

A Comparative Evaluation of the Share-VDE Search System

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A Comparative Evaluation of the Share-VDE Search System

The Share-VDE search system (<https://svde.org>) shifts the library discovery paradigm from record-based indexing and retrieval to that of linked data entity exploration. This paper reports results of iterative testing of multiple versions of the Share-VDE interface. The testing included remote user experience (UX) interviews with a total of twenty participants across four rounds of tests spanning two years. The comparison among participants encompassed catalogers, students of all levels, and faculty. Synthesizing IFLA LRM user tasks with interface evaluation methods supported the qualitative inquiry into how linked data systems in general, and BIBFRAME specifically, can support search system objectives.

Keywords: user studies; data models; catalogers; experimental; entity-relationships modelling; catalog indexing / display / design

Introduction

The Share-VDE linked data catalog is a federated discovery environment that applies the BIBFRAME vocabulary¹ to indexing, retrieval, and the presentation of the user interface (see Figures 1-3). Federation in the Share-VDE system indicates that the search environment integrates data from multiple bibliographic providers. The system thus offers a single federated search that spans a variety of collections, from national libraries (such as the British National Bibliography, the National Library of Norway, and the National Library of Finland) to academic libraries (including Stanford University, University of Pennsylvania, and University of Alberta).² It enables search across all member institutions or within the collections of an individual member.

Because BIBFRAME search interfaces are relatively new for library users, the focus of this research was to study how users interact with a novel interface for linked data entity

exploration. The study described in this paper was multi-year, beginning in 2021 and continuing into 2022, with two rounds per each year. A team at the University of Pennsylvania Libraries (Penn Libraries) gathered feedback through structured interviews and observation. Participants in the study included professional library catalogers, university faculty, and students. The broad aims of this study are:

- To understand the way the Share-VDE system supports user tasks promulgated in the IFLA Library Reference Model (IFLA LRM).³
- To determine the expectations users have about linked data search systems in context with other discovery interfaces within the academic research ecosystem.

This paper begins with an overview of the Share-VDE presentation level and then reviews prior work in discovery systems that evaluate entity-based search, with a particular focus on implementations of bibliographic conceptual models in search systems. It then presents the methods used to understand user tasks. Following this, a results section details participant responses to the structured interviews and tasks. The paper concludes with a discussion section and considerations for future steps in the research on linked data search systems.

Prior to BIBFRAME description, bibliographic search systems primarily identified data that existed in record-based systems. A BIBFRAME discovery environment is a major departure from a traditional records-based search. In BIBFRAME, relations among bibliographic entities are central to description. Record-based search and retrieval systems did not have ample support for rich interlinking methods and functionality to traverse relations among entities.⁴

The BIBFRAME vocabulary contains three core classes, implemented in the Share-VDE interface. The first of these core classes is the BIBFRAME Work class, which, from a set-theoretical perspective of similarity,⁵ contains the attributes that are found in the IFLA LRM

Work and Expression.⁶ The Library of Congress defines the BIBFRAME Work as the “... resource reflecting a conceptual essence of a cataloging resource.”⁷ The Share-VDE interface displays Works (see Figure 1) as “... clusters of publications,” which is consistent with the RDA and IFLA LRM conceptualization of a Work.⁸

Figure 1. Share-VDE Work layout.

My bondage and my freedom

Autobiographies/biography/dictionaries written by [Douglass, Frederick](#).

Also known as: *Life and times of Frederick Douglass*; *Life and Times of Frederick Douglass*; *Life and times of Frederick Douglass: his early life as a slave, his escape from bondage, and his complete history*; *My bondage and my freedom*

This is part of the series [Slavery and anti-slavery: a transnational archive](#), [Black thought and culture](#), [Black rediscovery](#), [Collier books](#), [Oxford world's classics \(Oxford University Press\)](#), [Ebony classics](#), [Blacks in the New World](#), [Penguin classics](#), [American Negro, his history and literature](#), [Norton critical edition](#), and [Oxford world's classics](#).

More options ▾

Publications of this
 Related agents
 Subjects of this

|

56 results

Sort by (A - Z) ▾

- [Sclaverei und Freiheit : autobiographie \(Online resource in German, published in 1860.\)](#)
Contributors:
 - [Douglass, Frederick](#) (author)
 - [Hoffmann und Campe](#) (publisher)
 - [Assing, Ottilie](#) (other)
- [Life and times of Frederick Douglass : his early life as a slave, his escape from bondage, and his complete history \(Volume in English, published in 1962.\)](#)
Contributors:
 - [Douglass, Frederick](#) (author)
 - [Lobb, John](#) (editor)
 - [Bernier, Celeste-Marie](#) (editor)
 - [Gilpin, R. Blakeslee](#) (editor)
 - [Bromell, Nicholas Knowles](#) (editor)
 - [Collier Books](#) (publisher)
 - [Smith, Gerrit](#) (dedicatee)
 - [De Gruyter](#) (other)

The second core class that Share-VDE uses from BIBFRAME is the Instance, displayed in the interface as a Publication, or a version of a Work (see Figure 2). The layout of a Publication page merges all the attributes from BIBFRAME Instance and some of the attributes of BIBFRAME Work for display purposes. Turning again to the set theoretical framework of attribute sets that comprise entities, the BIBFRAME Instance class contains the set of attributes found in the IFLA LRM Manifestation attribute set.⁹ The Library of Congress defines BIBFRAME Instance as one that reflects “... information such as its publisher, place and date of publication, and format.”¹⁰ The Share-VDE system implements the third core class of BIBFRAME, the Item, which corresponds to the holdings of an Instance.

Figure 2. Share-VDE Publication layout.

Life and times of Frederick Douglass : his early life as a slave, his escape from bondage, and his complete history

Volume. Published in English in 1962 in New York by [Collier Books](#).

Contributors
[Lobb, John](#) (editor), [Bernier, Celeste-Marie](#) (editor), [Gilpin, R. Blakeslee](#) (editor), [Bromell, Nicholas Knowles](#) (editor), [Smith, Gerrit](#) (dedicatee), [De Gruyter, Anderson, Elizabeth A.](#), and [Infomotions, Inc](#)

ISBN: 0020023502
Identifier: p1271654874426076
Notes: Reprinted from the rev. ed. of 1892.; Reprinted from the rev. ed. of *My bondage and my freedom*, published in 1892.
Bibliographic level: Monograph
Cataloging source: DLC
Descriptive cataloging form: AACR, Local
Dimension: 18 cm.
Encoding level: Full not examined
Extent: 640 p.
Record status: Corrected or revised, New
Responsibility statement: written by himself: his early life as a slave, his escape from bondage, and his complete history. With a new introd. by Rayford W. Logan., written by himself. With a new introd. by Rayford W. Logan.
Series statement: Collier books, BS74, Collier books, BS74.
System control number: (OCoLC-M)167587, (OCoLC)ocm00167587

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Related agents Subjects

Filter agents...

Agents in the Share-VDE display include “... persons, families, organizations and conferences,” defined as, “... the actors that create original works or contribute to publications...”¹¹ The screenshot in Figure 3 provides an example of a Share-VDE Agent, the Person page, which illustrates how the search system retrieves and displays related entities of a person, including Share VDE entities Work and Publication.

Figure 3. The Share-VDE Person page.

ShareVDE BETA

← frederick douglass search Search all content... Options

Person

Frederick Douglass

African-American social reformer, writer, and abolitionist (c. 1818 – 1895). Born in Talbot County (Md.). Died in Washington (D.C.).

Frederick Douglass was an American social reformer, abolitionist, orator, writer, and statesman. After escaping from slavery in Maryland, he became a national leader of the abolitionist movement in Massachusetts and New York, during which he gained fame for his oratory and incisive antislavery writings. Accordingly, he was described by abolitionists in his time as a living counterexample to enslavers' arguments that enslaved people lacked the intellectual capacity to function as independent American citizens. Northerners at the time found it hard to believe that such a great orator had once been enslaved. It was in response to this disbelief that Douglass wrote his first autobiography. - Wikipedia

More options

Wikimedia Commons

Original works by Publications by Original works about

Filter original works... Year Creator Genre

148 results

Sort by (A – Z)

- North star (Rochester, N.Y.)**

Creators:

 - Adam Matthew Digital (Firm) (other)
 - Frederick Douglass (other)
 - Martin Robison Delany (other)
 - Gilder Lehrman Institute of American History (other)
- My bondage and my freedom (Autobiographies/Biography/Dictionaries)**

Creators:

 - Frederick Douglass (author)
 - John Lobb (other)
 - Celeste-Marie Bernier (editor)
 - R. Blakeslee Gilpin (editor)
 - Nicholas Knowles Bromell (editor)

Related work

Several prototype projects have implemented a linked data interface, drawing on Functional

Requirements for Bibliographic Records (FRBR), IFLA LRM, and BIBFRAME as the major conceptual models in bibliographic description. These studies evaluated user interactions with search system prototypes to investigate how these bibliographic models influence search interface design and user experience.¹² The FRBR, which defined the Work, Expression, Manifestation, and Item (WEMI) entities, was conceived in an entity-relationship structure, which opened the possibility of applying linked data in library catalogs.¹³ This perspective has influenced system development and prototype research,¹⁴ leading to the creation of visualizations that display entities.¹⁵ These studies found that the “indented tree layout” visualization, defined as “... a tabular layout for hierarchical data” which “allow one or more columns of values to be shown alongside indented names,” was one of the most successful layouts evaluated for understanding the hierarchical relationships among linked data.¹⁶ In that study, success was measured along three dimensions: 1) the time taken to complete tasks, 2) success on a given task, and 3) success in navigating the system.

Several FRBR prototype studies explored “FRBR like features” in different interfaces and utilized the notion of user tasks as a part of their methodology.¹⁷ Researchers extended their catalogs with linked data sources and studied the user’s experience of the enrichment compared to the traditional catalog interface.¹⁸ Other data sources may include traditional bibliographic resources, such as subject headings expressed as linked data.¹⁹

The release of IFLA LRM was also influential in linked data discovery tests.²⁰ Studies in this strand of research have compared BIBFRAME and IFLA LRM to understand characteristics that may affect search usability.²¹ The IFLA LRM was influential in the framing of user tasks in the present study, described in the methods section that follows.

Methods

As a first step in the development of the methods for this study, the research team at University of Pennsylvania Libraries submitted a Quality Assurance/Quality Improvement Project determination form to the University of Pennsylvania Institutional Review Board (IRB) in April 2020. After a review of the study design and questions posed to participants, the IRB determined that the study qualified as non-human subject research, given that its focus was on testing a user interface and search system.

Remote Zoom sessions were the primary approach for conducting tests and collecting data. The realities of the global pandemic made this approach necessary, and had an added benefit of testing users with their familiar home device setups. Recruitment for uninc incentivized study participants yielded a small but dedicated group of twenty participants. Sessions averaged between twenty minutes and an hour, during which participants engaged in scripted tasks and provided reflections on the design patterns and decisions made during the search process. The participants consented to have the sessions recorded, which allowed the research team ample time to analyze task completion and compare user feedback.

A total of twenty participants were involved in this two-year study. The first year had two rounds of tests with twelve total participants. The second year had two rounds of tests with eight participants in total. Delineated in Table 1, “Testing schedule and participants,” are the testing details per year. The research focus progressed from gathering cataloger feedback from the same group during the first two rounds (detailed tasks in Tables 2 and 3), to conducting a series of tasks with participants in the third and fourth rounds (detailed tasks in Tables 4 and 5).

Table 1. Testing schedule and participants.

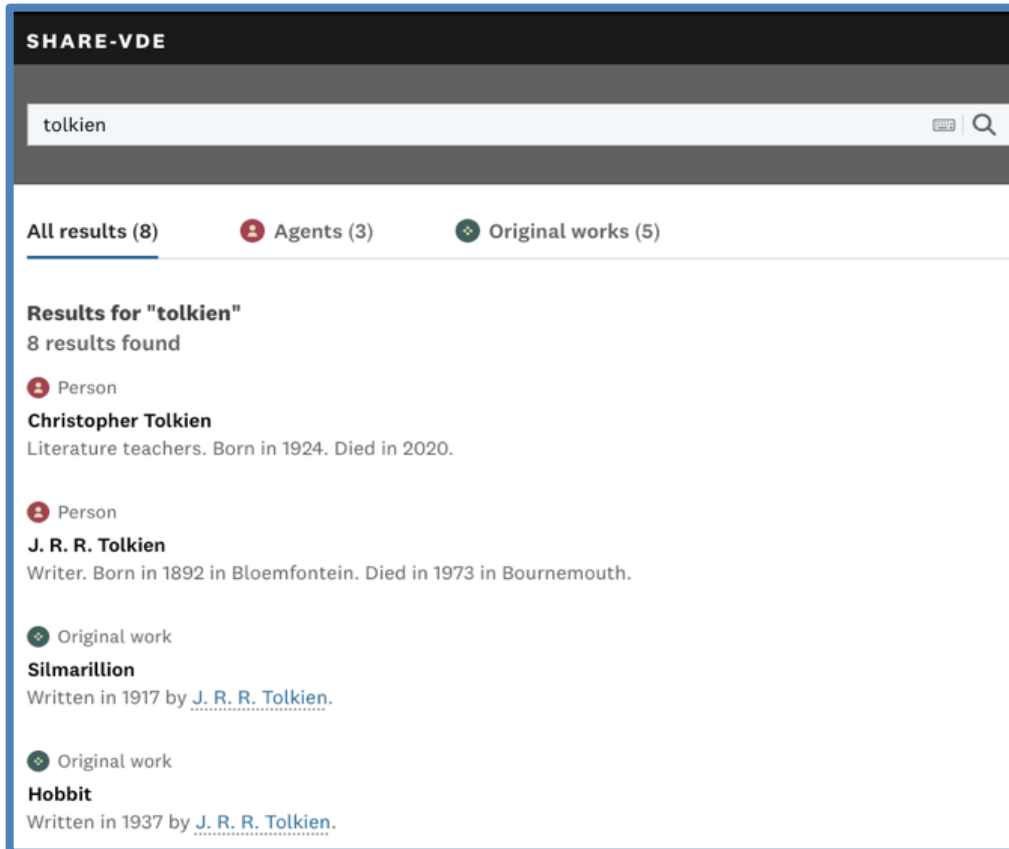
Testing Year	Testing Round and Semester	Number of Participants and Type
2021	Round one: Spring 2021	12 Professional Catalogers
2021	Round two: Fall 2021	12 Professional Catalogers
2022	Round three: Spring 2022	4 Participants: (1) Faculty, (1) Postdoctoral Researcher, (1) Graduate Student, (1) Undergraduate Student
2022	Round four: Fall 2022	4 Participants: (1) Faculty, (1) Research Coordinator, (1) Graduate Student, (1) Undergraduate Student

Rounds one and two

Testing aims

The first round focused on evaluating the basic search functionality in Share-VDE and the way library catalogers described and used the resulting detail pages. The advanced search features were the focus of round two. Shown in Figure 4 is the basic search interface with search results. Shown in Figures 5 and 6 is the advanced search interface.

Figure 4. The basic Share-VDE search interface with search results for “Tolkien” (2021).



Testing tasks

Specific IFLA LRM user tasks in round one focused on the Identify user task, particularly disambiguation of similar name results. The IFLA LRM defined the purpose of the Identify User Task in part, "... to distinguish between similar resources."²² Delineated in Table 2 are the tasks and objectives of round one. Delineated in Table 3 are the tasks and objectives of round two, focusing on the use of advanced searching in Share-VDE by catalogers.

Table 2. Round one testing tasks and objectives.

Testing Task	IFLA LRM User Task	Task Objective
Basic search result list - disambiguation	Identify	Test users' ability to identify a desired title or author from a list of results from basic search.
Work and Agent page usability	Not applicable	Understand from users how easy the interface is to use; what is confusing to users?
Search functionality	Not applicable	Compare search functionality to how users typically search for information.

Figure 5. The Share-VDE advanced search interface (2021) for Agents.

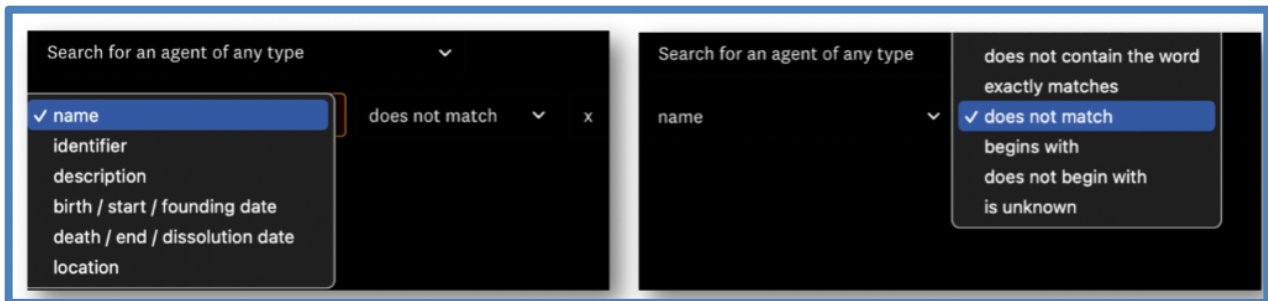


Figure 6. The Share-VDE advanced search interface (2021) for an Original Work.

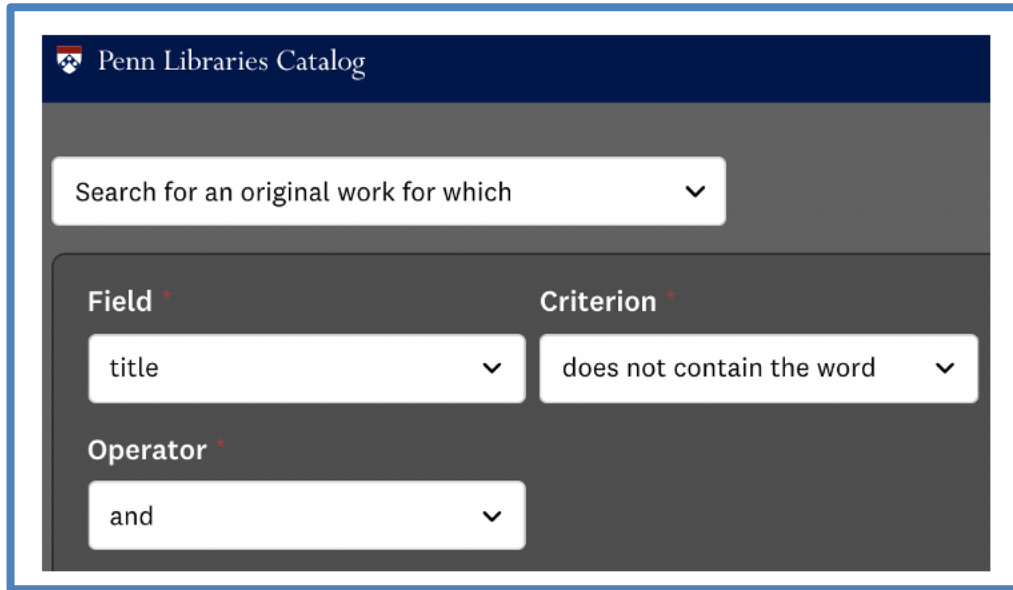


Table 3. Round two testing tasks and objectives.

Testing Task	IFLA LRM User Task	Task Objective
Advanced search result list – disambiguation	Identify	How easy are the results of advanced search useful for finding the desired Work or Agent?
Functionality of advanced search	Not applicable	Was anything new or surprising about advanced search features?
Design of advanced search	Not applicable	How easy is the advanced search to use?

Application of advanced search	Not applicable	Were you able to complete your search the way you would have liked to?
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Rounds three and four

Testing aims

Rounds three and four tested the Identify IFLA LRM user task and expanded to include the Explore task. The IFLA LRM Explore user task support the discovery of “... resources using the relationships between them and thus place the resources in a context.”²³ The exploratory aims included observing how users would traverse among the entities in the system, such as navigating from a Work to a related Agent.

Testing tasks

The third round of tests had four test participants. The UX tasks included person disambiguation, title disambiguation, language retrieval, related agents, exact title match, linked data exploration, and understanding of the terminology of the interface. Delineated in Table 4 are the third round tasks and objectives.

Table 4. Round three testing tasks and objectives.

Testing Task	IFLA LRM User Task	Task Objective
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Person disambiguation	Identify	To test name (person) disambiguation functionality in results of a search with similar names.
Title disambiguation	Identify	To test work (publication) disambiguation functionality in results with similar titles.
Language retrieval	Identify	To test retrieval of searching for publications of a work in a desired language.
Related Agents	Explore	To test the usability of the “related Agent” list.
Exact title match	Identify	To test the usability of a “exact match” menu presented as the result of title matching.
Linked data exploration	Explore	Exploratory linked dated exercise.
Terminology	Not applicable	Test language comprehension and clarity around the following terms: "Related Agents," “Original works by,” and “Publications by.”

Round four of the study involved four test participants. This phase focused on soliciting participants’ impressions of new “concept page” mockups, like the ones shown in Figures 7-9. Delineated in Table 5 are the round four tasks. These include terminology (time-period, place, topic, agent); UI design of content relationships, and UI design-filter options (year, creator, genre). A final additional measure used just in round four was an adapted Standardized User Experience Percentile Rank Questionnaire (SUPR-Q²⁴) metric to assess impressions of Share-VDE overall—see appendix for SUPR-Q questions.

Table 5. Round four testing tasks and objectives.

Testing Task	IFLA LRM User Task	Task Objective
Terminology (time-period, place, topic, agent)	Explore	To test if the headers and submenu wording on concept page(s) are understood.
UI design of content relationship	Not applicable	To test how users make the distinction among Work and Publication in the concept pages.
UI design of filter options (year, creator, genre)	Not applicable	To test how filtering features of the interface are understood.
Standardized User Experience Percentile Rank Questionnaire (SUPR-Q)	Not applicable	Assess perceptions of Share-VDE.

Figure 7. UX testing round 4 script questions next to concept page mockup (2022).

Task 2: Mockup Review (Agent)

Scenario:

Say we've selected a person related to the topic page we just reviewed. Take a moment and tell me what you think the information on this page is about.

Looking at the tabs below:

What do you think "Original works by" could mean in relationship to the information on this page?

- Publications by?
- Original works about?
- Related topics and events?

If you were looking for information about this person, would "Related topics and events" be useful or not useful? Is the information describing these related topics and events clear or unclear?

Thinking about the design of this page, is there anything that could have made finding this information easier or more intuitive?

Looking at the content of this page, is there any information type here that was missing? Would you add or change anything?

Figure 8. Share-VDE topic page prototype (2022).

Figure 9. Share-VDE place page prototype (2022).

Results

Round one – Results of basic search evaluation

Catalogers had suggestions for wording related to the uses of the terms Works and Publications, proposing that “search for titles” would be preferable as an alternative. They were also interested to know how far a related Agents tab might be able to traverse in a Share-VDE linked data graph. The sense among the participants in the first round was that there are several levels of Agents that could be of interest. This group also inquired about the possibility of composite works shown in detail pages. Delineated in Table 6 are the round one tasks and summary results.

Table 6. Round one testing tasks and summary results.

Testing Task	IFLA LRM User Task	Summary Result
Basic search result list - disambiguation	Identify	Requested that topics be included in results interface.
Work and Agent page usability	Not applicable	Question on how related Agent is displayed. Interest in seeing composite Works.
Search functionality	Not applicable	Feedback on wording for search.

Round two – Results of advanced search evaluation

In round two, catalogers offered critiques of the advanced search functionality and offered suggestions for Work results identification. Catalogers provided input on the wording used in the advanced search menu, which used the terms Agent, Identifier, and Description. The

functionality of advanced search was not clear to catalogers. The search menus in the advanced search (Figure 6) utilize aspects of Boolean logic that may be unfamiliar to new users.

Delineated in table 7 are the round two tasks and summary results.

Table 7. Round two testing tasks and summary results.

Testing Task	IFLA LRM User Task	Summary Result
Advanced search result list – disambiguation	Identify	Offered suggestions for Work result disambiguation; wording around how Agents are connected to Works.
Functionality of advanced search	Not applicable	Unclear to catalogers. More data in the search system are needed to fully appreciate relationships in testing environment.
Design of advanced search	Not applicable	Wording suggestions to improve understanding of advanced search.
Application of advanced search	Not applicable	Feedback on the wording around search to motivate users to try alternative ways of searching.

Round three – Results of Share-VDE evaluation by students and faculty

In round three, one undergraduate student and one faculty member had difficulty with the person disambiguation task. A system issue pointed out by participants was the challenges they had with exact title matching. All four participants from the third round of tests were able to complete the task that evaluated search retrieval for Publications of a Work in a desired language. Researchers observed a successful distinction between Works and Publications by participants. Participants also suggested to simplify the interface layout by listing Publications first as context cues and by consolidating Works and Publications filtered by type. Delineated in Table 8 are the round three tasks and summary results.

Table 8. Round three testing tasks and summary results.

Testing Task	IFLA LRM User Task	Summary Result
Person disambiguation	Identify	One faculty and one undergraduate student had difficulty with person disambiguation. One postdoctoral researcher and one graduate student were able to successfully complete the person disambiguation task.
Title disambiguation	Identify	One graduate student was unable to complete the title disambiguation task, whereas successful title disambiguation tasks were completed by a postdoctoral researcher, an undergraduate student, and a faculty member.

Language retrieval	Identify	All test participants were able to complete a task which required them to search for Publications of a Work in a desired language.
Related Agents	Explore	All test participants were able to successfully use a “Related Agent” list.
Exact title match	Identify	Three of the four participants were able to make use of the exact title matching feature. The faculty member had difficulty using exact title match, whereas the postdoctoral researcher, undergraduate student, and graduate student were successful.
Linked data exploration	Explore	All test participants were able to find the related links to other entities in the search environment.
Terminology	Not applicable	Feedback that the format filter is confusing, that terminology of Original Work is confusing, unsure about definition of Agent.

Round four – Results of Share-VDE concept page evaluation by students and faculty

All four participants in round four reviewed the “Topics and related events tab” positively and one participant described the concept pages as “topic milestones and research touchstones.” An area for clarification found in this round of tests was the sense that a Topic page and Work page seemed similar in layout. The image in Figure 8 illustrates the notion of a Topic page – it lists Works that are related to a subject area. For example, the “New York” page includes Works

about New York. In contrast, a Work page will display various publication of a Work. Where data exists, Work Pages may also include “Related Agents” alongside the Publication of a Work, as shown in Figure 1. Delineated in Table 9 are the round four tasks and summary results.

Table 9. Round four testing tasks and summary results.

Testing Task	IFLA LRM User Task	Summary Result
Terminology (time-period, place, topic, agent)	Explore	Differences between Concept page and the Work unclear.
UI design of content relationship	Explore	Reviewed positively.
UI design of filter options (year, creator, genre)	Explore	Suggestion to filter by Works and Publications as a consolidated list.

In response to the question, “At what points in your research process could it be useful to connect with this resource?” a graduate student responded that the Place Page (shown in Figure 9) would be a starting point in their research. A faculty member added that “This would be useful in the beginning to middle phases when I was looking for material related to a specific topic. When I’m looking for lots and lots of details about something... as I was starting to narrow down my search topic.” A final comment from a third round study participant illustrates a contrast between this search and other websites—“It really helps you orient to a topic, and unlike a search engine you don’t miss seminal events.”

A measure used in round four the Standardized User Experience Percentile Rank Questionnaire (SUPR-Q²⁵) metric assessed impressions of Share-VDE related to categories of usability, trust and credibility, appearance, and engagement. The usability category targeted questions of the ease of use of the interface and interface navigation. The trust and credibility category assessed the participant’s reported comfort and confidence in the system. The category of appearance relates to the design and presentation. The final category engagement assessed participants anticipated future use of the system. Delineated in Table 10 are the round four SUPR-Q results.

Table 10. SUPR-Q results (round four).

Category	Aggregate Score (1-5)	Statement
Usability	4.25	This interface is easy to use.
Usability	4.5	It is easy to navigate within this interface.
Trust and credibility	4.3	I feel comfortable finding library materials in this interface.
Trust and credibility	4.25	I feel confident that the materials I find in this interface will meet my needs.
Appearance	3.62	I find the design of this interface to be attractive.

Appearance	4.75	This interface has a clean and simple presentation.
Engagement	4.3	I would likely visit this interface in the future.

Discussion

The first year of testing, rounds one and two, highlighted the need for additional data in the Share-VDE system. Testing suffered from sparseness in the availability of data in the Share-VDE system, such that some of the broader objectives in the first year of study remained unaddressed—including a broader understanding of what types of searches linked data could support. In the second year of the study, rounds three and four, the next eight participants did have access to a larger set of entities in the test system. Results of cataloger feedback in rounds one and two provided helpful inspiration for the evaluations in rounds three and four—notably by helping frame tasks that evaluate the language used to describe entity-centric terminology.

Comparative evaluation

Professional catalogers were the sole participants in year one, whereas the second year included university members, such as faculty and students. When testing Share-VDE among catalogers and non-catalogers, the language used to describe new entity-centric features in linked data is quite important. Catalogers identified terminology to simplify, leading to language improvements in the interface. Underscoring this observation are results from all four test participants in this round that focused on the distinction of Work and Publications. Delineated in Table 5 is the task description, and recorded in Table 9 is the task result.

Comparisons among faculty and student participants are possible from the second year of results. Results showed that faculty and students have some commonality in disambiguation tasks. The results of round three tests showed that the faculty participant and the student participant failed to complete a name disambiguation task. Further design improvements to the interface may include better indicators for similar names, such as images presented in the initial search results, rather than the detail level webpage. Both the student and the faculty participant were able to understand and complete exploration tasks; including a task related to finding Agents related to entities in the Share-VDE system successfully. A graduate student noted the usefulness of topic pages as starting points for their research when tasked with exploring the topic-specific pages (shown in Figure 5). The faculty participant was able to articulate stages of their research process where a concept page would be useful, particularly in the context of “narrowing down” research targets—a task that they considered to occur in the middle of the research process at a stage for solidifying facts.

Research questions revisited

In revisiting the first research question that framed the study – “to understand the way that the Share-VDE system supports user tasks promulgated in the IFLA LRM” – the throughline of all four rounds was the inclusion of an IFLA LRM Identify task. The third and fourth rounds included the IFLA LRM Explore tasks. Table 11 delineates a unified view of IFLA LRM user task results from all rounds.

Table 11. A unified view of IFLA LRM task results.

IFLA LRM Task	Successful UX by Round and Task	Mixed UX by Round and Task
Identify	Round three – Language retrieval	Round one – Basic search result List; Round two – Advanced search result list; Round three – Person disambiguation, title disambiguation, exact title match
Explore	Round three – Related Agents, linked data exploration	Round four – Terminology (time-period, place, topic, agent)

The organization of the results by IFLA LRM user task are by “successful,” or “mixed” mixed. No test had failures by all participants. The mixed results are the results where one or more participants encountered a failure for the task. There were mixed results for the round four Exploration task. A high rating for usability of the concept pages in the Exploration user tasks from the fourth round. Aspects of navigation had an overall ranking of 4.5 out of 5 among the last set of participants (n=4), shown under the second “Usability” results of Table 10. The two key successes of the Explore user task in round three were the tasks that all four users of that round successfully completed: the Related Agents task and the Linked Data Exploration task. All test participants of the language retrieval task in round three were successful. However, Identify was not a strong point in all rounds, as there were mixed results for both round one and round

three disambiguation tasks. The exact title matching feature of the interface had mixed results from round three.

Turning now to the second broad research question regarding “expectations that users have about linked data search systems in context with other discovery interfaces within the academic research ecosystem.” Participants contextualized how they might use linked data search instead of other websites – “...unlike a search engine you don’t miss seminal events.” The notion that linked data search in Share-VDE can provide a holistic picture of a search domain was a surprising data point of the study. A graduate student remarked that they would like to use Share-VDE “...as a first line source when starting a research paper.” This contrasts with the reported result that a faculty member would seek to use Share-VDE in the beginning or middle of their research process. Tests in the fourth round showed that all four participants were interested in engaging further with linked data search systems. Presented in Table 10 under “Engagement,” the findings showed a high degree of support for the statement, “Given a choice, I would like to use this catalog in the future.”

While this study had a relatively small set of twenty total participants, there is evidence suggesting that “for comparative studies where statically significant findings are being sought, a group size of 8-25 participants is typically valid, with 10-12 participants being a sensible baseline range.”²⁶ The study population is in the general range for what might be expected for a UX study, though there is contention in the literature as to the ideal number of participants in qualitative UX studies.²⁷ The results of this paper do not provide UX feature suggestions for linked data search systems in general. However, the strength of this qualitative inquiry is the presentation of thematic trends researchers have observed in the context of the Share-VDE search system. The deep qualitative data can help to supplement further research that may

employ quantitative measures such as search log analysis. These quantitative measures would be appropriate in answering precise transactional questions about search behaviors and either confirm findings about disambiguation and exploration, or add additional nuances to these results.

Conclusion

Through two years and four rounds of sustained inquiry and analysis, this research compared the way that catalogers, students (both graduate and undergraduates), researchers, and faculty at the University of Pennsylvania have made use of the Share-VDE search system. Specifically, this study framed the Share-VDE search system's UX evaluation in terms of supporting IFLA LRM user tasks. The first year investigated notions of name and work disambiguation, exact title matching, and translations of works in the basic and advanced search functions of the system. This study was able to adapt UX questions to interface developments in rounds three and four by utilizing targeted questions relevant to the current stage of Share-VDE system development.

The general contribution of this research is to frame user experience tasks for linked data in the context of the IFLA LRM user tasks. By using IFLA LRM user tasks as a frame for traditional UX questions on interface functionality, the work synthesized a novel UX research method for interface studies in linked data search systems. While the present study focused on the Share-VDE search system, other linked data search systems can re-use and build upon the methods synthesized herein.

Appendix

Please indicate if you agree or disagree with the following statements related to Share-VDE.

Likert Strongly disagree (1) - Strongly agree (5)

- This interface is easy to use.
- It is easy to navigate within this interface.
- I feel comfortable finding library materials in this interface.
- I feel confident that the materials I find in this interface will meet my needs.
- I find the design of this interface to be attractive.
- This interface has a clean and simple presentation.
- I would likely visit this interface in the future.

Notes

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