Smarter Libraries through Technology: Engaging Technology to Support Public Libraries

By Marshall Breeding

Each type of library embodies distinctive characteristics and therefore a different set of demands for the technology components that support its work. Public, academic, school, and other types of libraries differ substantially in the collections they manage and the services they offer, despite sharing a lot of common ground in their core missions and values.

All types of libraries acquire, organize, and provide access to content of interest to their communities. In the past decade or two, a variety of dynamics in consumer technologies and the publishing sphere have led to growing divergence among library types. Although many libraries share a basic set of automation needs, their success also depends on technology applications designed specifically to support their distinct operational and strategic priorities.

Is it possible for the same technology products to support all types of libraries? Some automation systems currently available have been implemented by different types of libraries as others focus on a specific sector. SirsiDynix and Innovative, for example, promote their ILS products to all types of libraries. Ex Libris targets academic libraries, while Follett specializes in the K-12 school arena. It's challenging to design systems that can be implemented and configured to meet increasingly diverse requirements. My general observation is that even the systems that have historically served many types of libraries have drifted at least to a certain extent toward a specific sector.

Comparing Public and Academic Libraries

Public and academic libraries provide an interesting point of comparison, sharing a common core of basic requirements for

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technology support, but with new trajectories of activities that demand specialized tools. The differences shape the requirements for the systems implemented to manage their collections and in the catalogs or discovery services they offer to their patrons.

Moving Beyond Print

The transition of scholarly publishing to electronic formats has fundamentally reshaped academic libraries. These libraries devote the vast majority of their collection budgets to subscriptions for electronic content packages. Although many disciplines continue to invest in on scholarly monographs—especially in the humanities and liberal arts—tight budgets have led to drastic reductions of acquisitions in this area. Many academic libraries have discontinued approval plans where monographs in broad areas of interest are automatically received and purchased unless explicitly rejected. This just-in-case acquisitions strategy has given way to ordering only titles specifically requested by faculty or researchers. In the e-book realm, demand-driven acquisitions programs likewise reflect a just-in-time strategy.

Public libraries likewise have travelled a route from a legacy dominated by print towards the current era where print, while flourishing, is accompanied by many other formats and channels of content distribution. The content of interest to public libraries today includes not only physical books available for loan, but also downloadable e-books along with audio and video on physical media or through streaming services. Although libraries and booksellers have coexisted well throughout history, the current environment of commercial content services poses new challenges that seem much more complex than previous times. The effectiveness of technology systems have considerable impact on the success of public libraries as they seek to offer their collections and services to meet customer expectations that have been set by well-resourced commercial entities.

Public libraries offer collections that cover a broad range of topics, reading levels, and media formats, mixing recreational, educational, and scholarly interests. The ability to support lending and access models appropriate for each of these dimensions ranks as one of the key objectives for the resource management and discovery services oriented to public libraries.

Circulation Patterns

The circulation of physical materials continues to thrive in public libraries. Large public libraries report numbers of annual circulation transactions in tens of millions. In the United States, the branches of the New York Public Library rank as the busiest in the nation with 26,976,911 transactions recorded in 2012. Academic libraries typically conduct a fraction of that number of circulation transactions. (http://www.ala.org/tools/libfact sheets/alalibraryfactsheet13)

Managing Demand for Materials

Public and academic libraries both face scenarios where patrons compete with each other for access to materials. Academic libraries manage equitable access to materials assigned for classes through short-loans or specialized course reserves modules. These materials are taken out of the standard circulating collection and assigned temporary loan rules, often with hourly or daily terms and accelerated fines. Public libraries do not necessarily reduce the terms of loan for popular titles, but rather handle demand through efficient inventory distribution and fulfillment.

Public libraries need to handle enormous pressure on their collections. The reading public wants access to the current titles—and just as they are published. While academic libraries build efficient collections that avoid duplication, public libraries intentionally purchase many copies of popular titles. The inventory of titles may span several formats, including large-print, audiobooks, or even translations into different languages. Challenges for public libraries include acquiring and distributing an appropriate number of copies to meet potential demand of currently popular titles and building collections that cover the breadth of authors, genres, and disciplines to satisfy the interests of its community. Automation systems for public libraries must include sophisticated features to manage demand and maximize the use of both high-demand and special interest titles.

Libraries have to make decisions about how many copies of a title to acquire based on their understanding of the reading interests of their community, tempered naturally by budget limitations. In multi-branch systems, copies may be distributed uniformly, or demographic trends among the areas served may shape interests levels in specific topics and titles. The acquisition and distribution of titles among branches can be based on the insight of librarians making collection decisions, assisted by use statistics and analytics.

The inventory of copies of a popular title follow a pattern where demand spikes with the initial release and moderates

In public libraries, e-books have not diminished demand for the print versions.

over time. As interest diminishes, libraries need to make prudent choices to reduce the number of copies in circulation and make way for the next set of hot titles. Demand for a title may spike again, sparked by the release of a movies, winning of an award, or other events.

Technology Support

Automation systems must support a number of features to help manage the peaks and valleys of demand for titles in public libraries. A sampling of these features includes:

- Sophisticated use statistics and analytics that help collection development librarians anticipate the demand for titles based on topic, genre, or other characteristics that can be mapped to demographic data to support branch-level predictive procurement and distribution of materials.
- Provision of functionality to manage patron hold requests. During periods of peak interest, patrons compete among themselves to be able to borrow copies of a book from the library. Patrons need to be able to manage their lists of items on hold, with the ability to cancel a hold if they purchased the book or lost interest. They need to be able to see their position in the hold queue to estimate how long they may need to wait.
- Efficient routing of materials among branch locations. Functionality includes generation of lists of requested items that may need to be pulled from library stack locations or from returns and routed to designated pick-up locations. The requesting patron needs to be notified, by e-mail, SMS text, or phone when items requested have been delivered.

Not all public libraries prefer the same inventory management strategies. Their systems must offer the flexibility to configure business rules. Basic expectations include establishing circulation policies that set the loan periods, renewals, and fines for each combination of material type and user category. Other options determine how materials flow among branches. Some libraries may prefer that material purchased for a given branch circulate only in and out of that facility. Others may allow materials to flow to other branches, but be returned to its home location when returned. The concept of floating collections reflects an inventory management strategy where materials do not necessarily revert to an original home location, but rather allow materials to drift according to demand. Managing floating collections goes beyond simply allowing an item to remain in the facility where it was returned to also ensure specified minimal levels of inventory available at each service point.

Access to Electronic Materials

Both public and academic libraries have seen dramatic changes in missions brought about through electronic publication of content. Academic libraries have seen a wholesale transition in their serial collections from print to electronic. The licensing of packages of scholarly articles has become the dominant acquisitions model for academic libraries, with diminishing resources devoted to print monographs. Public libraries likewise have an interest in electronic content packages, but at a much lower level. They may license a few multidisciplinary article-level databases but do not develop the specialized collections that are the lifeblood of academic and research libraries. The impact of electronic publishing for public libraries comes via e-books. A growing proportion of the general public expects to read books on portable electronic devices, such as the Amazon Kindle or any of the tablets or smartphones. But unlike the almost complete transformation from print to electronic formats seen in academic journal collections, e-books represent a new category of activity but have not diminished demand for the print versions.

Differences in Discovery

Any modern discovery service needs to do more than simply return lists of results in response to the queries given by the searcher. It's helpful also to make recommendations of related resources and provide other services that improve the success in finding library materials. In an academic library context, enhancing search results with suggested alternative terms, inferred from mining use data, can help the researcher identify important items that may have otherwise been missed. The bX service from Ex Libris exemplifies a recommendation engine oriented to research libraries.

Discovery for a public library takes a considerably different shape. Patrons appreciate suggestions of materials from the library's collection to read next. The factors that drive such a recommendation might include authors, topics, or genres gleaned from the patron's loan history, derived from search terms given in the session, or from items selected or requested. Recommendation services geared to public libraries are available from ChiliFresh, LibraryThing, and Zola Books (Bookish

Recommends) in addition to technologies that may be directly built into online catalogs. BiblioCommons uses a variety of techniques and technologies to drive its features aimed at reader recommendations.

Virtual Branch Engagement

Public libraries often consider their website to be a virtual branch. As such, it aims to deliver the highest level of service possible relative to what is offered in its physical facilities. Discovery and delivery represent key components of the virtual branch concept, but must be supplemented by a variety of additional services that benefit users and that enhance the visibility and value of the library. While the success of an academic library discovery service can be measured in terms of objective and comprehensive content provided to the researcher, one of the prime objectives of public library interfaces can be characterized as engagement with the library. Desirable outcomes include satisfying the present need, but also fostering an ongoing interest in the library's varied collections, programs, and services.

Comparison of Academic and Public Library Requirements

Category	Academic	Public
Collection priorities	Electronic resources of article-level scholarly content, e-books, print monographs.	Print books, e-books, periodicals, multidisciplinary databases.
Inventory management	Avoidance of duplication.	Acquire sufficient copies to meet demand.
Demand management	Course reserves, short-term loans.	Hold queues, branch transfers, floating collections.
E-books strategies	Specialized collections, emphasis on chapter-level access. Collections selected via demand-driven acquisitions programs.	Strong interest in popular literature downloadable to consumer devices. Integration of e-book lending services provided by third-party services into the library's own catalog and discovery services.
Collection use	Circulation at moderate levels, with recent declines.	Vigorous circulation with high transaction loads for automation systems. Circulation statistics rising.
Discovery strategies	Comprehensive results for research queries; objective relevancy, identify related resources.	Satisfy queries for materials, identify related materials, recommend titles to match interests, foster engagement with library.

BiblioCommons Forges Path to Innovation

BiblioCommons, a company known for providing its BiblioCore discovery interface for major public libraries, has received a variety of awards engagements in recent months. These projects include engagement by the Council of Chief Librarians to help design and plan a new digital platform for all of the public libraries in England, receipt of a Knight News Challenge grant to develop a mobile app to enhance in-library patron experience, and participation in a major IMLS grant to develop a library-oriented digital badge system. BiblioCommons has also received direct financial investments from libraries or their foundations to support its development capacity.

English Public Libraries Engage BiblioCommons for New Digital Platform

BiblioCommons has been selected to assist in the design of a new platform for digital services that will be created for all of the public libraries in England. This platform will provide a unified end-user interface that will be created and available for all of the public libraries in England. The strategy for the project also includes a comprehensive catalog of all of the holdings of the public libraries in the country as well as access to a broad array of digital resources and information describing the programs and services of each library.

This project is part of a set of initiatives that follow the publication of the "Independent Library Report for England" compiled by William Sieghart with the support of an advisory panel composed of other prominent librarians, business leaders, and government officials. The creation of a national digital resource for libraries headed the list of three key recommendations. The report briefly characterized the platform: "This digital network could include a single library platform and a national library card and catalogue." Another component of the report recommended the provision of wi-fi by each library in the country, a service which currently is not universally available.

To more fully develop the concept the Society of Chief Librarians (SCL) sought and received a £30,000 grant from the Arts Council England (http://www.artscouncil.org.uk) and issued a public tender in December 2014, subsequently awarded to BiblioCommons, seeking a firm to assist with its planning and design. SCL is an association comprising the leadership of the public library services in England, Wales, and Northern Ireland (http://www.goscl.com). This project falls in the context of SCL's recently launched set of initiatives for "Universal Offers," defining essential services that should be available in four categories: this "digital offer," as well as access to information, reading services, and health.

Public libraries in England find themselves in difficult times. Facing reductions in funding in recent years, many library facilities have been closed and the number of personnel reduced. Some facilities are now run by community volunteers instead of trained librarians, a practice that has been met by considerable resistance by many library advocates. A statement issued by Martyn Wade, chair of the board of the Chartered Institute of Library and Information Professionals in response to the Independent Library Report for England quantifies the concern: "Compared to five years ago across the UK there are 337 fewer libraries and nearly 5,500 fewer staff. Library opening hours and visits to libraries have also declined" (http://goo.gl/qLt3Az). The Universal Offers and related programs provide one channel of response to the challenges faced by public libraries in the region.

This phase of the project, as funded by the grant, was scheduled for completion by the end of March 2015. The project aims to produce a high-level design and to further define the strategies for this unified platform for public libraries. With its relatively modest budget, this planning and design phase does not include the creation and deployment of the platform, which will be addressed in a subsequent project.

The proposed platform will provide access to a broad range of components, including access to library catalogs and digital resources, opening hours of local libraries, information about programs and technology training, and many other resources for public library patrons. According to the press release, "The platform will be designed to improve how patrons can discover, access, and engage with the resources that public libraries provide, including books, media, digital articles, journals, library programs, events, and much more. The platform will be designed to bring people into public libraries – both virtually and physically."

The new digital platform will supersede an earlier initiative called "Bookmark Your Library" (http://www.bookmarkyour library.org.uk) as noted in the "Invitation for Tender: Universal Digital Platform: Concept Development and Test." Bookmark Your Library was developed in partnership with OCLC as a portal that provided a variety of resources, including access to the national union catalog, map locations and listings to local libraries, information about community events, reading groups, and links to a wide variety of reference and genealogy resources. The document states, "In June this year, SCL decided that, given the pace of change, the growing profile and potential value of the Universal Offers and increasing public expectations, it had a preference for undertaking a fundamental review of its digital presence needs and specifically the needs of library customers rather than continuing to develop Bookmark Your Library, at this stage."

The new digital platform has the potential to provide a national public interface for public libraries, but it is not intended as a comprehensive technical infrastructure for the libraries. It will not replace the integrated library systems implemented to support operations such as collection management and circulation. Smaller countries such as Ireland and Northern Ireland have recently implemented national library management infrastructure to support all their public library services. Wales issued a tender for a similar project in January 2015. The idea of a single integrated library system to serve the more than 4,000 public libraries in England would be extraordinary ambitious, despite the trend seen in many states and smaller countries toward shared infrastructure.

The research and analysis performed by BiblioCommons includes working with a variety of stakeholders and partners. BiblioCommons expects to have submitted its report to the Society of Chief Librarians by the end of March 2015.

Knight News Challenge Award

BiblioCommons was one of the recipients of the Knight News Challenge grants, receiving $35,000 in support of "Making the Invisible Visible," led by Ian Lowe, product lead for BiblioCore. This project aims to create technologies that enhance awareness

of resources and programs for library visitors. It involves the development of a mobile app to promote library resources to patrons as they walk through the library according to their location and interests. The app will use such technologies as NFC beacons, geolocation, and the BiblioCommons software.

Other partners include the Boston Public Library and the New York-based Local Projects media design firm. The technology created through this grant will be incorporated into the renovation underway for Boston's Central Library. The BiblioCommons submission was one of 22 proposals funded in the latest round of the Knight News Challenge that distributed a total of $3 million in awards.

NISO White Paper on Discovery Published

NISO commissioned Marshall Breeding to write a white paper covering the current discovery environment; descriptions of how these technologies, methodologies, and products may be able to adapt to potential future change; and a look beyond current models of discovery to explore possible alternatives, especially those related to linked data. The free PDF is available at http://goo.gl/lnTdJd.

Partner in IMLS grant for Digital Badges

In March 2014 the Institute of Museum and Library Services awarded $250,000 to the Brooklyn Public Library to work with BiblioCommons to develop a digital badging system for libraries. The general concept involves the ability to award badges to library patrons for acquiring specific skills or accomplishing specified tasks. The system was created with Mozilla Open Badges (openbadges.org), which provides open source software and a technical standard. With support from the grant, BiblioCommons developed the technical infrastructure, including an authentication mechanism tied to the patron's library card, to support a trusted environment that will also interoperate with other third parties that issue badges. Because of the possibility of children may participating in the programs that award badges, the system must pay careful attention to privacy and security and comply with the Children's Online Privacy Protection Act (http://goo.gl/8a4z16). In addition to Brooklyn Public Library, the lead partner, Seattle Public Library, Omaha Public Library, and Tulsa City-County Library are participating.

BiblioCommons completed the work and released it through Biblio Summer Sites, a set of tools that a library with BiblioCommons can use to deliver online programs and activities, especially for children and young adults. Based on the ability to easily access materials via BiblioCommons, Summer Site provides features to interact with the system by contributing comments, tags, or summaries, to record reading times, take quizzes created by the library, and to earn digital badges or printed certificates.

Investment from Libraries

BiblioCommons has also been able to attract investments by libraries. Some of the initial funding for the company came from provincial libraries in Canada that shared its interest in developing a new platform to replace traditional library catalogs. The company saw early funding through advance two-year subscriptions for province-wide licenses in Ontario, Alberta, and British Columbia in addition to other private investors.

In 2011 New York Public Library not only opted to implement BiblioCore, but also made an additional investment of around $1 million in the company to help strengthen its capacity for future development. As stated in a press release, the the investment would "help accelerate the development of additional features central to the Library's long-term digital strategy." NYPL continues to retain a stake in the ownership of the company.

Chicago Public Library implemented BiblioCore in 2013 and invested $1 million in a three-year partnership to support further development of BiblioCMS, a comprehensive platform that delivers the entire web presence for a library. While BiblioCore provides an alternative for the online catalog module of its integrated library system, BiblioCMS replaces the entire web site with a fully managed platform. It enables libraries to control the presentation and populate the content of its website through a managed environment that is fully integrated with BiblioCore.

Chicago Public Library' website based on BiblioCMS launched in April 2014. Other libraries to subsequently implement BiblioCMS include Pima County Public Library and Calgary Public Library.

BiblioCommons Background and Products

Beth Jefferson and Patrick Kennedy co-founded BiblioCommons in 2007, to create technology products that would provide new models of access to the collections of public libraries. Prior to co-founding BiblioCommons, Jefferson was involved in a non-profit initiative exploring online teen literacy, called the Perfink Project, in partnership with Toronto Public Library.

BiblioCore, the company's primary product, provides a discovery environment for public libraries that entirely replaces the online catalog of the integrated library system. It features

relevancy-based search and retrieval, a rich interface with faceted navigation, and functions for social engagement between patrons and with the library. BiblioCore is deployed through a multi-tenant platform that provides a patron interface that integrates with the library's integrated library system. Records are exported from the ILS to populate the library's instance of BiblioCommons. Current availability status and patron record features are provided through BiblioCommons using APIs or page parsing conducted with the ILS. The library's patrons can be organized separately, or they can be enabled to interact with those of other organizations that have implemented BiblioCommons.

The initial prototype of BiblioCore was launched in July 2008 for the Oakville Public Library in Ontario. Based on feedback from the prototype, the interface was refined and the platform re-engineered with new implementation in libraries beginning by around 2010. The company has more than tripled its size since 2010 to its current workforce of more than 50 personnel.

BiblioCommons has since been adopted by more than 200 libraries, primarily in the United States and Canada. Prominent clients include New York Public Library, Brooklyn Public Library, Boston Public Library, Seattle Public Library, King County Library System, San Francisco Public Library, Chicago Public Library, Multnomah County Library, as well as many mid-sized libraries and consortia. The Christchurch City Libraries and the Yarra Plenty Regional Library in New Zealand have also implemented BiblioCommons.

BiblioCommons competes directly with the vendors of the integrated library systems. Even though the company does not offer its own ILS, it displaces existing or potential sales for discovery products. Libraries that implement BiblioCommons, for example, would use it instead of products such as SirsiDynix Enterprise, Innovative's Encore, or the online catalog module of any ILS. BiblioCommons has developed connectors that enable the interoperability of BiblioCore with the major ILS products and does not necessarily require the cooperation of their providers. BiblioCommons provides strong competitive motivation for ILS vendors to create compelling public interfaces. Despite improvements made in the patron-oriented products offered by the ILS vendors in recent years, BiblioCommons continues to see a steady flow of new implementations.

Library Technology News

Mellon grant awarded to NISO to explore patron privacy in library and publisher systems

Baltimore, MD—March 11, 2015—The National Information Standards Organization has been awarded a grant from the Andrew W. Mellon Foundation to develop a Consensus Framework to Support Patron Privacy in Digital Library and Information Systems. The grant will support a series of community discussions on how libraries, publishers, and information systems providers can build better privacy protection into their operations. The grant will also support creation of a draft framework to support patron privacy and subsequent publicity of the draft prior to its advancement for approval as a NISO Recommended Practice.

This project will consist of three phases. The first will be a pre-meeting discussion phase, which will consist of four virtual forums to discuss privacy of internal library systems, privacy of publisher systems, privacy of provider systems, and legal aspects influencing data sharing and policies. Each of the discussion sessions will be a three-hour web-based session designed to lay the groundwork for a productive in-person meeting at the conclusion of the American Library Association meeting in San Francisco, CA in June 2015. Following the in-person meeting, a Framework document will be completed detailing the privacy principles and recommendations agreed to by the participants, and then circulated for public comment and finalization.

More information, including a version of the project proposal, is available on the NISO website at: www.niso.org/topics/tl/patron_privacy/.

EBSCO partnership with ByWater Solutions

IPSWICH, MA—March 3, 2015—EBSCO Information Services (EBSCO) and ByWater Solutions have partnered. ByWater Solutions is a provider of support and implementation services to libraries using Koha. Working with ByWater, libraries that use the Koha ILS can readily adopt EBSCO Discovery Service as their discovery service and front-end of choice.

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