

VRA Bulletin

Volume 48
Issue 1 *Spring/Summer 2021*

Article 5

May 2021

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Recommended Citation

Willis, Shannon, and Marcia McIntosh. "The Perils of Complexity: A Multi-Stage Study to Determine Necessary Images for Digitized Scrapbook Representation." *VRA Bulletin*: Vol 48: Iss. 1, Article 5, 2021. Available at: <https://online.vraweb.org/index.php/vrab/article/view/202>.

The Perils of Complexity: A Multi-Stage Study to Determine Necessary Images for Digitized Scrapbook Representation

Abstract

The digitization of scrapbooks is a common challenge faced by digitization practitioners. Unlike more standard bound works, scrapbooks are highly complex, with multiple moving parts and numerous special features. As such, determining digitization standards that will hold across all manner of scrapbook collections and will accurately represent their unique elements in an understandable way in a digital environment can be problematic. The researchers at the University of North Texas (UNT) conducted on a multi-stage project to examine current practices and gain user perspectives on the images needed for optimal scrapbook representation in a digital library. The results from their work have enabled the implementation of clear guidelines on scrapbook digitization at their institution that can be applied throughout the field.

This article has undergone a double-blind peer review process.

Keywords

visual resources, digitization, scrapbooks, object representation, user study, digital libraries, library science, cultural heritage imaging, special collections, users

Author Bio & Acknowledgements

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The authors would like to acknowledge the contributions of those who donated their skills, expertise, materials, and/or time to this research: Nancy Reis (review and copyediting), Megan Gellner (video creation), Joshua Sylve (video production assistance), Ana Krahmer (usability expertise), Dianne Jansing (swag for study participants), UNT Special Collections (scrapbook loans), Phase 2 Beta Testers, and all study participants.

Introduction

Digital libraries host a wide variety of material types. Some items, such as books, are easily understood online. When presented in a digital library as a series of static images, users quickly understand that they are looking at a book; they recognize that the order of the images represents the order of the pages as they appear in the physical book. Other objects, however, are not as simple to understand in a digital environment.

The authors of this paper, librarians in the University of North Texas (UNT) Digital Libraries Division, have found that many scrapbooks are exceptionally complex physical objects. Scrapbook makers attach various material types to pages in prefabricated bound books. Many items fold out or can be moved to reveal more information, and, at times, loose items are included between pages. Such complex objects can be a challenge to represent in a digital library in a way that makes sense to users when the image viewer can only present a series of static images. Additionally, which images to capture and the order in which they should appear is not always intuitive.

Questions about how to digitize complex scrapbooks arose often enough to prompt the authors to research how to effectively capture and represent them online. Given the limitations of current standard digital library viewers, the authors sought to answer the following research questions:

- What images are needed to fully represent the object?
- What images are needed, if any, in order to provide context for the users as to the nature of the distinct elements?
- In what order should those images appear to make the most sense to online users when interacting with the object in a digital library?

To answer these questions, the authors embarked on a three-phase research study: a digital collections review of scrapbook digitization practices at other institutions, an in-person user study, and a digital survey. The project took place over multiple years and concluded in 2019. The data collected during the study reveals users' needs when interacting with digitized scrapbooks and informs the standards and practices of scrapbook digitization at UNT.

Literature Review

Many articles about scrapbook digitization focus on aspects of the full process,¹ careful handling and suggested equipment,² and viewer development.³ However, none of them robustly address the images needed to represent the various moving pieces in complex scrapbooks from a user-centered perspective. All of the cited articles have valuable information and insight for professionals working with complex scrapbooks, but they did not answer the researchers' questions about what users need in order to make sense of a scrapbook in a digital environment.

Study Phases

Phase 1: Review of Other Institutions' Scrapbook Digitization Practices

¹ Epsen S. Ore, "Digitising Complex Data: Integrating Text, Images and Physical Organisation," *Liber Quarterly: The Journal of European Research Libraries* 12, no. 2-3 (2002): 208-218, <http://doi.org/10.18352/lq.7684>.

² "Chapter 4, For Scanning Technicians," *Digitizing Entire Collections*, Archives of American Art, Smithsonian, accessed March 2019, <https://www.aaa.si.edu/documentation/digitizing-entire-collections-chapter-4-for-scanning-technicians>.

³ Allison B. Zhang, "Creating Online Historical Scrapbooks with a User-Friendly Interface: Case Study," *D-Lib Magazine* 13, no. 11/12 (November/December 2007), <https://doi.org/10.1045/november2007-zhang>.

Before beginning a user study, the researchers wished to determine if there was any field-wide consensus on how various unique scrapbook elements should be represented by still images. In order to do so, in spring 2017, the authors conducted an examination of scrapbooks found in the Digital Public Library of America (DPLA) to discover how other cultural heritage institutions digitize scrapbooks and present them in digital libraries. DPLA is a freely available, single point of access resource to digitized cultural heritage resources.⁴ It aggregates the digital holdings of thousands of contributing institutions across the United States.

The authors examined at least one scrapbook or scrapbook artifact from the 29 DPLA partner hubs that appeared in a search for the term “scrapbook,” leading the authors to analyze 69 scrapbook items. They examined nine aspects of scrapbook digitization:

1. The use of targets when digitizing
2. Borders around the item
3. Loose objects in the item
4. Objects in the scrapbook that fold out
5. Envelopes with objects inside
6. Cropping down to individual scrapbook elements on a page
7. Structure
8. Orientation
9. Blank pages

A thorough review of the results of this analysis was presented at DPLAFest 2017.⁵

Phase 1 Summary

While the researchers did find trends in how institutions handled some of the above unique elements, they also saw plenty of variation. They also never saw absolute adoption of any one method for an element by all institutions. In essence, if one thought an element should be handled in a particular way, one could probably find some institution that digitizes that element in that way.

Not finding a field-wide consensus on how to handle unique elements of scrapbook objects and wishing to base their practices on user needs, the authors designed a second phase of their study.

Phase 2: User Study

Study Design

In the second phase, the researchers pivoted from examining the practices of other institutions and focused on the preferences of digital collections users. Phase 2 aimed to answer the following questions:

1. What images do users need to make sense of a digitized scrapbook in a digital environment?
2. In what sequence should images of a digitized scrapbook page appear in order to be most understandable to an online user?
3. How do users prefer scrapbooks to be represented in a digital environment?

⁴ Digital Public Library of America, “Strategic Roadmap, 2019-2022: Collaborating for Equitable Access to Knowledge for All,” accessed February 17, 2020, <https://pro.dp.la/about-dpla-pro/strategic-plan>.

⁵ Marcia McIntosh and Shannon Willis, “Professional Opinion vs. User Directed Digitization, Round 1,” Presentation, 2017 DPLA Fest, April 20-21, 2017, Chicago, Illinois, <https://digital.library.unt.edu/ark:/67531/metadc987476/>.

The researchers used a variation on paper prototyping to conduct in-person user testing. Paper prototyping is a low-cost technique, frequently used in software development and usability testing, that gives participants the flexibility to design their desired outcome using paper with minimal input from the researchers that might sway their design.⁶ As the authors were not testing a piece of software, but rather the images needed for digital scrapbook representation, they modified the processes to better fit the needs of the study.

In order to create a model of a paper-prototyping setup that would be simple and understandable for users unfamiliar with cultural heritage digitization, the authors created a sample scrapbook. Each page in the scrapbook had a single dynamic feature for participants to represent. The researchers chose to test just three unique elements of scrapbooks: loose items, items in envelopes, and foldouts. Each of the pages was then digitized in a number of variations. These images were printed out on cardstock and labeled with alpha-numeric codes. The test subjects were given these images – as well as blank paper, drawing materials, and Post-It notes – to use in their representation of each dynamic feature.

Each study session was conducted in a library conference room at UNT and lasted between 30 and 60 minutes. Test subjects were recruited through library and digital repository listservs, social media, and flyers posted at the local public library branches. Each subject signed an informed consent form before being brought into the testing room.



Figure 1: Scrapbook user testing room.

Inside the testing room, the researchers gave each participant an overview of The Portal to Texas History (UNT's largest digital repository) so that the participants would understand the functionality that the current viewer has and that objects are represented in the digital space by a series of still images. The participants were also shown examples of scrapbook objects from the UNT Special Collections to demonstrate the unique nature of the objects the study was addressing.

⁶ Brian Still and John Morris, "The Blank-Page Technique: Reinvigorating Paper Prototyping in Usability Testing," *IEEE Transactions on Professional Communication* 53, no. 2 (June 2010): 144-157, <https://doi.org/10.1109/TPC.2010.2046100>.



Figure 2: User testing setup for task 1: items in envelopes.

Each participant then performed three tasks, where each task centered on representing a single unique element of the scrapbook. For each task, the researchers gave participants a set of possible images they could use (the sample images created before). Participants were instructed to select the images they believed would best represent the scrapbook page and put them in the order that would make the most sense to them if they were looking at this scrapbook in The Portal to Texas History. They could select as many or as few images as they desired, and they had blank paper and drawing materials if an image they thought best was not represented in the images provided. Participants could also use Post-It notes if they thought an image provided was close to what they wanted but they preferred some element on it to be changed. Participants were instructed to narrate their thoughts as they worked and to put their final selections on a magnetic whiteboard. After all three tasks were completed, participants were asked to complete a brief survey on their previous experience with and exposure to scrapbooks.



Task 1: Envelope

Task 2: Loose Item

Task 3: Fold out

Figure 3: Example task image orders and annotations from participants' results.



Table 1: All images for task 1 (envelope).

Task 1 tested how users preferred envelopes and the items inside to be represented. Participants were given 14 sample images from which to choose (table 1). Below are the images most often selected by participants for inclusion (table 2).

Phase 2 had 15 self-selected participants. For each session, the researchers collected data on the three tasks' final results, photographing the whiteboards during the session, and photographing the alphanumeric codes on the chosen images after the session (fig. 3). The alphanumeric codes were later recorded in a spreadsheet. If participants drew their own images or modified a provided image, this was also recorded. The researchers also took session notes and video recordings of each session to be able to document why participants made the particular decisions they did.

Results
Task 1: Item in Envelope







					
A67	A23	A43	A72	A37	A86
3	3	3	3	3	3
43%	43%	43%	43%	43%	43%

Table 2: Most popular task 1 (envelope) images.

Task 2: Loose Item

Task 2 tested how users preferred loose items between pages of a scrapbook to be represented. Participants were given eight sample images from which to choose (table 3). Below are the images most often selected by participants for inclusion (table 4).

			
B05	B60	B17	B42
			
B68	B21	B35	B53

Table 3: All images for task 2 (loose item).






				
B17	B21	B35	B42	B53
7	6	5	4	4
100%	86%	71%	57%	57%

Table 4: Most popular task 2 (loose item) images.

Task 3: Foldout

Task 3 tested how users preferred elements that fold out beyond the edge of the scrapbook page to be represented. Participants were given ten sample images from which to choose (table 5). Below are the images most often selected by participants for inclusion (table 6).

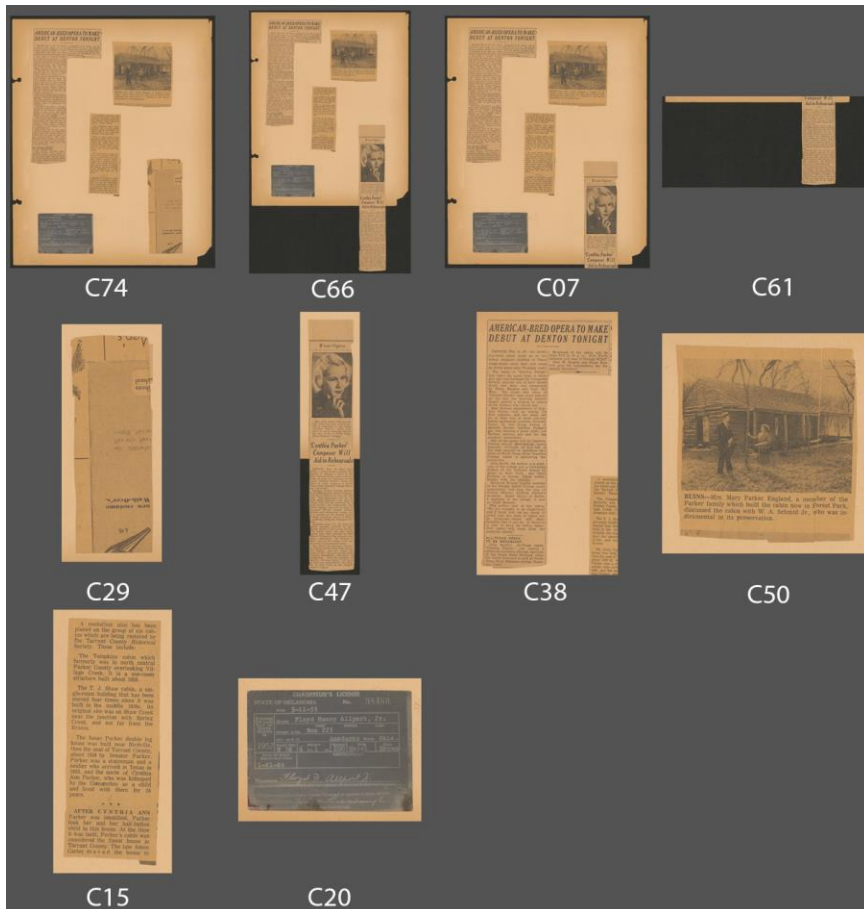


Table 5: All images for task 3 (foldout).




		
C74	C66	C47
6	5	4
86%	71%	57%

Table 6: Most popular task 3 (foldout) images.

Discussion

Task 1: Item in Envelope

The results of task 1 varied wildly; there was far more variation than trends. The researchers had assumed that the images of the card inside the envelope and/or the image of the card pulled slightly out of the envelope would act as context shots for the participants, to show where the card came from. But while these images were sometimes used as context shots, they did not seem to be the only images used for the purpose of providing context.

There was a distinct preference to include at least some images of the card from the envelope on top of the scrapbook page, rather than on its own off the scrapbook page, ostensibly to further show the relationship between the card and the envelope. 73 percent of participants included at least one image of the card on top of the page, sometimes with and sometimes without the other context images mentioned previously, and 47 percent of participants only included shots of the card on top of the page (they included no shots of the card off the page). However, more than half of the participants also wanted at least one image, or more, of the card off the scrapbook page.

These results left the researchers with continuing questions about which images are needed for context so people can understand the movement of attached objects and the relationship of unattached objects (removable cards and letters) to the page. It was assumed that either an image of the card inside the envelope or the card slightly pulled out of the envelope would be sufficient to provide users with the context needed to understand the elements on the page. But since 73 percent included some image(s) of the card on top of the scrapbook page, a question remained after this phase of the study as to whether the two previously mentioned context images provided enough information to the users. However, determining which image(s) of the card on top of the page should be included as further context images was not possible from the results due to the amount of variation seen between participant responses.

Therefore, given the variation seen, the researchers still had questions after this phase of the study about which images will be able to clarify for the most people the movement and relationship of objects for an attached envelope with letter.

Task 2: Loose Item

In task 2, the researchers hoped to determine if users need an image of a loose item scanned on top of a neighboring page to help clarify that it was not attached to a page. The study did show a preference for the inclusion of this image (or some slight variation of it) by the participants, 67 percent. Of the participants who did not include it, two of the participants did want the photograph scanned on top of a scrapbook page, but they felt the left neighboring page was more appropriate than the right neighboring page. A few of the participants, regardless of whether they included the image on top of the page or not, did say that they would like some mechanism, such as an icon or a label, to indicate that the photo is a loose item and not attached to a page.

With less variation between participants, the results of this task seemed clear that the context image of the loose item on top of a page should be included. However, since several participants indicated the desire for some sort of labeling, the researchers wondered if such labeling would

negate the need for the context image entirely. Although not usually done at UNT, the mechanisms used to provide pagination for bound objects could be used to provide such descriptive labeling. Thus, this task left the researchers asking if descriptive labeling would provide participants enough context for loose items and would be a better solution than extra images.

Task 3: Foldout

In task 3, the researchers assessed whether users needed a cropped image of the foldout object on the scrapbook page. In Phase 1 of the study, the authors found that some institutions did provide this cropped image, rather than show the whole page with the element folded out, but it was not a universal practice among digitizing institutions, and the researchers wanted to know what users preferred.

The results showed a slight preference for inclusion, 53 percent. However, looking more closely at the participants who included it in their final result, only 13 percent included it without also including other cropped images of the other attached objects on the page. On this task, several participants chose to include one or more cropped images of other items on the page, despite not having done so in previous tasks. So, the cropped image of the foldout object may or may not have been uniquely important to them. Also of note, one of the participants who included the cropped image of the foldout, included it in lieu of the image of the full scrapbook page with the clipping folded out, an image most other participants chose to include to show movement.

Based on the results of Phase 2 of the study, the researchers did not have enough persuasive data to make the inclusion of cropped images of foldout objects a standard practice at their institution. However, they did wonder if the results would be different if the foldout element was a multi-page booklet rather than a single sheet that extended beyond the edge of the page. They believed further testing would help answer their remaining questions.

Phase 2 Summary

After Phase 2 of the study, the researchers determined that further testing was needed. Although Phase 2 did illuminate many aspects of user preferences and shed light on what users see in an image in a repository, the researchers wanted to test variations of the previous tasks to verify user preferences and test other hypotheses. It was decided that a final Phase 3 of the project would employ an online survey to test three more questions.

Phase 3: Survey

Study Design

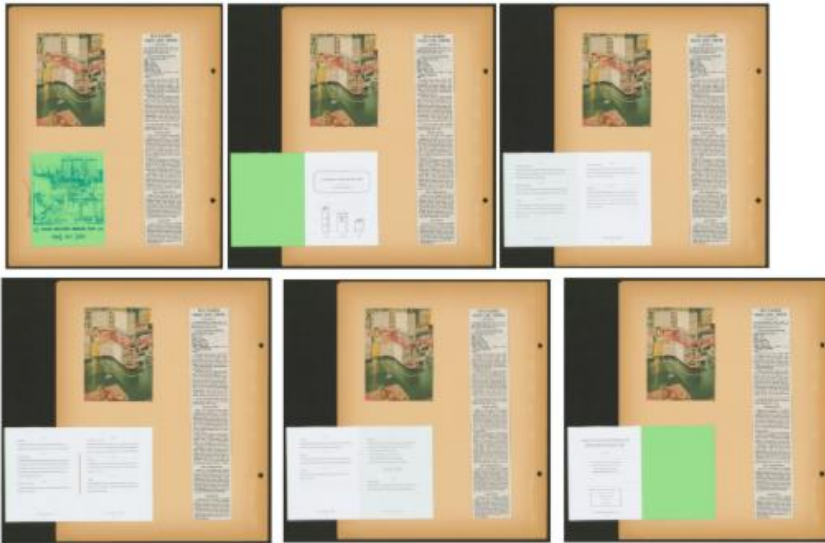
Phase 3 of the study was an online survey. The researchers narrowed their research questions down to three specific element variations they wanted to test. The survey addressed these three specific questions, derived from Phase 2:

1. Do users prefer to see the pages of an attached booklet with the whole scrapbook page visible, or do they prefer to see the pages of an attached booklet with the rest of the scrapbook page cropped out?
2. Do users prefer to have a context image of a loose item on a page of the scrapbook, or do they prefer to have labels to indicate that an object is loose?
3. Do users prefer to have a context image of a card in an envelope where the card is slightly pulled out of the envelope, or do they prefer to have a context image with the card out of the envelope and on top of the scrapbook page?

The digital survey, administered through Qualtrics, included both audio and video elements to help respondents understand the nature of the questions. When taking the survey, respondents first watched a short video giving them introductory information on The Portal to Texas History and the viewer used in the Portal, similar to the introduction given to test subjects in Phase 2. The respondents were then asked three questions: one for an attached booklet, one for a loose item, and one for a card in an envelope. Before each question, a short video played demonstrating how the physical scrapbook looked and moved and explaining the choices for that unique element.⁷ The respondents then selected one of two options for each element. The respondents had space with each question to explain their choice or provide any feedback. The survey was promoted through UNT listservs, newsletters, social media, and local genealogical societies where possible.

Results

A



B



Figure 4: Phase 3 digital survey. Question 1: booklets options. Each option begins with an image of the scrapbook page as first seen. Option A: a series of images with the booklet open to each page, seeing the full scrapbook page in each image. Option B: a series of images with the booklet open to each page, cropped down to just the booklet without seeing the full scrapbook page.

Question 1: Booklet

The options for the booklet element were as shown to the left (fig. 4). The results were 26.47 percent for option A and 73.53 percent for B, with respondents favoring the cropped option.

Question 2: Loose Item

The options for the question about a loose item were as shown below (fig. 5). The results were 39.71 percent for option A and 60.29 percent for option B, with the respondents favoring descriptive labeling over the image of the loose item on top of a neighboring page.

⁷ University of North Texas Libraries. "Digital Scrapbook Survey." UNT Digital Projects. Updated October 6, 2020. Four videos, 5:13. <https://www.youtube.com/playlist?list=PLi8hUaCnJKguug0o5RoKOYRHw9LkwoDLn>.

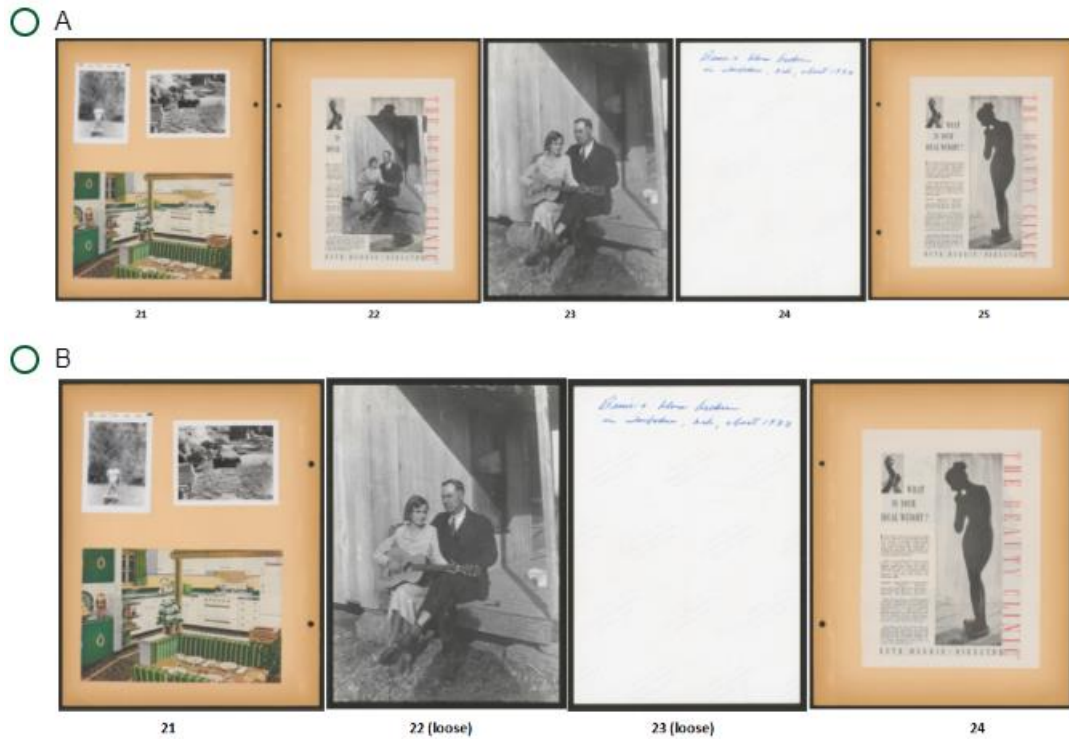


Figure 54: Phase 3 digital survey. Question 2: loose items options. Option A: an image of the page on the left, an image of the page on the right with the loose item on top, an image of the front of the loose item, an image of the back of the loose item, with naming to indicate that it is loose, an image of the back of the loose item with naming to indicate that it is loose, and an image of the page on the right. Option B: an image of the page on the left, an image of the front of the loose item with naming to indicate that it is loose, an image of the back of the loose item with naming to indicate that it is loose, and an image of the page on the right.

Question 3: Item in Envelope



Figure 6: Phase 3 digital survey. Question 3: envelope options. Each option begins with an image of the page as first seen and an image with the envelope opened, includes images of the card after the context shot being tested, and ends with an image of the empty envelope. Option A: an image with the card partially removed. Option B: an image of the card on top of the page.

The options for how to represent an envelope with an object inside were as shown to the left (fig.

6). The results were 46.15 percent for option A and 53.85 percent for option B, implying a very slight preference for showing the card on top of the page.

Discussion

Question 1: Booklet

In analyzing the respondents' comments, respondents who chose option B thought the cropped images made it easier to both see and focus on the booklet; some specifically said they did not want to have to zoom in on each page of the booklet with each new image. A couple of participants who chose option B also commented that they believed the option to be "less cluttered."

Given the strong favoring of the cropped images, the researchers concluded that they should change their institution's standards regarding scrapbooks to include cropping down images of multi-page items attached to scrapbook pages. The added work of cropping to the attached item rather than cropping to the scrapbook page is negligible. And while some respondents who chose option A did express concern about preserving the nature of the scrapbook as found, a sentiment shared by the researchers, it should, in this case, fall second to user ease, especially as the scrapbook will still be captured in its entirety, leaving nothing out.

Question 2: Loose Item

In analyzing the respondents' comments, the researchers found it particularly interesting that quite a few of the respondents who chose option B (the descriptive labeling option) found the context image of the loose item on top of the scrapbook page (found in option A), to be simply confusing, as though they could not quite tell what they were looking at. One respondent wrote that it looked like an image of the loose item was "superimposed" on top of the image of the scrapbook page, appearing odd to that respondent. The confusion of some respondents over this image in Phase 3 does, oddly, harken back to many comments made by participants during Phase 2 of the study. In Phase 2, while several chose to include an image of the loose object on the scrapbook page, a number did not like *how* the loose object was placed on the scrapbook page in the image. They wanted to skew or move the loose item so that it was shown on the neighboring page but was more obviously (to them) not attached to the page, making the image less confusing for them. Perhaps these results show that if one is doing the digitization and handling the physical object, one can more easily make sense of an image of a loose item on top of a scrapbook page, but if you are simply viewing the images in a repository and are completely removed from the physical item, such an image makes less sense.

Based on the results, the researchers determined that they should not include images of loose objects on top of neighboring scrapbook pages, as many respondents to the survey found this image confusing. As well, many respondents who chose option B spoke about not assuming a relationship between page and loose item, which the researchers agree with. In fact, one respondent who chose option A insisted that there was a clear relationship between the loose photograph and the newspaper clipping on the scrapbook page, which there was not. Objects for this sample scrapbook (the same one used in Phase 2 of the study) had been sourced and pieced together at random. That this respondent assumed a relationship where there was none because of the placement of the item on top of a neighboring page is problematic and suggests that including such an image may indeed cause confusion for users and may suggest to them a relationship that does not exist.

The researchers did, however, conclude that descriptive numbering or labeling should be added to indicate that an item is loose to help orient users in the digital scrapbook. In fact, the

researchers believe that using some sort of similar practice for other unique elements might also be useful.

Question 3: Item in Envelope

The results for question 3 had the closest results of the three elements tested in the survey, 46 percent for option A (image of the card slightly pulled out) to 53 percent for option B (image of the card on top of the page). And the respondents' comments further seem to show that there is little or no preference between the two options. Many respondents who chose option A and many respondents who chose option B both stated in their comments that they saw little difference between the two context images and that they had no strong opinion as to which was better. Furthermore, those respondents who clearly preferred the option they chose and believed it to be markedly superior to the alternative mostly preferred their option for the same reasons as others preferred the alternative. Both respondents who chose option A and respondents who chose option B stated that their option was more like the experience of handling the physical object; it was cleaner, clearer, and more easily understood. As well, a couple of respondents did not feel either context image was necessary.

As a result, the researchers found there was not enough compelling evidence to include either context image in their usual standards for representing objects inside envelopes since there was not a clear preference and perhaps neither is really needed for users to make sense of a complex scrapbook in an online environment.

Phase 3 Summary

The researchers concluded from the survey administered in Phase 3 that images of multi-page items attached to scrapbooks are better cropped down to just the item to facilitate easier use. Images of loose objects digitized on top of neighboring scrapbook pages should not be included, but images of the loose objects themselves should be labeled as "loose." Finally, no extra context images for items in envelopes are necessary.

It was also clear, from testing the representation of loose items, that descriptive labeling offers much to users and seems to be preferable to adding extra images to the digital object. With this in mind, the researchers see an opportunity to expand their suggested descriptive labeling for loose items to other unique elements in scrapbooks. Labels could be added to cropped images of attached multi-page items and to items taken out of envelopes, as well as other oddities as they arise, to keep users oriented in the digital space of the scrapbook. Such labels, while adding some extra time and work to the post-processing of the digital item, will ultimately save the researchers' institution from capturing more images and increasing the size of the digital scrapbook object, making it a preferable solution to the addition of context images in most cases.

Conclusion

Over three phases, the researchers were able to delve deep into user needs and the best methods of representing dynamic features of scrapbooks in an online environment. From the study the researchers concluded the following:

1. Images of pages with attached items that fold out do not need to be cropped to the attached item.
2. Images of multi-page items attached to scrapbook pages should be cropped down to the attached item.

3. No new context images need to be added to sequences representing objects in envelopes, and the researchers' institution will keep its previous standards regarding these items (standard sequence as follows: image of the envelope flipped up, images of items from the envelope, image of the empty envelope).
4. Images of loose items on top of neighboring pages should not be captured.
5. The researchers will develop standard descriptive labels to add to scrapbook images, most importantly for loose items, but for other elements as well.

Overall, this study allowed the researchers the opportunity to gain insight on user needs and then to apply these perspectives to the creation of digital surrogates of scrapbook items. It helped validate current practices and illuminate where changes can best be made to benefit the users. The research process also familiarized the authors with various methods of assessing user needs and perspectives. These methods, and the digital survey in particular, could easily be replicated to test other aspects, not only of scrapbooks, but of other cultural heritage objects to ascertain how users prefer such materials and elements to be represented in a digital environment.

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