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Report of the Link Resolver Implementation Team

Varnum, Kenneth J.; Desai, Shevon; Folger, Kathleen; Stuart, Kenyon; Saylor, Kate; Tuckett, Harold; Bertram, Albert; Earley, Jon; Howell, Ben; Dobias, Trevor; Campbell, Lisa; Ahronheim, Judith

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Link Resolver Implementation Team

Final Report

9 December 2016

Service Leads

Lisa Campbell (3/2016 - 6/2016)

Shevon Desai (7/2016 - 12/2016)

Technical Lead

Ken Varnum

TASC Sponsor

Kathleen Folger

Division Stakeholders

Collections

Judy Ahronheim (3/2016 - 8/2016)

Kenyon Stuart (8/2016 - 12/2016)

Research

Shevon Desai

Taubman

Kate Saylor

Learning and Teaching

Harold Tuckett

LIT

Albert Bertram

Jon Earley

Ben Howell

Trevor Dobias

Executive Summary

The Link Resolver Implementation Team was charged in March 2016 with carrying out the recommendations of the Link Resolver Investigation Team,¹ submitted to TASC in January 2016, to re-launch the MGet It link resolver service as a locally-hosted application using the existing 360 Link knowledge base. Specifically, the Implementation Team was asked to complete three primary tasks, which we have done (see following sections for discussion of each of these primary charges):

1. Selection and prioritization of added services in the link resolver menu interface. There will be many services that could be added (cited-by counts, cited-in lists, catalog links, get a citation service, save for later, report a problem, etc.). Care will need to be taken to keep the interface usable for the majority of users the majority of the time, while selecting specific services that make sense for classes of users.
2. If a report-a-problem link is going to be included, the Ask a Librarian and EAU staff will need to have workflows to handle a larger volume of reports than are currently received through ArticlesPlus.
3. Whether the menu page should appear for all users, all the time, or should only appear in certain circumstances (e.g., such as when a full text link is not available). Weighing a frequently streamlined interaction flow against the need to provide options when the direct-to-full-text link fails will need consideration.

The new MGet It service was released as a limited beta for library staff on September 14, 2016. After a period of review and feedback from library staff, and subsequent adjustments to the interface, the new interface replaced the native 360 Link interface on Monday, October 17, 2016.

¹ <https://deepblue.lib.umich.edu/handle/2027.42/117361>

Implementation Process

The team met every other week from July through October to explore issues, review usability information, and determine next steps. The team was specifically charged with resolving three issues delegated to it by the earlier investigation team:

Issue 1: Selection and Prioritization of Added Services

The Investigation Team had initially recommended that the library take advantage of the new MGet It page to direct users to several optional services, in addition to providing links to the desired full-text content. In the course of our work, and after conducting user research, the team opted to reduce the number of offered services to the bare minimum to meet the primary user need: getting the desired document. In addition to links to the desired document itself, the interface presents a link to the document delivery service, to search the catalog for the desired item, and to Ask a Librarian for personalized assistance. Additionally, the interface provides a “report a problem” link (see the next section for discussion) and, during limited beta and immediately after launch of the new service, a link to a feedback mechanism.

This team decided to amend the earlier recommendation because it became clear that users who noticed the additional options (catalog holdings, links to “cited by” data for the desired article, etc.) were either confused by the plethora of options or did not view them as valuable in the context of this page. The primary user interest was in getting to the full text of the item; links to specific physical holdings were confusing or not understood. With that in mind, we decided to leave those links out of the display, relying instead on the sidebar links to “Search the catalog” and “Request to have a copy delivered (Interlibrary Loan, 7Fast)” to get users to physical copies of items.

Issue 2: Problem-Reporting Links

We included a “Report a Problem” link on the new MGet It interface. User reports through this link follow the same workflow as those currently submitted through our ArticlesPlus interface. That is, reports go to the Ask a Librarian inbox. Ask a Librarian staff determine whether the issue arises from the resource itself or any other cause. When the problem is with the resource, the report is transferred to the Electronic Access Unit in Technical Services, where staff troubleshoot and resolve the issue.

There is still some concern about the potential volume of trouble reports, but also broad interest in being more proactive and responsive to problems with our licensed content. Reports submitted through the new MGet It interface are identified so that we can track the number of reports from MGet It and ArticlesPlus for future review.

Issue 3: When the Service Should Appear

This was perhaps the most debated point of the three charges. Should we change current practice and have the new MGet It screen appear every time a user clicks an MGet It icon in any database, or should we continue with the status quo and direct the user to full text where the 360 Link Knowledge Base provides a direct-to-full-text link?

In the end, we decided to present the MGet It page in all cases to all users. This decision was made after lengthy discussions within the project team and consultation with user experience staff in LIT's Design & Discovery department and PARC. The crux of the decision came down to two factors. First, when the full text link turned out to be faulty, the user had no obvious recourse to seek an alternate source for the item, report the problem, or to get assistance from Ask a Librarian. While this sort of situation is relatively rare (depending on the kind of full text link, between 5% and 35% of MGet It Clicks),² it does happen and does not represent the level of service we wished to offer.

The second reason is that the inconsistent user interface we have presented up until now -- sometimes an MGet It screen appears, sometimes there's an option to get to the screen, and most often there is no clear way for the user to get to the screen -- is itself a poor user experience. Consistency and predictability of an online interaction is itself a value, and we determined it made the most sense to give our users a single, repeatable, experience.

Roll-Out Plan

The project team targeted launching the new link resolver before the fall 2016 semester began. However, as the summer went on, it became clear that we had additional testing and verification of the interface to do, so we initially deferred launch until later in September, to give staff ample time to review the new interface on a development server.

In early September, it became clear that launching the service would be better to do over the October mid-term break. This delay was necessary for several reasons:

1. Other significant project launches were already scheduled for late September (Deep Blue Data, the Mellon-funded Fulcrum project), meaning that key staff would be focused on other priorities.
2. In early October, key staff would not be available
3. Switching DNS entries for the MGet It application from the Serials Solutions-hosted platform to the library's might mean that users would see the old site or the new, providing an inconsistent user experience.

² See "Measuring Journal Linking Success from a Discovery Service," by Kenyon Stuart, Ken Varnum, and Judith Ahronheim, *Information Technology and Libraries*, Vol. 34 (2015, No. 1).
<http://ejournals.bc.edu/ojs/index.php/ital/article/view/5607>

4. The Electronic Access Unit needed to update the 360 Link platform from version 1.0 to version 2.0 so that the locally-hosted version of the tool would have full benefit of direct-to-full-text linking. We did not want to make that change in the public eye, so wanted to make the DNS switch first, followed by the platform update.

The project team made use of the delay by giving library staff more time to review the interface and by conducting several rounds of usability testing of the new tool. This usability testing confirmed that we had created an easy-to-understand interface that users found helpful, rather than a roadblock, on their path from a citation to full text. (See Appendix 2 for a summary of the results of this testing.)

Launch & Initial Response from Campus

The new MGet It service launched on Monday, October 17, during the central campus's mid-semester break. The technical components of the launch went smoothly, thanks to efforts by LIT's Architecture & Engineering department to stage and test the code in a production environment the week before. Once the main interface for MGet It was moved to our locally-hosted tool, the Electronic Access Unit converted our 360 Link 1.0 instance (which will no longer be visible to the public) to version 2.0, giving the new tool access to the updated API and direct-to-full-text links. This change went into effect, as planned, on Tuesday, October 18.

The cutover to the version 2 API caused a few small problems with presenting appropriate full text links for some items linked via a DOI, but those were identified and resolved by Wednesday, October 19. Because of these small changes to the API code, we deferred switching the library's own ArticlesPlus from its former workflow to MGet It until Friday, October 21.

Coincidental with our launch, the PubMed API was experiencing difficulties of its own. This API is used to turn PubMed IDs -- provided by PubMed, Medline, and other sources -- into full text links. The PubMed service was in the midst of updating their infrastructure to run on HTTPS only -- a secure connection -- causing intermittent issues with any application that makes use of the service. These issues affected both the 360 Link native interface and our local interface during the first weeks after our launch, but have since been resolved by Serials Solutions.

It also became apparent that a small design change was needed to show the "report a problem" link on MGet It pages where no full text options were available (the initial design omitted this link in this situation). As noted below, the majority of the feedback we received was due to failure of the system to provide links, rather than about the interface or workflow.

We kept an eye on Google Analytics for the 360 Link native interface (which theoretically should not have been seen) and noticed that several citation services, most notably Google Scholar, were still directing traffic to the hosted link resolver using Serials Solutions' URL, rather than <https://mgetit.lib.umich.edu/>. In most cases, Kathleen Folger updated the link with the vendors. In the case of Google Scholar, we discovered that Serials Solutions provides Google with the

URL for its customers' 360 Link resolver interface and has no ability to customize them on an individual basis. To resolve this problem, Design & Discovery added some JavaScript to the 360 Link interface that redirects traffic from Google Scholar to our locally-hosted link resolver interface.

For the first three weeks after launch of the new interface (October 17 - November 9, 2016), there was a link at the top of the screen asking users to provide feedback on the tool. During this time, only 38 responses were submitted over the course of about 78,000 pageviews. Most of the initial reports were providing feedback on *failures* of the tool to present a full text link; most of these would have been better processed by the "report a problem" link because they largely involved bad data from the 360 Link API or failures of the PubMed API to provide a result. See Appendix 3.

Between the launch of the new MGet It interface on October 17, 2016, and November 30, 2016, the new MGet It interface processed 151,915 full text article requests. Over this time period, 215 reports were submitted through the "report a problem" link in the MGet It interface. This compares to 367 reports submitted through ArticlesPlus for the same period (out of 135,238 ArticlesPlus searches). To provide a rough comparison of the two, MGet It generated 1.42 problem reports per 1,000 links requested while ArticlesPlus generated 2.71 problem reports per 1,000 searches.

We also took advantage of the new tool to convert MGet It to be accessed exclusively via HTTPS. This means that when a user is interacting with the MGet It interface, all transactions between the server and the user's web browser are encrypted, protecting the exchange from third-party observation.

Library Analytics

Now that the library has a locally-hosted interface to the link resolver, we are starting to capture detailed information about use of the tool. For each transaction, we are capturing and storing selected information about users as transactions to help us understand who is using what kinds of resources (see tables 4.1 and 4.2 in Appendix 4 for a description of the data being collected).

As of early December, these data are being stored in MySQL tables, but will be migrated to the new analytics infrastructure when it is ready to accept data. As part of the independent library analytics project, tools will be developed to do basic reporting on usage patterns (by school/college or department, by kind of user, etc.) to understand how resources are used at a more granular level than is presently possible.

Lessons Learned

The link resolver is an essential tool for nearly all library patrons, and major changes to the user workflow and interface have far reaching impact. We recognized this from the beginning of our

project and made a concerted effort to communicate in advance with all stakeholders (we visited PARC multiple times, sent messages to the “libraryallstaff” email group, and presented at the Public Services Communication Forum). However, in retrospect we should have been more aggressive in working through detailed user workflows affecting specialized user groups, such as Taubman informationists and health sciences patrons. We could have done more targeted user testing earlier in the process, and may have prevented last-minute concerns.

We underestimated the amount of logic in the 360 Link native application that we would need to replicate, especially with the prioritization of database ranking. Our library’s database prioritization -- the ranking we give various full-text sources so that the most reliable targets are the ones that appear first in the list of full-text options -- are not reflected in the data the 360 Link API returns. Design & Discovery worked with the Electronic Access Unit to export these rankings from 360 Link and use them in our interface. EAU will provide updated database lists to Design & Discovery monthly, or more frequently as significant changes are implemented.

Usability research was conducted on existing link resolver functionality and prospective designs within prototypes. Fully functional prototypes were unavailable during development because we didn’t have access to the API for testing. The lack of a fully functional prototype and testing environment provided many challenges in simulating the contexts and conditions our users encounter when using the link resolver.

We were able to simulate current behaviors within clickable prototypes that combined simple functionality with still shots of Umlaut designs, existing search results, record view and vendor result pages. Feedback from usability research on Umlaut page design prototypes was very positive.

We were able to meet with individual stakeholders to hear their concerns about how the link resolver would interact with third party applications. We were able to test stakeholder concerns using documented workflows (e.g. Link Resolving within Endnote, etc.). These tests helped us discover and clarify how the link resolver was working and currently works with third party software.

Next Steps / Recommendations

Service Team / Maintenance Plan

Moving forward, the implementation team agreed that it is not necessary to create a new service team to handle any future issues related to the new link resolver. Between the Ask a Librarian service, Electronic Access Unit, and LIT’s Design & Discovery team, we already have the infrastructure in place to follow up on any problems that may arise.

Future development work, based on these and other assessment efforts, will be coordinated by Ken Varnum, LIT's Senior Program Manager, in conjunction with staff in Design & Discovery and PARC.

Future Development

Several functionality suggestions were revealed during library staff testing. While these were not deemed critical for the current release, they should be considered for a future phase of MGet It development:

1. Add a journal-level link for each resource, even when the 360 Link API does not return one. This would be useful for troubleshooting by staff or users when the item-level link is not successful. In the current version of MGet It, there is a link to the publication platform which may include many journals under one interface.
2. Create a staff-only or advanced tool to pre-populate the citation linker form with any OpenURL. While this would likely be used primarily by library staff, if it were developed it should be available to all users. This would be helpful for advanced users to tweak the data in the original OpenURL in order to correct erroneous elements or add other information.

Assessment Plan

Design & Discovery will continue to do user research on the current interface, with a particular focus on understanding how users on the medical campus interact with full text content through the MGet It interface. Design & Discovery is coordinating this research with staff at the Taubman library, and are planning a series of user sessions for the winter term.

Additionally, Design & Discovery have prepared a longer user survey (in comparison to the quick user feedback survey that ran in October and early November). This is planned to run in January 2017 once the interface is no longer novel.

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Appendix 1. Early-Stage Usability Research

The objective of early usability research was to identify areas where we could improve design, content and functionality in the interface. The usability research conducted at the beginning of the project involved in-person moderated usability research with six participants (2 Undergraduate, 3 Graduate Students, 1 UM staff member) using a high fidelity clickable prototype.

Key findings: Need to clarify main pathway to full text, include publishing information in item description and to show only the highest rated online option with a 'Show n more options' below it.

1A: Design Stage Usability Research (Data)

User	Website Usage	Task 1 Completed	Task 1 Completion Time	Task 1 Comments	Task 2 Completed	Task 2 Completion Time	Task 2 Comments	Umlaut Elements that Helped User	Umlaut Elements that did not help	Umlaut Elements they were indifferent to	Wishes	Warm up Exercises
University Staff		Y	0:00:02 sec	Seamless use of Big Blue Button 'Read Article' (6/100 of our users), no distractions and no questions, just uses it almost immediately. Expects to be able to browse an abstract of the article when they hit 'read article' button. "I can't see what the original dates were on the current citation to compare to the other digital sources options." "I'm not sure what this is telling me the directory is..." (referring to the directory structure when she clicks on the 'more sources' button. Tried to use the 'favorites' button to save link.	Y. Found article but did not identify it as correct. (Vendor Cover Page issue)	time to first interaction (click on 'Go to Journal') 00:00:16; Time to find PDF 00:02:09	User states: "You have to have all the information about the resource: Title, Author, Vol., Issue, Date, Pages." You have to copy all this (The Citation) and paste it in to the Vendor page. If searching the vendor page doesn't work, then she would copy citation and search Google. "I'm reluctant to go to the librarian (Ask a Librarian)... if the article is unavailable via the vendor I don't need to hear that again from the librarian."	Read Article button (Very Good), More Sources button, article citation information (some info like publishing date was missing and made finding full text sources much harder), clicked favorite article (to save it)	Misinterpreted the database date range of availability for the article's publishing date. (Needs to be explicitly related to database and article level citation info needs to be as complete and explicit as possible). The directory tree was confusing to the user, they could not discern a relationship between the article, journal and database in this format. When the other sources button was selected they were more confused about the difference between both			User searches Scifinder search engines instead of library website
Library Staff 1		Y	0:00:04 sec		N. Couldn't identify correct Citation Info (Missed Supplement Info)	time to first interaction (click on 'Go to Journal') 00:00:24; Time to find PDF 00:05:09+ (abandoned search-missed issue supplement in citation searched issue 1 instead)						Uses Google to do initial search for full text
Graduate Student 1		Y	0:00:22 sec		Y	time to first interaction (click on 'Go to Journal') 00:01:42 (Scott is giving lots of description of actions/thought process); Time to find PDF 00:03:52	Clearly understands that read article is unavailable. "I'd like to know why it's unavailable". I can go to the journal but I'm not sure why I have to do that. "I'm not sure what's in the database, can I read the article there?" (We can make sure to label database column as 'Vendor Database' or 'Journal Database' if we style 'see more options' as a table					Uses Google Books to do initial search for full text
Graduate Student 2	A couple of times in three months	Y	0:00:02 sec	If user ran into trouble with page, she would use 'Ask-a-librarian' service or 'see more sources'	Y	time to first interaction (click on 'Go to Journal') 00:00:23; Time to find PDF 00:02:07	"I want to know how to find the article if 'Read Article' is unavailable" (Better Error Message). A table would be easier to see journal and database level links when article link is unavailable.	Read Article button (Very Good)			Need a 'Copy Citation info' option so users can copy and paste citation info into journal or database to find the full text article	Uses Google Scholar to do initial search for full text
Undergraduate Student 1	Only used 2 to 3 times total, uses laptop at home	Y	0:00:05 sec	Goes to full text without hesitation, where are the author names,	Y	time to first interaction (click on 'Go to Journal') 00:00:36; Time to find PDF 00:01:47	User clearly identifies that article is unavailable but doesn't know where to go next. "I'm not sure if these 'go to journal' or 'go to database' buttons would help, but I would try them." User wants to copy and paste Article title, date, issue, page number from link resolver to the vendor web page's search bar instead of navigating through the issue info to find the article on the vendor site. User searches vendor database using just part of of the article title and finds article at the top of search results.					Uses Google Scholar to do initial search for full text
PhD student & Faculty	Every day	Y	0:00:02 sec	"This is perfect"	N, talked through process together	time to first interaction (clicks on 'Go to Databases') 00:00:58; Time to find PDF ---:--: (didn't do that task, talked through process together)	"I think it's nice to see it nested..." (Speaking of relationship between article, journal and database - when article level link is unavailable) If 'Read Article' link isn't available, wants a clear alternative to resource like (Direct Link is unavailable, click Go to Journal to find article). Clicking back and forth between Vendor site and Umlaut Page. Options are too complicated. "What do I do if I can't go to the article." "I'm extraordinarily grateful for the resources the library provides, but if the links could get me to my resources in a clearer way that would be great."	Read Article' Link;			Would like to be able to save a pdf in a save as window to put it in his personal folder system rather than downloading a pdf automatically to the desktop. He doesn't like the extra step of finding the file in his downloads folder and then renaming/moving the pdf to his own folder system.	

1B: Design Stage Usability Research Findings (Presentation)

Umlaut Designs User Testing

Link Resolver Implementation Team - July 2016



Objectives

Objectives

1. Can users access full-text articles via the link resolver page design?
2. Can users get to full-text when only journal level linking is available?
3. Can users report a problem with a broken link?

1. Can users access full-text articles via the link resolver page design?

100%

- 6 out of 6 users accessed desired full text via the 'Read Article' Button
- Users took just 3.9 seconds* to identify and use button

What does this mean?

- Identifying & Clicking the 'Read Article' button is quick, easy and clear
- User responses: "This is Great!", "So much easier!"
- 80 to 90% of our users will encounter this kind of Link Resolver page on a regular basis.

What about the other 10%?

2. Can users get to full-text when only journal/database level links are available?

- Yes, but...it requires a substantial increase in user attention and effort (**35s** to first interaction, **2m 45s** to find Article via Vendor page)
- **4 out of 6** users still found the article through vendor page
- They all tried to **copy/paste citation information** from the link resolver page to vendor page (journal or database level)

What can we do?

UX/UI Suggestions

- Focus functionality of Link Resolver page to what it says it does: Link users to Electronic Text (not physical holdings info/document delivery)
- Let users access physical copies/document delivery through search results rather than in the Link Resolver page. (When no electronic version is available a link to holdings info at the search results page will help them understand relevant services)
- Clearly indicate key Item Information: (Item Title, Journal Title, Author(s), Publication Date, Volume/Issue/Supplement, Pages)

Additional UX/UI Suggestions

- When Article Level Link is unavailable clearly indicate (in a clear and conversational tone) where they can go to get the article (search journal website with citation info to find article...)
- Provide an easy way to copy citation info and paste in vendor website to find article...(so they don't have to toggle between two tabs)
- Continue having links to article, journal, database open a new tab
- Place 'report broken link' link next to 'Article Unavailable' error text
- Keep layout order of Article (left) , Journal, Database, Database date range (right) in a column structure with column headings

More to come...

Appendix 2. Final Usability Research

A second round of usability research was conducted with three participants (an undergraduate student registered with The Office of Services for Students with Disabilities, a 1st year undergraduate student and a PhD student). The objective of the study was to identify bugs, design/content challenges for users trying to access full text via the link resolver page. Participants used the testing instance of the link resolver page.

Key findings: When full text links are available on the link resolver page, researchers find and access the articles without difficulty. When a direct path to full text is not available, users are aware of secondary options (Ask-a-Librarian, 7-fast, Mirlyn, report a problem) but prefer to use more familiar search engines (Google, etc.) to search by title or to return to search results to edit their search.

2A: Final Usability Research Moderator Script

Background

The Library is trying to improve our website and we have a particular page we'd like to ask for feedback on today.

Problem Statement: **How do we make it easier to access electronic full text?**

There are no right or wrong answers, we want to hear what you're thinking and your gut reactions to the interface. As a researcher at the University, your feedback is invaluable.

As a thank you we'll send you a gift card via email.

Warm Up Questions

- What do you study at the University?
- Tell me a little about how you use the library website in your research
- What web browser do you typically use?

Scenario 1 - Link Direct to Item

Let's say you are doing research on water analysis in the Detroit river on the library website.

Tasks:

- Show me how you would search for 'water analysis detroit river' via the library search box.
- Please find and select the full-text article "***Occurrence, habitat, and movements of the endangered northern madtom (Noturus stigmosus) in the Detroit River, 2003–2011***"
- (Upon seeing Umlaut page for 1st time) ask, "What do you think this page is for?"
- Show me how you would access this article using this page.
- How do you typically access full text articles?

Scenario 2 - Link Direct to Item with more options (first option doesn't work)
[\[link to umlaut page\]](#)

Let's say you are trying to decide between several options to read an article.

Tasks:

- Please demonstrate how you would decide which option is best based on the citation info on this page.
- *How would they open a new page? (Expect it to open a new tab/ does user open a new tab themselves? (option or control + new tab) or another way?*
- *Do they want to refer back and forth between the Umlaut page and the vendor pages?*

Scenario 3 - No direct link to item, journal level link [\[item with journal level link\]](#)

(Bring up page with Journal Level Link)

Task:

- You entered a search for a Journal 'Times' and the article date (1927-03-02) but you had no article title and you get this page. Show me how you would use this page to get access to this article.
- *How would you expect to find and read an article if the 'read article' link wasn't available?*
- *Where might you go to get better info about your desired article?*
- *Are any other options on this page helpful? Why or Why not?*

Scenario 4 - No electronic access through Link Resolver, use Mirlyn to get electronic access

(Show search result that leads to an Umlaut page with a broken link)

Tasks:

- Let's try another example. Walk me through how you'd find full text for an article titled, ***"Presence of pharmaceuticals and pesticides in Detroit River water and the effect of ozone on removal"*** and describe your actions out loud.
- Show me what you would do if there was no electronic access to item you're looking for
- Show me how you would look for a copy of this item in the library catalog [test Mirlyn link] (no link in Mirlyn, only title search)
- Show me how you would request a copy of this item to be scanned and sent to you in a PDF

Scenario 5 - No electronic access, only physical copies

(Show search result that leads to an Umlaut page with a broken link)

Tasks:

- Show me how you would find the following article: "**TRANSIENT ANALYSIS OF THE DETROIT RIVER BY THE IMPLICIT METHOD**"
- If the library doesn't have electronic access to the item you want, show me how you would request this item from 7 fast or from from another Library
- If you weren't sure what to do at this point, show me how you would chat with a librarian for help

Scenario 6 - Button Labels/Difference between chapter or full book [Link to Book Chapter Example](#)

(Show search result that leads to an Umlaut page with Book Chapter Button & Full Book)

Tasks:

- Let's say you arrive at this page after searching for a book title and the term 'magic'. Please show me the available options for accessing this full text.
- Is the button label and message on this page typical for how we've been using this page? Why or why not?

Scenario 7 - Disambiguation due to vague search parameters [\[Link to Search Results - select top link\]](#)

(Show search result page that leads to an Umlaut page needing disambiguation)

Tasks:

- Let's say you're looking for a newspaper article with the Title, '**Obama won't meet Phillipine president**' and you arrive at this search results page. Show me how you would get to the Article?
- If that didn't work, show me where would you go next

Post Test Questions

- (Show the Umlaut page) How would you explain this page (Umlaut page) to another student who encounters it?
- What kind of instruction would you like to receive on how to use the MGet It page?
- Have you ever given up while using a MGet It page? Why or why not?

- If you had to rush to find 3 full text articles for a paper tomorrow and you needed access to an article or ebook today, how would you find them? Why would you go that way to find it?
- If you had a magic wand and you could change anything on this page what would it be? Why?

2B: Umlaut Beta Usability Research (Data)

User Type	Familiarity with Library Website	Technology Expertise	Scenario 1 - Link direct to Item
Sophomore (Student)	New User (first time seeing library website)	Internet - 4 of 10; PC user (intimidated by a mac)	<p>Selects "Read Article" button (under 2 seconds) arrived at full text. (3:26) "It said full text right there, it was pretty easy." "Typically, I use Google to look for articles." If this link was not available they would click the back button (this currently doesn't work because the link resolver page button in search results opens a new tab) Recommend following standards and staying in the same tab. At 4:26 user copies and pastes same article title from Articles Plus search results into Google Search bar. It is the first article to appear in Google Search Results. She clicks on the article and gets the same vendor (Science direct) page that MGet It led to. User confidently stated, "See, it's right there.'</p>
Freshman (Student) LSA student	New User, no U-M library training yet	Internet - 7 of 10; Mac user, uses Safari but also Chrome	Quickly clicked "Read Article" button (under 2 seconds) and arrived at full text.

Scenario 2 - Link to Item with multiple options	Scenario 3 - No direct link to item, journal level link	Scenario 4 - No electronic access through Link Resolver, use Mirlyn to get electronic access
<p>Select main link, if it doesn't work they would select additional links until one works. User doesn't notice they clicked journal level link when looking for article. If user needed help at this point they would click "Ask a Librarian"</p>	<p>Selects "Go to Journal" button, also uses the journal name link to the side of the button. User highlights citation info in Link Resolver page and copy/pastes it into journal search page</p>	<p>User doesn't notice the name of the journal in the Link Resolver when they select "Search Catalog" option. They don't think the search result in Mirlyn matches their search result in Link Resolver. (Recommend changing "Not available online?" header to be more specific "Not available through MGet It?") also we could be more specific than "Search Catalog" by saying "Search for this item in the catalog" (overall - help people know what to expect when they are clicking on a link)</p>
<p>Selected "show more". Would select the first option, then see if any of the vendors looked familiar. If they didn't look familiar she would work down the list in Link Resolver until she found a link that brought her the full text. If none of the links worked then she would go to secondary options (Ask a Librarian, ILL/7Fast, Report a broken link)</p>	<p>Wasn't sure what the title meant (journal or article title?); If they saw this page, they would try another search. Used Google (copy/pasted title) when they encountered the "Citation Only" MGet It link in the search results - (This worked)</p>	

Scenario 5 - No electronic access, only physical copies	Scenario 6 - Button Labels/Difference between chapter or full book	Scenario 7 - Disambiguation due to vague search parameters
<p>User would click "Ask a Librarian" for these alternative options. If they did use ILL button they are confused by this page: [https://www.lib.umich.edu/help/sfx/docsys/openurl.php?aufirst=Ledbetter%2C+Mary&genre=article&isbn=&issn=1056-0300&title=social+studies+and+the+young+learner&year=2013] (It is difficult for users to parse through required fields that may or may be populated from their query.)</p>		<p>User reads help text in this page. Sees that newspaper articles all have the same date on Link Resolver Page. User would click through all the results until one works well. They stated, "I don't know what I'm doing." (they would click through each disambiguation link)</p>
<p>User recognized this was a different page and read the link resolver content</p>	<p>User would prefer to select "Go to Chapter". Would use "Go to Book" if they had to.</p>	<p>User realized she would have to search again in Factiva website. By the 3rd attempt she did another search in the vendor page (Lexis Nexis). User would just work down the list of disambiguation hits in the Umlaut/link resolver page till they found the right one or she would abandon the MGet It page and Google search the article title.</p>

Other	Have you ever given up using this page? Why?
<p>Would give up if links made her search too many times for full text. User suggested defining Citation information with clear Title: [name] format. (Title: [title], Name: [name], etc.) Describe fields rather than just show them.</p>	

<p>PhD (Student) Higher Education</p>	<p>Advanced user, searches for journal articles, books, searching for funding, uses research guide for education, uses ask-a-librarian, goes to Hatcher Library to do research in person</p>	<p>Internet - 8 of 10; Mac user, uses ProQuest (doesn't click full text because it limits results too much)</p>	<p>"Sometimes when you click on MGet It, you don't go to full text" user says. PhD Student uses ProQuest for most of his research. Doesn't expect the 'read article' button to work.</p>
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Student quickly clicks the main "Read Article" button (action < 3sec) and accesses PDF. User likes to use proquest download because he can easily save into his own folder on his local machine.

Clicks through to Journal but gets stuck on Journal level page

When user sees "Online Access not available" message he says he would abandon search at this point and look for an article that has a PDF he can download. Has heard stories of students having a copy delivered but he has never had the energy to figure those options out. "When it gets to this part, I just don't have time" "I get hyper focused [in my search] sometimes...I want to get everything I can during a search because tomorrow I probably won't have time to return to it."

PhD student has never had time or interest in requesting a physical copy. "I do 'binge' researching, if I have a couple research topics I'll do that for a while, hyper intensely focus on it because I probably wont focus on it another time.

(This scenario for this user worked differently than button labels) When disambiguating the same newspaper title in search results the student clicks the top result title and looks in the full item record for a full text link at the bottom of the record rather than using the MGet It link.[important behavior for search beta] . "For some reason I think if there is a link down here that it would be better than the MGet It Link. Immediately selects read article button.

User reads and compares dates, publisher loca

"The link resolver page tells me how to get to the article or the journal, it gives me the information about the article to get there." "There is the Michigan search stuff, then there's the actual journal that's somewhere and this is the intermediary page that bridges the two."

"I don't like to use it" [link resolver page]. I especially like it when there's a PDF on the article...like in ProQuest, if I can see the PDF, I can just download it there. ProQuest also allows me to download it into a folder I choose, whereas, this one just downloads the file to your downloads folder or to your browser automatically without giving me the choice of where it's going. User wants to save the file with his own file naming convention in his own folder system and ProQuest Download interface makes that easy.

"sometimes you can sometimes you can't" [get the article]. There's a part of me who wants the MGet it page to be a pop up or a smaller window on the search results or full item record page. There's not a whole lot of information, so if it popped up and I could click it and it would go away and it would give me the article, rather than opening up a new tab. I don't know if I'd love that but I think I would. It certainly wouldn't be mobile friendly. The date, title and journal title I already know from the previous page so it's not super helpful.

I should ask, "Show me the page on Proquest that helps you the most when researching articles." The student says, "I do my initial search and then I use the search results page. PhD Student doesn't use Mendeley or any other citation management tool. He uses his own system to keep track of his research in his own files on dropbox, for articles he might use later, he saves them on his hard drive.

Appendix 3. User Feedback

After the launch, a user feedback form was made available from the link resolver page. The response rate was very low; 0.05% of page views resulted in user feedback. Coincidental with our launch of the new interface, PubMed was experiencing significant stability issues, leading to an initially negative reaction among those who opted to provide feedback. Of the few 38 total responses, 25 (66%) gave it a rating of “much worse than the previous one”. The [raw survey results](#) are available via Google Drive (all personally identifying information has been redacted). Almost all feedback was received in October (between launch on October 17 and October 30) before the PubMed API problems were resolved by the vendor; the form was available until November 9, but only two reports were submitted during this time, neither with the lowest rating.

Individuals were asked to provide a statement as to why they gave it the rating they did. Those who gave it the “much worse than the previous one” rating did so for a few reasons, as outlined in the table below. Many of the problems were related to the coincidental issues 360 Link was experiencing with DOI resolution in general, and PubMed in particular. Because of this 360 Link problem, no data was returned to the application, resulting in a screen with no citation information or links to full text. Once the problem was identified, we showed an error message to indicate that the user should try again soon.

We followed up with all the users who shared their email addresses through the survey to help identify the problem and to provide the individuals with the documents they had unsuccessfully accessed.

The follow list summarizes the reasons users provided for giving the lowest rating. See Table 4-1 (Reasons Provided for Lowest Rating of New MGet It Interface) below for verbatim comments.

- DOI/PubMed (11) -- reflects problems with OpenURLs containing DOIs and PubMed IDs
- Interstitial Page (4) -- reflects concerns with the always-present MGet It menu
- No Export (5) -- reflects concerns about the lack of an option to export a citation to RefWorks or other citation management tool.
- Other (5) -- a catch-all for other concerns.

Appendix 4

The following tables show the data being collected about users of the MGet It link resolver interface and about the source and target of their interaction.

Table 4-1. Data about the User

Data point	Description/explanation
IP address	Network address for all users
Access location, e.g., <ul style="list-style-type: none"> ● On campus ● Off campus ● Proxied ● State/Country 	Translation of IP address to geographical location
Academic status, e.g., <ul style="list-style-type: none"> ● Student <ul style="list-style-type: none"> ○ Undergraduate ○ Graduate ○ Post-Doc ● Faculty ● Researcher ● Staff ● Other ? 	Looked up from Registrar's data.
User agent string	The browser the user was employing at the time of the request
School/College	Looked up from Registrar's data.

Table 4-2. Data about the Transaction

Data point	Description/explanation
OpenURL or IEDL	Kind of link
Raw OpenURL	The entire OpenURL passed to Umlaut
OpenURL SID	The Source ID for the originating platform; recorded separately for data analysis
ISSN / eISBN	Extracted from the OpenURL for quick analysis
Link(s) on the Umlaut screen the user clicks	All clicks on the interface to resources or services
Bounces	User lands on page, clicks nothing, and leaves
Was there full text	Was there a link that claimed to provide full text, or only issue, volume, title, publisher-level access?
Target vendor/platform	The domain of the vendor that the OpenURL resolved to
Referring URL	The URL from which the OpenURL request originated