

## User Research and Testing of FRBR-Based Online Library Catalogs

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### Presentation Outline

- Problem statement
- Problem significance
- Research objectives
- Methodology
- Findings
- Conclusions and future work

## Problem Statement

- The FRBR model offers opportunities for creating retrieval systems that better support user information seeking.
- There has been a lack of user studies of library catalogs with FRBR features.
- Current FRBR development efforts largely reflect the viewpoints of researchers, developers, and librarians **for** users, rather than those of users themselves.

## Problem Significance

- Gain a better understanding of user needs and tasks when using library catalogs.
- Fill the gap in research of public library users.
- Inform changes for future cataloging standards, library practice, and system development to better support user information seeking.
- Address concerns raised in the recently released final report by the Library of Congress Working Group on the Future of Bibliographic Control that calls for more FRBR-related testing.

## Research Objectives

The major focus of this study is to gain an understanding of users' experience with FRBR-based online library catalogs and evaluate current FRBR implementations.

Specifically, the following questions are explored:

- Do FRBR prototype systems support user tasks defined by the FRBR model?
- Do FRBR prototype systems support user tasks better than regular OPACs?
- What functions do users find helpful when searching FRBR prototype systems?
- What factors contribute to differences in user performance when using FRBR prototype systems?
- How could existing FRBR prototype systems better facilitate user information seeking?

## Methodology (1): *FRBR-Based Catalogs*

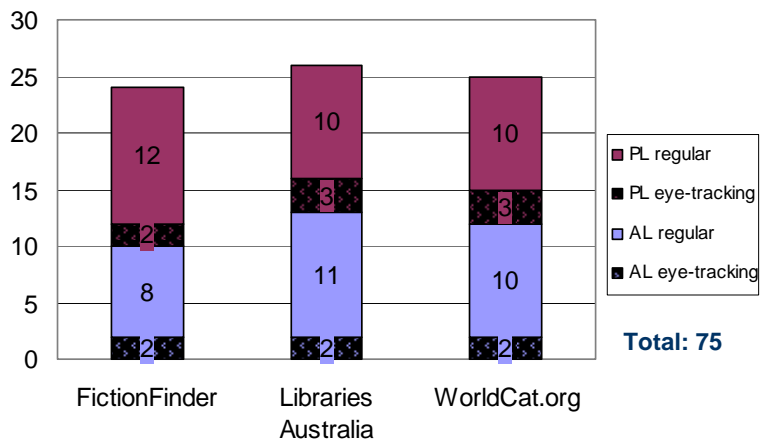
- OCLC FictionFinder  
(<http://fictionfinder.oclc.org/>)
- WorldCat.org  
(<http://www.worldcat.org/>)
- Libraries Australia  
(<http://librariesaustralia.nla.gov.au/apps/kss> with its FRBR prototype demonstration system available at <http://li01.nla.gov.au/>)

## Methodology (2): *Data Collection*

User and system interactions were gathered through a multi-method approach, including:

- Screen captures
- Eye-tracking
- Think-aloud protocols
- Survey interviews
- Focus groups
  - academic library users (hereinafter AL)
  - public library users (hereinafter PL)

## Methodology (3): *Participants*



## Methodology (4): *Tasks*

- Search tasks are designed around the following general user task categories as defined by FRBR:
  - a) to **find** materials corresponding to the user's stated search criteria;
  - b) to **identify** an entity;
  - c) to **select** an entity appropriate to the user's needs; and
  - d) to **acquire** or **obtain** access to the described entity (IFLA, 1998).
- In addition, participants were asked to search their regular online catalogs and the FRBR systems for their own tasks.

## Findings: **Do FRBR systems support user tasks? (1/2)**

### User success by task and system:

- “**Find a work**” tended to enjoy the highest success rate among all tasks across systems.
- “**Find a set of works**” and “**find a similar work**” tended to be completed successfully.
- “**Find a manifestation**” appeared to be difficult, particularly in FictionFinder.
- “**Find an expression**” appeared to be challenging, particularly in WorldCat.org.
- “**Obtain/acquire**” tended to have the lowest success rate, with those using FictionFinder having the least success, followed by those using Libraries Australia.

## Findings: Do FRBR systems support user tasks? (2/2)

### User perceptions about tasks and systems:

- Users had no difficulty finding sets of works or a specific work.
- "Find an expression" was successful but required more effort; language information was not always available; sorting option by language was not always intuitive.
- Identifying and selecting a specific manifestation by publisher and/or date was not easy.
- Information on how to obtain/acquire an item was problematic, especially in FictionFinder, due to the "find edition" labeling and the presence of the "libraries" column, which was assumed to contain library holding information.

## Findings: Factors contributing to differences in user performance (1/2)

### • Success by user group

- Overall, AL users tended to be more successful than PL users in completing the FRBR search tasks.
- There is no statistically significant difference between the two groups.

### • Success by system

- Users tended to be more successful for the tasks using Libraries Australia, followed by WorldCat and FictionFinder.
- This pattern holds for both AL and PL user groups.
- There is a statistically significant difference in success among the three systems, suggesting **system design plays an important role in user search success.**

### Findings: Factors contributing to differences in user performance (2/2)

#### • Other factors

- statistically significant
  - Internet/web experience (p=.01)
  - Catalog experience (p=.01)
  - Computer experience (p=.03)
  - Age (p=.01)
  - Education level (p=.01)
- not statistically significant
  - Catalog use frequency (p=.61)
  - Gender (p=.08)
  - Race (p=.42)

### Findings: Comparison to regular OPAC systems

#### Search Success for Self-Assigned Tasks

- AL users tend to be more successful overall with this self-assigned task.
- Both types of systems appear to be comparably supportive in this user task.

|                            | Academic Library Users | Public Library Users |
|----------------------------|------------------------|----------------------|
| <b>FRBR-based catalogs</b> | 30 out of 31 (96.8%)   | 33 out of 35 (94.3%) |
| <b>Regular OPACs</b>       | 30 out of 31 (96.8%)   | 32 out of 35 (91.4%) |

### FictionFinder (FF) Home Page

**FictionFinder**  
OCLC Research

[Project Page](#) | [Feedback](#) | [Known Problems](#) | [Exit](#)

Browse



[Advanced]

**Welcome**

FictionFinder is a project of OCLC Research that provides access to millions of records for books, eBooks, and audio materials identified as fiction (including novels, short stories, dramas, and comics).

With FictionFinder, you can search these records by author, title, ISBN, and subject. You can also search book summaries and Search and Browse by genres, characters (real & fictional), settings (real & imaginary) and literary awards. And, when you discover an item you are interested in, FictionFinder can help you find a copy.

**Subject Clouds**

Dutch
English
French
Spanish

Actors Actresses Adultery Amnesia Angels Archaeologists **Artists Assassins Boys Brothers** Cats City and town life  
**Clergy** Composers Conspiracies Cookery **Criminals** Cults Death Depressions **Dogs** Dreams Ex-convicts Explorers  
**Family** Fathers and daughters Fathers and sons Foundlings **Friendship** Gay men **Girls** Governesses Grandmothers Heroes  
Hotelkeepers Immigrants Immortalism Inheritance and succession Islands **Journalists Kidnapping** Legislators **Lesbians** Mafia  
**Magic** Magicians Man-woman relationships Marriage Married women Millionaires Monsters Mormons Mothers and daughters **Murder**  
**Murderers** Nobility **Novelists** Nurses Opera **Orphans** Outlaws **Physicians** Pianists Pirates Poets  
Policewomen Presidents Prisoners Psychics Queens Reincarnation **Revenge** Sailors Scientists Sheriffs **Sisters** Slaves  
Soldiers Supernatural Terrorism Time travel Totalitarianism **Twins** Vampires Werewolves Widowers **Widows**  
**Witches** Wizards **Women** Young men Young women

\* Faceted Application of Subject Terminology (FAST)

### Libraries Australia Home Page

Search for:   | [Help](#) | [About](#) | [Feedback](#)

**About the demonstrator**

This system is a very simple demonstration of searching MARC bibliographic records using Lucene for storage and indexing. The database being searched is a copy of the Australian National Bibliographic Database (ANBD) as at January 2006. It contains 16 million bibliographic records with holding information for Australia libraries. The demonstrator extracts topics and relationships from records retrieved from a simple full text search to present search results.

- relevance ranked
- indexed by date, subject (two levels and facets), form, genre, author, Dewey & LC classification
- suggested with suggestions based on subject authority matching
- auto spelling suggestions based on output context

**Record details are shown augmented with:**

- related records grouped into an **FRBR-like** structure
- related records found using OCLC's **NDSN** service
- data including ratings and reviews from Amazon
- links to book acquisition and borrowing services (the latter is imaginary, **222p00** suggested because links to imaginary services are overabundant)
- for selected holding libraries, deep links into their OPAC

The user's library can be used to boost rankings, and 'online' resources can also be selected (although the current definition of what is an 'online' resource is too broad to be very useful).

The same data (a few months more up to date) is also accessible in a public form through [Libraries Australia](#). Please note that this system is a demonstrator of ideas, not a statement of direction by the National Library of Australia for the Libraries Australia service. The user interface has been left unchanged because we want feedback on the basic ideas rather than graphic design.

Please provide feedback on the [NDSN Prototype Discussion Wiki](#) or by email to [Kent Fisk, NLA](mailto:Kent.Fisk@NLA.gov.au).

As shown at the [NSA Incentive Library Forum: Rethinking the catalogue](#) presentation, here's a static demo of integration of library metadata search and remote full text source search.

This work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 2.1 Australia License.

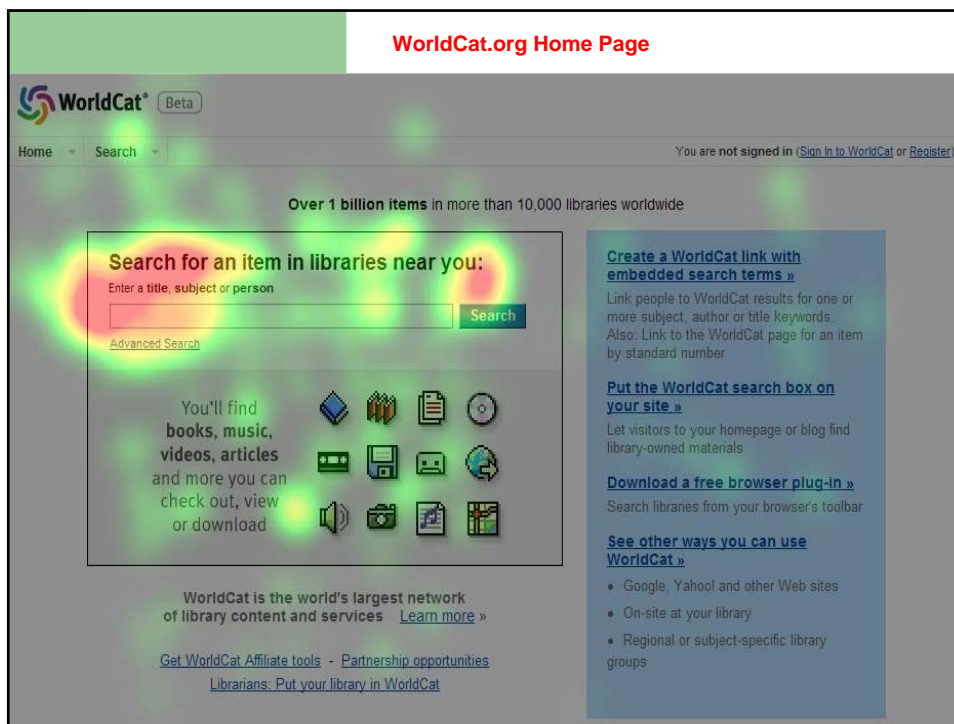
**Database**

This system has been implemented using Lucene as the storage and indexing mechanism. Four Lucene databases have been created:

1. A simple database with 16 million MARC records, stored in a compressed XML representation with a single unique identifying key (index) - 22 GB
2. An index database of these 16 million MARC records. Over 150 logical indices have been created (omitting many of the indices in the current production NDSN), but most of these are tiny and are compressed into just 1 of the 24 Lucene 'shards' of indices created on the database. Less than 10 indices are used by the searching and clustering functionality of the demonstrator. The process creating these indices exploits much coded data in the MARC representation, for example, the 043 codes are mapped into words, which are indexed as part of genre, collection level records have their ranking boosted, holding codes also boost ranking. There are dozens of such mappings. The database is about 2 GB.
3. A database used to drive spelling suggestions. This database was built using simple Lucene spellchecking code, augmented with phonetic representations and word frequency data. 0.4 GB
4. Subject authority index - 0.2 GB

The program which reads the raw MARC records and constructs the 2 large databases runs for about 16 hours elapsed to produce the final, merged version of these databases (4 x 1GB Java heap with 8GB memory). The other databases require relatively significant elapsed time to generate.

**Approach**



## Findings: Features users like (1/2)

System features users like based on think-aloud protocols and post session interviews:

| Feature   | # of users | Fiction Finder | WorldCat | Libraries Australia |
|---|------------|----------------|----------|---------------------|
| Interface (user friendly, easy to use, appealing)   | 37         | √              | √        | √                   |
| Related items links in descriptions (collocation by author, subject, similar)             | 36         | √              |          | √                   |
| Refining options  | 35         | √              | √        | √                   |
| Additional information (ratings, reviews, price, audience, summaries, format icons, etc.) | 21         | √              | √        | √                   |
| Sorting options (by date, format, language, etc.)   | 21         | √              | √        |                     |
| Availability/holdings information   | 20         | √              | √        | √                   |
| Single search box   | 19         | √              | √        | √                   |
| Terminology and labeling (clear, easy to understand)                                      | 14         | √              | √        | √                   |
| Organization and presentation of information (results page, description)                  | 11         | √              | √        | √                   |
| FRBR display (by format, language, editions)  | 9          | √              | √        | √                   |
| Searching in specified fields   | 8          | √              |          |                     |
| Advanced search option  | 6          | √              | √        |                     |
| Spelling or search suggestion "Did you mean ..."  | 5          |                |          | √                   |
| Subject clouds option   | 5          | √              |          |                     |
| External links (to Amazon, etc.)  | 2          | √              |          | √                   |
| Keyword search option   | 2          |                | √        |                     |
| Browse option   | 1          | √              |          |                     |
| Retain query in search box  | 1          | √              |          |                     |
| Subject search option   | 1          |                | √        |                     |

## Findings: Features users like (2/2)

System functions users like based on focus group discussions:

| FictionFinder: Features - Positive feedback  |   |  | PL | AL |
|--|---|--|----|----|
| Sorting options  | √ |  | √  |    |
| Easy to understand and use even when unfamiliar with the system                          | √ |  |    |    |
| Labeled well   | √ |  |    |    |
| Refining options   | √ |  |    |    |
| Subject clouds   |   |  | √  |    |
| Browse feature   |   |  | √  |    |
| WorldCat: Features – Positive feedback   |   |  | PL | AL |
| Refinement options eliminate unwanted results  | √ |  | √  |    |
| User friendly: interface has a familiar look, easy to learn                              | √ |  | √  |    |
| Format icons (books, discs, etc.) help identify items more easily                        | √ |  | √  |    |
| Easy navigation through results going back and forth without having to repeat the search | √ |  |    |    |
| Good tool for research   |   |  |    | √  |
| Libraries Australia: Features – Positive feedback  |   |  | PL | AL |
| Resource ratings   | √ |  |    |    |
| Suggestion feature "Did you mean ..."  | √ |  |    |    |
| Ability to search within a specified library collection                                  | √ |  |    |    |
| Ability to see different formats immediately   | √ |  |    |    |
| Cover art, especially multiple covers for variations of each title                       |   |  |    | √  |
| Availability information (library holdings)  |   |  |    | √  |
| Content summaries (abstracts)  |   |  |    | √  |
| Listing and hyperlinking similar items from a record description                         |   |  |    | √  |

## Findings: System improvements (1)

Suggestions for system improvements based on think-aloud and post session interviews:

| Suggested Features  | # of Users | Fiction Finder | World Cat | Libraries Australia |
|---|------------|----------------|-----------|---------------------|
| Add more <i>links to related works</i> (collocation via "more like this," hyperlinked subjects, hyperlinked authors, series links, linked keywords, linked cited works, linking other formats from a desired work)  | 39         | 12             | 12        | 15                  |
| <i>Grouping and displaying</i> information in results page (group into categories; arrange by language, date, author in alphabetical order, title in alphabetical order if an author search, multiple criteria)   | 34         | 7              | 10        | 17                  |
| Add <i>sorting</i> options (by multiple criteria, age groups, date, language, relevance, etc.)  | 34         | 11             | 10        | 13                  |
| <i>Interface display</i> (less clutter, larger font, color to differentiate sorting and refining options, aesthetically pleasing, use column display, use bold letters for library information, highlight searched terms in results page, highlight resource summaries) | 25         | 7              | 3         | 15                  |
| <i>Labeling and terminology</i> used (e.g., "find edition" should change to "libraries," clarify "language" choices for site interface so they are not confused as to material/resource language, change terms in advanced search options, etc.)                        | 24         | 13             | 3         | 8                   |

## Findings: System improvements (2)

| Suggested Features   | # of Users | Fiction Finder | World Cat | Libraries Australia |
|--|------------|----------------|-----------|---------------------|
| Allow <i>advanced search</i> option at the initial page  | 20         | 5              | 10        | 5                   |
| Availability information, library holdings display (easier to find, more prominent, larger font, hyperlink), and sorting   | 19         | 5              | 2         | 12                  |
| Add <i>search options</i> (by audience, age groups, date, publisher, format)   | 17         | 7              | 3         | 7                   |
| Include <i>additional information</i> in descriptions of items (reviews, summaries, cover art, cited in, sample pages, etc.)   | 15         | 4              | 7         | 4                   |
| Interface <i>positioning</i> (place buttons or certain information in more prominent location or near related information)   | 14         | 8              | 2         | 4                   |
| Add <i>refining</i> options (e.g., specific library, language, format, categories, audience, age group, remove a specific refinement)                                | 13         | 3              | 4         | 6                   |
| Add a <i>suggestion option</i> (spell checker, "did you mean...", related keywords to include in query)  | 10         | 5              | 4         | 1                   |
| Provide <i>help</i> information (tutorials, searching examples under search box, how to sort, popups with instructions, help information when mousing over a button) | 9          | 4              | 4         | 1                   |

## Conclusions and Future Work (1)

- FRBR user evaluation and research is critical in developing effective systems that support user information seeking.
- The results of this user study help to identify some useful options for future development of effective FRBR systems.
- The findings of this study also reveal current FRBR implementation issues and possible solutions from users' perspectives.

## Conclusions and Future Work (2)

- Continue user study and evaluation of new library catalog prototypes to explore features users find helpful.
- Analyze and better understand the nature of user needs and tasks based on an array of real user tasks.
- Conduct user study to examine collection-based system features (e.g., music, fiction, and moving image).
- Develop a FRBR-based catalog using participatory design approach to engage users and include their perspectives during the design and implementation processes.

Questions?

Project web site: <http://frbr.slis.kent.edu>

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**Thank you!**