

XC User Research Preliminary Report

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Introduction

This report summarizes the objectives, methods, and major software design findings from the data collected in the user research portion of the eXtensible Catalog (XC) project. A full analysis and interpretation of the data is not included here and will be provided at the conclusion of the project. This report includes edited results from the brainstorming sessions and a list of the features that emerged from the analysis of those results. (See the eXtensible Catalog website at www.eXtensibleCatalog.org for more information about the overall project.)

Objectives

The eXtensible Catalog (XC) is a set of open-source applications that provide easy access to all resources across a variety of databases, metadata schemas and standards. Once completed, XC will enable libraries to reveal an enormous range of digital and physical content through their content management, learning management, and other systems. XC will also make library collections more web-accessible by revealing them through web search engines.

XC is our attempt to address a large number of long-standing, known user problems by working around proprietary black-box software platforms and reaping greater benefits from existing metadata.

We already had a wealth of information about problems with current OPACs. We have conducted usability tests for years, as have teams at other libraries, and our knowledge in this area is extensive. When we polled 68 representative libraries, we confirmed that the top frustrations with OPACs were:

- Difficulty of customization
- Inadequacy of search functions
- Opacity of results and lack of grouping or faceting
- Limitations of the user interface
- Lack of Web 2.0 functionality
- Backend problems
- Lack of integration with databases or other systems

There were also multiple complaints about:

- Difficulty in accessing various kinds of data
- Difficulty finding journals and the articles in them



- Lack of an application programming interface (API)
- Usability problems

In the same survey, we polled respondents on the features they would most want to see in an imagined alternative, open-source user interface that would solve most of their OPAC problems and that would work alongside their existing integrated library system (ILS). The two most popular features were:

- Ability to work alongside the respondents' existing library systems to provide new features to end users
- Faceted search interface

Other popular features were:

- Integrated user interface that searches across digital and non-digital resources simultaneously
- Google-like search box with no need to select an index
- "Did you mean..." spelling correction

Many respondents were also interested in seeing:

- Flexible ways to view search results, including relevance, popularity, or availability
- A search system that produces better results for simple keyword searches

[Note: See http://www.extensiblecatalog.org/files/XC_survey_report.pdf for the survey report.]

Thus we felt that we already knew what we had to do to make a more usable and helpful interface for non-expert users of the library. Based on these understandings, we proceeded to design the XC system and began coding the basic software components.

However, we still wanted to go a step farther by asking how our new system could do more than fix *known* problems. We wanted to provide features that would answer existing but not yet identified user needs, which required additional research on the work practices of our faculty members, undergraduates, and graduate students. We were most interested in researchers who are heavy users of library resources and we wanted to build a system to support both the casual and the expert user. Therefore, we conducted a study of serious, productive student and faculty researchers in four universities to learn how they find out about and acquire their digital, traditional, and other research materials from traditional library sources and other physical and digital collections, such as archives, museums and special collections.



Methods

We created user research teams at Cornell, Ohio State, Rochester, and Yale. Each team was directed by the project's anthropologist and included approximately six to eight people, mostly reference librarians and catalogers. An expanded team at the University of Rochester also included the project's lead computer scientist and its metadata specialist, a graphic designer, several programmers, and the XC project manager.

The four user research teams conducted approximately twenty interviews at each of the participating universities. The interview questions (see Appendix) were nearly identical at each institution, with minor variations only in the ways we referred to local libraries and technologies. In brief, we asked about:

- The most recent articles, books or other resources the researchers used for a current project
- How they knew the item existed
- How they obtained it
- How they used it
- How they keep current in their fields

In addition, we asked a few questions about archives and special collections, and librarians and the card catalog. We asked participants to conduct a fresh, on-camera search for a desired resource; we also encouraged people to imagine what they would do if they had a magic wand to help them complete their current project.

We approached the analysis and interpretation of the data in two ways: a team-based analysis and an analysis and interpretation conducted separately by the project anthropologist. (The results of the team-based analysis appear below.)

For the team-based analysis, we worked with the data in our university teams and then in the enhanced Rochester team. First, we conducted activities at each institution so that team members could immerse themselves in the data and start organizing it into manageable chunks. Our main activities were viewing video-recorded interviews and discussing them and carefully reading assigned transcripts and "coding" them with colored pens and Post-Its. Then, we held two days of brainstorming and interpretive sessions at each site, using data from the coded transcripts to identify such things as what researchers were managing to do, where they were getting stuck, how they were finding resources and keeping up, and what tools we would give them if we did not have to worry about time, money and the laws of nature.

The results of these site-based sessions were then brought to the enhanced Rochester team, augmented with the leaders of the Cornell and Ohio State teams. This group conducted additional sessions using the partially analyzed data. These sessions produced a list of features for XC that responded directly to the needs we captured in the interviews.



As of this writing, we are taking the features from this list, and from our longstanding issues list (generated out of the change request system for our library website combined with usability data), and adding them to the XC use case documents for inclusion in the software.

A separate report by the project anthropologist will be forthcoming at the conclusion of the project.

Findings: Brainstorming Results

We conducted two days of “brainstorming the brainstorming” sessions in which we worked from the accumulated results of the site-based brainstorming sessions. All of this brainstorming was focused on three objectives:

- Describing the practices of researchers around gathering resources
- Identifying the problems and obstacles connected with these practices
- Developing feature ideas for XC that would address these problems and obstacles

Accordingly, our sessions revolved around the details of what our researchers can and cannot do. We did not seek to establish what our researchers habitually do, since that would have required long periods of observation that were not possible in this project. Instead, we created snapshots of what our researchers did in one, admittedly artificial moment. From a multitude of these moments, across researchers and institutions, we have developed lists of our researchers’ activities and needs, as follows.

1. Things our researchers do with more or less success

Read and stay current

- Read a lot
- Buy books (even hard to find ones)
- Print articles
- Create personal libraries of books and articles
- Stay current in their fields
- Read journals in their field
- Browse book catalogs
- Review other’s manuscripts
- Collect everything that has to do with anything even remotely connected to their research

Find books and articles to read

- Find the books and articles that they need
- Find primary sources even under difficult conditions
- Realize that there may be really good uncatalogued resources in a collection
- Use the online catalog



- Use databases
- Winnow down long hit lists to the best stuff
- Use Google and other search engines
- Use Amazon and other sites
- Use table of contents alerts and other notifications
- Know their librarian subject specialists and consult with them
- Come across things serendipitously
- Develop personal and professional networks and use them to find things out
- Recommend books and articles to colleagues
- Browse the stacks and periodicals
- Trace citations forward using the Web of Science

Use a variety of media and sources

- Use the public library
- Use microforms
- Use more than one computer in more than one location
- Use other libraries, archives, and collections
- Obtain resources through Interlibrary Loan

Annotate and organize their resources so they can find things later

- Annotate, highlight, and take notes on articles and books
- Organize materials to find later
- Manage citations
- Mine bibliographies
- Know the experts in their field
- Correspond with colleagues, and collaborate with them
- Participate in professional societies
- Attend conferences
- Use multiple ways of classifying and finding things (books, bees, chemical structures)
- Find stuff in their own offices
- Re-find lost information
- Use “workarounds,” e.g. Gmail to file, sort, and search saved articles

Do research

- Develop research questions
- Get grants
- Go to field sites (Arizona, Japan)
- Work with people in other departments and institutions



Teach

- Teach
- Use Blackboard
- Find or create good images
- Serve on doctoral committees

Present and publish their work

- Present their research
- Publish books and articles

II. Things that stump or slow down our researchers

Information overload

- Can't deal with so much information
- Can't keep up in their fields when there is too much out there
- Can't read all of the articles they think they should read

Personal technology

- Have to learn a new computer every few years
- Can't find tools that integrate well together (e.g. Nota Bene, Word, PDF)
- Can't learn everything that existing technology can do

Research

- Don't see how their research extends into other fields
- Don't feel confident that they have a new idea
- Have trouble keeping a lot of undocumented knowledge in their heads
- Having trouble keeping track of bibliographies

Working in the physical world

- Not supposed to annotate library books
- Hard to browse online, not enough time to browse in stacks
- Trouble with physical organization of library
- Not finding enough time to talk to people face to face

Getting access to resources

- OPAC shortcomings, including terminology, spelling, subject headings that are hard to use
- Don't understand that you aren't searching the journal literature when you do a Voyager search
- Don't know whether they have found everything relevant



- Can't get everything they want online
- Have trouble finding obscure sources
- Only know one or two databases and have to deal with changes to interfaces
- Don't understand databases – what they cover, how to use them most effectively, that journal coverage has moving walls
- Have trouble using library content from off-campus
- Don't know that certain databases are available all the way back in time
- Often have to travel because they can't get access locally
- Have trouble finding words from other languages, especially character-based, from other scripts, or using diacritics
- Have trouble selecting an author from a search list when there are several forms of the author's name
- Don't understand variations in titles for the same item in catalog
- Have trouble using library content from off-campus
- Don't realize that the library subscribes to something that it didn't subscribe to a few years ago
- Can't reconstruct a search they did as recently as yesterday
- Feel that they are not finding the things that are there to be found
- Don't understand library tools in general
- Don't know they can turn on local links in Google scholar to get full text
- Don't know the best subject headings for topic
- Haven't had a satisfactory experience with microform
- Give up too easily on getting things they need from the library

III. Faculty members use elaborate but arbitrary systems for annotating, organizing, filing, and retrieving their resources

- They use colored pens and markers, Post-Its, symbols, and folders, and they organize materials by classes, projects, semesters, and so on
- They are individual and quirky, realizing that no one else has to understand their organizational scheme
- They master their personal collections, relying on mnemonics and their growing mastery of their fields to manage these collections

The value of seeing and understanding native organizational schemes is that they give us an insight into the types of tagging that might be valuable in XC.

IV. Faculty members keep up in their fields - and students begin to learn their fields - as well as they can through a variety of activities

- Attending conferences (including book displays)
- Attending departmental seminars and invited talks
- Giving talks and getting feedback



- Subscribing to listservs, table-of-contents alerts, and other “pushed” notifications
- Reading journals, including articles, book reviews, and other matter
- Reading university press catalogs, book ads
- Conversing and corresponding with colleagues
- Browsing stacks, new book shelves, periodicals
- Visiting selected websites, including online journals
- Looking at others’ bibliographies and footnotes
- Editing journals, reviewing submitted articles
- Editing book series, reviewing book manuscripts
- Participating in journal clubs
- Reading book reviews
- Reading the new books and articles they assign to their students
- Buying books and magazines
- Consulting with library staff
- Browsing handbooks
- Browsing the shelves in their colleagues homes and offices

V. Researchers rely on many different kinds of information in deciding whether items on results lists are worth pursuing, including:

- Date of publication
- Period covered by work
- Journal “tier”
- Title of item
- Author
- Abstract
- Footnotes
- How much the article is cited
- Language

VI. Team members generated a long list of additional metadata that they feel would benefit users of XC, including:

- User-supplied notes on the item’s usefulness
- Table of contents
- Bibliography
- Different or better versions of the work
- Indicators of quality and substance
- Identity of the author
- Additional information about the author
- Subject headings, both “official” and “folksonomy”
- Tags, possibly using controlled vocabulary
- Metadata about electronic theses and dissertations



- Physical descriptions of books
- Information about special qualities of the library's copy
- Genre
- Whether item exists in digital form and how to get it
- Historical period (make it easier)
- "Recommended by faculty" or "recommended by colleague in field"
- Related works
- Connections to a film that may have been made of a book
- User-generated FRBR-ization
- More information about provenance

VII. Team members conducted a number of activities in which they brainstormed what they thought researchers would wish with a magic wand, including:

- Do the grunt work and give me more time to think
- Make my materials accessible in a departmental reading room
- Let me browse the shelves on my computer screen
- Keep track of all my articles and papers
- Give me access to all rare materials from my desk
- Assure me that no one else is doing a similar project
- Give me better capabilities but no more changes in any interface
- Write my article/dissertation/book
- Tell me how complete my search is
- Find a needle in a haystack
- Give me the 20-40 articles that are most important
- Give me articles that jog new ideas
- Make sure that all the books are on the shelves where they're supposed to be
- Let me enter whatever bits and pieces I know about a resource, and narrow down my search for me or make suggestions
- Translate work from any language
- Give me the "Rosetta Stone" or "perfect" resource for my research
- Let me travel through time and space to see "history" for myself
- If it's already digital, never make me type it again
- Give me time to think without email or hordes of demands assailing me
- Make all databases and other online sources searchable in exactly the same way
- Digitize all collections and make them easily available online
- Find all information in both academic and popular media about the subject I'm researching
- Let me immediately see the source when I click the footnote
- Tell me why forgotten objects, discourses, or studies were forgotten or dismissed
- Have citation information from all online catalogs in one easy program
- Make other people's notes in library books disappear



- Help me find things in the library
- Make the OPAC search within journals
- Open up all archives
- Make Library of Congress subject headings make sense to me
- Provide a searchable table of contents for all books
- Include all books in the library in the OPAC
- Index all journals online
- Provide comprehensive guides to all archives
- Make sure that all titles actually reveal what the book or article is about
- Recall the book I need instantly
- Book recalled instantly
- Subscribe to all print journals
- If I find an article I like, file it immediately and capture the citation
- Eliminate all copyright laws, rules, and regulations
- Send me TOC alerts with exactly the articles I want to see
- If I make a mistake in a search and nothing is retrieved, give me options
- Tell me everyone who's researching something related to my idea
- Let me search images easily and instantly
- Give me exactly the links I need on the library homepage
- Give me a mega digital workspace that I can manipulate as if it were paper
- Let me easily find out what the experts in the field are reading
- Make the library acquire what I need very quickly
- Capture all the copy specific information of every book
- Help me write my grant proposals
- Make all computers and networks speedy and 100 percent reliable

Features

After we had gathered information, analyzed it, and worked through the analyzed information across sites, we devoted two intensive sessions to the generation of lists of features that answered the user needs we had extracted from the data. Our features fell into several categories. The first is features that we had **already planned** to include either because they were known issues or because they were obvious; these features were also deemed entirely feasible. The second category is features that are directly related to **user-supplied metadata**. The third category includes a variety of features that respond directly to the user needs we identified in the research but that are not clearly feasible and **require more research**.

Already Planned Features and Facets

- Help link
- Ask a librarian
- Availability of the item
- Did you mean...?



- Authority control
- Call number browse (backwards and forwards)
- Book covers
- Book reviews
- Ability to customize the fields in the results list
- Sort options (author, topic, and so on)
- Faceted browsing
 - Publisher
 - Journal
 - Item length
 - Date of publication
 - Historical period
 - Keywords
 - Paper vs. electronic and limit to electronic resources
 - Versions of the work

User-supplied Metadata Features

- Tag item for own use, e.g. related to my project, related to my class
- When tagging for own use, allow for hierarchy
- Importance, relevance, usefulness, and other user ratings
- Recommended by...
- Annotation of specific item owned by library
- People who searched for this also searched for...
- Comment on content

Features that Require More Research

- Indicate instantly available resources
- Provide citation management software through the OPAC
- Generate a list of author's recent publications
- Allow user to browse journals
- Generate a network of related authors
- Provide alerts (newly published or newly acquired)
- Link the authority record to social networking or other personal sites
- Give "popularity" statistics (circulation or download)
- Provide ETD abstracts
- Develop a cross-institutional tag thesaurus or folksonomy-to-official terminology concordance
- Develop an item-to-course concordance



Appendix

Interview Questions

Introduction

1. I understand that you work in the field of... What is your current project? [Limit this discussion to five minutes.]
2. Do you use books and articles in your research? What else do you use? [Prompt for original manuscripts, archival materials, museum objects]

Recent Search Pt. 1

1. What is the last article or book or other resource you used for this project?
2. Can you show me this item? (Note physical or virtual, brief description, how stored, markup)
3. How did you know this item existed? How did you find out about it? (Prompt for personal contact, catalog, OPAC, or database, other)
4. How did you obtain it? (Prompt for librarian, ILL or other help, technology used)
5. How did you use it?
6. Have you shared this resource with anyone else? (Prompt for who and how)

Current Searches

1. Are you currently looking for any resources? What are you looking for? How do you know about it?
2. Would you be willing to set to work on getting this item as I watch and videotape you? (Narrate what the person is doing/prompt the person to narrate)

Recent Search Pt. 2

1. What was the previous article or book or other resource you used for this project?
2. Can you show me this item? (Note physical or virtual, brief description, how stored, markup)
3. How did you know this item existed? How did you find out about it? (Prompt for personal contact, catalog, OPAC, or database, other)
4. How did you obtain it? (Prompt for librarian, ILL or other help, technology used)
5. How did you use it?
6. Have you shared this resource with anyone else? (Prompt for who and how)

Keeping current

1. Do you receive Table of Contents alerts? If so, what do you do the last time you received one?
2. Do you go to the print periodicals area and browse through journals? If so, when did you



do this last? What journals did you browse?

3. How do you keep up in your field? (Prompt for conferences, journals, online resources, online networking, personal contacts, web searching, TOC alerts)

Searching for known items

1. Try to remember the last time you had a particular item in mind – a particular book or article – that you needed. What was that particular item? How did you get it? (Prompt for tools or people that helped, physical or digital resource)

Searching for unknown items

1. [Direct the person to the OPAC search box] What do you call this? When you type something into this box, what are you searching through? When was the last time you searched the [use their word] using keywords?
2. Do you use anything like [names of locally accessible databases]? What do you call those things? Which [use their word] did you use last? Can you show me? How did you use this [use their word] the last time? Have you ever typed keywords into the search field?

Searching for Primary Sources

1. In your current research, what primary sources have been the most use to you?
2. **[For scientists only, use this question; for others, skip to question 3]** Do you have concerns about using online or microfilm versions of journals? **[For scientists, skip to next section]**
3. How did you discover these primary sources (online catalog, web, word of mouth, footnotes, librarian)?
4. Are there tools or resources that you found particularly valuable in the discovery process? What made them so valuable?
5. How have you used primary sources in this project: in person or online or on microfilm?
6. Have you ever used manuscripts, papers, photographs, works of art, or books solely in digital format? If so, how would you compare that to using the physical objects?

Using resources in teaching

1. How do you use library resources in your courses?
2. Do you use [name of course management system]? If so, how do you use library resources in connection with [course management system]?
3. If you could do anything to change or improve [course management system], what would you do?

Card and other catalogs

1. Did you ever use a card catalog? [If no, go to next question.] Do you miss the card catalog? If yes, what do you miss about it? Do you think that the online catalog is better in any way? If so, how?
2. Have you ever used an online catalog at another college or university that you liked



better? What did you like about it?

Librarians

1. When is the last time you actually talked to someone in the library? What happened?

Magic Wand

1. If I gave you a magic wand to help you in your current research project, what would you do with it? [Prompt, if necessary, by saying, "Would you just wave it and your book or article would be done?"]

Using resources to explore interests (undergrads only)

1. What do you plan to do with your degree in [major]?
2. Do you ever look for information related to this? [We are asking about how they get information about the particular things that are interesting to them.] When was the last time? What did you look for? Can you show me what you did?
3. Do you use any online tool for finding stuff? [Prompt: It might be for finding a certain movie, recording, video, or something you want to buy.] What is the tool? [Prompt for enough information so we can find it] What do you like about that finding tool?

