# Search Systems and Finding Tools

## LMS Embedded Librarianship

Academic libraries rely on diverse search systems and finding tools. Web-scale discovery platforms have become the preferred search and have replaced federated searching, which was seen as slow and "too cumbersome to serve our students well."[1] Users value an intuitive, simple, and comprehensive search experience. Accordingly, librarians today are reviewing and licensing the next-generation catalog and other discovery tools, often referred to as a discovery layer, discovery service, or discovery user interface. If college and university libraries decide to utilize a truly comprehensive discovery service, then their other traditional tools become less important for searching. Often the work of LMS embedded librarianship includes introducing users to the new discovery service and clarifying what material types and formats are being searched in order that users do not overlook significant resources. Wrong assumptions and incomplete findings can result if these details are unclear.

The LMS embedded librarian minimizes researchers' frustration, confusion, and time when she explains where to start searching and why, as well as what each finding tool is intended to discover. Many administrative decisions about the operation of a discovery system are made locally, and these decisions affect how different types of materials are discovered by searchers, so it becomes imperative for the LMS embedded librarian to offer a recommended order of search with rationale. For example, some academic libraries may set up their discovery service to identify books, articles, institutional repository items, and open-access content in one search. Administrators of another library's discovery service may separate the next-generation catalog for books, e-books, institutional repository items, and open-access content from its discovery service for articles. So if a student is searching for articles on a given topic, it makes sense to start with the library's discovery service for articles, which would incorporate many databases. If a student wants a medical e-book, then using the library's discovery service for books is the logical beginning. At other times, the researcher may prefer the sophisticated search interface of a single database and start with databases *A–Z* to locate that database. A student who wants information from online news or an individual's website will start with a search engine. A researcher who needs carefully selected, discipline-specific websites may start searching from a portal such as the Virtual Religion Index. In short, need drives the selection of which finding tool is most appropriate because the tools differ and do not discover the same sources. As much as students may like the convenience and ease of starting with Google, that search engine does not do it all.

## Index-Based Discovery Services

Next-generation catalogs are turning to discovery. The most significant criterion for a discovery service is its ability to retrieve all library resources in one search, including books, e-books, articles from databases, videos, and items in digital repositories. Often this mechanism relies on a unified index or real-time searching. So the first question to ask is, what is the size of the discovery service's unified index and the extent of coverage of the library's holdings? Admittedly, no discovery service, or search engine for that matter, delivers 100 percent of all resources, so comprehensive finding tools are not a reality yet. The second question to

## Leading Discovery Services

EBSCO Discovery Service (EBSCO)
www.ebscohost.com/discovery

Encore Discovery Solution (Innovative Interfaces)
www.iii.com/products/sierra/encore

Primo (Ex Libris)
www.exlibrisgroup.com/category/PrimoOverview

Summon (ProQuest)
www.proquest.com/libraries/academic/discovery
-services/

Worldcat Local (OCLC)
www.oclc.org/worldcat-local.en.html

## Proprietary Discovery Services

EBSCO Discovery Service (EBSCO)
https://www.ebscohost.com/discovery

Encore Discovery Solution (Innovative Interfaces)
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Primo (Ex Libris)
www.exlibrisgroup.com/category/PrimoOverview

Summon (ProQuest)
www.proquest.com/libraries/academic/discovery
-services

WorldCat Local (OCLC)
www.oclc.org/worldcat-local.en.html

AquaBrowser (ProQuest)
www.proquest.com/products-services/AquaBrowser
.html

Axiell Arena (Axiell)
www.axiell.co.uk/solutions/interface

BiblioCore (BiblioCommons)
www.bibliocommons.com/products/bibliocore

Endeca (Oracle)
www.oracle.com/us/solutions/business-analytics/
business-intelligence/endeca/overview/index.html

Enterprise (SirsiDynix)
www.sirsidynix.com/products/enterprise

Visualizer (VTLS)
http://vtls.wikispaces.com

## Open-Source Discovery

Blacklight
http://projectblacklight.org

eXtensible Catalog
www.extensiblecatalog.org

VuFind
http://vufind-org.github.io/vufind

pose is, what is the quality of the unified index? How well does it retrieve items from the local institutional repository as well as e-books or patents from the open web?[2] Faceted navigation is expected by searchers as a limiting feature. Relevancy ranking is standard; however, Primo alone offers popularity ranking based on views or usage. Primo alone suggests similar articles. RSS feeds are a nice feature for researchers wishing to be alerted to new materials that match their interests. It is possible to share resources through social networking sites integrated in the discovery service; the majority of products make this possible. A minority of discovery tools offer a persistent link; both EBSCO Discovery Service and WorldCat Local do. The majority of discovery tools supply a separate mobile interface. FRBR enables searchers to find various editions and formats of a work, but this is not a standard feature of most discovery services. Primo and WorldCat Local do offer this desired option. For further details see the excellent review article by Chickering and Yang, which rates Primo and WorldCat Local as the highest scoring discovery tools.[3] Clearly the four vendors of index-based discovery services are competing. Currently, EBSCO "holds the dominant market share, challenged by Ex Libris Primo, OCLE WorldCat Discovery Service, and ProQuest Summon."[4] In October 2015, ProQuest announced it will acquire Ex Libris Group.

## Discovery Service

Discovery search systems are replacing federated searching. Discovery systems improve user experience by giving searchers a single starting point to identify all items in the library's holdings. Simple, intuitive, fast searching of everything at once is expected by today's users. "The need to improve user experience was the trigger for the development and deployment of discovery systems and has become the cornerstone of these systems."[5] They enable users to search the library's collections and beyond, note relevancy-ranked items, and get instant access to full text, thus saving the searcher's time. The essential appeal of web-scale discovery is the ease of identifying library materials from publishers, aggregators, and repositories regardless of format or location. They are fast and comprehensive and offer a single search box, familiar to searchers who use Google, the standout among search engines. Libraries wishing to promote their numerous electronic resources are licensing a discovery service so the campus community may conveniently search nearly all holdings simultaneously. Library administrators at last have a means of collecting anonymous

## Sixteen Evaluation Criteria for Next-Generation Catalogs

Does the discovery service offer:

- One-stop search?
- A modern web interface?
- Enriched content?
- Faceted navigation?
- A simple keyword search box with a link to advanced search on start page?
- A simple keyword search box on every page?
- Relevancy ranking of results?
- Spelling suggestions?
- Recommend other similar titles?
- An opportunity for user contributions?
- RSS feeds?
- Integration of social networking sites?
- Persistent links?
- Auto-completion/stemming?
- Support for mobile devices?
- Functional Requirements for Bibliographic Retrieval (FRBR)?

Source: F. William Chickering and Sharon Q. Yang, "Evaluation and Comparison of Discovery Tools: An Update," *Information Technology and Libraries* 33, no. 2 (2014): 12–13, Professional Development Collection, EBSCOhost, http://dx.doi.org/10.6017/ital.v33i2.3471.

*The main problem here is that students, lacking deep content knowledge, are unlikely to choose well even if they know the best criteria to use and are well motivated. Sadly, for the majority of students, neither knowledge of criteria nor motivation to spend time evaluating is a prominent factor in their research.*

Source: William B. Badke, "Expertise and Authority in an Age of Crowdsourcing," in *Not Just Where to Click: Teaching Students How to Think About Information*, Publications in Librarianship no. 68, edited by Troy A. Swanson and Heather Jagman, (Chicago: American Library Association, 2015), 205.

usage data for assessment. With advances in technology, scholars now have access to discovery systems with their increasingly personalized options that facilitate research. Undergraduate searchers who lack expertise have one starting discovery tool that allows them to apply facets to the many results returned to reduce irrelevant hits. Facets may include availability, format, publication year, journal name, database, language, and so on. Although academic libraries are making sizeable investments in updating their search tools, not all librarians enthusiastically support the transition to discovery services. Some librarians have reservations concerning relevancy rankings, evaluation, and authority for reasons that follow.

Academic research continues to challenge students. First, there is the problem of too much information. Although discovery search systems offer limiting features, students tend not to use them. Students turn to trial-and-error keyword searching. According to Asher, "By relying so heavily on simple keyword searches while simultaneously failing to use features to narrow down or refine search results, students were regularly working with an overabundance of search results and potential resources."[6] When searchers are confronted with too many results, they solve this problem via relevancy rankings. Relevancy ranking is problematic, says Asher, who reports undergraduates place too much trust in discovery systems' proprietary algorithms while failing to evaluate sources for themselves. Students' choice of source type is impacted by the search tool they use. The Discovery Tools Project revealed that the biases of the search tools (Google Scholar, Summon, EDS, Library Catalog/Databases, No Tool) influenced the source types students chose—academic journal articles, books, newspapers/magazines/trade journals, for-pay articles, websites, government documents, and other documents.[7]

Because students are hard-pressed to evaluate scholarly sources without "deep content knowledge," they rely on the convenience of relevancy rankings.[8] Typically, students review only the first page of results. Nor do students spend sufficient time and thought working with sources, which presents further problems. According to the Citation Project, three quarters of all student citations involve the first three pages of a source, whatever its length.[9] Obviously, reliance on the introductory source pages skews students' research understanding of academic issues. Instruction in digital literacy as discussed in chapter 1, as well as information literacy, are crucial for student researchers. Both should be added to the course curriculum and set as learning outcomes by collaborating faculty and librarians.

## Databases

Databases represent traditional search systems that involve similar records and often relate to one subject or discipline. They excel at providing a sophisticated search interface that allows users to define their

## Top Five Discovery Systems by One-Stop Searching

Listed Chronologically

- OCLC, WorldCat Local, 2007–
- ProQuest, Summon, 2009–
- EBSCO, EBSCO Discovery Service, 2010–
- Innovative Interfaces Inc., Encore Discovery Solution, 2010–
- Ex Libris, Primo, 2010–

Source: F. William Chickering and Sharon Q. Yang, "Evaluation and Comparison of Discovery Tools: An Update," *Information Technology and Libraries* 33, no. 2 (2014): 27, Professional Development Collection, EBSCOhost, http://dx.doi.org/10.6017/ital.v33i2.3471.

## A discovery service may include:

- library catalog records
- indexes and databases
- open-access content
- institutional repository records
- local digital collections
- library research guides
- library web pages

## Database Vendors

ABC-CLIO
www.abc-clio.com

Alexander Street
http://alexanderstreet.com

Cambridge University Press
www.cambridge.org

EBSCOhost
https://www.ebscohost.com

Elsevier
www.elsevier.com

Engineering Village
www.engineeringvillage.com

Gale Cengage
www.cengage.com

LexisNexis
www.lexisnexis.com/en-us/gateway.page

Oxford University Press
http://global.oup.com/?cc=us

ProQuest
www.proquest.com

Salem Press
www.salempress.com

Thomson Reuters
http://thomsonreuters.com/en.html

Wiley
www.wiley.com/WileyCDA

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information need accurately. A thesaurus of medical subject headings by the National Library of Medicine, used in PubMed, MEDLINE, or CINAHL, or an industry code for products such as the North American Industry Classification System, used in business databases, represent just two advanced features database searchers may employ. Databases are Boolean-based and enable advanced searchers who have thoughtfully defined their information need to locate matching items on a specific topic. This makes databases ideal for serious searchers. Databases may collect articles from journals, magazines, or trade publications; images and videos; government documents; dissertations; or books.

Having acknowledged the strengths of traditional databases, whether they are index and abstract or full-text, librarians are reexamining whether they ought to and can still afford to offer databases, especially when users are satisfied with "good enough." Library budgets are limited, and many libraries cannot afford to duplicate content, nor do they have to, now that web-scale discovery is available. Library administrators are economizing where possible and cancelling database subscriptions where they duplicate content or where usage is low. Discovery systems are disrupting the status quo in scholarly finding tools.

## Search Engines

Millions of searchers rely on free search engines daily. Students turn to the market leader Google when conducting course-related research, according to studies like Project Information Literacy.[10] Professionals and faculty also rely on search engines and online tools. "Search results, news feeds, alerts and email are the way most readers see new content now. In fact, many researchers rarely 'read' entire journals anymore; even the concept of 'read a journal' tends to mean 'read the email TOC'!" says John Sack of HighWire Press.[11] Some researchers think library discovery channels are limited. "It is no longer enough to make sure that content is discoverable through academic channels (such as abstracting and indexing services or library platforms); we also need to consider the implications of discovery through traditional and social media platforms," says Charlie Rapple of Kuduos.[12] Publishers are supplying article metadata to vendors of index and abstract databases, as well as search engine vendors, to index article information at publishers' websites. Publishers are also

## Most Popular Search Engines, August 2015

Alhea
http://us.alhea.com

AOL
http://search.aol.com/aol/webhome

Ask
www.ask.com

Bing
https://www.bing.com

Contenko
www.contenko.com

Dogpile
www.dogpile.com

DuckDuckGo
https://duckduckgo.com

Google
https://www.google.com

Info
www.info.com

InfoSpace
http://infospace.com

MyWebSearch
http://home.mywebsearch.com/index.jhtml

WebCrawler
https://www.webcrawler.com

WolframAlpha
www.wolframalpha.com

Wow
www.wow.com

Yahoo
https://www.yahoo.com

Source: eBizMBA, "The 15 Most Popular Search Engines | August 2015," www.ebizmba.com/articles/search-engines.

## Portals

Digital Public Library of America
http://dp.la

Google Scholar
https://scholar.google.com

Library of Congress
https://www.loc.gov

Multnomah County Library Homework Center
https://multcolib.org/homework-center

Public Library of Science
https://www.plos.org

Social Work Portal
www.socialworkers.org/swportal

USA.gov
https://www.usa.gov

Virtual Religion Index
http://virtualreligion.net/vri/index.html

working with Google Scholar and send Google Scholar information so its search engine locates article PDF links for subscribers and open-access materials.[13]

Independent searchers turn to search engines for quick, convenient access to information. They value the Semantic Web and linked data to an institution's library holdings. "Companies such as Google and Microsoft offer comprehensive search services to users free with advertisements and sponsored links, the only reminder that these are commercial enterprises."[14] Open search systems provide a free alternative to commercial search products that searchers find attractive. Cost-minded library administrators are considering how and where to spend their limited budgets. It is no longer possible to assume that students and faculty will necessarily choose an academic library's expensive and varied finding tools.

## Portals

Portals are gateways to related websites on the Internet and are built by people with subject expertise applying selection standards. Beginning a search at a portal, rather than a search engine that automatically applies algorithms, leads the researcher to quality information faster. If a student needs US federal government information, then going to USA.gov makes sense because this is the official portal for US agencies and departments. If a student wants librarian-vetted websites for homework assignments, he could start at the Multnomah Public Library Homework Center. If a scholar wants notable websites, then Google Scholar, which links to the library holdings of her university library, is a fine choice. There are many discipline-specific portals, such as the Virtual Religion Network for religion websites, the Social Work Portal, or the Public Library of Science for open-access articles in science.

## Notes

1. F. William Chickering and Sharon Q. Yang, "Evaluation and Comparison of Discovery Tools: An Update," *Information Technology and Libraries* 33, no. 2: 5, Professional Development Collection, EBSCOhost, http://ejournals.bc.edu/ojs/index.php/ital/article/view/3471/pdf_1.
2. Jeff Wisniewski, "Beyond the Single Search Box:

Discovery Systems," Control-Shift, *Online Searcher* 38, no. 2 (March/April 2014): 75, CINAHL Plus with Full Text, EBSCOhost.

3. Chickering and Yang, "Evaluation and Comparison of Discovery Tools," 28.

4. Marshall Breeding, *The Future of Library Resource Discovery: A White Paper Commissioned by the NISO Discovery to Delivery D2D Topic Commission* (Baltimore, MD: National Information Standards Organization, February 2015), 15, www.niso.org/apps/group_public/download.php/14487/future_library_resource_discovery.pdf.

5. Tamar Sadeh, "From Search to Discovery," *Bibliothek Forschung Und Praxis* 39, no. 2 (June 2015): 214, Library, Information Science & Technology Abstracts with Full Text, EBSCOhost, http://dx.doi.org/10.1515/bfp-2015-0028.

6. Andrew D. Asher, "Search Epistemology: Teaching Students about Information Discovery," in *Not Just Where to Click: Teaching Students How to Think About Information*, Publications in Librarianship no. 68, edited by Troy A. Swanson and Heather Jagman (Chicago: American Library Association, 2015), 144.

7. Ibid., 147.

8. William B. Badke, "Expertise and Authority in an Age of Crowdsourcing," in *Not Just Where to Click: Teaching Students How to Think About Information*, Publications in Librarianship no. 68, edited by Troy A. Swanson and Heather Jagman (Chicago: American Library Association, 2015), 205.

9. Ibid., 199.

10. University of Washington, Information School, Project Information Literacy, http://projectinfolit.org.

11. John Sack, quoted in "Scholarly Searching," *Research Information* no. 78 (June/July 2015): 30, Risk Management Reference Center, EBSCOhost.

12. Charlie Rapple, quoted in ibid.

13. Laird Barrett, quoted in ibid., 31.

14. Adrian O'Riordan, 2014, "Open Search Environments: The Free Alternative to Commercial Search Services," *Information Technology and Libraries* 33, no. 2 (2014): 45, Professional Development Collection, EBSCOhost, http://dx.doi.org/10.6017/ital.v33i2.4520.