

LIBRARIES<sup>BETA</sup>  
DIGITAL LIBRARY COLLECTIONS  
COGNITIVE WALKTHROUGH

Andrew Ward  
Pratt Institute

School of Library and Information Science

# EXECUTIVE SUMMARY

Columbia University Libraries/Information Services recently launched their Digital Libraries Collection (DLC), which brings together digital materials from a variety of exhibitions and repositories to a single unified gateway. The project is currently in public beta, with site managers soliciting feedback from users through a link at the bottom of each page. In order to evaluate, three usability evaluators from Pratt Institute School of Information and Library Science performed a cognitive walkthrough on the website. While generally favorable, the cognitive walkthrough revealed two issues where the site's design affected the usability, and this report offers a number of actionable suggestions for improvement.

**First Issue:** The layout of the site is mostly derived from the metadata of the records. Therefore, the site's structure reflects the architecture of library organizational methods that may not match how users expect digital image repositories to work. Possible improvements include:

- Rearrange the image and metadata display panels for more space and a neater arrangement.
- Rename the “Name” element to something that more closely represents the relationship between the metadata and the resource.
- Add space between repeated metadata field for improved readability.
- Hyperlink related resources for easier navigation.

**Second Issue:** The action menus on the image page were not very visible and some of the icons could be change to more clearly communicate the options to the user. Possible improvements include:

- Enlarge the two menus slight.
- Change the highlighting of the selected option in the dropdown menus.
- Use general sizes instead of pixels to indicate image size in the download menu.
- Change the “return to search” icon and possibly the share icon.

The report that follows explains the methodology and analysis that led to these recommendations. All of the problems and recommendations above will be explained in more detail. By implementing these changes, it is believed that the DLC, already a strong resource, will be easier to use for novice and veteran users alike.

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# INTRODUCTION

Columbia University Libraries/Information Services recently launched their Digital Libraries Collection (DLC). The DLC brings together a variety of digital materials from across the university's distinct library collections into a unified organizational and discovery system. As stated on the project About page,

The site includes scans of photographs, posters, objects, manuscripts and other material from our special and archival collections. It will continue to grow as more of our earlier digital projects are loaded in, as more of our special collections are digitized and described, and as hybrid and born-digital archival collections are acquired.

The project is currently in public beta, with site managers soliciting feedback from users through a link at the bottom of each page. To help improve the usability, a group of usability evaluators at Pratt Institute School of Information and Library Science conducted a cognitive walkthrough of the site in order to assess how novice users might navigate the collection.

## METHODOLOGY

The cognitive walkthrough is a method of usability assessment wherein a group of evaluators navigates through an interface, using their expertise to recognize and critique potential problems for users. During the assessment, the group focuses on one particular task, breaks it down into the component steps, and asks four questions of each of the steps (Wharton, Rieman, Lewis & Polson, 1994):

1. Will the user try to achieve the right effect?
2. Will the user notice if the correct action is available?
3. Will the user associate the the correct action with the effect trying to be achieved?
4. If the correct action is performed, will the user see that progress is being made?

By looking closely at the individual parts of the overall goal, the cognitive walkthrough models novice users' problem-solving strategies when confronted with an unfamiliar interface. By doing so, the cognitive walkthrough uncovers discrepancies between the designers' and users' mental models of the system (Wharton, Rieman, Lewis & Polson, 1994). However, this approach also limits the definition of usability to ease of use.

Three usability evaluators participated in this cognitive walkthrough at Pratt Institute School of Information and Library Science. The target users, general tasks, and correct action sequence were decided upon before beginning the walkthrough. One evaluator acted as a moderator, leading the other evaluators through the Digital Library Collections and engaging them in discussion around the questions listed above. For the analysis, each step was listed as either a success or a failure, based on the discussion among the evaluators (see: Appendix) and this report follows the problems identified.

## **Target User**

For the purposes of the study, evaluators assumed users of the DLC were undergraduate students enrolled at Columbia University. They would be familiar with a variety of digital interfaces, having grown up surrounded by technology. They also would be familiar with the general process of research, though perhaps not on the formalized, undergraduate level. They would not be familiar with the inner organizational systems of library systems.

## **Task & Correct Action Sequence**

An undergraduate student is writing a paper on tenement conditions at the turn of the century. During a reference interview, a librarian mentions that the Rare Books & Manuscript Library houses photographs from the Community Service Society, and directs the student to the newly launched DLC. On the site, the specific task was to find and download images of families from the Community Service Society Collection, taking note of the information recorded about each image. The individual steps were:

1. Select “Community Service Society Photographs” –either by clicking the image or selecting “browse content.”
2. Search “family” within the collection.
3. Navigate to the first photograph.
4. Locate any information of interest about the photograph.
5. Download the image in a resolution appropriate for inclusion in a written assignment.
6. Return to search.
7. Navigate to the image mentioned in the metadata of the first photograph.

# FINDINGS & RECOMMENDATIONS

For the most part, the usability of the Digital Library Collections ranked very high. Elements were consistently arranged. Actions were located where and functioned how evaluators expected. This indicates that the design of the DLC matches well with commonly held models of digital collections. However, the cognitive walkthrough revealed two usability issues during assessment:

1. The arrangement and presentation of some information is based on library standards that may be unfamiliar to students.
2. The visibility of some menus could be improved.

What follows are suggestions to improve these issues based on the discussion and analysis of the cognitive walkthrough.

## Problem 1: Change the display and behavior of image metadata.

The first usability issue above is based the failures of steps 4 (locate any information of interest about the photograph) and 7 (navigate to the image mentioned in the metadata of the first photograph.) In both cases, the problems grew out of the mismatch between system and evaluator terminology, which Wharton, Rieman, Lewis & Polson credit the cognitive walkthrough method with revealing (1994, 4). However, in discussion it became clear that while the problem began as a vocabulary issue, it potentially could prevent users from recognizing the correct action and understanding how to progress. To illustrate this point, the image below is of the first image arrived at through the cognitive walkthrough.

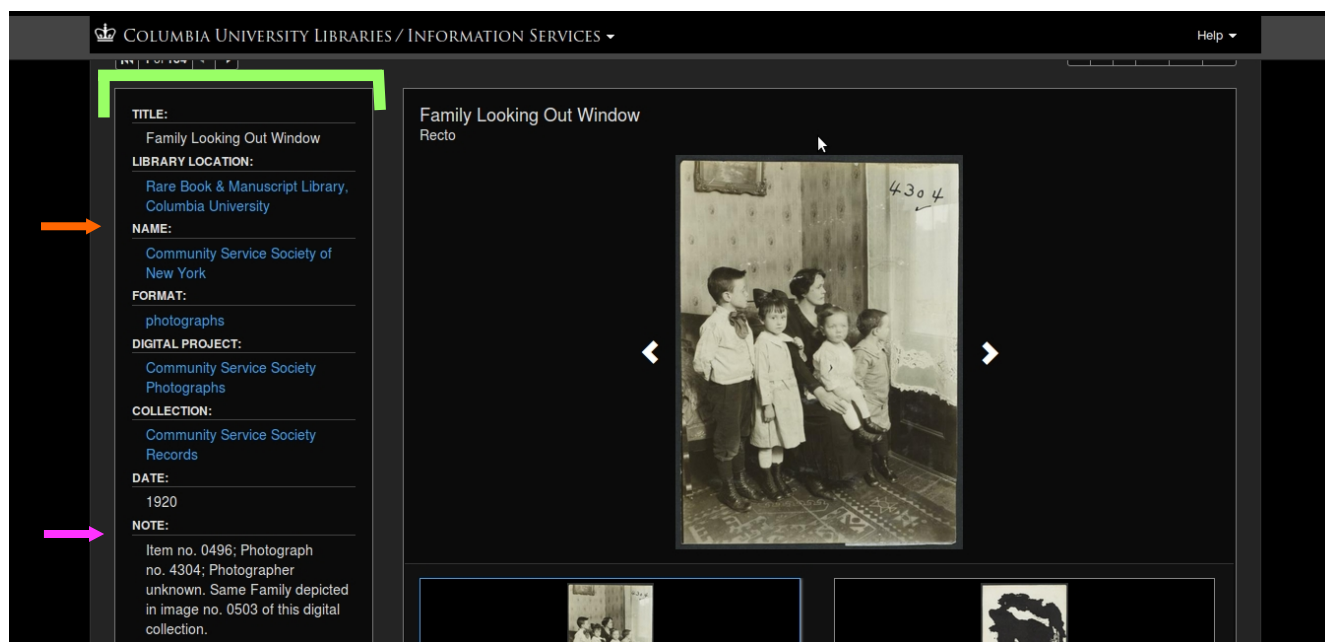


Figure 1. The image page, as is.

In Step 4 of the walkthrough, evaluators were divided on whether or not users would recognize relevant information. One evaluator believed that users were sufficiently constrained to find the information they were looking for, given the clear indication of the side panel (green bracket) which was the only display of text on the page. Another evaluator noted that the information appeared to be arranged according to the collection, not necessarily what was of interest to potential users. This could potentially work against the system when viewed on lower resolution displays, where all of the information may not appear without scrolling. In that event, users may not realize the extent of information available to them.

**RECOMMENDATION:** Move the recto and verso thumbnails (and rename them to the commonly used “front” and “back”) to the sidebar where the metadata is currently located and vice versa. This clearly arranges the metadata with enough space for everything to be arranged clearly and coherently (see figure 3 as well.) List the fields relevant to research before organizational and administrative information (e.g. Title, Author, and Date before Collection, Library Location, and Digital Project.)



Figure 2. A mock-up of the image page, rearranged.

The lack of metadata visibility is compounded by the vocabulary mismatch, the most immediate example of which is the “Name” field (figure 1, orange arrow.) The information on the site maps to the MODS element “namePart,” which is a subelement of the “name” field, which has more subelements that clarify just how the information in the “name” element are related to the resource. On the site, however, this added information is not visible. Evaluators thought that an unfamiliar user may not immediately understand the meaning of the name field, especially when that field is populated by an organization, instead of the photographer or the subject of the photograph.

**RECOMMENDATION:** Change the “Name” label on the site to map to the MODS “role” field (in this case, “Collector.”) This better communicates the relationship between the metadata and the object (orange arrow, figure 3.)

Also in figure 1, the purple arrow points to the “Note” field, long recognized in cataloging as the repository of metadata that doesn't fit into any of the other fields. MODS allows catalogers to record multiple note fields. In displaying this information, DLC adds a semicolon and appends the fields on to each other. The result is a paragraph of unrelated bits of information, separated by semicolons.

**RECOMMENDATION:** Separate multiple notes fields with line breaks and formatting for improved readability (purple arrow, figure 3.)

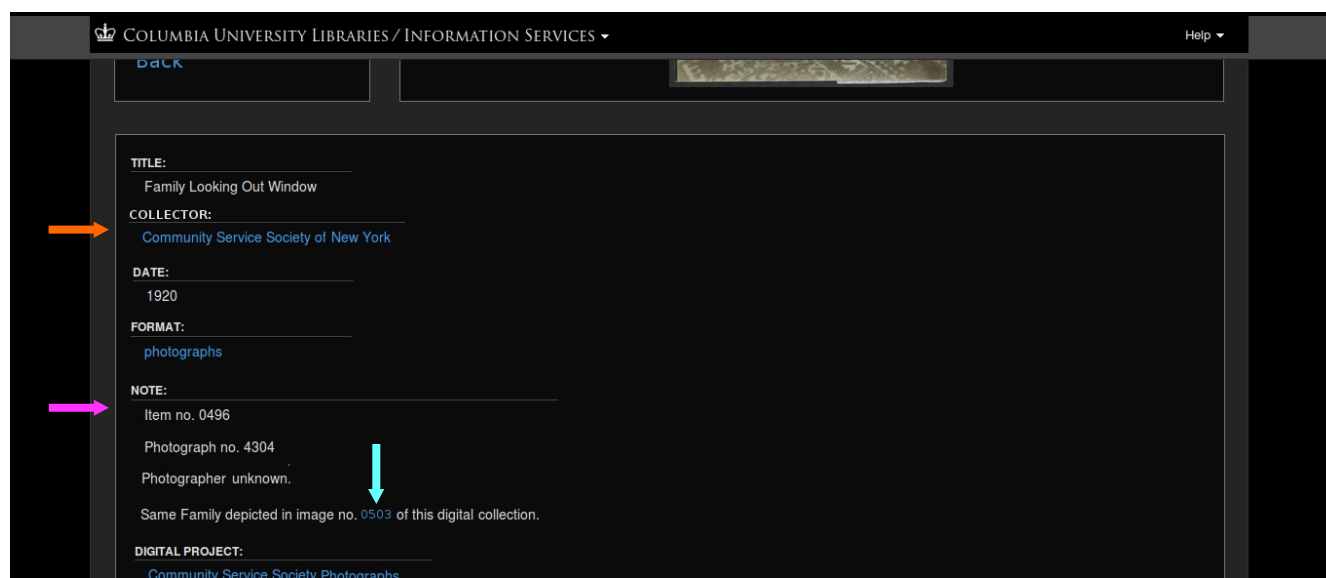


Figure 3. A mock-up of metadata fields, rearranged and reformatted. Located below the new image view (as seen in figure 2.)

Lastly, step 7 of the walkthrough was to navigate to the related image mentioned in the metadata of the first image. However, when viewing the photographs on the collection page or search results page, there were no references to catalog numbers. Instead, users would be forced to search the collection using new criteria. When searching within the collection for a specific catalog number, the corresponding photograph is displayed, but there are no visible references to the image number (figure 4.)

**RECOMMENDATION:** Hyperlink related resources for easy navigation. In figure 3, the image number is hyperlinked and colored according to the site's formatting conventions to make its function clear to users (blue arrow.)



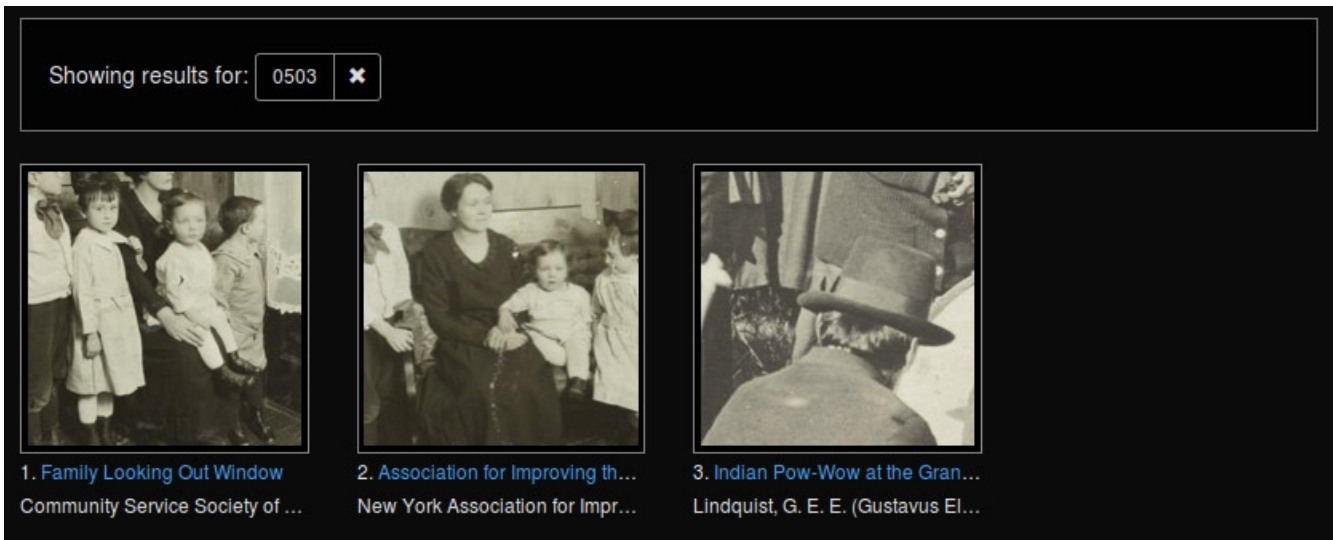


Figure 4. The results of a search for a specific image number. The first result is the photograph referencing the image in the notes. The second result is the corresponding photograph. The third result is the same item number in a different collection.

## Problem 2: Increase the visibility of the menus on the image page.

The second usability issue arose out of the failures of steps 5 and 6 (Download the image in a resolution that can be incorporated into a written assignment and Return to search, respectively.) Both tasks required evaluators to make use of the menu bars located between the search bar and image/side panels. Evaluators felt strongly that the menus should be made more visible, as users may skip over them in their current state, and have to “go looking” for them. That being said, evaluators did expect them to be near the top, and, once having found them, clearly recognized their purpose.

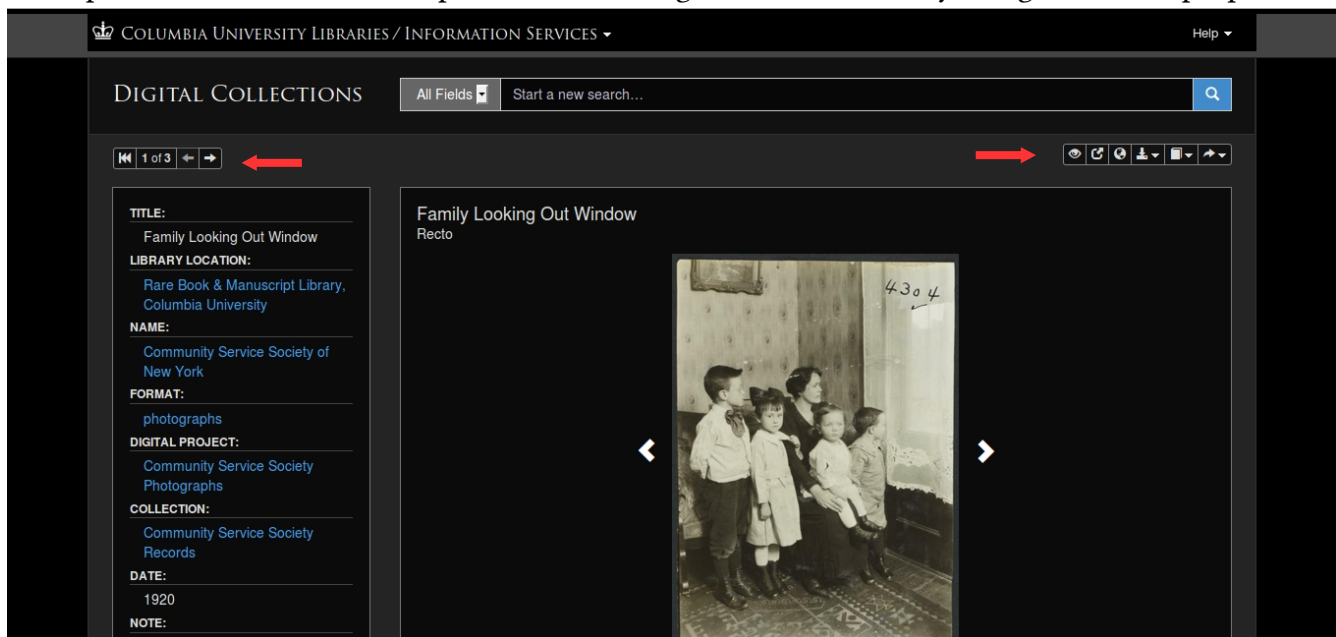


Figure 5. The image page with the two menus as it appears currently.

**RECOMMENDATION:** Increase the size of the buttons slightly. Figure 6 shows the same menu grown by about 150%. This brings the height of the menu bars to approximately the same as the search bar, instead of the text. Because the menus take up more screen space, users should notice them more immediately.

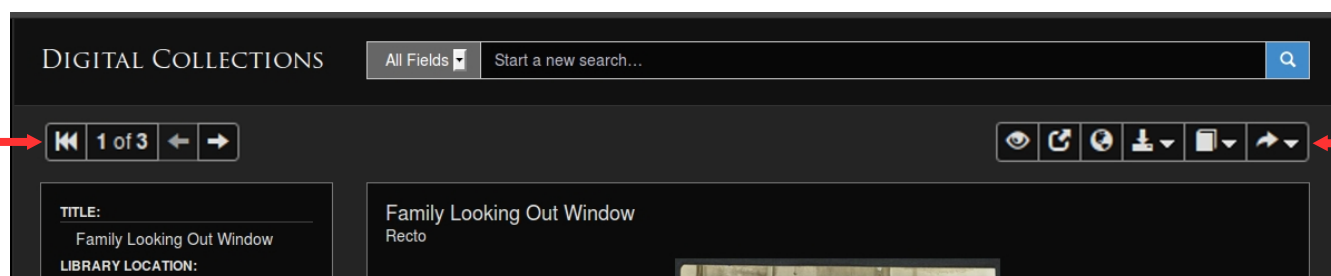


Figure 6. The menus enlarged by 150%.

Another small issue with the visibility of the menus arises when selecting one of the dropdown options from the menu, in this case the download action. When hovering over an option there is a very subtle change in the background color that is hard to perceive. It is a good idea to give users visual feedback when making a selection so that they can make their choice quickly and efficiently. Increasing the difference between an unselected option and the one being chosen would mean that users could make a selection without closely examining their specific actions.

**RECOMMENDATION:** Instead of shading the background slightly, change the selected text color to blue. This would obviate the user's selection and fit with the established formatting of the site (see figure 7.)

Also in the download menu, the language used to delineate between options uses terms that may not be familiar to users. It is hard to make the conversion from pixels to the perceived size of an image, especially when converting that to the printed page. Using general descriptors may better communicate the image's properties, especially when couched in terms familiar to users from other internet contexts such as thumbnail, small, and large. In addition, novice users may be unfamiliar with image formats. Unless there are multiple options available, it is unnecessary to list them.

**RECOMMENDATION:** Use the terms *thumbnail*, *small*, *medium*, and *large* to describe the image sizes, possibly in addition to pixels. Remove the references to file format.

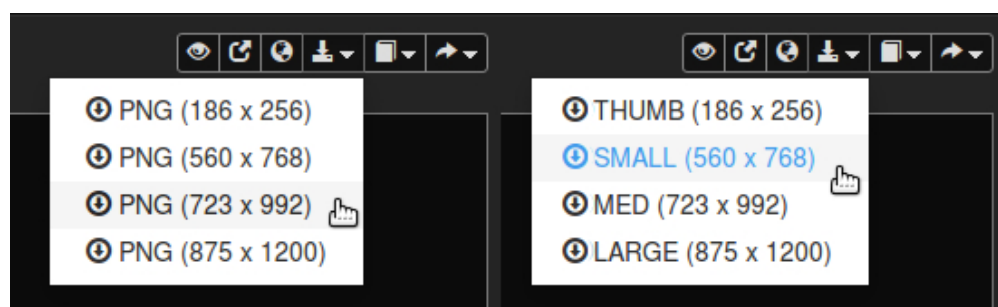


Figure 7. The dropdown menu: as is (left), and as suggested (right.)

The last small issue related to the menus is the “return to search” option: the leftmost icon in the menu on the left side of the page. The icon currently used for this action is typically associated with “rewind to the beginning” or “return to start.” Given the icon's placement next to the controls to move forward and backwards through the image results, evaluators assumed that the button would move back to the first image in the collection.

**RECOMMENDATION:** Change the icon to one commonly used to indicate return. These usually involve arrows pointing up and/or to the left. If the symbol is too close to the icon already used to indicate “share,” replace that icon as well.

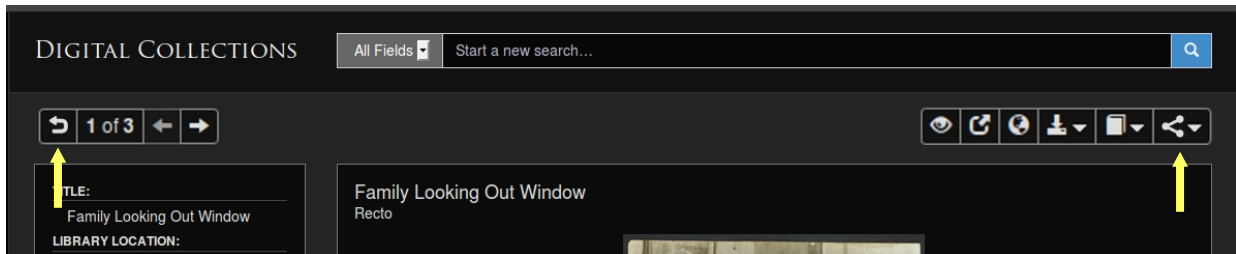


Figure 8. The menu with the “return to search” and “share” buttons replaced.

## CONCLUSION

The Columbia University Libraries/Information Services is a world-recognized research library system and technological innovator. The Digital Library Collections is an online repository worthy of the stature of the system's holdings as well as the staff's continuing scholarship. Most importantly, the DLC supports the libraries' mission to provide for students, faculty, and researchers from across the world.

To help identify ways in which the beta interface can be improved, a cognitive walkthrough was performed on the DLC. While mostly positive, the assessment identified two usability issues and gave recommendations to improve them:

1. disparity between potential users' vocabulary and system terminology and
2. the visibility of menus on the image page

By implementing these suggestions, DLC will move their model of the system more aligned with the user.

# REFERENCES

John, B. E., & Packer, H. (1995, May). Learning and using the cognitive walkthrough method: A case study approach. *Proceedings of the SIGCHI conference on Human factors in computing systems*, 429-436. ACM Press/Addison-Wesley Publishing Co..

Wharton, C., Rieman, J., Lewis, C., & Polson, P. (1994, June). The cognitive walkthrough method: A practitioner's guide. *Usability inspection methods*, 105-140. John Wiley & Sons, Inc.. Chicago

# APPENDIX

## Task

The context of the cognitive walkthrough was that an undergraduate student was writing a paper on tenement conditions at the turn of the century. In service of this goal, the specific task was to find and download images of families from the Community Service Society Collection.

### **Step 1: Select the Community Service Society Collection**

**Failure** —Will the user notice if the correct action is available?

Evaluators stressed amount of information displayed in the projects tab as well as the density of that information. Users unfamiliar with the collections and their contents must read through a lot of text to locate goals. This fact is compounded because some collections have creative titles and informational subtitles as they end up alphabetically sorted. Once they find the corresponding collection, however, the site provides users clear and understandable options to continue on.

### **Step 2: Search “family” within the collection**

**Success**

The search bar is clearly visible at the top of the page, where users have come to expect it. The magnifying glass icon on the right is a clear affordance of the bar's purpose. Evaluators also appreciated the indication of search history in the “Showing results for:” section after they searched.

### **Step 3: Select the first image**

**Success**

This task was clearly mapped to the action. All evaluators immediately recognized that clicking on the picture would open the next page. This suggests that users will have a mental model of the action. The image border changing to blue is a good indication that this model is correct.

### **Step 4: Locate any information of interest about the image**

**Failure** —Will the user notice if the correct action is available?

Evaluators were divided on the success of this task. While they acknowledged that the information is consistently displayed on the left hand side, it may not be immediately clear

what information is listed (especially on smaller resolution monitors which would show less information before the page break. Also, the information is scraped from MODS metadata records, which is most likely unfamiliar to the user in format and, to a lesser degree, content.

### **Step 5: Download the image in a resolution that can be incorporated into a written assignment**

Failure —Will the user notice if the correct action is available? Will the user associate the correct action with the effect trying to be achieved?

The list of action icons is very small and located in an out of the way place on the page. Users may skip over the menu entirely as their eye focus on the image first and the metadata second. Both of these parts of the page are clearly bounded by large frames whereas the menu is part of the interstitial space between the search bar and image box. In the menu, the icon used to symbolize the download is clear, but the highlight color in the resulting drop down is very similar to the background —making it hard to see which option is selected. If users are not familiar with pixels as a unit of measurement, they may have a hard time picturing how big the downloaded images will be.

### **Step 6: Return to search**

Failure —Will the user try to achieve the right effect? Will the user notice if the correct action is available? Will the user associate the correct action with the effect trying to be achieved.

Because it was located in a similar place on the page (though on the left hand side) as the menu in the previous task, the return to search button suffered from the same visibility issues. More importantly, however, the icon used to signify “return to search” is one commonly associated with rewind to start or go back to the beginning. The fact that all other icons in the menu are related to what number image the user is currently looking at only serves to reinforce this discrepancy.

### **Step 7: Navigate to the related photograph mentioned in the notes of the previous picture**

Failure —Will the user try to achieve the right effect?

In the notes of the first photograph, it states that the family depicted is the same as in “image no. 0503,” however, on the collection page, there is no way to view or sort by image number. Instead, the user sees the result number based on their current search criteria. In the current example, image no. 0503 is result number 13. It is worth noting that some evaluators wanted to search for the image number, not browse, which does present the user with the correct photograph. It still does not display the image number on the results screen though.