



EXPLORING DISCOVERY

THE FRONT DOOR TO YOUR LIBRARY'S
LICENSED AND DIGITIZED CONTENT

EDITED BY
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INTRODUCTION

We are in a new age of discovery. Not the one recalled from high school history books, where exploration of the physical world proceeded apace, but an age in which the incredible breadth and depth of knowledge is just as mysterious to the typical researcher. Where centuries ago, explorers set out to find the edges of the known world, so information seekers today are setting out to find the edges of knowledge so they can build upon them. Much as the new technologies of that era enabled those explorers to go farther, go faster, and make discoveries that redefined their world, so do today's technologies enable researchers to explore ever-vaster realms of information more efficiently than ever before, and make new discoveries in the heretofore hidden realms of someone else's studies.

This new age of discovery builds on decades of advancements in handling metadata and full text in digital formats, natural language processing, keyword searching, and information science. The pace of change in the last half-century has been dizzying, enabling library technologists to enable discovery across multiple scales, with tools and processes specific to each. There was a period of centuries when a comprehensive index of books was simply a chronological list of published works, maintained by individuals and copied by hand or, eventually, by the printing press. Discovery required going someplace, often several places, to find both the index and the items.

First, there is discovery writ large. As the twentieth century dawned, we entered the age of the subject-based card catalog, in which there were several indices to printed books: title, author, a few hand-selected subject words. As we entered the current century, it became plausible to describe searching the entire contents of most printed works available in the world. Google Books and HathiTrust provide search and display capabilities for a significant proportion of the information contained in printed books.

In parallel processes, article-level discovery has emerged as a technologically driven tool. From early hand-maintained indices to individual publications in the nineteenth century, we arrived at the mass-produced subject guides to articles and journals in the form of the venerable *Readers Guide to Periodical Literature*, a staple of my secondary education. Rapidly, as the information technology age burst upon us at the turn of the millennium, not just the indexes but the full text of the articles themselves became accessible to computer-driven indexing and search technologies. Products such as Google Scholar, Summon, and Primo Central are the brands the library world has come to see as the providers of article-level (and, for e-books, chapter-level) discovery. Second, there is discovery writ small. There is even more innovation here, because the tools are purpose-built for specific needs, even if they share a common infrastructure and application computer code. The variety of materials managed and collected by individual libraries is expansive, and purpose-built discovery tools are still needed to provide in-depth access to them. Where the relatively small number of items in a unique collection in one library might get lost in the ocean of all human knowledge, once the collection surfaces through a large-scale discovery tool, the items can then be found in smaller-scale, purpose- or collaboratively built interfaces. Libraries and archives have been busy working on custom interfaces to large-scale discovery tools and, equally important, discovery tools and interfaces that are focused on the specialized items of a single collection.

Thus, the concept of “discovery” covers scales from billions of items in the large, web-scale systems to thousands, or even just hundreds of items at the other end of the scale. This book therefore approaches the topic with commensurate breadth, and explores both tools that have been made to enable in-depth access to relatively narrow information silos and tools that enable exploration of broad swathes of digital and off-line content. What cutting-edge tools and services are emerging from the growing suite of discovery interfaces and indexes? Where is “discovery” going, and what tools and techniques are emerging as standard elements in the library technology toolbox? By providing a series of case studies illustrating the interfaces and technologies that can be used by libraries today, this book attempts to explore answers to these questions.

PART I

VENDED DISCOVERY SYSTEMS



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COLLABORATIVE GROWTH TOWARD DISCOVERY

Becoming Stronger through Change

MARGARET HELLER AND HONG MA

In 2014 and 2015, Loyola University Chicago Libraries migrated to Alma and Primo from Ex Libris's Voyager integrated library system (ILS) and the WebVoyage online public access catalog (OPAC), WorldCat Local, and a suite of electronic resource tools from Serials Solutions. We chose the radical act of leaving the past behind and deliberately changing all our systems at once. We grounded the project in a collaborative selection and implementation process with user experience data-driven decision-making. While the project is in the implementation phase at the time of writing, we can convey a number of best practices from the literature and suggestions for similar projects.

MOVING TO WEB-SCALE AND LIBRARY SERVICES PLATFORMS

The first commercial web-scale discovery (WSD) products came to the market in 2009, though the concept goes back farther to earlier federated search systems. Athena Hoepfner defines WSD as a pre-harvested central index coupled with a richly featured discovery layer providing a single search across a library's

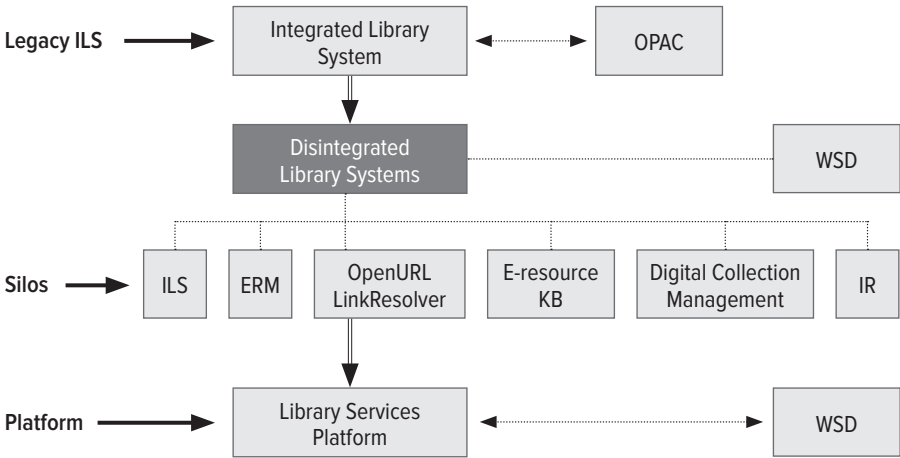
local, open access, and subscription collections (2012). The WSD contains two major components: a central index and a discovery layer. Major WSD products are WorldCat Local (now called WorldCat Discovery Service), Summon, Primo, and EBSCO Discovery Service (EDS). These products began as independent from the specific library systems, but that is changing, as we will see.

Increasingly by 2010, academic libraries started evaluating and adopting web-scale discovery services. Most institutions used WSD as a tool for consolidated article search and kept their legacy OPAC for locating local collections. This tendency is partially due to the hesitation of reference librarians to introduce WSD to users, especially graduate students and other researchers in specific subject domains. While the tools are easy to use and cover a lot of disciplines, their subject coverage is not always clear and relevancy rankings are proprietary algorithms, leading to information overload and dissatisfaction with known item searching (Thomsett-Scott and Reese 2012).

Providing access to resources is increasingly challenging as libraries offer information resources in all formats. Library users' expectations and needs require the library to provide an easy way to access all these collections in a comprehensive and timely manner. Given the complexity of managing multiple information resource formats, the legacy ILS and OPAC are no longer adequate to manage all aspects of selection, acquisition, cataloging, discovery, and fulfillment. To make up for the absence of necessary functions in the ILS, Loyola University Chicago Libraries (which includes eight physical locations in the Chicago area and Rome, Italy) implemented a variety of ancillary products such as link resolvers, electronic resource management (ERM) systems, digital asset management systems, and web-scale discovery services. Installing, configuring, maintaining, and integrating systems in such a disintegrated environment are challenging.

The solution to this is to reimagine the ILS to match what WSD did for the OPAC. Marshall Breeding named what was popularly known as “next-generation ILS” as library services platforms (LSP) (2011). LSPs aim to provide a more comprehensive approach to managing library collections than a traditional ILS. They can handle diverse print and electronic formats of content in unified workflows to simplify library operations (figure 1.1). They use new cloud computing models, such as fully web-based multi-tenant and software as a service (SaaS). LSPs emphasize managing library collections through shared metadata rather than traditional local bibliographic databases. Theoretically, LSPs are decoupled from discovery services. One vendor's LSP could power another vendor's WSD, however synchronizing library holdings with multiple/different knowledgebase may be difficult or impossible, and so in that way retains the nature of an ILS with OPAC attached. WSD products have evolved and improved in expanding content coverage as well as features, relevancy ranking, and so the LSP adds in seamless integration with library patron services.

FIGURE 1.1

Transformation of legacy ILS and siloes to library services platform**CHOOSING THE RADICAL SOLUTION**

We say replacing a traditional ILS and OPAC with an LSP and WSD is radical because it forces library staff across the board to examine the root of their practices and make changes where necessary. Not all practices will change—for instance, bibliographic data may still be encoded in MARC—but other practices such as approaches to library instruction or copy cataloging may change dramatically. Managing this change is a challenge, and our journey to choosing an LSP and WSD is a good example of effective and ineffective ways to approach this.

One of the major risks of migrating systems is making a particular portion of the staff feel that they must make all the changes, or that they have no say in the changes. For example, the Auraria Library in Colorado believes their transition to WorldCat Local in 2009 failed for this reason, and a later migration to Summon was successful because they started by understanding fundamental practices and workflows in a collaborative process (Sommerville 2013). Other experiences shared in the literature bear this out. For instance, Fabbi recommends organizational learning with a participatory focus to reimagine a technical services department (2009). A truly participatory project requires that the participants be able to decline the project at all, which was the experience of one institution which in 2012 voted not to implement any discovery layer (Ellero 2013).

Like other academic libraries at the advent of WSD in 2010, Loyola University Chicago did a short investigation and decided to try WorldCat Local. In 2010, the initial solution was to keep a traditional OPAC (WebVoyage), and

implement WorldCat Local as an article discovery tool. At the same time, we had been looking for a long-term solution for managing all different formats in a unified workflow by monitoring the trends in next-generation library systems. However, public service librarians felt left out of the process and unhappy with the results. Usability testing revealed serious flaws in the accessibility of resources, which was partly due to the tool not meeting the needs of technical services staff, who did not feel confident in their ability to work with it, because of the lack of local control, and reliance on master bib records which anyone in the OCLC community could modify. Furthermore, development was not up to our current needs, including the process for ingesting local library content and the OCLC knowledge base for electronic resources.

The experiences of other libraries mesh with our own. Much of the literature focuses on the effect that implementing a WSD service has on public service staff, but we can draw from their experiences to understand the potential effects of an LSP and WSD on all library staff. Because public service librarians must work with end users, they have to be comfortable with the tool, which example after example shows is not always the case. Edith Cowan University described librarian perceptions of their 2009 migration to Summon as “culture shock” with a lack of initial trust and not enough time to adjust (Howeard and Wiebrands 2011).

In fact, as Dave Pattern points out, WSD systems are not meant to be particularly comfortable for librarians, since they are designed for the needs of the average user (2012). Most library users have already made the radical shift that libraries are only just now making. When Google Scholar became available a decade ago, users took to it immediately because it offered a search experience that was more appealing than library-provided interfaces, which was alarming to librarians who cautioned people away from using something not as powerful as library-provided tools (York 2005). Students are so used to the Google Scholar experience that a discovery layer may not tempt them back. A 2015 study of Summon found that while overall users were satisfied with the tool, graduate students reported that they preferred specialized databases for their subject work, or Google Scholar for general searching (Lundigran, Manuel, and Yan 2015). That said, another study of student searching in Google Scholar and a federated search tool found that students do prefer the research experience in the federated tool, though they have a limited understanding of the differences between the two (Georgas 2014).

A limited understanding of how discovery layers work has created massive shifts for instruction and reference librarians, on which population most of the literature focuses. In theory, it is no longer necessary to spend so much class time on how to search in a database interface, and class time should be devoted to higher-level skills such as evaluating and using information (Cmor and Li 2012). In fact, the advent of discovery layers has in some ways directly contributed to

the Association of College Research Libraries (ACRL) developing Information Literacy Frameworks to replace the Information Literacy Standards (Seeber 2015). As Pete Coco points out, the convenience of a discovery layer belies its complexity—finding articles is easy enough, but understanding and using them still requires instruction and information literacy. Librarians can use the opportunity to teach the discovery layer in creative ways (2012). Buck and Steffy suggest that instruction librarians must know whether the tool is appropriate to a certain class by knowing what is in it, making sure students understand the tool at the level that is appropriate, using active learning techniques, teaching refining techniques to manage information overload, and working with colleagues to share successful techniques over time (2013).

Not all users or librarians will change their practices radically, or even at all. Ninety percent of instruction librarians at the Association of Research Libraries (ARL) institutions would bypass the discovery layer in favor of a specialized database for subject-specific classes (Kulp, McCain, and Scrivener 2014). That said, limited data exists about how advanced researchers and librarians actually use discovery layers, and furthermore how this changes when the traditional OPAC is no longer available. Anecdotally, however, we have heard from faculty that they plan to use the discovery layer for current awareness rather than searching in each database interface. Known-item searching is a weakness in discovery layers, since they rely on relevancy algorithms and post-search filtering, which is frustrating for searchers such as librarians with a solid understanding of Boolean logic and left-anchor searches. At Loyola, a priority for implementation is creating an advanced search in Primo that meets the needs of both librarians and advanced users. Alma, which is the library services platform powering Primo, is of course available to Loyola librarians to take advantage of its robust repository search, but we want to ensure that users are able to perform their own advanced searches without relying on staff access to another interface.

MAKING GOOD CHOICES

Identifying user needs should underpin implementation of a WSD or an LSP. Techniques such as query log analysis and web analytics have a role in the development and testing of discovery layers (particularly from the vendor side), since these allow us to see that, for instance, users start with simple searches and use facets to limit their results (Diamond, Price, and Chandrasekar 2013; Durante and Wang 2012). Users work with idiosyncratic methods and favorite tools that might not be the most efficient but are comfortable for them. It is our job to figure out what works for our users and either adapt our systems accordingly or teach them better practices (Daigle 2013).

Testing early is more effective than testing at the end of the project (Krug 2006, 134). In the case of implementing a new discovery layer, this means well before the project is under way in whatever system the library is currently using, as well as systems the library is considering using. Gallaway and Hines (2012) suggest “competitive usability” as a method to select the next-generation catalog or discovery system. But knowing what questions to ask in competitive usability should be informed by knowledge of users’ current practices. Without the baseline from the legacy OPAC search it is difficult to understand what has improved or how instructional material should be changed (Jarrett 2012).

The Loyola University Libraries Web Team started routine usability testing of the library website, catalog, and other services in 2013. We followed the method outlined by Steve Krug in *Rocket Surgery Made Easy* (2010), which emphasizes lightweight routine testing and fixing of errors. These routine tests uncovered errors or confusing aspects of the library website in general, but most importantly for discovery, the tests found it impossible to locate e-books or digital collections when starting from WorldCat Local. This realization prompted a meeting of all the departments that touched WorldCat Local to understand the features and limitations of WorldCat Local. These tests made it clear that while the traditional OPAC worked for students, they did not enjoy searching it and tended to choose WorldCat Local without understanding why, or what the differences between the two were. While we made a number of changes to the library website interface to provide help and context clues, it was clear from testing that maintaining two systems in parallel was not a good use of our time. (A 2014 debate between Dianne Cmor and Rory Litwin came to roughly the same conclusion.)

One example of how our testing led us to know an LSP was right for us was that of theses and dissertations, which were cataloged in the ILS up until 2012, at which point they were cataloged in the institutional repository. Older dissertations and theses in the catalog had no link associated with them, and the newer ones were not at all discoverable without searching the repository, which was almost unknown to average users. To provide complete access, it would have been necessary to catalog all the new dissertations, as well as add the links to the older records. Harvesting the institutional repository into WorldCat Local certainly helped with finding these items, but it still left the management of them spread across multiple systems.

Other intractable issues included constant miscommunications between the discovery layer and the link resolver that made it impossible to trust its results. We attempted to improve this, but determined that going forward we would only try to use a discovery layer with a tightly integrated link resolver. All of these usability findings made us determined to select a system with integrated

resource management, access, and discovery so that we could focus on presenting our resources to the best of our ability without having to spend so much time massaging rough edges between systems. These pre-identified limitations left a limited number of available systems as contenders.

COLLABORATIVE SELECTION PROCESS

In 2014 when the libraries began the process of developing a new three-year strategic plan, the dean of libraries decided to initiate a process to select and implement an LSP. We evaluated the following candidates: OCLC WorldShare Management Services (WMS)/WorldCat Discovery Service, Ex Libris Alma/Primo, and ProQuest Intota/Summon. We determined that Alma and Primo should replace the current Voyager ILS and WorldCat Local. The evaluation process involved people from all library departments to ensure we included concerns from all aspects of library work. Our four years of experience using WorldCat Local, routine user studies, and feedback gathering helped to clarify the expectation for systems under evaluation.

The dean of libraries appointed a Next-Gen ILS Exploratory Committee (chaired by the head of library systems) and public service/technical service subcommittees in January 2014. There were purposely overlaps between the main committee and the subcommittees. The main committee involved personnel from campus IT as stakeholders from outside the libraries. The collaborative selection process started with educating all library staff about LSPs and WSDs with an overview of novel terminology and concepts (such as cloud computing, service-oriented architectures (SOA), SaaS, and multi-tenant computing), coordinating vendor webinars, and encouraging participation of related presentations in conferences. Similar to any system evaluation process, the main committee developed a request for proposal (RFP) and sent it to three vendors, reviewed RFP responses from the vendors, and developed customized scripts for the on-site vendor demo. All library staff were invited to attend the on-site demo and asked to fill in the survey for each LSP demo. In addition to the interaction and communication with the vendors, we interviewed peer institutions which recently implemented these candidates LSPs. It was essential to have participation in the process by all staff in a variety of functional areas. In July 2014 the committee summarized pros and cons based on information gathered and produced a report, including a recommendation to select Alma and Primo, for library administration to make a decision. After a couple of follow-up discussions between library administration and the committee, the Loyola Libraries made the final decision to choose Alma/Primo in October 2014, and signed the contract in December 2014.

COLLABORATIVE IMPLEMENTATION PROCESS

The pre-implementation phase started immediately after signing the contract. Ex Libris delivered a project schedule on December 31, 2014. The implementation phase started with a kickoff meeting on January 16, when an Ex Libris implementation team came on-site and did a complete project overview with all library staff. The dean appointed the head of library systems as project manager. We formed an executive group focused on policy, vision, planning, coordinating, and communicating decision making. We formed a series of working groups to focus on migration and implementation details: Access Services, Acquisition and Resource Management, ERM, Primo/Discovery, and Systems, as well as an electronic resources access and troubleshooting group midway through the process. Representation on the implementation team included librarians and staff from across functional areas of the library and from branch libraries (Law and Health Sciences), with overlaps between groups. The largest group was the Primo group. It contained staff from a variety of library departments (Reference, Technical Services, Systems, and Special Collections). After the first implementation meeting the Loyola team and Ex Libris's team held weekly calls to manage the project, and each working group started watching video trainings, as well as completing a variety of forms to prepare the initial migration, which took place after Ex Libris's on-site systems analysis workshop in late January. The chairs of each working group took the lead on implementation tasks, so that the majority of the decision making was decentralized from the project leader and in the hands of functional areas. Ex Libris used Basecamp as a project management tool, and Loyola used an institutional Box subscription to share files and manage the project internally.

The nature of collaboration and a decentralized model can make things happen in an efficient way. However, due to the different contexts of and needs expressed by multiple campuses, the radical shift in approach did not always go smoothly. For example, the Health Science Library uses a separate EZProxy server. There are resources shared by all campuses, as well as resources limited to health science users. The built-in solution in Alma required that all patrons be loaded into predefined network groups to gain access to the specific licensed resources, but not all health science patrons could be loaded into Alma since the hospital system is owned by a different corporate entity and their staff information system was not accessible. Accessing this data is a high-priority goal for the future. In order to resolve this challenge, we reached out to other institutions for advice and learned a great deal about the structure of Alma and Primo. Eventually, we identified an acceptable solution. While this put us behind our agreed-upon time line with Ex Libris, in the end the main campus libraries and the Health Sciences Library better understood each other's needs.

Usability testing continued throughout the implementation process. We started with an informal card-sorting exercise, and once Primo was available we did four rounds of usability testing with students, both undergraduate and graduate. The card-sorting exercise took place in a busy area of the library and invited students to describe the process they would take to access an item in the catalog. This helped us determine which Primo jargon would work—other Primo studies have found that while searching Primo is intuitive, its language is not, nor are terms for standard library practices such as holds (Comeaux 2012). Doing the card-sorting exercise led directly to changes in the request area of user interface, including removing or moving vendor-provided labels and page elements with CSS and JQuery to remove visual clutter and improve flow. Alma provides robust display logic that allows only the most appropriate services for intercampus or interlibrary loan to be displayed in Primo, and card sorting helped us to understand the most effective ways to use that display logic.

Our usability testing continued to follow the Krug model. The first round used the questions from an earlier WorldCat Local and Voyager testing session to see how the user experience changed. The second round incorporated questions raised by the first round as well as staff testing in Primo. Both sessions uncovered errors and areas for improvement, but the most heartening result was that in staff discussions about our implementation choices we could point directly to our usability testing as justification for these choices. Later rounds of testing continued to test questions about access and labeling as well as customizations to the user interface. We created two versions with a different set of customizations and labeling and tested these with five students on one day, and then picked the most popular results out of these two tests for an additional test before opening the interface for a public beta in late June 2015. Our results generally match those in the Primo usability testing literature—post-search facets used for filtering are clear to students, but the scope of the search is not clear (Comeaux 2012), and metadata errors will create confusion (Nichols et al. 2014).

We could act on results of tests quickly because of the cross-departmental collaborative nature of our Primo team. The electronic resources librarian spotted a problem with ProQuest database activation and made a plan to fix it without needing to wait for an error report from public service staff, but while still ensuring public services staff understood the technical issues. Reference staff could likewise relay information about changes in instructional practices to access services staff. While going forward we will return to testing all library web services with a slightly different group of staff running the testing, and we will be able to use the collaborative ties formed in our implementation team to ensure we are gathering testing scenarios and creating solutions with the appropriate people. While we are confident in our testing to give us a roadmap for future development, we will maintain a regular testing schedule as our student population changes and the features of Primo change.

One of the struggles with implementing a discovery layer, particularly one on top of an LSP, is identifying the most effective ways of providing reliable access to resources. Learning how to navigate the complex relationships between a variety of data sources such as the Alma repository, the Primo Central index, and a new link resolver requires new ways of thinking about how we provide access. One example is when to make edits to the holdings, which rely on indexing mechanisms over which we have limited control. Primo Central has a 5–10-day delay for new resources to be available to users for searching, and publishing our local holdings information to Primo Central involves a 4–5-day delay. Learning all this takes ongoing collaboration between public and technical services to test and fix issues in the product over time (Silton 2014). For that reason we decided after Primo was available that we needed a group to address e-resource access issues and troubleshooting in a structured way, and so formed a new working group with members pulled from across departments and campuses. This has been a valuable group to work together to learn the system and make choices together that we will all understand in the future. The new group will continue when Alma/Primo goes live, and will establish a structure to deal with access issues efficiently during implementation, build knowledge, establish a model for ongoing maintenance and support, and coordinate problem reporting and solving. Frequent releases and changes in resource coverage will require monthly meetings to stay on top of changes (Boyer and Besaw 2012), and so going forward we plan to maintain these collaborative ties between departments in order to stay knowledgeable on both the public and technical sides about Primo and Alma. This is a new model for our libraries, but it already has been successful enough that we feel it is worth continuing.

CONCLUSION

Radical changes mean uneasy times for those living through them. But when approached with the right attitude they can strengthen an institution and improve its practices. Going into the project with a user-centered, inclusive process grounded in evidence and data will not alleviate all stress and uncertainty, but can provide a framework for decision-making that will give everyone confidence.

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