Discovery in 2020: Trends and User Behaviors

William H. Mischo
Michael A. Norman
Mary C. Schlembach
Jason Heldreth
Grainger Engineering Library Information Center
University of Illinois at Urbana-Champaign

w-mischo@Illinois.edu  manorman@Illinois.edu

CNI 2020
May 21, 2020
Library Discovery Remains at a Crossroads

Academic libraries should step back to reconfirm (or reconsider) their vision for discovery, to ensure that their visions connect with information-seeking practices and preferences, and to determine whether they have a viable strategy in place.

- Roger Schonfeld, Ithaka S+R, 2014

Now is the time for a revolution in discovery.

- Catherine Coleman, Stanford Library, 2018

The systems we buy...will require a fundamental re-orientation to the needs of the academic user, and similarly a fundamental re-architecture and re-configuring ....

OhioLINK white paper on Discovery systems, 2020
OhioLINK White Paper

• Earlier presentation at CNI 2020
• “It’s Not What Libraries Hold; It’s Who They Serve”: Roger Schonfeld and Xuemao Yang
• Vision:
  – Every ILS system is centered around the collection of a library; systems must be completely re-architected to center on the user
  – Systems must provide a coordinated mix of local, external, and collaborative services (facilitated collection)
  – Library systems must integrate effectively -- on a service and date layer -- with other research, teaching, and learning systems
  – Library systems must provide modern business intelligence capabilities for individual and consortial libraries
Full Library Discovery

• Coined by Lorcan Dempsey 2013

• Access in relation to Discovery and Discoverability
  Discovery should contain features that move beyond the retrieval of collection materials: includes local information services and content
  Includes library websites, local LibGuide information, subject specialist links, course management system content, etc.

• Goal is to bundle and interconnect related information services
History of Modern Discovery

Over the last 30 years:

– **Supercatalogs** with A&I services loaded

– **Federated search**: broadcast search

– **Web-Scale Discovery Systems** (WSDS) with metadata and full-text content aggregated into a single consolidated index

– Hybrid **bento style systems** with information result displays presented in a zoned or partitioned screen display with content grouped by type/material
Web-Scale Discovery Systems

• Rich literature on WSDS; Bibliography by Francois Renaville (Liege)

• WSDS Issues:
  – Confusion with blended results displays
  – relevancy rankings burying known-items
  – inadequate access to local library services
  – Need to better address known-item searching
  – Need to expedite access to full-text
Bento Advantages

• Partitions results by material type / format
• Addresses WSDS issues: blended results, relevancy ranking problems, known-item access
• Full library discovery features; inside out & local information services and content
  – Library websites, pathfinder information, local services, subject specialist links, CMS content
• One click links to full-text or to publisher presentation pages (bypass link resolver)
Search for materials discovery and machine learning
2: Tensile property prediction by feature engineering guided machine learning in reduced activation ferritic/martensitic steels.

Wang, Chenchong; Shen, Chunchang; Cui, Qing; Zhang, Chi; Xu, Wei.


Academic Search Ultimate, Academic Journal

Get FullText | ScienceDirect Link | PDF Link | Issue Table of Contents

Dataset: Dataset-2

3: Properties-to-microstructure-to-processing Inverse Analysis for Steels via Machine Learning

Toshio Ogawa; Yoshitaka Adachi; Zhi-Lei Wang.

ISIJ International, 2019, 59(9):1691 vol: 59, issue 9, 2019, pp. 1691-

J-STAGE, Academic Journal

Get FullText | EDS – J-STAGE | EDS – J-STAGE | Issue Table of Contents

Open Access

4: Property prediction and properties-to-microstructure inverse analysis of steels by a machine-learning approach.

Wang, Zhi-Lei; Adachi, Yoshitaka.


Academic Search Ultimate, Academic Journal

Get FullText | ScienceDirect Link | PDF Link | Issue Table of Contents

5: Prediction of mechanical properties of concrete incorporating quarry dust, silica fume, steel or polypropylene fibres using relevance vector machine.

Karathik, M.; Sobhramanian, K.


Academic Search Ultimate, Academic Journal

Look for FullText

American Society of Civil Engineers c2011

3: CONCRETE 10: Mechanics and Physics of Creep, Shrinkage, and Durability of Concrete and Concrete Structures (E-book)

Status: (E-book) ASCE Library – Full text online 2015


Status: (E-book) ASCE Library – Full text online 2010

5: Engineering, construction, and operations in challenging environments: proceedings of Ninth Bienia... (E-book)

Status: (E-book) ASCE Library – Full text online 2009

6: Computing in civil and building engineering: proceedings of the 2014 International Conference on Co... (E-book)

Status: (E-book) ASCE Library – Full text online 2014

7: Geo-Congress 2014 technical papers: geo-characterization and modeling for sustainability: proceedings (E-book)

Status: (E-book) ASCE Library – Full text online 2014

8: International Conference on Transportation Engineering 2007: proceedings of the First International... (E-book)

Status: (E-book) ASCE Library – Full text online 2007

9: Materials and joints in timber structures: recent developments of technology (E-book)

Status: (E-book) ASCE Library – Full text online 2007

Additional resources

IDEALS Dissertations and Theses
WorldCat Discovery
Google Scholar Results
Easy Search 'Classic'

Other Resources

Title Word Matches (CrossRef) 1226821 Article Matches
WorldCat Discovery 31 Article Matches
I-Share Statewide Catalog 9 Article Matches

3: CONCRETE 10: Mechanics and Physics of Creep, Shrinkage, and Durability of Concrete and Concrete Structures (E-book)

Status: (E-book) ASCE Library – Full text online 2015

The accurate prediction of tensile properties has great importance for the service life assessment and alloy design of FASM steels, in order to overcome the limitation of traditional physical metallurgical models, a machine learning algorithm was used to establish universal models for the prediction of FASM steels’ yield strength and total elongation.

1: Tensile property prediction by feature engineering guided machine learning...


2: Design of Comprehensive Mechanical Properties by machine...


In order to make reasonable design for the improvement of comprehensive...
Illinois Bento Box Discovery Model

Search:

Suggestions:
- Direct link to (search term)
- Look at the Journals or databases that match this search.
- DOI direct link
- Limit this search to title words
- Libguides Link
- Research Starters (EBSCO) Link
- Ask a Librarian online chat link

Articles (EBSCO EDS API)
- 10 Results
- See all matches
- 46 EBSCO EDS Targets
- EBSCO PDF links, DOI, Publisher, Catalog, Scopus links
- Altmetric Attention Badges – Scholix dataset links – UnPaywall open links - Browzine PDF and Issue TOC

Library Catalog (VuFind)
- 10 Results
- See all matches
- Direct links to full-text

Second Center Display Area for Resources
- 5-10 Results
- See all matches
- Direct links to full-text

Subject Suggestions
- Two Subject Disciplinary Database matches & links to completed search
- Relevant Departmental Library Librarian contact
- General Searches

Bing Web Search Results
- 5 matches
- Filtered Results: Technical Reports, Library Web Pages
- URL’s proxied when possible

Additional Articles: Scopus is default but also selected EBSCO targets or Engineering Village, IEEE
- 5 Results
- See all matches
- DOI links
- Altmetric Attention Badges – Scholix dataset links – UnPaywall open links - Browzine PDF and Issue TOC

Advertise Library Service
Click image
Illinois Bento features

• Context-specific and adaptive search assistance
  – Spelling suggestions, Libguide links, direct links for frequent searches, limit suggestions, DOI identification, online chat link, journal title links
• Direct link to PDF when available
• DOI, publisher, OpenURL, custom value-added links
• Relevant subject disciplinary A&I links that open at point of completed search
• Librarian and departmental library subject contacts
Illinois Value Added Features over Article APIs

- Augmenting EBSCO and Scopus API results asynchronously (via the article DOIs from the APIs):
  - Clickable Altmetric Badges giving attention scores
  - Scholix derived dataset and article data links
  - UnPaywall open access links showing OA articles
  - Browzine PDF links and issue TOC links

Also search assistance links, DOI detection links, Bing API links, Subject A&I completed search results, librarian contact links
Bento Libraries

Bento Features

- Monitoring 42 academic libraries with bento instances
  - 10 libraries have dropped bento, 7 are Primo installations
  - All have Books and Articles areas
  - WSDS for articles: 21 Summon, 10 Primo, 10 EBSCO EDS

- Website search = 34
- Library/research guides = 24
- Journal titles = 20
- Databases = 23
- Digital collections = 12
- Manuscripts/Archives = 9
- Dissertations/Theses = 3
- Institutional Repository = 3
- Course Reserves = 3
- FAQ = 6
- Contacts = 18
Bento Observations

- Feature sets vary; many bento versions do not do spell checking and do not provide top-level direct links to full-text
- Only three employ the one-click to full-text w/o going through local link resolver
- OPAC may be separate application: VuFind, Blacklight
- Have local control and customization
- But, requires programming/server staff and maintenance ... API processing
- Need for catalog item availability and direct links to ebooks
Easy Search Custom Transaction Logs

Instrumented to record user actions, system suggestions, search reformulations, and clickthroughs

• Identify search sessions
• Collected 11 years of logs: 16.5 million searches and 15.8 million clickthroughs
• Latest study: May 2017 – April 2018: 2.75 million actions, 1.51 million searches, incl 1.1 million in bento system
• Sample of 5,400 searches analyzed for type of search (known-item vs. Exploratory), success rate, user behaviors
Transaction Log Study 2018

• **Average words per query = 6.1** - up from 5.6, 5.1, 4.1, 3.8 in previous analyses)
  - 9.1% are one word, 44.9% are 3 or less, 28.7% are 7 or more, 20.5% are 9 words or more
  - Copy and paste searching

• 2.07 searches per session. 60% of sessions are one search

• In 21.8% of searches, a search suggestion was offered; the suggestion was clicked 28.1% of the time. Most popular: “did you mean” spelling suggestions and the Direct Suggestion links
Transaction Log Study 2018

• DOI searches (76 searches per day) and growing

• In the sample of 5,400 searches:
  • **Known-item searches = 64.7%**, up from 56% in 2014-2015 study. Includes title word, author/title, full citation
  • 1.5% of the searches were known citation searches. That extrapolates to 45 per day
<table>
<thead>
<tr>
<th>User Clickthroughs by Category</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Article links</td>
<td>57.1%</td>
</tr>
<tr>
<td>OPACs (VuFind and I-Share)</td>
<td>34.4%</td>
</tr>
<tr>
<td>Suggestions</td>
<td>5.85%</td>
</tr>
<tr>
<td>Added Links</td>
<td>2.3%</td>
</tr>
<tr>
<td>Subject DB Links</td>
<td>0.33%</td>
</tr>
<tr>
<td>Library links or contacts</td>
<td>0.114%</td>
</tr>
</tbody>
</table>
Clickthrough Actions

• April 2020: 141,784 searches, 3770 clicks per day
• Full Text clicks: 1600 per day, 41.7% of all clicks
• Browzine - PDF: 224 per day, TOC: 5 per day
• Bing - 102 clicks per day
• “Did You Mean” spelling suggestion - 54.7 per day
• Unpaywall - 20 per day – increasing since remote teaching
• Direct Link Suggestions – 20 per day
• AtoZ Journal list - 19.3 per day
• Dataset (Scholix) - 6.2 per day
• Ask a Librarian - 4.3 per day
• Email a Subject Librarian – 1.9 per day
• Clicking an Ad - 1.8 per day
2019 Easy Search User Survey

- November 2019, IRB approved: user name, e-mail address, major or department, status (undergrad, grad, faculty, staff), types of materials they were looking for, their frequency of use of Easy Search, and open-ended comments
- 483 responses with 230 users providing comments
- 24% of the respondents were daily users of Easy Search and 81% were daily or weekly users
- High level of satisfaction
- Delivery of full-text is paramount; concerns were about journal holdings, full-text links, known item search results
Challenges in Discovery

Questions:

– Should libraries be the starting point for users seeking scholarly content? ITHAKA S+R survey question: How important is the Gateway function?

– Have library systems always played a supplementary role in topical search/exploration?

– Should the library focus be on aiding known-item discovery and effective content delivery?
Next Steps

• Augment displayed records (asynchronously via APIs):
  – Additional OA records from GS, Open Access Button, etc.
  – Add Impact Factor, Eigenvalue, CiteScore evaluative data
  – Add citing information

• Mega-Index and Specialty Discovery Usage

• Machine Learning, AI techniques

• Integration of complementary digital services
  – Linked Open Data
  – Data management services
  – Publication metrics & visualizations
  – Course management content
  – Faculty profile system analytics
In June 2020, the University of Illinois Library will be migrating to Ex Libris’s Alma and Primo VE systems.

New deployment model that combines the backend processes of both Alma and Primo VE into one integrated platform.

The Library’s transition to the new system is in concert with all 91 I-Share libraries in the Consortium of Academic Research Libraries in Illinois (CARLI)
What kind of a systems are Alma and Primo VE

- Alma is a unified resource management system that allows libraries the ability to manage their print and electronic resources and services in a single environment.
- For an electronic title, Alma creates electronic inventory (portfolios) that permeates Alma and associates the electronic access in Primo for all instances it can match.
- Alma has a Network Zone that takes over the function of the union catalog.
Network Zone in Alma and Primo VE

- The Network Zone in Alma is built using a first-in premise. That is, the first copy of a record that gets added becomes the “master” record for the consortium.
- This master record is a shared bibliographic record that will be linked to your local records in your Institution Zone.
- Much of our local data was not migrated over from Voyager to the master record in the Network Zone.
- We are currently doing lots of customization to re-introduced our local information.
- Localized URLs to electronic resources populate this shared Master Record. This is problematic for University of Illinois users wanting to navigate to full-text content. Also, major issue for linking in Easy Search.
Easy Search Bento to remain as the Library’s Primary Discovery source

- Easy Search Bento will remain the Library’s primary and default discovery service available as the single search box on the Library’s Web Page.
- Primo will replace VuFind as the catalog search.
- We are testing utilizing certain features of the Primo Central Index including creating a separate Newspaper Primo Search.
- Continued benefits of separate Bento zones for the various areas of search results for articles, books, subject-based results, and Bing academic web results.
Easy Search the Default Library’s Discovery Layer

https://www.library.illinois.edu/
Easy Search Bento with Primo Catalog Results

Search Keywords: stone circles astronomy

Suggestions:
- Need additional assistance? Ask a Librarian

Articles – 111 Results

1. STONE CIRCLES
   Morris O'Sullivan; Liam Downey.
   *Archaeology Ireland* vol. 25, Issue 1, 2011, pp. 17–
   JSTOR Journals, Academic Journal
   Get Fulltext JSTOR Link
   Open Access

2. Some Stone Circles in Ireland
   A. L. Evans.
   JSTOR Journals, Academic Journal
   Get Fulltext JSTOR Link
   Open Access

   J. Süsser, Ulrich.
   *Archaeological eJournals* vol. 8, Issue 4, 2006, pp. 20-26
   Art & Architecture Source, Periodicals
   Get PDF HTML Full Text JSTOR Link

4. ARCHAEOLOGICAL ALIGNMENTS—STONE ROWS
   Morris O'Sullivan; Liam Downey.
   *Archaeology Ireland* vol. 25, Issue 2, 2011, pp. 32–
   JSTOR Journals, Academic Journal
   Look for Fulltext

   Morty, Liz.
   *PMI: Papers from the Institute of Archaeology* vol. 24, 2014, pp. 1-14
   Art & Architecture Source, Academic Journal
   Get PDF

6. The Sun, the Moon, and Megaliths: Archaeo-Astronomy and the Standing Stones of Northern Ireland
   Anthony Birt.
   *Literary Journal of Archaeology* vol. 50, 1987, pp. 7–
   Get Fulltext

Primo – 7 Results

1. The stones and the stars: building Scotland’s newest megalith
   Larner, Duncan. 1946–
   Springer 2013
   Springerlink – Full text online

2. Stone circle Athlone: the stones of time
   O’Cleary, Helen.
   A.H. Morrison 1930

3. Great stone circles: fables, fictions, facts
   Birl, Aubrey.
   Yale University Press 1999

4. Standing place
   Available Online
   Today, Ark, filmmaker.
   University of Manchester, Granada Centre for Visual Anthropology 2007
   Alexander Street Press – Online access

5. Echoes of the ancient skies: the astronomy of lost civilizations
   Kraig, E. C. (Edwin C.), 1944–
   Harper & Row 1982

6. The megalithic odyssey: a search for the master builders of the Iberian Moor astronomical complexes of stone circles and giant cairns
   👑Brench, C. A. E.
   Turnstone Press 1982

7. Magic and medieval society
   Leventha-Mathers, Anna. 1953–
   author.
   Routledge 2014

Subject Suggestions

History and Auxiliary Sciences
- Historical Abstracts
- America: History and Life

More resources
- History, Philosophy, and Newspaper Library
- Contact Librarian
- Celestina Savonius-Wroth

Other Resources
- Title Word Matches (CrossRef) 247537 Article Matches
- WorldCat Discovery 64 Article Matches
- I-Share Statewide Catalog 19 Article Matches

Additional resources
- IDEALS Dissertations and Theses
- WorldCat Discovery
- Google Scholar Results
- Easy Search "Classic"
Possibilities - Easy Search Bento for Primo Newspaper Articles
API Issues

- We are currently using the Primo Search API to pull in results from the Primo Library Catalog into Easy Search Bento.
- We are very pleased with how quickly results come in from VuFind. It averages 1-2 seconds response time.
- With the Primo Search API, we are encountering some slowness in performance. It is averaging about 10-11 seconds per search. Many comments from testers about slowness.
- API performance with Primo Catalog needs to be optimized and improved to gain full benefits of discovery in Easy Search Bento.