



Grey Literature Report
Fill the gaps in your public health research



User Testing Report of GreyLit.org

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EXECUTIVE SUMMARY

GreyLit.org is the website for The Grey Literature Report, a collection of publications and reports made available by The New York Academy of Medicine. The goal of GreyLit.org is to make grey literature items from the Academy's collection available to the public and to assist other librarians with collections in similar fields to develop their own reports. If the Grey Literature Report hopes to be accessible to a growing population of users, it is crucial that the site operate in a way that both experienced and novice users can understand.

To evaluate the usability of GreyLit.org, a team of three usability experts conducted a User Test of the site. User testing is a method of user experience research wherein users are observed in a controlled setting completing a set of preselected tasks. Six participants were observed performing three tasks on the site:

1. *You're conducting research on how the Affordable Care Act was received during its initial rollout in 2010. You are trying to find one article in support of it and one against. After you find the articles, select them and download them for future reference. Keep in mind, your co-workers have warned you that the search functionality of the site is not perfect.*
2. *You were just talking about the content of one of these articles with a colleague! Share it with them online.*
3. *You're thinking about donating to the Grey Lit program. Find where on the site you could get more information on how to donate.*

The results of the user testing study were analyzed using the System Usability Scale (SUS), a standardized questionnaire that quantifies user experience. Using this scale, the site ranked quite well on learnability, but it was dragged down by its usability ranking.

By taking into consideration the expressed thoughts and feelings of the observed users, we have made recommendations on how to improve the functionality issues that were discovered. We separated our recommendations into two sections relating to **minor** and **major** issues within the site. We put forth five suggested changes that would require minimal site redesigns and would address minor issues relating to the search process, downloading and sharing articles, and donating to the program. We also identified a number of larger, more complex problems that frustrated and confused participants, and would require a more substantial overhaul of the setup of the site.

By following the recommendations laid out in this report, GreyLit.org will more closely resemble similar research sites, and therefore create a more positive experience for its community of users.

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INTRODUCTION

GreyLit.org is the website for The Grey Literature Report in Public Health, a bi-monthly report published by The New York Academy of Medicine, aimed at alerting readers to new grey literature publications in health services research and selected public health topics. Created in 2011, the site serves as a database for the Grey Lit reports, providing a web resource for public health researchers to fill in the gaps of their peer-reviewed literature research. GreyLit.org, while aware of some functional problems, had never been officially user tested to find solutions to said problems.

Interested in an overall site analysis, GreyLit.org was tested by six participants who performed a series of tasks on the site while using a screen-capture software, as guided by evaluators. Results were gathered and analyzed from which several recommendations were formed with the intent to rectify usability problems of GreyLit.org and create a more positive research environment for its users.

METHODOLOGY

For the purpose of this study we conducted a usability test to assess interactions with the website for The Grey Literature Report (GreyLit.org). User testing is a method of user experience research wherein users are observed in a controlled setting completing a set of preselected tasks. For this report, six in-person tests were conducted to assess participants' interactions with GreyLit.org. While the site administrators are aware of some functional problems such as limited search capability and citation downloading, we tried to be objective when creating tasks that we believed would result in an overall site analysis. These tasks included searching for articles about a relevant medical topic, downloading and sharing said articles on social media, and exploring donation information for The Grey Literature Report.

Participants

The mean age of the six participants was 27 with half (3) being over the age of 25. The majority were female (5:1), and all had at least a graduate education level. When asked about preferred online research sources, five out of six mentioned Google in some capacity as either Google Scholar or simply as the search engine (Google, Google search). The same number of participants mentioned academic databases. One participant was familiar with the concept of 'grey literature' before this test began.

When rating themselves on a 1-7 scale for familiarity/comfort with technology, 1 meaning "Not at all" and 7 meaning "Expert", the mean rating was 5.67 with half (3) selecting 6 and half (3) selecting 5. The familiarity/comfort using online databases was lower at 4.83; answers on the scale varied including a 2 and a 4. Half (3) considered themselves quite familiar with the research, selecting 5 on the scale. The remaining participants selected 6, 6, and 4 on the scale; the mean was 5.17.

Data Collection

Tests were completed in-person in a controlled environment. The tests were scripted with each usability expert following the setup and procedure outlined by it (see Appendix A). We used screen-capturing software that recorded each participant's interaction with the site, click for click, as well as all audio. Users were encouraged to think out loud throughout the test in order to better explain the decisions that were being made, and what they were thinking and feeling during the process. For continuity of experience and with the intent to replicate common experiences with the site, all tests were done using the web browser Firefox.

The main points of data collection were:

- Pre-test demographic questionnaire
- Three site-based tasks to perform on GreyLit.org
- Four post-task questions
- System Usability Scale post-test questionnaire

Post-task questions were open-ended to be answered qualitatively by participants. We asked about feelings, gave the opportunity for suggestions, as well as any additional information they felt like they had not had the chance to say.

The System Usability Scale (SUS) is a standardized questionnaire that quantifies user experience. The SUS consists of 10 statements about a variety of metrics from ease of use to the users' feelings while using the system. The user rates each statement from 1 to 5, with 1 indicating "strongly agree" and 5 indicating "strongly disagree." The responses from the SUS are combined and put through a calculation that yields an overall score, a usability score, and a learnability score. The scores all are on a 1 to 100 scale, meaning they are easily understandable. Moreover, the SUS is incredibly widely adopted, so it gains tremendous value

by producing a standardized usability result that is easily comparable to other scores as well as a variety of published benchmarks (Sauro, 2011).

Analysis

Feedback was analyzed by – based on notes taken during the test and after re-listening to test audio – creating a spreadsheet of general notes from each task as well as the responses from the post-task questions for each participant. For anonymity, users were only identified by ID numbers given to them during the test process. Experts did their best to use direct quotes in order to better support recommendations that would be made. We looked for patterns of common usability issues encountered by participants and from these we were able to find minor issues that may hinder a user familiar with the site as well as more major usability issues as they would effect and possible deter the novice user. A condensed version of our table can be found in Appendix F.

Using System Usability Scale responses (data), we were able to calculate a raw SUS score which determining a confidence interval and a percentile rank (see Appendix D).

FINDINGS & RECOMMENDATIONS

The Grey Literature Report received an overall SUS of 48.8, which is in the 11th percentile of all web-based systems and rates as poor. However, due to the small sample size and significant variation in participant responses, the standard deviation of the SUS was 21.8. This means we can be 95% sure that the population mean SUS is between 25.8 and 71.7. For comparison, a 71.7 is in the 62nd percentile and rates as good. The site ranked quite well on learnability (79.2, 82nd percentile, good,) but it was dragged down by its usability ranking (41.1, 6th percentile, poor.)

In general, participants expected The Grey Literature Report to behave like a database, which most users were very familiar with. Therefore, they did not need much explanation or help to complete the tasks. As one user narrated their search process:

“

I'm looking to see... can I click on the article? Yes. "View Detailed Summary. I'm seeing if they have good subject headings. Which it seems like they do, so I'm going to click on [them.]

However, when the site deviated from what users expected based on their interactions with other sites, they were upset and confused. As the same participant said later while trying to

locate the article within the detailed summary page, “Where’s the article though?” There was a trend of confusion across all participants – words like “disjointed” and “frustrating” were used during post-task questions.

This trend continued when users were asked to share an article on social media. Users classified this as “fine” to “confusing” and “not successful,” mostly because it deviated from what they have grown to expect from social media sharing on other sites.

Finding information about donating deviated a little from what users were expecting, though most found it to be simple. The action was only hindered by the redirecting of the “Donate” link to a new website that was not GreyLit.org. All users deemed it successful in the post-task questioning.

Acknowledging these trends, recommendations were made for both users that were categorized as *minor* for the familiar user and *major*, for more dramatic changes to benefit the novice user.

Minor Functionality Issues and Recommended Changes

The results of the usability study brought attention several functions within GreyLit.org that hindered the users’ ability to use and understand the site’s functions properly. We have outlined these changes as **minor**, since they would most benefit a familiar user of the site and would require fairly minimal redesign efforts.

Searching

Because the search functionality of the site is known to be limited, the users in the study were warned of the limitations as a part of the first task. Despite the warning, most of the users went straight to the search bar to begin their first task of locating articles within the report. A casual user would not necessarily know to reference the FAQ section before performing a search, and the search is still a very significant function for the site overall. We recommend adding in some language to the search bar to bring attention to the search limitations until this function can be improved in the future (Fig.1).

Search the Report

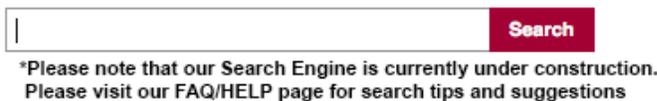


Figure 1: Recommended text addition to the Search bar

After performing a search, two of the users expressed confusion at the way that the results were sorted. They found the available sorting options to be unhelpful, and the difference between the two options “Catalog Date” and “Publication Date” to be unclear. It was also noted that although sorting by “Author” is the first option, many of the articles do not have Author names listed.

Sort By: Author Title Publisher Date of Publication Catalog Date

Figure 2: Sort functions currently available on GreyLit.org

Users commented:

“ I’m not sure what the difference is between Catalog Date and Publication Date. They should clarify that.

“ They should ensure that the search results are sorted in a consistent way, with different filtering options, so that the default is the same when you repeat a search.

We recommend adjusting the search sort options to remove the “Catalog Date” and “Author” options, and to make it clear which direction the search is organized (A-Z/A-A, Newest-Oldest, Oldest-Newest) (Fig.3).

Sort By: RELEVANCY TITLE PUBLICATION DATE PUBLISHER

Figure 3: Recommended changes to the search results sort function.

Downloading Articles

In our first task, we asked that users find two articles about a given topic, and then to download the files that they had selected. The “Download” button that appears at the top of the search results only gives two download options: MARC and BibTex/Refworks (Fig.4). Most of our users were confused by these options, and they were unsure as to how to download the article as opposed to the catalog records.

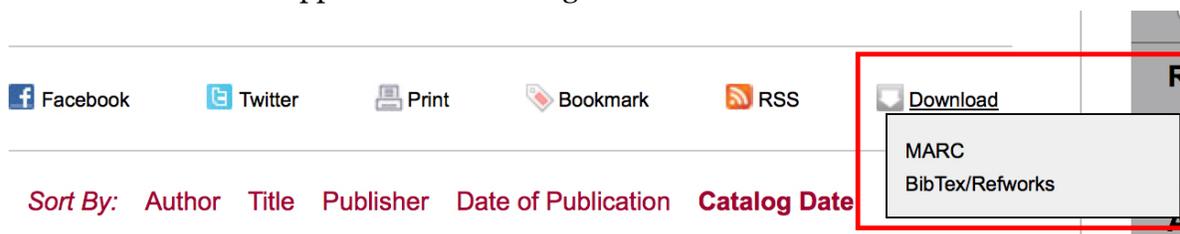


Figure 4: The “Download” button drop down on the search results page

Several users reported confusion as to how to download an article from the site:

“ Well now I don’t know how to download the file. I see "Download," but how can I do that without selecting it?”

“ I can download them here [Download dropdown link], but I’m not sure what I’m downloading. I want the article. I’m not sure what BibTex/Refworks means, but I don’t want that. I don’t want MARC either. I guess I could

bookmark it, but then I wouldn't have the file on my computer. I'm not sure what to do.

“

I would want to download the actual article. I don't want BibTex/Refworks either.

Upon further inspection, most of the users discovered the ability to download the PDF file or view the direct link for an article, but this was not immediately apparent.



To resolve this issue, one option would be to build out the ability for a user to do the action that he or she would expect -- to select articles of interest, and then to click a “Download” link at the top of the page to trigger a download of those articles. This would speed up the search process, as one would be able to save multiple articles at once without worrying about losing the search results (Fig. 5.)

Figure 5: Proposed change to download function

Another alternative option would be to remove the Download function from the top bar entirely. Users currently can only download an article from within each specific search result, but it is unclear why they can download MARC or BibTex/Refworks records from the top bar. By moving the entire download function to individual search results, this would greatly reduce the overall confusion caused by the Download button (Fig. 6.)

Title: Frequently asked questions : America's Affordable Health Choices Act of 2009

(H.R. 3200) [View detailed summary](#)

Publisher: [American College of Physicians](#)

Date of Publication: 2009

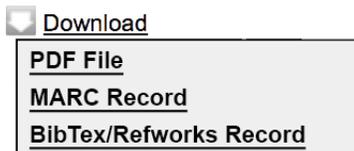


Figure 6: Proposed change to the Download function

Sharing Articles

In our second task, we asked users to select an article and share it with a friend online. The majority of the users stated that their first instinct would be to email the article:

“

For sharing it, I would email it.

The users did not make any attempts to share the article via the social media buttons (Facebook and Twitter), without being prompted to do so. Users expected to see an icon or link to directly email the article, but none is available:

“ *I would probably just take the link of the article and email it to someone. I don't like to do things like share an article right on Facebook.*

“ *I would try to email it, but I don't see that option.*

“ *I'm not sure how you would email an article. I guess you can open the link and email the link. I don't think there's any direct way to email an article on here. I only see Facebook and Twitter and Bookmark and Download. I don't see email, but I feel like that would be a common button to see.*

When directly prompted to use the social media buttons to share the article, users were confused by what happens when the Facebook and Twitter links were clicked. Since the buttons appear at the top of the search results instead of on the article level, the Facebook and Twitter share functions do not include any specific article links or text (Figs. 7 & 8.)

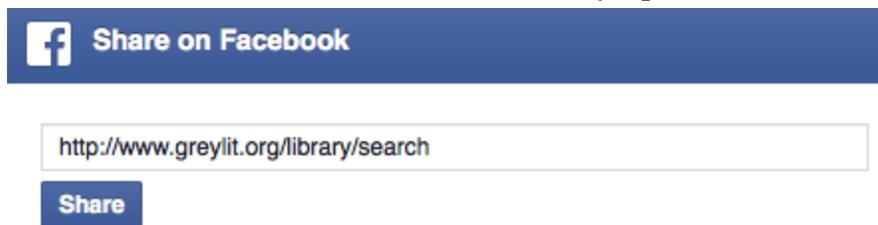


Figure 7: Facebook share function on GreyLit.org

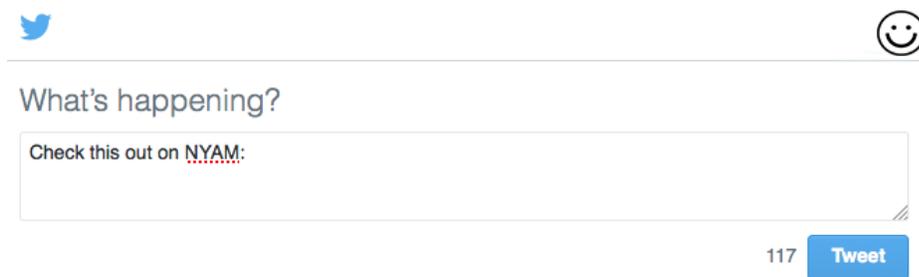


Figure 8: Twitter share function on GreyLit.org [profile image modified]

When guided to try to share an article on Facebook, one user commented:

“ *“I would expect there to be some sort of thumbnail on the Facebook link. Why is it showing a link to my search? I would want to share the article. This is not what I would expect to see.”*

When using social media buttons to share something online, users are accustomed to seeing a standard Facebook or Twitter pop-up, with the text and link for the article auto-populated and different options for where to post on Facebook (on the Timeline, in a message, etc.). We

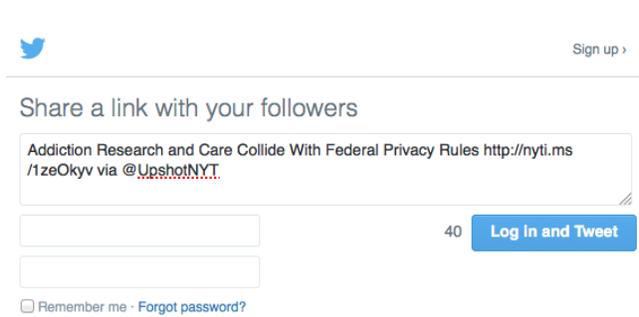


Fig.9: Twitter share function on NewYorkTimes.com

recommend altering the social media sharing functions to emulate this style, as shown here via NewYorkTimes.com (Figs.9 & 10).

Another option would be to remove the social media sharing altogether, and just replace them with an email function, as that was shown to be a much more popular method for users.

If keeping the sharing buttons on the site, we recommend moving them from the top of the search results bar to within the detailed summary level for each article, since it's unlikely that a user would want to share more than one article at once or if this is even possible in the current system set up. This



Figure 10: Facebook share function on NewYorkTimes.com [profile image modified]

change could be combined with the added Email function and modified Download function, as shown below (Fig.11).

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Title: Frequently asked questions : America's Affordable Health Choices Act of 2009 (H.R. 3200)

Publisher: [American College of Physicians](#)

Publication Year: 2009

Description: 13 p.

Notes: Caption title.; "Updated August 12, 2009."

Associated Organizations: [American College of Physicians](#)

Main Subjects: [United States](#); [America's Affordable Health Choices Act of 2009](#); [Health Care Reform](#); [Primary Health Care](#); [Delivery of Health Care](#)

Full Subjects:

[Health Care Reform--legislation & jurisprudence--United States](#)

[Primary Health Care--manpower--United States](#)

[Delivery of Health Care--manpower--United States](#)



Figure 11: Proposed changes to the function buttons in the search results

Donating

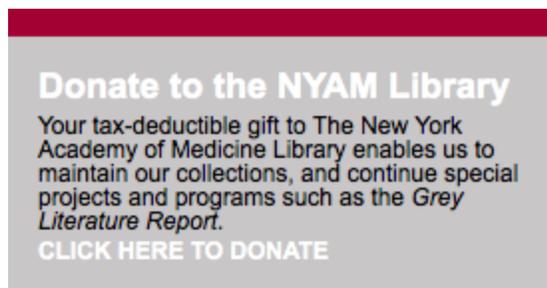


In our third task, we asked users to find more information about donating to the Grey Literature Report. In almost every instance, the users first selected the “Donate” link in the footer of the page (Fig. 12.) This link redirects the page to the website for the NYAM Library, but there is no immediate information about donating shown on this page.

Figure 12: GreyLit.org footer links

“

I was expecting a page that at least has a title that says 'Donate'.



Users expressed confusion at seeing this external website, and they were prompted to return to the homepage to find an alternate way to donate. After searching the page, most users finally discovered the “Donate to the NYAM Library” link on the right hand side, shown in grey (Fig. 13.)

Figure 13: GreyLit.org “Donate” link

This page does in fact link to the page that the users were expecting to see, and many expressed relief to have completed the task successfully once clicking this link.

Since the two “Donate” links proved to be confusing for users, we would recommend moving the “Donate to the NYAM Library” link and description to a separate tab entirely, which would be accessible via the “Donate” link in the footer. This tab could provide information on how donations are used by the NYAM library and how they would be applied to fund the Report specifically. On that page, a direct link to donate to the library should be provided, along with an explanation that the user will be redirected to a different web page.

Major Functionality Issues and Changes

In addition to the minor usability issues detailed above, this user study identified a number of larger, more complex problems that frustrated and confused participants. Often these problems arose when the Grey Literature Report deviated from users’ mental model of other similar databases. By addressing these issues, the Report will lessen the need for users to learn the peculiarities of the site’s design and implementation. Instead, the site will function more akin to other commonly-used repositories for academic and/or research articles. Therefore,

these changes will support visitors who might be familiar with the research process, but are new to GreyLit.org.

Because these problems stem from functionality issues or organizational strategies deep within the site's architecture, fixing them will require significant overhaul of the website. For this reason, they are being included in a separate section, so that the New York Academy of Medicine can plan for long-term, extensive work.

Change the Display of Article Metadata.

Users who visit the Grey Literature Report expect that they will be searching a database like any other they might visit during the research process. For the most part, this experience is the case. As one participant said of their search,

“

[It was] pretty normal for a database.

When users are seeking specific information as part of the research process, there are important pieces of metadata that they look for in order to decide whether a particular article is relevant to their search. Each user, however, may find different pieces of information valuable depending on the context. The balance for databases, then, is in displaying enough metadata clearly without overloading the user with too much information. The Grey Literature Report, like many other databases, splits the display of metadata across two pages: the search results page (fig. 13) and a more detailed summary page (fig. 14.)

Search the Report

ACA

239 results for ACA

[Facebook](#) [Twitter](#) [Print](#) [Bookmark](#) [RSS](#) [Download](#)

Sort By: [Author](#) [Title](#) [Publisher](#) [Date of Publication](#) [Catalog Date](#)

Title: Legislative actions to repeal, defund, or delay the Affordable Care Act
Author: [Redhead, C. Stephen](#)
Publisher: [Library of Congress, Congressional Research Service](#)
Date of Publication: 2013
Electronic Resource: [Full Report Online \(if link is broken, contact publisher to inquire about access to full text\)](#)

[View detailed summary](#)

Title: The cost of the Affordable Care Act to large employers
Author: [Troy, Tevi D.](#)
Publisher: [American Health Policy Institute](#)
Date of Publication: 2014
Electronic Resource: [Full Report Online \(if link is broken, contact publisher to inquire about access to full text\)](#)

[View detailed summary](#)

Refine your search [reset](#)

Search Within

Full Text Summary
 Author Publisher
 Title Subject

Reports To Search

All Current

Additional Keywords

Date Added To Database:

Anytime

Publication Year:

- Select -
Custom range from: to:

Publisher

Henry J. Kaiser Family Foundation (80)
 Urban Institute (32)
 Library of Congress, Congressional Research Service (10)

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Figure 13: The search results page of the Grey Literature Report.

Three out of the six users for the study mentioned that they would have liked to see an abstract or article summary directly in the search results. As one user put it,

“ I was kind of hoping to see the abstracts in the search, not just library metadata because that’s not very helpful.”

Another user specifically mentioned that they would have saved time had the summary been displayed directly on the results page. By displaying an abstract or article summary on the results, users can read a little bit about the article, determine whether or not it is relevant, and either select it or move on quickly. Moreover, they could do all this without clicking through to other pages.

It may be the case that The Grey Literature Report only scrapes the metadata from the source website. If this is the case, when the source provides no abstract, then the Report cannot display a summary. The fact that the Report does not have abstracts for every article seems to suggest this. In order to still provide users with a brief summary, it is recommended that the Report either scrape or manually copy the first paragraph of the article at the moment of cataloging. This method is employed by Gale General OneFile (fig. 16) and ultimately supports the same user task as an abstract: ease of browsing.

Beyond the abstract, users mentioned a variety of other small issues with the metadata on the results page. Some users were thrown off by the various ways the Grey Literature Report linked to articles. Sometimes the link in the Electronic Resource field (see fig.14) reads “PDF file,” other times it reads “full report online,” and still other times it reads “Full Report Online (if link is broken, contact publisher to inquire about access to full text).” In the words of one participant,

“ I don’t care as long as I can read it.

Other participants found that the general display of metadata made it hard to differentiate between fields and read through the page-long list of articles. One participant requested,

“ The title needs to be larger so the page can be scanned easier.

This response gets at the heart of the matter: when users are scanning a list of articles, they want to quickly determine whether or not any particular one is relevant and then move on. The current metadata display forces users to carefully parse the metadata themselves, which slows them down and makes them put in work before they have even started reading the article.

[Back to results](#) [NEXT»](#)

Title: Legislative actions to repeal, defund, or delay the Affordable Care Act
Author: [Redhead, C. Stephen.](#)
Publisher: [Library of Congress, Congressional Research Service](#)
Publication Year: 2013
Electronic Resource: [Full Report Online \(if link is broken, contact publisher to inquire about access to full text\).](#)
Series: [CRS report for Congress, R43289](#)
Description: 24 p. : digital, PDF file.
Notes: Title from title caption (viewed on March 6, 2014).; "December 5, 2013."; Includes bibliographical references.
Summary/Abstract: This report summarizes legislative and other actions taken to repeal, defund, or delay the ACA since the law's enactment. The information is [Show More](#)
Document: [Download](#)
Main Subjects: [United States, Patient Protection and Affordable Care Act; Health Care Reform; Patient Protection and Affordable Care Act; Government Regulation; Health insurance](#)
Full Subjects:
[Health Care Reform--legislation & jurisprudence--United States](#)
[Patient Protection and Affordable Care Act--legislation & jurisprudence--United States](#)
[Government Regulation](#)
[Health insurance--Law and legislation--United States](#)
Additional Personal Names: [Kinzer, Janet](#)

All
 Current

Additional Keywords

Date Added To Database:
 Anytime

Publication Year:
 - Select -
 Custom range from: to:

Publisher

- Henry J. Kaiser Family Foundation (80)
- Urban Institute (32)
- Library of Congress, Congressional Research Service (10)

[Show More](#)

Full Subjects

- Health Care Reform--United States (37)
- Health Care Reform--legislation jurisprudence--United States (21)
- Public Opinion--United States (20)

[Show More](#)

Search

Figure 14: The Detailed Summary page for a single article on the Grey Literature Report.

This cognitive load was especially present on the Detailed Summary page (fig.14), which lists all the collected metadata for a particular article in a long list without much white space. Users routinely responded negatively when they first opened the page. One user said explicitly,

“ This is hard to read. It all just blends together and looks the same.

On both the Detailed Summary and search results pages, The Report should use the page layout and some simple CSS to help users quickly scan the page and find what they are looking for. By separating different fields with more white-space and using different font sizes to indicate the importance of specific elements, the Report could lighten the user’s cognitive load while browsing search results.

In implementing the above few recommendations and redesigning the display of search results, The Grey Literature Report has many options. Below are some examples of database search interfaces that display slightly different metadata in different ways based on their use. Figure 15 is ACM Digital Library, the archive to the Association for Computing Machinery. Using limited styling (some bold and a few different font weights) and a simple layout, ACM quickly communicates important metadata for scholarly research: the title, author, publisher and date, an abstract, and keywords.

The screenshot displays the ACM Digital Library search results page. On the left, there are several filter panels: 'REFINE YOUR SEARCH' with sub-sections for 'Refine by Keywords' (containing a search box with 'health'), 'Refine by People' (listing Names, Institutions, Authors, Editors, Reviewers), 'Refine by Publications' (listing Publication Year, Publication Names, ACM Publications, All Publications, Content Formats, Publishers), and 'Refine by Conferences' (listing Sponsors, Events, Proceeding Series). Below these is 'ADVANCED SEARCH' with a link to 'Advanced Search', and 'CONTACT US' with a link to 'Contact The DL Team'. At the bottom left, it states 'Found 27,620 of 440,003'. The main search results area shows 'Search Results' for 'Results 1 - 20 of 27,620'. It includes a 'Sort by' dropdown set to 'relevance' and an 'in' dropdown set to 'expanded form'. Below this are pagination links: 'Result page: 1 2 3 4 5 6 7 8 9 10 next >>'. The results list three items:

- 1** [Health information and decision-making preferences in the internet age: a pilot study using the health information wants \(HIW\) questionnaire](#)
Bo Xie, Mo Wang, Robert Feldman, Le Zhou
November 2010 **IHI '10**: Proceedings of the 1st ACM International Health Informatics Symposium
Publisher: ACM [Request Permissions](#)
Full text available: [PDF](#) (545.37 KB)
Bibliometrics: Downloads (6 Weeks): 3, Downloads (12 Months): 55, Downloads (Overall): 226, Citation Count:
Recent paradigm shift in health care calls for more attention to patient preferences. The Health Information Wants (HIW) Questionnaire measures patients' preferences (desires) for health information and participation in decision-making. It has parallel ...
Keywords: decision-making, health information, health information wants (hiw), instrument development, patient preferences
- 2** [Characterizing mammography reports for health analytics](#)
Carlos Rojas, Robert Patton, Barbara Beckerman
November 2010 **IHI '10**: Proceedings of the 1st ACM International Health Informatics Symposium
Publisher: ACM [Request Permissions](#)
Full text available: [PDF](#) (1.15 MB)
Bibliometrics: Downloads (6 Weeks): 4, Downloads (12 Months): 17, Downloads (Overall): 105, Citation Count:
As massive collections of digital health data are becoming available, the opportunities for large scale automated analysis increase. In particular, the widespread collection of detailed health information is expected to help realize a vision of evidence-based ...
Keywords: clinical notes, electronic health records, temporal analysis, text analysis
- 3** [Trust in health websites: a review of an emerging field](#)

Figure 15: The search results page of the ACM Digital Library.

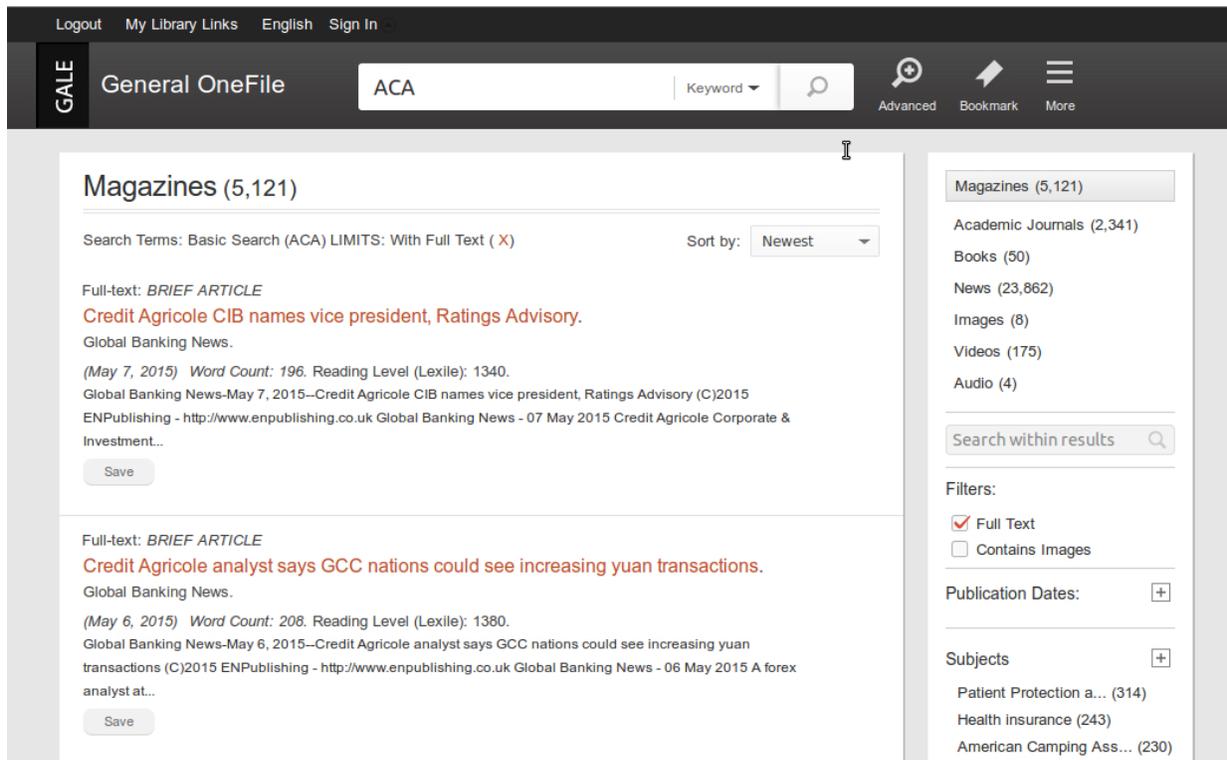


Figure 16: The search results page of Gale General OneFile.

Compare ACM’s search results to those of Gale General OneFile (fig.16.) While Gale’s design is neater, it also presents less metadata. The important information on display to users is: the title, whether or not the article is full-text, the publication that the article appears in, and the first few lines of the article. This search results page reflects that users of the database are looking for different information than those of ACM Digital Library. Gale General OneFile collects general interest topics from a wide range of source. ACM is a scholarly repository used by academic researchers.

It follows, then, that before changing the design of the site, the Grey Literature Report should determine exactly what metadata is relevant to the users of the site. This will involve further user testing. By speaking directly with users, the Report can form a better idea of what metadata they routinely look for and use. Then, the Report can decide on a design that presents the regularly sought information front and center.

Bugs in the system

While performing the tests, users ran into a number of bugs in the Grey Literature Report. These bugs directly affected whether or not users believe the system is functioning as desired. When confronted with errors and other atypical behavior, the participants often questioned if the results were accurate. This uncertainty is an incredibly important indicator of user experience and should absolutely not be ignored. If the user does not think they can trust the website, they are not likely to continue using it. While participants did not explicitly say so,

these bugs may account for why the site scored so low on the SUS. It was often after encountering some behavior that deviated from their expectation that users had their strongest negative reactions to the Report.

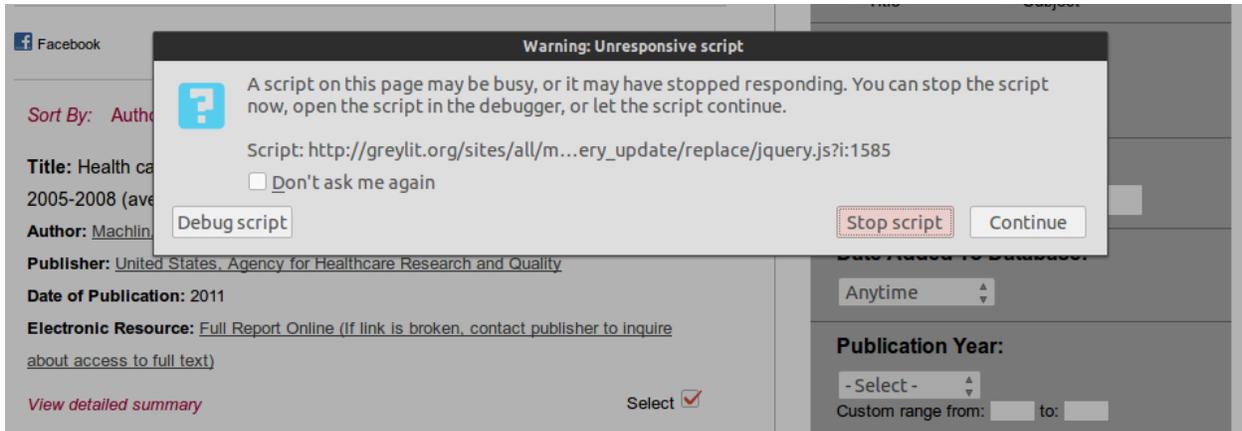


Figure 17: A javascript error that occurs after checking the “Select” box.

The most common bug users encountered was a javascript error that occurs when checking the “Select” article box on the search results page. After doing so, the site hangs for a few minutes, not allowing any further input. Users were frequently confused by the lack of feedback, and often forced a reload of the page.

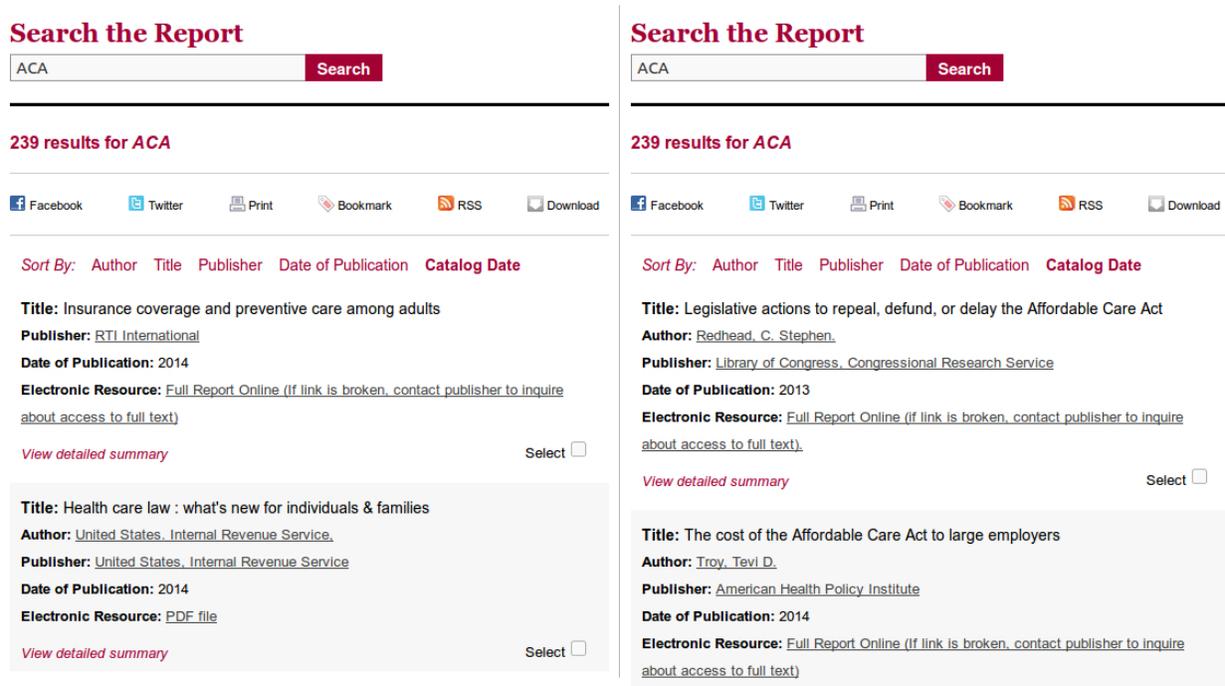


Figure 18: Two different search results for a search of “ACA.” The left image was searched from the homepage. The right image was searched from the search results page.

While perhaps not a bug, users also encountered aberrant search behavior depending on what page they searched from. Figure 18 shows two searches for “ACA” on the Grey Literature Report that yielded different results. The searches retrieved the same total number of results (239) and appear to be sorted the same way (by catalog date,) and yet the articles displayed in the search results are completely different. As one user said,

“

It's not really clear how the results are matching my search.

Because it is not clear why the site is displaying the results in a different fashion, users called in question the overall search functionality of the site.

CONCLUSION

The Grey Literature Report fills a valuable niche in the medical research community. By collecting and maintaining a searchable index of grey literature, the New York Academy of Medicine should be commended. The high number of monthly visitors and the amount of users who subscribe to the Report are testament to its value. There are, however, moments when the functionality of the website does not match that of other comparable databases. If the Report hopes to be accessible to a growing population of users, it is crucial that the site operate in a way that both experienced and novice users expect and can understand. By following the recommendations laid out in this report, GreyLit.org will more closely resemble similar research sites, and therefore create a more positive experience for its community of users.

REFERENCES

Sauro, J. (2011). A Practical Guide to the System Usability Scale (SUS) Background, Benchmarks & Best Practices. Retrieved from MeasuringUsability.com

APPENDIX A: Script

Session Setup:

- Two investigators (one conducting the tasks with participant, other observing the study and taking notes)
- One laptop equipped with recording software (Snagit or BB Flashback Express)
- Pens and paper for notes
- Printout of the consent form
- Printout of the script
- Printout of the tasks
- Open the following pages in different tabs in a web browser and minimize the browser so that the user is presented with a blank screen:
 - Demographic questionnaire
 - GreyLit.org
 - Post-test questionnaire

Introduction:

Hello! Thank you for agreeing to take part in our research study! My name is [NAME] (and this is [NAME]), and I am one (we are two) of three members of this study, who are all graduate students at Pratt Institute. Before we begin, I'd like to read some information about our project.

We're here to learn about how people use the website GreyLit.org, which is the website for the Grey Literature Report, published by the New York Academy of Medicine. Participation in this study will consist of three tasks each followed by a short series of questions and a post-test questionnaire. We expect the session to last no more than half an hour.

Your honest feedback will provide us with valuable information for the improvement of GreyLit.org. The members of this study are independent researchers who are not employed

by the makers of this site. Please be as honest as possible with your reactions and feedback about the tasks.

Consent Form:

With your permission, we will be recording both screen navigation and audio recording of this test. By documenting this session, we can share and review the data we collect today with the other moderators of the test. These recordings may be used in an academic presentation or report. Please review and sign this consent form before we proceed. [HAND CONSENT FORM]

Take as long as you need to read it through and let me know if you have any questions.

Instructions:

We will use this computer for the test tasks as well as pre- and post-test questionnaires.

Throughout the process, I will be sitting with you, and I may ask additional questions from time to time.

Before we begin, do you have any questions for me?

Pre-Test:

To begin, please fill out this questionnaire to help us understand your background with this type of site.

[OPEN [DEMOGRAPHIC QUESTIONNAIRE](#)]

[Participant ID number is the first letter of the moderator's last name, followed by an unique number 1-6]

Introduction to Tasks

We have three tasks that we would like you to try to complete on the site. Keep in mind, this is not a test of you, it is a test of the functionality of the site, and we are very interested in hearing your reactions. From this point on, please express your thought processes out loud so we can better understand the decisions you're making. Please know that you can stop at any time without penalty. Your participation in this study is entirely voluntary and at any point during it, you are welcome to tell the moderator that you would like to stop.

Task 1:

You're conducting research on how the Affordable Care Act was received during the its initial rollout in 2010. You are trying to find one article in support of it and one against. After you find the articles, select them and download them for future reference. Keep in mind, your co-workers have warned you that the search functionality of the site is not perfect.

Post-task questions:

Did you feel you were successful?

How was the experience?

Do you have any comments or suggestions on this task?

Anything else you'd like to tell me?

Task 2:

You were just talking about the content of one of these articles with a colleague! Share it with them online.

Post-task questions:

Did you feel you were successful?

How was the experience?

Do you have any comments or suggestions on this task?

Anything else you'd like to tell me?

Task 3:

[RETURN TO HOMEPAGE]

You're thinking about donating to the Grey Lit program. Find where on the site you could get more information on how to donate.

Post-task questions:

Did you feel you were successful?

How was the experience?

Do you have any comments or suggestions on this task?

Anything else you'd like to tell me?

Post-Test

We have a final post-test questionnaire for you to fill out that will help wrap things up and summarize your experience. [BRING UP [POST-TEST QUESTIONNAIRE](#)]

For this test's scale, 1 indicates "Strongly Disagree" while 5 indicates "Strongly Agree".

Debrief

Thank you so much for all of your feedback! We really appreciate you taking the time to participate. We are going to take what was recorded during your test and review it, analyze it, and combine it with our other users' test results to create a report evaluating the usability of the Grey Literature Report.

Again, thank you for your help and time!

APPENDIX B: Consent form

Purpose:

The purpose of this study is to evaluate the usability of GreyLit.org. This study is part of Usability Theory and Practice, a graduate level class under the supervision of Professor Craig MacDonald at Pratt Institute.

Procedure:

Upon agreeing to participate in this study, you will be asked to complete four (4) tasks:

1. Search for and download articles within the grey literature interface
2. Go through the steps one to share one of these articles online
3. Use/read the FAQs in order to determine helpfulness and tone
4. Find out how to donate to the grey literature program

The total time required to complete the study should be approximately 20 minutes.

Benefits/Risks to Participant:

Participants will learn about the functions of the Grey Literature Report's search features, the content of its reports, and as well as become familiar with other important functions of site use. This will help contribute to the body of knowledge in usability research. There is no risk to the participant.

Voluntary Nature of the Study/Confidentiality:

Your participation in this study is entirely voluntary. At any point during the study you are welcome to tell the moderator that you would like to discontinue your participation in the study. You may also ask the moderator any questions that may arise during any part of the study. Any personal information provided is completely confidential and will only be accessible to the members of the project team. This includes data you produce during the study.

Contacts & Questions:

At this time you may ask any questions you may have regarding this study. Should you have questions later, you may contact your moderator with the following contact information:

Moderator: _____ email/phone: _____

Statement of Consent:

I have read the above information. I have asked any questions I had regarding the experimental procedure and they have been answered to my satisfaction.

I consent to participate in this study.

ID Number: _____

Age: _____

(Please Note: you must be 18 years of age or older to participate in this study).

Name of Participant _____

Date: _____

(Please Print)

Signature of Participant

Thank you!

APPENDIX C: Questionnaires

Pre-Test Questionnaire

* Required

Please enter your ID number *

Age

Gender

Education level

Highest level completed or started

- High School
 Undergraduate
 Graduate
 Ph.D/Doctorate

How would describe your familiarity/comfort with technology?

1 2 3 4 5 6 7

Not at all Expert

How familiar are you with the research process?

1 2 3 4 5 6 7

Not at all Expert

How would you describe your familiarity/comfort using online databases?

1 2 3 4 5 6 7

Not at all Expert

What are your preferred online research sources?

Are you familiar with "grey literature"?

Post-Test Questionnaire

* Required

I think that I would like to use this system frequently. *

1 2 3 4 5

Strongly disagree Strongly agree

I found the system unnecessarily complex. *

1 2 3 4 5

Strongly disagree Strongly agree

I thought the system was easy to use. *

1 2 3 4 5

Strongly disagree Strongly agree

I think that I would need the support of a technical person to be able to use this system. *

1 2 3 4 5

Strongly disagree Strongly agree

I found the various functions in this system were well integrated. *

1 2 3 4 5

Strongly disagree Strongly agree

I thought there was too much inconsistency in this system. *

1 2 3 4 5

Strongly disagree Strongly agree

I would imagine that most people would learn to use this system very quickly. *

1 2 3 4 5

Strongly disagree Strongly agree

I found the system very cumbersome to use. *

1 2 3 4 5

Strongly disagree Strongly agree

I felt very confident using the system. *

1 2 3 4 5

Strongly disagree Strongly agree

I needed to learn a lot of things before I could get going with this system. *

1 2 3 4 5

Strongly disagree Strongly agree

Converting a Raw SUS Score to a Percentile Rank

* Required Fields

Input		Results	
Raw SUS Score*	41.1	Percentile Rank	6.3%
SUS Benchmark	67	Adjective :	Poor
		Grade (Bangor):	F
		Grade (Sauro & Lewis):	F
		Acceptability:	Not Acceptable
Reporting			
A raw SUS score of	41.1	has a higher SUS score than	6.29% of All Products
Calculations			
Actual Benchmark	68.000		
Reflected Score	58.9		
Reflected Benchmark	32		
Ln Reflected Score	4.08		
Ln Reflected Benchmark	3.466		
Population SD	12.500		
Ln SD	0.3980666		
z	1.531		
Reflected %	0.937		
%	0.063		
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APPENDIX E: User responses

	Participant W1	Participant W2	Participant M1	Participant M2	Participant P1	Participant P2
Task 1						
<i>General Notes</i>	<p>There's a lot of stuff here."</p> <p>Doesn't know if advanced search worked way expected.</p> <p>"I was kind of hoping to see the abstracts in the search, not like library metadata because that's just not very helpful."</p>	<p>The results "seem like what I would expect." (Detailed summary, expected to find subject headings.)</p> <p>Full subjects: "I don't like the fact that it's three columns." Hard to remember what was read especially because subject headings are all really similar "</p> <p>Looking at detailed summary: "Where's the article, though?"</p>	<p>"Catalog Date" seems like it's one of their terms, and not something related to the document."</p> <p>User clicked the "Select" button and the screen froze and the browser needed to be restarted on two occasions.</p>	<p>"I would want to download the actual article." (Not MARC or BibText)</p> <p>Clicks the back button. The search history is not available "Did it delete my results? That's not nice. Now I have to do the search again."</p>	<p>Used search bar, expected searching interface</p> <p>"I wish the title was more prominent because it's hard for me to scan the search results."</p> <p>Checked boxed - bit of a lag that confused user</p> <p>"Disjointed"</p>	<p>Selected "Current Report" but did not seem confident in what would come up.</p> <p>Browser froze when trying to check box to select article, had to restart it.</p> <p>When participant tried to select a second article, box was unresponsive.</p>
<i>Successful?</i>	<p>"Yes but very slowly. Borderline painfully."</p>	<p>Abstract would mean not having to read through article.</p>	<p>The search portion of the task was successful but not the download portion.</p>	<p>"Not great experience. The initial search was fine, I came up with adequate information, but maybe not very consistent."</p>	<p>"I was able to narrow by year but it was really hard to search more specifically within the results"</p>	<p>"I couldn't download it which was part of my goal. That was problematic."</p>
<i>Experience?</i>	<p>"I can't read the titles clearly." "I'm getting information I'm not looking for."</p>	<p>"Pretty normal for a database."</p>	<p>"Not bad. I like that the refine your search bar is right on the side, once you</p>	---	<p>Ease of use was difficult.</p>	<p>"Tricky"; the sort process was too lengthy.</p>

	Detailed summary: "Not what I expect or hope for."		do a search, so you can filter your results and you don't have to keep going back to edit your search."			
<i>Comments?</i>	"It's not really clear to me how the results are matching my search." "Sorting by catalog date? Why is that the default?"	---	"I'm not sure what the difference is between catalog date and publication date. They should clarify that." "In terms of saving and downloading, it doesn't really give you options within the site."	"They should ensure that the search results are sorted in a consistent way, with different filtering options, so that the default is the same when you repeat a search."	Title needs to be larger so page can be scanned easier, share options integrated right near the abstract so you don't have to select and go all the way back up.	Selecting and downloading should work properly
<i>Anything else?</i>	---	Detailed summary: "This is just a little hard to read." "It all blends together and looks the same."	---	"It would seem intuitive that if you click select on multiple articles, that you could then go up to the Menu across the top where it says Facebook, Twitter, etc. and then download it."	---	---
Task 2						
<i>General Notes</i>	No attempt or even acknowledgement of social media buttons	Looking for emailing option, but it doesn't exist.	I don't think there's any direct way to email an article on here. I don't see email but I feel like that would be a common button to see.	"I would probably just take the link of the article and email it to someone...but I don't see that option" Facebook link: "Why is it showing a link to my search? I would want to share the	Totally not typical; twitter interface usually has title, short link, via whatever in the Tweet box Expectation to have it pre-filled. Inconvenience. "I would never do this."	Participant did not feel able to complete this task because of previous issue with selecting articles.

				article. This is not what I would expect to see."		
<i>Successful?</i>	---	Yes (only emailing).	"Yeah, I guess."	"Not successful."	"I was more successful I think this time because I would be able to tweet it if I wanted to. If I wanted to put the effort in...I didn't want to and I don't think people should have to."	No; "The website wouldn't allow me to do it."
<i>Experience?</i>	---	Fine; "I expected there to be a link, but it's ok because it's pretty easy to email."	"Fine. This one was ok."	"Confusing"	Easier to interact w/prefill (tiny URL, NYAM twitter mention)	"Frustrating"
<i>Comments?</i>	---	"Email link is a useful tool. I email articles to myself a lot when I'm searching."	---	I would prefer there to be an email link or something that gives you the direct link more easily.	Adding the URL would be really helpful. "If not, just simply add the title of the article in there."	Make section option easier to use. Unclear as to what sharing options were.
<i>Anything else?</i>	---	---	---	---	---	---
Task 3						
<i>General Notes</i>	Right to the donate button on the homepage. NOT the bottom bar. "I expect to see a donate button on the homepage."	"Did it take me to their... oh, I see." - new website, not expected.	"Oh I see that 'Donate to the NYAM Library' is another button here [didn't notice originally]. At least that brings you to a specific Donate link; the other one just brought me to the homepage [was confused by that]. But that link is hidden on the	Clicked "Donate" link in the footer, did not expect to be taken to a different page. On "Donate" link in sidebar: "I would think that donations would be more of a priority. It's not my instinct to look on the side bar...I would think to go to the footer."	"Would expect an "About" in top page - find donate option within that page Totally different website [after clicking footer link] - not expecting that at all. "I was expecting a page that at least has a title that says 'Donate'."	Clicked "Donate" from footer right from FAQ page - did not notice donate link box in sidebar; confused by being taken to NYAM homepage Went to "What is Grey Literature?" and notice it from there. Was satisfied

			page. I think I would click the button on the bottom before that one.		Still wants more information. Could donate to a lot of places, why them?	with the page they arrived at.
<i>Successful?</i>	Yeah.	Yes.	Yeah.	"Yeah, that was not so bad."	"Yeah, sure."	Yes "after much trial and error".
<i>Experience?</i>	"Straight-forward."	"Initially confused" when on NYAM site, but obvious what had happened.	It was fine, not bad.	"Better than the search. It just seems that when you click on the Donate link in the footer, there's an extra step, but it wasn't too bad."	"Same as all the other ones it was just okay."	"Frustrating"
<i>Comments?</i>	Like the bar at the top that points out the step currently on.	---	Suggest having the donate link on the bottom go to the same place as the one on the side. Brought you to the other homepage, which doesn't make sense.	---	After clicking on "Donate" next page should say Donate. Brought onto a whole different website - disorienting.	Bottom link should be same as side link.
<i>Anything else?</i>	---	---	---	---	---	---