with no real structure beyond a common vision, and building upon the experience, expertise, and generosity of the University of Minnesota and the Minnesota Historical Society, and with significant support from LSTA grants through the Office of Library Services, a small group of interested people started the Minnesota Digital Library and its initial project, "Minnesota Reflections." MDL has now grown to provide services and a central repository of collections for over 160 libraries, archives, and organizations across Minnesota. The MDL served as one of the initial regional hubs for the Digital Public Library of America; Minnesota Reflections is now included in the DPLA collections (through whom additional funding has been received for some targeted projects, such as the MDL-developed "History of Survivance").

For several years now, MDL has also be working with the University of Minnesota and the Minnesota Historical Society on a digital preservation project (if we build it, can we sustain it?). Yet to be addressed is how to begin to capture, assess, and curate born digital content—which is rapidly being lost.

Slide 24

Our A-to-Z database directories began to look like old phone books. Our z39.50 broadcase search services never fulfilled needs and required constant attention. Suddenly, "discovery service" became the solution: a single "google-ized" interface to a whole range of online databases, jumbling print and online books, journals and articles, videos, recordings, images, and whatever into single results. Most database vendors provide their own discovery service, optimized for their databases; a few ILS vendors, like Ex Libris with Primo, provide a discovery service; and there are a few open source

systems, like the University of Rochester's eXtensible Catalog, that can scale to a discovery service. Unfortunately, some of the vendors, in order to maintain or gain market share, don't play well with the other vendors, which means some important databases and content gets left out of discovery service search results. (Ex Libris and EBSCO are engaged in an on-going feud over this very issue.)

But the larger question is: are we truly serving our users with discovery services? It may be what they expect, but is it what they need?

Slide 25

Adding to the complexity, but also somewhat getting back to the roots of the library, in the 1990s many libraries started to digitize and disseminate locally produced scholarship, initially in the form of preprints of faculty scholarship, capstone or culminating projects like masters and honors theses and doctoral dissertations, but rapidly expanding to journals of undergraduate research and open access disciplinary journals. Some were motivated by the (so-called) serials crisis, others by improving the scholarly discourse on their campus, most by both; and some were motivated to share some of the rich, but too often hidden, resources of their Archives or rare books. While locally some of this had been digitized by the Minnesota Digital Library and placed in Minnesota Reflections, much remained hidden, beyond the scope of the MDL. As libraries gained experience and capacity, local IRs became a natural development. As much as anything, IRs have become a source of institutional pride and promotion, a subtle recruitment tool that simultaneously elevates the quality of student learning and research as well and faculty scholarship, teaching, and mentoring.

Libraries feel the need to become more active in using social media—Twitter, Facebook, Instagram, Pinterest, Tumblr, Google+--but success is difficult to define. Social media may not be going away, but its effectiveness in advancing an academic library's mission is yet to be determined.

Slide 26

Matthew Battles, in *Library: An Unquiet History* (2003), notes "The Library of Congress each day adds some 7,000 books to the more than 100 million items already standing on its 530 miles of shelves. (In comparison, St. Cloud State University has 21 miles of shelves) Add to this the printed ephemera we daily produce at our word processors, fax machines, and photocopiers, plus the more than 800 million pages on the World Wide Web (now estimated to be 4.58 billion pages as of 14 March 2015 (see

http://www.worldwidewebsize.com/)), and it becomes clear: we are inundated. The flood of text forces us to ask, 'How do we sort it all out?'" (pp. 8-9)

Andrew Abbott, in his 2008 Windsor Speech at the University of Illinois, expressed the belief that librarians since the 1920s have desired to "make the library a universal identification, location, and access machine." We've come close to doing that; but Abbott see that as a "race to the bottom," largely a failure of libraries. Is Abbott a Luddite or is he on to something important for librarians to consider? Personally, I don't think he's a Luddite. (Available online at https://www.ideals.illinois.edu/bitstream/handle/2142/14401/windsor_abbott.pdf.txt?sequence=4)

Christine Madsen, Head of Digital Programmes for the Bodleian Libraries, has written that the "struggle of the academic library to stay relevant today is due to the switch from a scholar-centered model to an information-centered one." She goes on to say that "What has been forgotten is that libraries were, and should be again, inherently social spaces. That these spaces are not just for getting access to resources, but to people—librarians, archivists, and other scholars—with whom discourse can be entered about the resources (and the knowledge) therein. An academic library should first be seen as a collection of services that support the creation of new knowledge. From this perspective, the library is not defined by its walls or its collections, but by those very services." (Christine Madsen (2010) "In the Wrong Business: A New Theory of Academic Libraries" http://christinemadsen.com/2010/in-the-wrong-business-a-new-theory-of-academic-libraries.)

Slide 27

Now, we're in some ways returning to the idea of the library that existed nearly 200 years ago—a social interaction among scholars and artisans to explore new areas and applications, new ways to see and understand knowledge and to create new knowledge.

The digital humanities (although I prefer the phrase used at the University of Minnesota: Digital Arts Sciences and Humanities) are a set of services (and associated resources) that many libraries are exploring. In an earlier session at this year's Library Technology Conference we saw an example of a digital humanities project as the focus of a course project, facilitated in part by a library. It was an opportunity to elevate student scholarship through curating an online exhibit (using Omeka), to expand their understanding and awareness of information literacy, and to develop stronger social relationships among librarians and disciplinary faculty. Digital humanities is more than about applying computing technology to address questions in the humanities; it's also

about applying the humanities to address questions in and about computing. While the software logos here represent a wide variety of tools that can provide a deeper understanding of the humanities--

- ArcGIS – connecting data, people, and maps
- Juxta – "an open source tool for comparing and collating multiple witnesses to a single textual work"
- Orange – open source textual analytics
- Tapor – another sophisticated textual analysis and visualization tool
- TextArc – another textual analysis and visualization tool
- Voyeur – a Web-based text analysis tool
- Many Eyes – a Web-based data visualization tool
- WordPress – more than just a blogging platform
- Omeka – an open source platform for creating and managing curated digital exhibits
- DIRT – a repository of DH tools

--the humanities themselves pose numerous questions about the increasing use of technology, and about human-computer interaction.

"There is no library without a culture of inquiry. Everything that is done in the library, everything the library holds, when bound together by a systematic, continuous, organized knowledge structure supports the act of new knowledge creation also known as scholarship." (Madsen (2008))

Slide 28

Predicting the future is a fool's errand. Over the years, we've heard plenty of predictions that subsequently been the source of amusement.

- "I think there's a world market for maybe five computers." Thomas Watson (IBM CEO), in 1943.
- "In two years spam will be solved." Bill Gates (Microsoft CEO) in 2004.
- "Apple is already dead." Nathan Myhrvold Microsoft CTO) in 1997.
- "I predict the Internet will soon go spectacularly supernova and in 1996 catastrophically collapse." Robert Metcalf (founder of 3Com and inventor of Ethernet) in 1995.

(David Pogue (2012),"Use it better: The Worst tech predictions of all time." Scientific America. http://www.scientificamerican.com/article/pogue-all-time-worst-tech-predictions/)

Many of the predictions of Arthur Radebaugh and Athelstan Spilhaus, while largely cartoon fantasies at the time, have been fulfilled and some exceeded, although not in the manner or form either futurist thought.

This image is a recent Google n-Gram on the phrases "library of the future" and "future of libraries." Since about 1997, interest in the future of libraries has been waning. Either that, or librarians are getting smarter about trying to predict the future and are spending their time creating it.

Slide 29

Through all of this there have been some prerequisites for success:

- When I was interviewing for my first academic library position, I was asked to describe myself in one word. I chose "inquisitive." At this conference, Courtney McDonald at Wednesday's keynote address used "curiosity." The synonyms require asking Why? and What if…
- Then "dare," primarily to try, to admit what you don't know and learn, to accept mistakes (and learn from them), and, more importantly, dare to succeed.
- Always "trust," which requires being "positive," about colleagues, about yourself, about possibilities, that failure leads to success.
- And above all, "do." Don't wait for the right time, for full agreement, for funding, sometimes even for complete permission. Risk is inherent in much of what we do, both the present and future are always risky. So, "do" something, see how it goes. As Captain Picard would say, "Make it so."

If I were to hazard any prediction, it would be to agree with Christine Madsen—that as long as we are tied to the current concept of libraries (as warehouses of information and providers of information access), that as circulation declines and the appetite for buying books (in print or online) shrinks, then administrators will see less need for librarians. That will be a disaster for knowledge production and dissemination.

And remember the enduring words of Vince Lombardi—"Perfection is not attainable, but if *we* chase perfection, we can catch excellence."

Slide 30

Thank you.

Questions?