Team Project: Missouri State Archives Website High-Fidelity Prototype (Version 2)

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Executive Summary

The redesign of the Missouri State Archives website sought to enhance user experience and efficiency when locating and searching within archival materials. Specifically, the redesign sought to streamline navigation and reduce user errors. The site has a broad user base, encompassing historians, researchers, educators, and others who may have interest in archival materials for genealogy or other purposes. These varying experiences and user goals were considered when redesigning the site.

Production of the final high-fidelity prototype relied on an iterative process. This involved producing a low-fidelity prototype and multiple versions of a high-fidelity prototype. Each of these was created in Figma and modified based on peer and instructor feedback. The high-fidelity prototypes incorporated more visual appeal by leveraging a color palette inspired by the Missouri State Seal and incorporating design elements like tooltips and a consistent layout.

To evaluate the effectiveness of the redesign, three users participated in the evaluation process. Efforts were made to ensure these participants represented a diverse user base. Each was asked to complete three different tasks on the existing website and the high-fidelity prototype, answer post-observation questions, and complete a usability form. Evaluation results revealed an improvement in task efficiency and error reduction when using the redesigned site. Participants reported higher satisfaction with the prototype than the existing site.

The final high-fidelity prototype can be accessed here: High-Fidelity Prototype

Part I: Problem Analysis and Requirements

Part A: Analysis

Description of the Current Technology/Tool

The Missouri State Archives website makes Missouri-related historical documents available to the public. While some documents are stored directly on their website, others are stored and maintained through CONTENTdm, a digital collections management and storage system. Documents stored in CONTENTdm are integrated into the Missouri Archives website, where users can interact with them. Some of these documents, particularly those that were typed, are transcribed using CONTENTdm's own OCR (Optical Character Recognition) technology.

According to one Missouri State archivist, the CONTENTdm OCR technology is sometimes less accurate than that of other programs, like Adobe. Mistakes with the OCR can result in more difficulty searching for keywords within archived documents. On the other hand, CONTENTdm has been commended, according to a Qualtrics survey of mostly archivists: "It [CONTENTdm] does a better job than other systems in enforcing an order to publications (easy to see all volumes of something in the order in which they were published). [It] [a]lso does a very good job with photographs and small manuscript collections."

On the Missouri State Archives website, CONTENTdm is primarily used to manage the six publications listed in the table below. Users interact with CONENTdm documents and artifacts to find historical information. This data could include historical facts, images, government information, laws, legal decisions, proclamations, and so forth. The users of the site include anyone interested in history, including researchers, historians, students, politicians, political scholars, and legal researchers. These groups of users are listed in the table below near the publications and purposes that are likely most relevant to them.

	Missouri Archives Publications using CONTENTdm	**Publication Website**	**Purpose / Information Provided by Publication**	**Potential Users**
1	Blue Book (Official Manual of the State of Missouri), 1878-2000	https://mdh.contentdm.oclc.org/digital/collection/bluebook	● government ● culture ● history ● research (statistical, historical, and political research)	● Researchers ● Historians ● Students ● Politicians ● Political Scholars

2	The Red Book (Bureau of Labor and Statistics), 1879-2004	https://mdh.contentdm.oclc.org/digital/collection/redbk	“Missouri's history of industry and labor”	● Researchers ● Historians ● Students ● Politicians ● Political Scholars
3	Missouri Session Laws, 1824-Present	https://mdh.contentdm.oclc.org/digital/collection/molaws	Missouri laws	● Legal Researchers ● Historians ● Educators
4	Missouri Supreme Court Reports, 1821-1955	https://mdh.contentdm.oclc.org/digital/collection/p16795coll33	“published opinions of cases argued in front of the court” that are “important and necessary to be published.”	● Legal Researchers ● Historians ● Educators
5	Missouri Governors Records, 1837-1901	https://www.sos.mo.gov/archives/mdh_splash/default.asp?coll=govrecs	● Correspondence ● Court records ● Advertisements ● Letters of recommendation ● Resignations ● Arrest warrants ● Extradition requisitions ● Pardons ● Rewards for capture ● Bills ● Invoices ● Receipts ● Oaths of loyalty and supporting materials ● Election notices ● Writs of election ● Legal opinions by the Missouri Attorney General and the Supreme Court of Missouri ● Maps ● Memoranda ● Meeting minutes ● Newspaper clippings	● Researchers ● Historians ● Students ● Politicians ● Political Scholars

			● Petitions ● Proclamations ● Reports ● Resolutions ● Statistics ● Telegrams	
6	Missouri State Archives - House and Senate Journals, House Journals from the 19th century through 2017 and Senate Journals from the 19th Century to the mid-20th century	https://mdh.contentdm.oclc.org/digital/collection/housej	● Proceedings of the state legislature ● Department & committee reports ● Correspondence ● Missouri Attorney General and Supreme Court rulings ● Statistics ● Commendations ● Resignations ● Eulogies and obituaries ● Resolutions ● Gubernatorial messages ● Proclamation ● Orders.	● Legal Researchers ● Historians ● Educators

Introduction of the Problem

Problems with CONTENTdm were illuminated through

- a Qualtrics questionnaire, described in more detail in the “User Analysis Data and Instruments” section of this report, and
- our personal experience as authors of this report.

Three of the four participants in the questionnaire were archivists, and the fourth was a PhD student. Thus, all could be considered expert researchers.

Description of the Current User Tasks and Goals in Relation to CONTENTdm

The Qualtrics questionnaire revealed that CONTENTdm on the Missouri State Archives site is used to accomplish the following tasks:

- Find relevant historical information in text [by using keyword searches or an index]
- View scanned books (e.g., Laws of Missouri, House and Senate Journals)
- [Do] genealogical research
- Download documents/images
- Find photographs [and other images]
- Upload materials for the public to use for research

Other tasks that users could do, not mentioned directly by questionnaire participants, are as follows:

- Scroll through results in a volume/publication to find information
- Sort information (e.g., by relevance)
- Browse information topically

Description of the Task Performance Context

The context in which users perform tasks with CONTENTdm on the Missouri Archives site can be described in terms of devices used, location of use, the ambiance of the location, and frequency of use.

Devices. Users can access the Missouri State Archives on any internet device. CONTENTdm reports that its materials can be read on “phones, tablets, and workstations.” According to the Qualtrics survey, most users access the Missouri Archives site through a desktop computer or laptop; these included 3 Dell devices and one Lenovo device.

Locations. Users could work in various contexts such as at home, in a library, at a school/university, or in a professional office. According to the Qualtrics survey, the most common places were in a professional office (3 of 4 users) and at home.

Ambiance. Based on the questionnaire, most users work in a quiet area with good lighting during the morning and afternoon. However, Missouri State Archives site and CONENTdm records could be accessed in various lighting conditions during any time of day.

Frequency of Use. Users vary in their frequency of use according to the survey; some people use the Missouri Archives site daily, weekly, monthly, or sporadically.

Identification of Sources Revealing Interaction Issues

The main sources of the problem were the Qualtrics questionnaire and our personal experience as writers of this report.

The Qualtrics Survey revealed the following three main issues.

1. Searching that is Ineffective and Inefficient

- One user reported “us[ing] collection the same way I would use a physical book: go to the index, then to the page rather than trying to do a keyword search.” This type of traditional searching means that the user is missing out on automated computer searches.
- According to another user, “The search is complicated and the simple search is not very effective. Also the way it displays pages of books or publications is not the easiest to use.”
- “The search function is absolutely terrible, especially when searching a keyword across an entire collection.”
- “The OCR function is not as good as other platforms out there, such as Adobe.”
- “Searching on the user end is very confusing.”

2. Interface and Navigation Issues

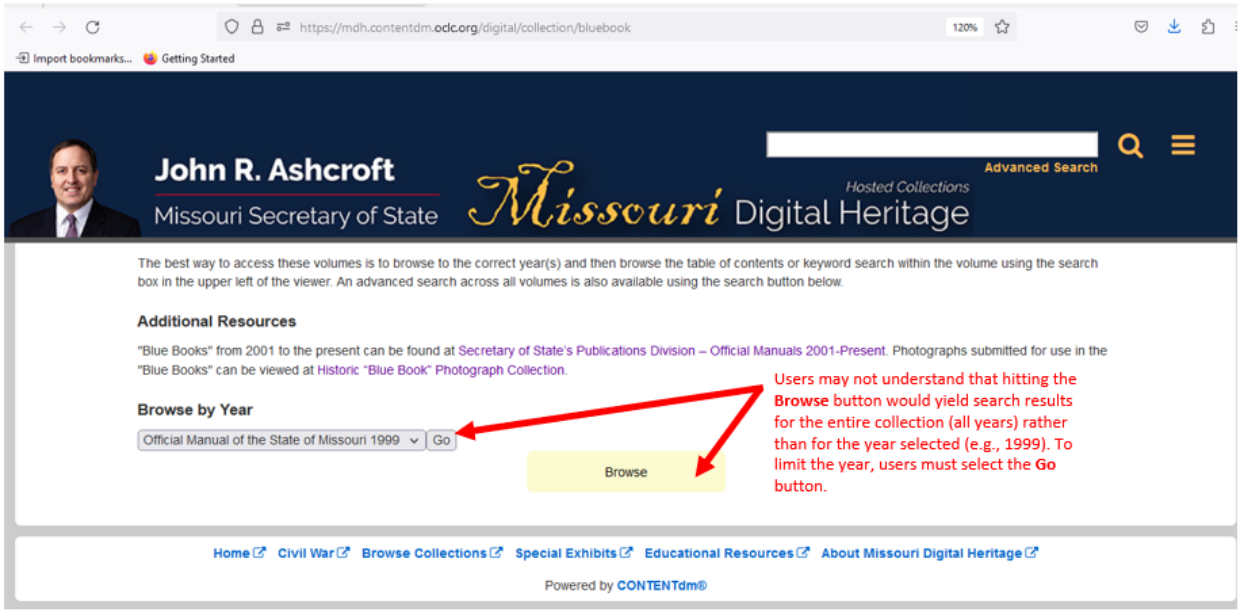
- Another user wants a “streamlined interface where I can find things quicker.”
- “Navigation on the user end is very confusing.”
- “Download options can also be confusing, and they vary by collection.”
- “There are several layers to get through to find what I need.”

3. Barriers for People with Visual Impairments

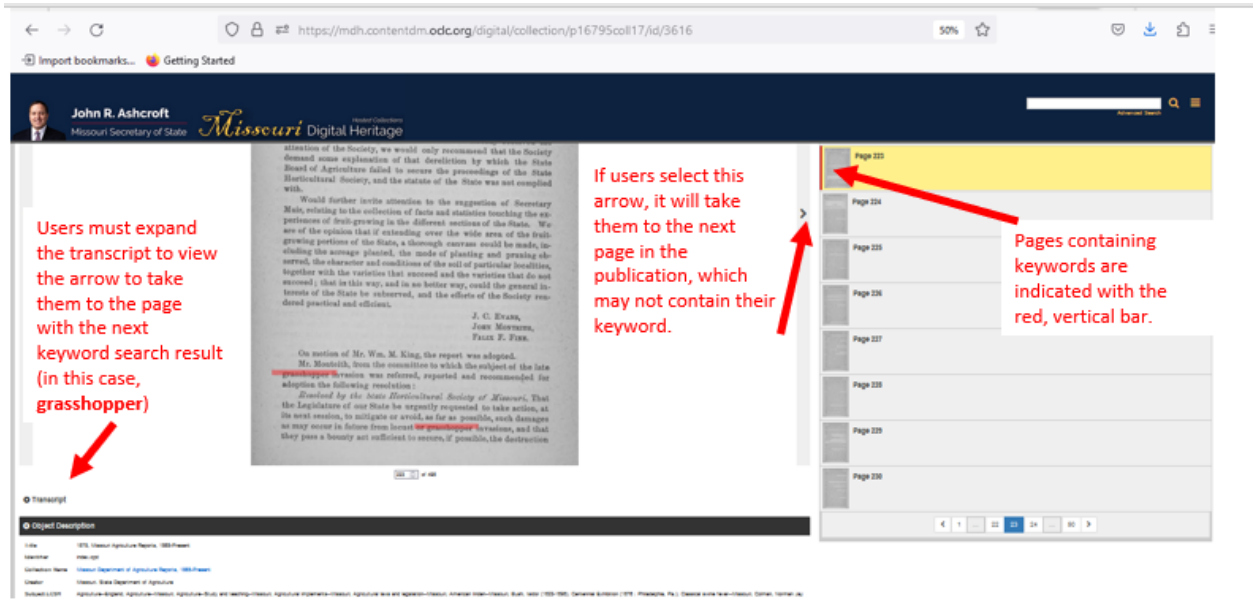
- “People with visual impairments will not be able to use the system as well as someone who can see because screen readers cannot read images. If something, like a Governor's handwritten letter, has not been transcribed, they would have no way to read it. All the screen reader would see would be the metadata.”

Through our personal experience, we have also noticed navigational issues like the following:

- On a collection page (e.g., for Blue Books), after users select a year, there is a "Go" button but also a "Browse" button, which is confusing for users.



- The arrows are misleading for scrolling through searches. Users may think the arrow on the central page takes them to the next search result, but it takes them to the next page of the publication (probably without their keyword). To jump to the next result, users must use the arrow at the bottom of the text image, which sometimes is not visible on the screen. An example with the keyword grasshopper is shown below, searching inside this *1875, Missouri Agriculture Reports, 1865-Present* publication: https://mdh.contentdm.oclc.org/digital/collection/p16795coll17/id/3616



User Analysis Data and Instruments

Summary

Data was gathered using a questionnaire built in the Qualtrics platform. Questions were designed to be comprehensive and generated to gather specific data around the following:

- User demographics
- User behaviors
- Access patterns
- User preferences
- User needs
- User goals
- User frustrations

Questions were also embedded to allow users to explain, in detail, how they perform tasks in the system. A copy of the questionnaire is provided in the Appendix A.

This data collection method was deemed most appropriate as it allowed users to think critically about their interactions and craft their responses accordingly. Interviews or focus groups may not have yielded data as comprehensive as what we were able to gather since respondents are required to answer in an impromptu manner. Furthermore, it allowed for time-efficient collection of data where the organization of focus groups or interviews would have been much more time-intensive and further delayed the project timeline. The questionnaire responses yielded the following impressions:

Respondent 1

The first respondent was a non-binary person between the ages of 25 and 34 who lives in Columbia, Missouri. They have a master's degree and are currently a PhD student. They typically access the Missouri Archives CONTENTdm system from their home in a quiet, spacious, and comfortable space. Access occurs in the morning on a sporadic basis using a Lenovo laptop using the Opera browser.

The respondent's primary purpose for accessing the system is for genealogical research. Their preference is to use a streamlined interface where they can quickly access resources relevant to their goals. They are particularly frustrated with the complexity of the navigation in the CONTENTdm system and report that they typically "poke around" to find what they need. They report that this is a time-consuming process that limits their use of the system.

Respondent 2

The second respondent was a female between the ages of 35 and 44 who lives in Jefferson City, MO. She serves as a Visual Materials Archivist for the Missouri Archives. She typically accesses the system from her professional office which she describes as a relatively quiet cubicle. Access occurs on a monthly basis during the morning and afternoon hours. She uses a Dell desktop computer with Google Chrome as her browser of choice. Her primary purpose for using the system is to upload materials for public use. This involves creating and uploading metadata for documents and photographs, sending typed documents through OCR tools, and manually transcribing and uploading handwritten documents, where appropriate.

She expressed several concerns about the system, particularly noting that the OCR functionality is less effective than in other platforms like Adobe's OCR capabilities in Acrobat. She also states that navigation, searching, and downloading are unintuitive for users. She does not express much positivity about the CONTENTdm system with regard to uploading and searching within documents, but she states it is fairly useful for providing access to photographs. She also voiced concerns about the system's accessibility, especially for users with visual impairments. She explained that screen readers struggle to interpret content without transcriptions or textual representations, rendering certain content types inaccessible to some users.

Respondent 3

The third respondent was a female between the ages of 35 and 44 who lives in Tebbetts, MO. She serves as a Supervising Archivist for the Missouri Archives. She primarily accesses the system from her professional office which she describes as quiet, well-lit, and private. Access occurs daily during the morning and afternoon hours. She uses a Dell desktop computer with Google Chrome as her browser of choice. Her primary purpose for using the system is to view scanned books, specifically the *Laws of Missouri* and *House and Senate Journals*.

She states that she approaches the system similar to how she would a physical book. She navigates through indexes and pages instead of relying on keyword searches made possible

through the OCR tool. She states that the functionality for searching keywords across documents is “absolutely terrible.” Aside from this, she states that she appreciates the system’s flexibility which allows her to access collections from anywhere at any time, not just at the archives.

Respondent 4

The fourth respondent was a female between the ages of 35 and 44 who lives in the State of Missouri. She works as an Archivist for the Missouri Archives. She primarily accesses the system from her professional office which she describes as quiet and well-lit. Access occurs weekly in the morning and afternoon hours. She uses a Dell desktop computer with Google Chrome as her preferred browser. She primarily uses the system to find information. She states that she often searches collections such as the Laws of Missouri to find content related to a certain topic.

She states that she typically searches for a keyword in an entire collection or, if known, opens a specific volume with the content of interest and searches within that specific volume. She finds the complexity of the search function and the ineffectiveness of a simple search to be particularly frustrating. She also states that the display of and navigation through pages from books or other types of publications is not intuitive.

She does, however, acknowledge some positive aspects of the system. She states that the CONTENTdm system performs better than others with regard to ordering publications and that it performs well with photographs and small manuscript collections.

Environmental Analysis

The Missouri Archives Content DM website is a widely used platform in academic settings, libraries, professional offices, and is also often accessed from home. To better understand its environmental impact and usage patterns, we can examine its various contexts and settings:

Academic Settings

Usage: Missouri Archives Content DM is frequently accessed in academic institutions such as universities and colleges.

Environment: Academic settings often provide well-lit and quiet spaces for research and study. Users predominantly engage with the platform during the daytime or evening.

Devices: Users in academic settings mainly rely on desktop computers for accessing the archives, although laptops are also common.

Library Environments

Usage: Libraries, whether large or small, serve as key hubs for accessing Missouri Archives Content DM.

Environment: Libraries generally offer well-lit, quiet, and spacious reading areas.

Devices: Desktop computers are typically available in library settings for users, ensuring a consistent and reliable experience.

Professional Office Settings

Usage: Professionals in various office settings also rely on Missouri Archives Content DM for research and reference purposes.

Environment: Office spaces can vary from cubicles to individual offices, typically featuring fluorescent lighting. Usage primarily occurs during regular working hours.

Devices: Users in professional offices predominantly use desktops or laptops for accessing the platform.

Home Use

Usage: The platform's versatility allows individuals to access it from the comfort of their homes.

Environment: Home environments may vary widely but tend to offer more flexibility in terms of usage times, often extending from morning to evening.

Devices: Accessing the Missouri Archives Content DM from home is typically done through personal laptops or desktop computers.

Inclusivity and Cultural Analysis

The Missouri Archive Content DM system serves a diverse user base, spanning a wide age range from high school-aged individuals (16 and above) to adults. While accommodating users with varied educational backgrounds, including high school students and those pursuing post-graduate education, its primary focus is on individuals with a Master's degree and beyond.

The system's user base exhibits diverse abilities, encompassing physical limitations like color blindness and other visual impairments. However, the website currently lacks features designed to cater to these specific groups.

- For example, the site lacks translation options and currently only supports English, posing a challenge for non-native speakers. Introducing translation features would greatly enhance the accessibility for users who prefer browsing in languages other than English.

- Another notable accessibility issue is the absence of alt text attributes for images, hindering screen readers in interpreting visual content. Implementing alt text for images would significantly improve accessibility for users relying on screen readers.

- Additionally, navigating the website without a trackpad or mouse is challenging as arrow key functionality is not supported. Enabling arrow key navigation would enhance the user experience, particularly for those who rely on keyboard navigation.

- While the site does maintain suitable contrast and font sizes, it lacks options for users to increase font size, particularly beneficial for visually impaired individuals. Introducing the ability to adjust font sizes would further contribute to the site's overall accessibility.

Addressing these issues by incorporating features such as alt text for images, translation options, improved navigation, and font size adjustments would significantly enhance the Missouri Archive Content DM system's accessibility for a broader and more inclusive user base.

Three Personas

Persona #1	
 **Stephanie Alvarez**	Stephanie is a seasoned legal professional who also has a passion for history. While she has worked in law offices in a variety of capacities over the past decade, she ultimately wants to become a legal historian and will be returning to college next fall to pursue this goal. In the meantime, she is assisting colleagues with legal research and documentation. She regularly accesses the Missouri Archives CONTENTdm system to review legislative history and different publications of *The Official Manual of the State of Missouri* to understand the evolution of Missouri's legal and political landscape. Stephanie carefully examines historical legal documents, case records, and legislative materials to gain insights into the state's legal history, analyze legal precedents, and trace the development of laws.
Goals	Regarding the use of the Missouri Archives CONTENTdm system, Stephanie's goals are to locate relevant resources and search within them for keywords and phrases concerning the specific project she is working on at the time.
When, Where, Frequency of Interactions	● Stephanie accesses the system on a weekly basis. ● Access is made from a quiet, professional office. ● The office is well-lit. ● Interactions with the system usually happen during business hours.

Preferences	● Stephanie prefers Apple products.
	● Her personal devices include:
	  ○ iPhone
	  ○ Macbook Pro
	● Her office setup features:
	  ○ iMac
	● Primary usage:
	  ○ iMac with Google Chrome for work-related tasks
	  ○ iPhone for social media and communication
	  ○ Macbook Pro for personal activities

Visual or Physical Disabilities	Stephanie has dyslexia, and she often uses a screen reader or text-to-speech technology to assist her in computing.
Age Range	35-44
Frustrations, Likes, Dislikes	Stephanie is frustrated by: ● limited search capabilities ● incomplete metadata

	• inefficient and confusing navigation • inaccessible content that affects her ability to use assistive technologies Furthermore, she dislikes cluttered interfaces that hinder her workflow and make it challenging to focus on her tasks. She likes streamlined, user-friendly interfaces which allow for intuitive search features and quick actions to access frequently-used tools.

Persona #2	
 **Gracie Peters**	Gracie is a 17-year-old junior at Hickman High School in Columbia, Missouri. She usually earns good grades in school and has always enjoyed learning about history. In her advanced American history class, her instructor is encouraging students to submit their class projects to the NHDMO (National History Day in Missouri) State Contest: https://www.nhdmo.org/state-contest.html Her research topic is the causes and effects of the 1874 locust/grasshopper plague. For her project, Gracie will create a website about this plague.
Goals	Gracie's goals are to • create a good project for the NHDMO State Contest and to support it with primary and secondary sources from the Missouri Archives CONTENTdm system. • earn a higher score on her project in her history class and perhaps even rank highly in the contest. A high ranking may also strengthen her college applications.
When, Where, Frequency of Interactions	• Gracie has about a month to research her topic of the 1874 locust/grasshopper plague. • During one of her high school history classes, she participated in a one-hour demonstration session with a librarian from the Missouri Archives about how to use their website to find sources. • Gracie mostly accesses the website after school, while she does her homework on her computer at home. She also sometimes has some time to do research on the website during her history class. • She has used the site about four times a week for the past two weeks.

Preferences	Gracie prefers working on her Dell laptop, which she can use at school and at home.
Visual or Physical Disabilities	Gracie does not have any visual or physical disabilities, but she is not used to reading cursive.
Age Range	Under 18
Frustrations, Likes, Dislikes	*Likes* ● the maps and images she has found in the Missouri Archives CONTENTdm system that show which states the grasshopper plague struck and what the grasshoppers look like in the field; she knows these images will enhance her website. ● the ability to search for keywords within text records, like this one: https://mdh.contentdm.oclc.org/digital/collection/p16795coll17/id/3616. *Frustrations*: ● sometimes forgetting to select "Transcript" at the bottom of the screen to advance to the next record with a keyword like "grasshopper." ● searching using keywords in CONTENTdm, which does not always highlight the keywords in the text (e.g., in handwritten texts). *Dislikes:* ● reading cursive print in letters about the plague like this one: https://mdh.contentdm.oclc.org/digital/collection/p16795coll5/id/1579/rec/10

Persona #3	
 **James Anderson**	James Anderson is a Museum Collections Specialist at the St. Louis Museum of History and Art. His primary responsibilities include: ● Managing and preserving the museum's extensive collection of historical artifacts, documents, and photographs.

	● Making history accessible to the community and ensuring the museum's collection is well-documented and properly cared for. He is familiar with the ContentDM digital archive system and appreciates its capabilities for cataloging and managing digital collections. He often uses the site to delve into the numerous collections, uncovering hidden treasures of lesser-known local history.
Goals	James' goal is to locate and download historical images and documents that can be used to supplement museum exhibits, educational materials, and marketing.
When, Where, Frequency of Interactions	● Interacts with the system at least once a day. ● Uses it to update records, upload media, or retrieve research information. ● Works in a brightly lit, climate-controlled museum office.
Preferences	● Tech-savvy and comfortable using various digital tools and platforms but prefers Apple products. ○ Has a Macbook Pro for home use
Visual or Physical Disabilities	● No disabilities that impact use of digital systems.
Age Range	25-34
Frustrations, Likes, Dislikes	*Frustrations:* ● Finds the search function confusing and overly complex, often making it difficult for him to locate specific items. ● The lack of search options and customization in the advanced search feature. ● He wishes the system allowed filtering by media type, which would improve the precision of his searches. *Likes:* ● While searching for photographs, he appreciates the readily available action buttons, including zoom, print, download, and search the metadata. ● He values the ability to search by subject matter. *Dislikes*: ● Annoyed by the system's limitation that prevents direct year input. Instead, it requires him to scroll through options, which can be time-consuming and inconvenient, especially when searching for specific years.

	• Although James himself is not visually impaired, his colleague has partial blindness and struggles to read small fonts or cursive text; therefore, James must manually transcribe needed excerpts for his colleague. • He strongly wishes that the system would include transcriptions for cursive and handwritten text, making it more accessible for users with visual impairments.

Task Analysis

Hierarchical Task Analysis

Users may access the Missouri Archives CONTENTdm system for a wide variety of purposes. Three different tasks are identified and outlined below. The first two represent tasks that any general user may execute. The last task represents an example of a task executed by an archivist with the Missouri Archives.

1. Search for keywords within a volume of a collection, such as the “Official Manual of the State of Missouri - The Blue Book”
    a. Access the Missouri Archives site
        i. Open browser
        ii. Navigate to the Missouri Archives site using a web search, shortcut, bookmark, or URL
    b. Locate and Select the Collection
        i. On the Missouri Archives site, navigate to the appropriate menu.
        ii. Select the menu option for the desired collection
    c. Select the Desired Volume
        i. On the collection page, use the dropdown to select the volume of interest.
        ii. Click the “Go” button.
        iii. If all volumes are of interest, click the “Browse” button.
    d. Search the Desired Volume
        i. In the CONTENTdm system, select the name of the volume to open it.
        ii. Use the table of contents to jump to a specific page.
        iii. Use the next and back buttons to navigate from one page to another.
            1. Click the back arrow to navigate to the previous page.
            2. Click the forward arrow to navigate to the next page.
        iv. Search by keywords or phrases using the search option above the table of contents.
            1. Type in the keyword or phrase of interest.
            2. Press enter to search.

3. Use the backward and forward arrows in the transcript window to see every identified occurrence of the keyword or phrase in the resource.
    a. Click the back arrow to see the previous occurrence.
    b. Click the forward arrow to see the next occurrence.

2. Browse a collection, such as the “35th and 89th Division World War I Unit Histories”
    a. Access the Missouri Archives site
        i. Open browser
        ii. Navigate to the Missouri Archives site using a web search, shortcut, bookmark, or URL
    b. Choose a method for browsing the collections
        i. Hover over the “Browse Collections” menu option
        ii. Select to browse by topic, media type, or by institution. Select “view all” if interested in all collections. For the example, select “by media type.”
    c. Locate a collection of interest.
        i. Select the relevant topic, media type or by institution. For the example, select “books and pamphlets.”
        ii. Click the blue “view collection” button for the collection of interest.
    d. Identify specific topics of interest.
        i. On the collection page, use the dropdowns to select the topic of interest.
        ii. Click the “Go” button.
        iii. If topics are of interest, click the “Browse” button.
    e. Browse documents in the collection.
        i. Click on any document of interest in the CONTENTdm system.
        ii. Use the table of contents to jump to a specific page.
        iii. Use the next and back buttons to navigate from one page to another.
            1. Click the back arrow to navigate to the previous page.
            2. Click the forward arrow to navigate to the next page.
        iv. Search by any keywords or phrases using the search option above the table of contents.
            1. Type in the keyword or phrase of interest.
            2. Press enter to search.
            3. Use the backward and forward arrows in the transcript window to see every identified occurrence of the keyword or phrase in the resource.
                a. Click the back arrow to see the previous occurrence.
                b. Click the forward arrow to see the next occurrence.
        v. Use the browser’s back button to leave the document and access others.

3. Upload Records to the Missouri Archives CONTENTdm system.
    a. Determine required actions for specific document
        i. Verify document type (Handwritten or Typed).

ii. If typed, proceed to OCR process.
iii. If handwritten, decide if word-for-word transcription is required.
iv. If transcription is not required, proceed to metadata creation.
v. If transcription is required, start transcription process.

b. OCR Typed Documents (if applicable)
   i. Launch CONTENTdm's management system software.
   ii. Upload typed document.
   iii. Initiate OCR process.
   iv. Confirm OCR results and accuracy as appropriate.
c. Create Metadata
   i. Gather information about the document:
      1. Unique identifier (file name).
      2. Who authored the document (who).
      3. Document content (what).
      4. Date of the document (when).
      5. Location mentioned in the document (where).
      6. Collection to which the document belongs.
      7. Additional relevant information (if any).
   ii. Open Microsoft Excel for metadata entry.
   iii. Create a new row for each document.
   iv. Populate metadata fields with gathered information.
   v. Save metadata in the Excel file.
d. Save Metadata as Tab-Delimited Text File
   i. Export the metadata as a tab-delimited text file.
   ii. Confirm the file's integrity and formatting.
   iii. Save the file for later use.
e. Upload Documents and Metadata to CONTENTdm Manager
   i. Access the CONTENTdm manager.
   ii. Start the upload process.
   iii. Select and upload the tab-delimited text file containing metadata.
   iv. Upload the document files.
   v. Verify successful upload and data integrity.
f. Transcription (if required for handwritten documents)
   i. Open the handwritten document.
   ii. Start transcription process if appropriate (word-for-word).
   iii. Save the transcription if applicable.
   iv. Associate the transcription with the document's metadata.
g. Task Completion
   i. Confirm that all documents are successfully uploaded.
   ii. Ensure metadata is accurate and complete.
   iii. Archive and organize documents and metadata for future reference.

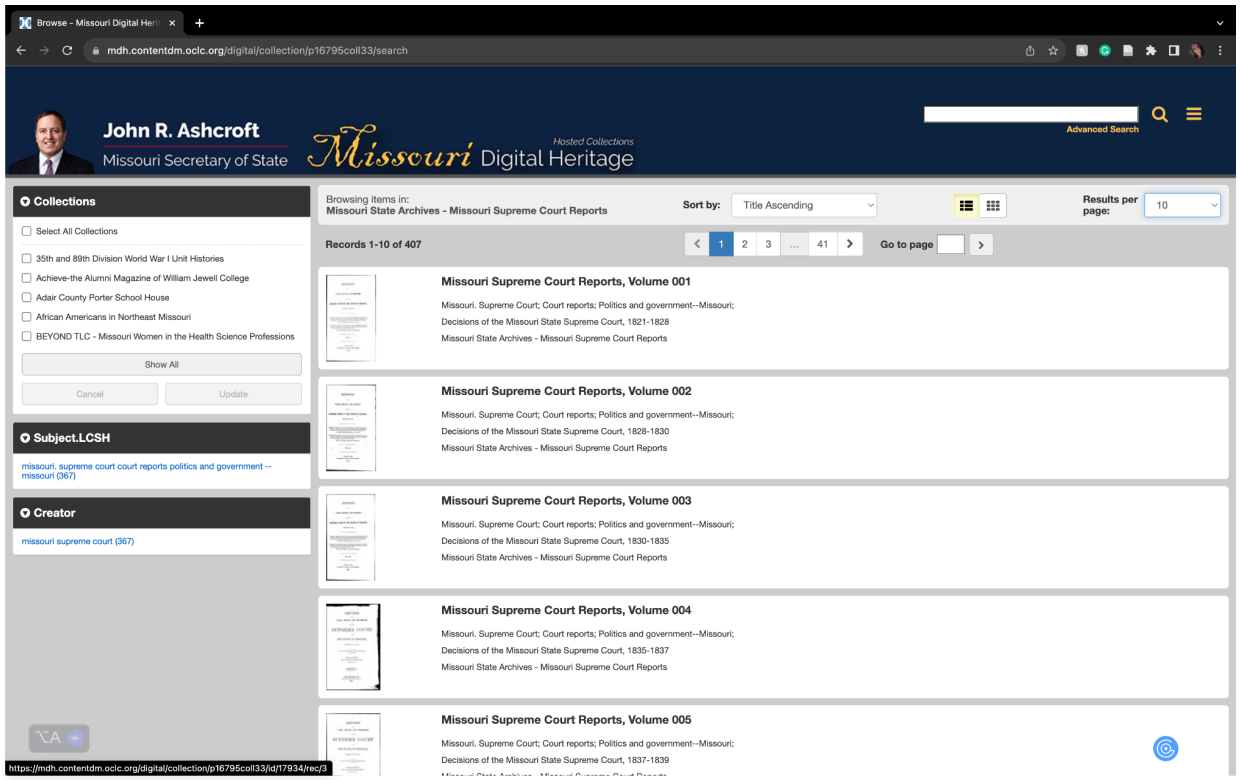
Task Description Method

Scenario 1

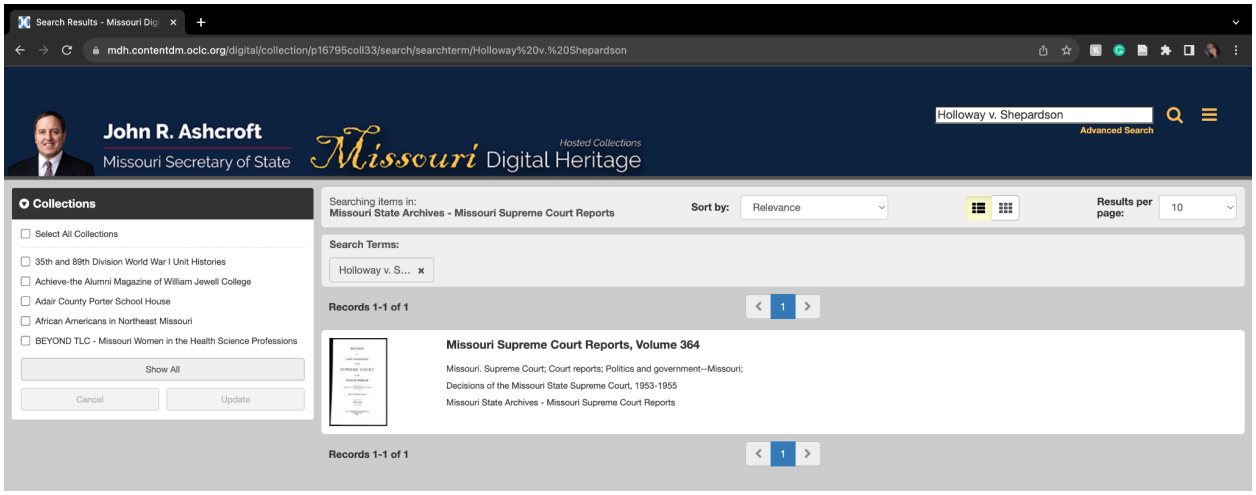
Stephanie Alvarez is a seasoned legal professional with a passion for history. She has worked in a variety of capacities in legal offices for over a decade, but she is planning on returning to college next fall to pursue her goal of becoming a legal historian. In the meantime, she is assisting her colleagues with legal research using the Missouri Archives CONTENTdm system.

Stephanie has been tasked with locating information about a Missouri State Supreme Court case from 1953, Holloway v. Shepardson. She navigates to the Missouri Archives website, hovers over “Browse Collections” menu option, and selects “by Media Type.” She selects the option for “Organizational Records,” and locates the “Missouri Supreme Court Reports” option. This opens an overview page in the CONTENTdm system for the “Missouri Supreme Court Reports.”

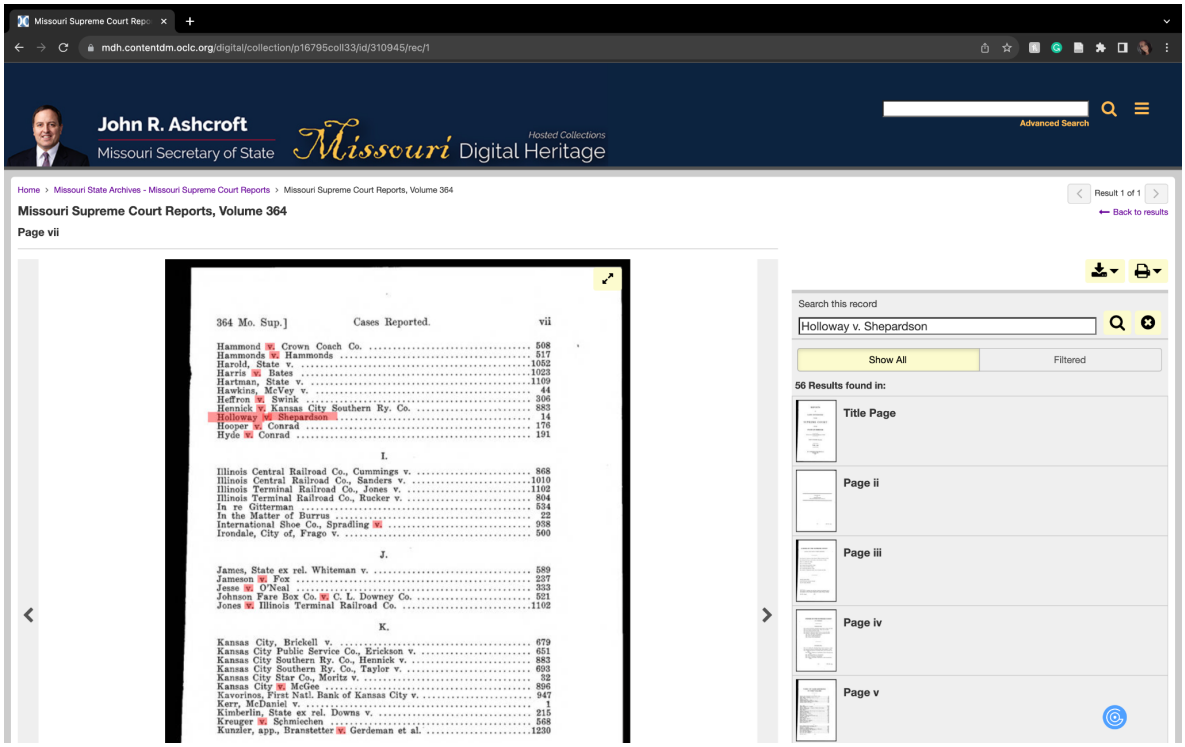
On this overview page, Stephanie scrolls all the way to the bottom and selects the yellow “Browse” button. As displayed below, this loads 41 pages of content which is far too much for Stephanie to sift through:

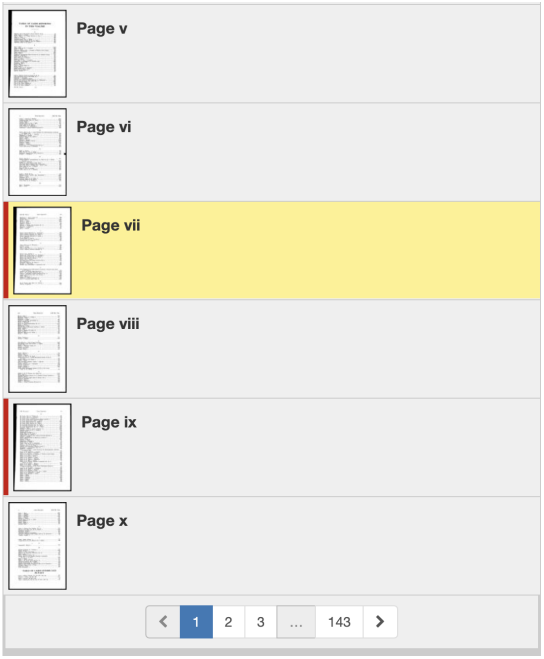


She decides to use the search at the top of the screen to narrow down her results. She enters the name of the case she's interested in:



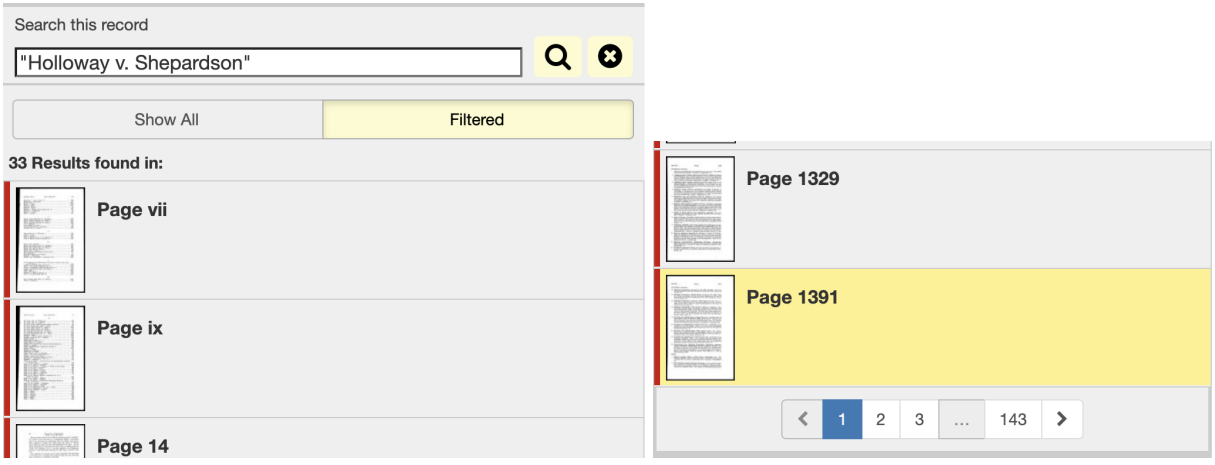
This produces the result she's looking for. She clicks on the name of the volume to open it for further investigation. When viewing the volume, she notices that the system has kept the keywords she searched earlier, but it pulled over 140 pages of results:





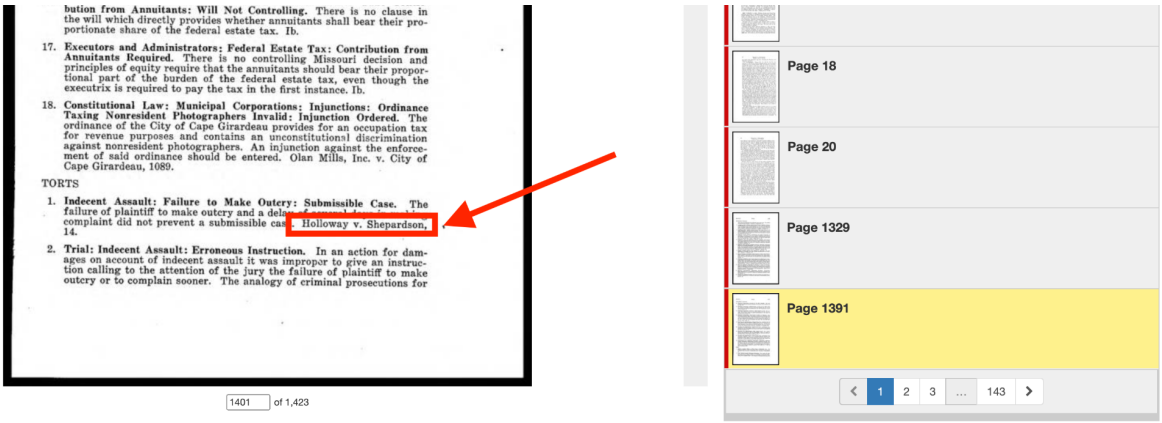
Stephanie notices that the search feature has located instances where each of the three words or abbreviations in her search appear within the text, even when these terms do not appear together. These instances are highlighted in red. The page indicates that there are 56 results, but 143 pages are listed. This is confusing to her, but she shrugs it off.

She knows that most searches allow users to place quotes around terms so that search results will only display instances where those terms appear together in the same sequence. She places quotation marks around her search terms:



This yields 33 results, but somehow still lists 143 pages of results. Stephanie clicks through the results. She notices that the red highlighting she saw on earlier pages doesn't exist on all results, making it difficult to identify where the text appears on the page. Stephanie is dyslexic and uses text-to-speech (TTS) technology to help her read content online. Her TTS extension is

having trouble reading the content to her. The narration seems disjointed and not fully representative of the text at hand. She decides to forego the TTS extension and skim through the text herself. After some time, she finally finds the mention of the case of interest at the bottom of the page result:



While she's glad to have this information, she is exhausted by the idea of doing any more work inside the system.

Scenario 2

Gracie Peters wants to find a primary source about her research project for the NHDMO (National History Day in Missouri) State Contest. She is creating a website about the causes and effects of the 1874-1875 (or mid 1870s) locust/grasshopper plague.

She begins with the website suggested a Missouri State Archivist who did a demonstration session with her history class: Missouri Disasters, 1785-Present - Agricultural**.** The bottom of this page presents her with two options: **View the Collection** or **Search the Collection**. She decides to select the latter "search" option so that she can find one of her keywords: grasshopper, locust, and plague. She decides to try a Boolean search by typing the following phrase: "grasshopper* or locust*" and plague. She is surprised when she sees the message, "**No results found.** Please try different search terms," at the top of the page. Then, she tries just searching for one word: grasshopper*. This search yields 34 results, and she is pleased by the first result at the top since it is a map that looks like it would be great to indicate which states were affected by the locust plague. She then browses the results for other primary sources, which she knows her instructor is expecting.

She tries to read the first two handwritten records, but the cursive is too difficult to decipher. She therefore moves on to the first typed document: General History of Macon County, Missouri.

It seems manageable to read since it is only three pages. She tries to find the keyword (grasshopper) highlighted, as happens with some documents, but she is disappointed that there is no OCR version of this document, so she must scan it to find her keyword. She finds

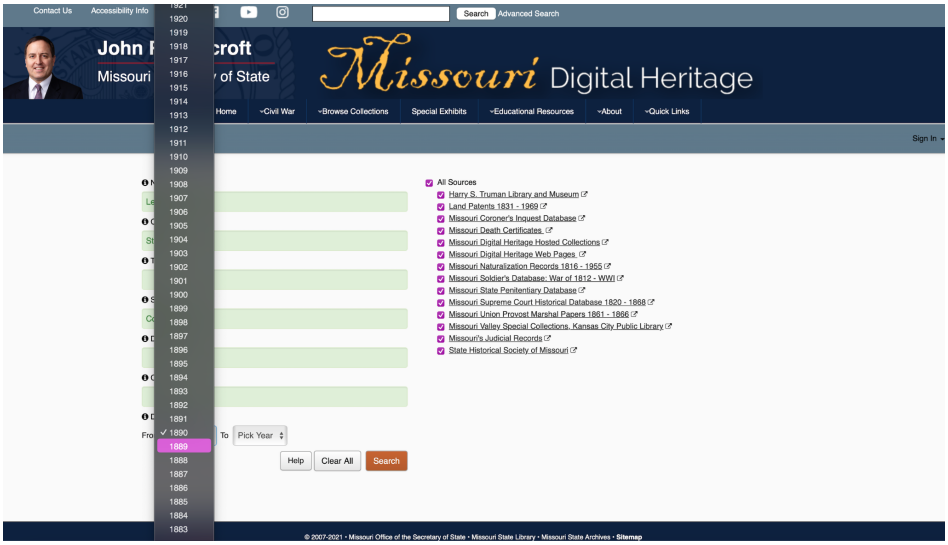
information about the grasshopper plague at the bottom of page 2 and on page 3. After reading, she realizes that this source was published in 1910; it included some useful information about the duration of the grasshopper plague in 1875 in Macon County, Missouri, and Governor C.H. Hardin's proclamation for fasting and prayer for the day of June 3. However, it is not a primary source.

She then decides to sort the results by year, so that she can find sources from 1874-1875, which are more likely to be primary sources. She is disappointed to learn that sorting by year is not an option. Instead, she will have to scan the titles of each research record, which all include the year of publication. She continues scanning with her eyes.

Scenario 3

James Anderson is a Museum Collections Specialist at the St. Louis Museum of History and Art and frequently accesses the Missouri Archives CONTENTdm system. James needs to curate media for an upcoming special exhibit, a tribute to historical homes in Missouri. Today, he specifically needs to find photographs of the Lemp Mansion captured within its first year of construction.

James visits the Missouri Archives website and navigates to the CONTENTdm digital collections system. On the homepage, he opts for an advanced search, entering the name, county, subject, and year. While selecting the year, James is mildly annoyed because he dislikes the slow scrolling down to "1890" and wishes he could directly input the desired year.

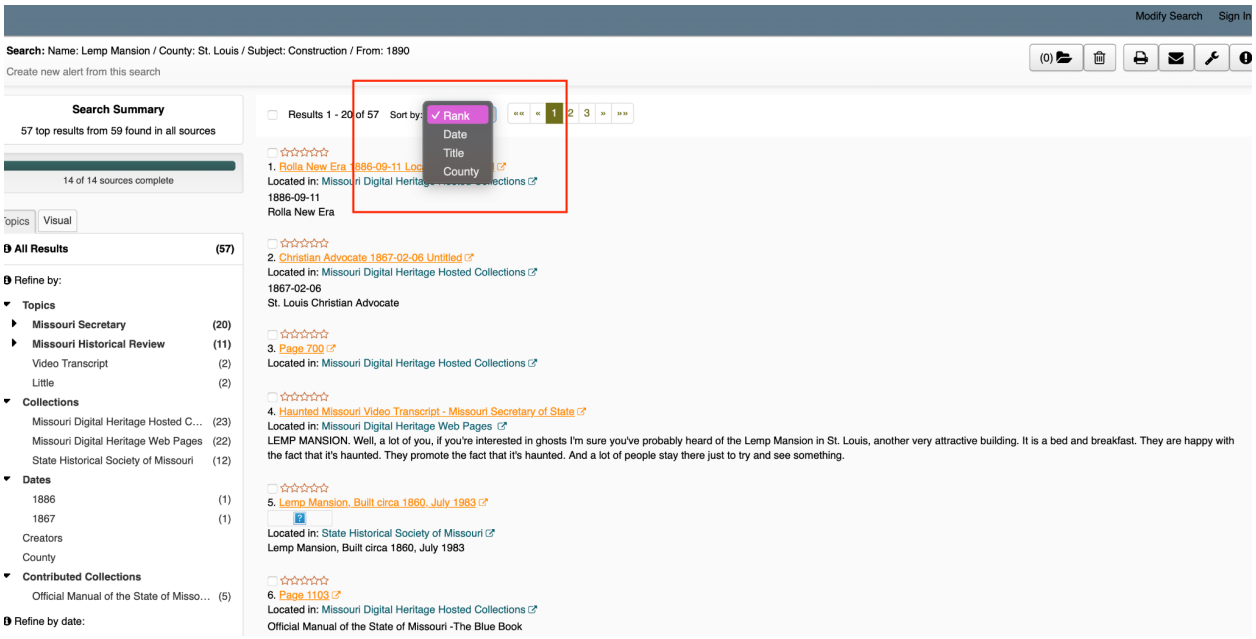


Upon receiving the search results, James realizes he forgot to specify a date range. Instead of backtracking, he chooses to sort the results by date.

James sifts through the outcomes, wishing that he could filter further by media type because his search for construction-related references yields no immediate results. He decides to sort by title instead and stumbles upon a photography collection titled "The German Experience in Missouri." He finds a photo of the original Lemp mansion then proceeds to explore the entire collection out of curiosity.

After a brief struggle to relocate the image amidst the system, James happily downloads the image file, selecting a large format for future museum use and returns to the search results page.

He decides to also look for more recent images of the mansion and tries to sort the result by descending date order, but forgets that the system doesn't allow this search option.



Although he is slightly annoyed by this, he is happy with the located image and will return to the site tomorrow for more if needed.

Project Scope

Below are details about the scope and rationale of our project.

Scope

Our project will focus on the following tasks using CONTENTdm:

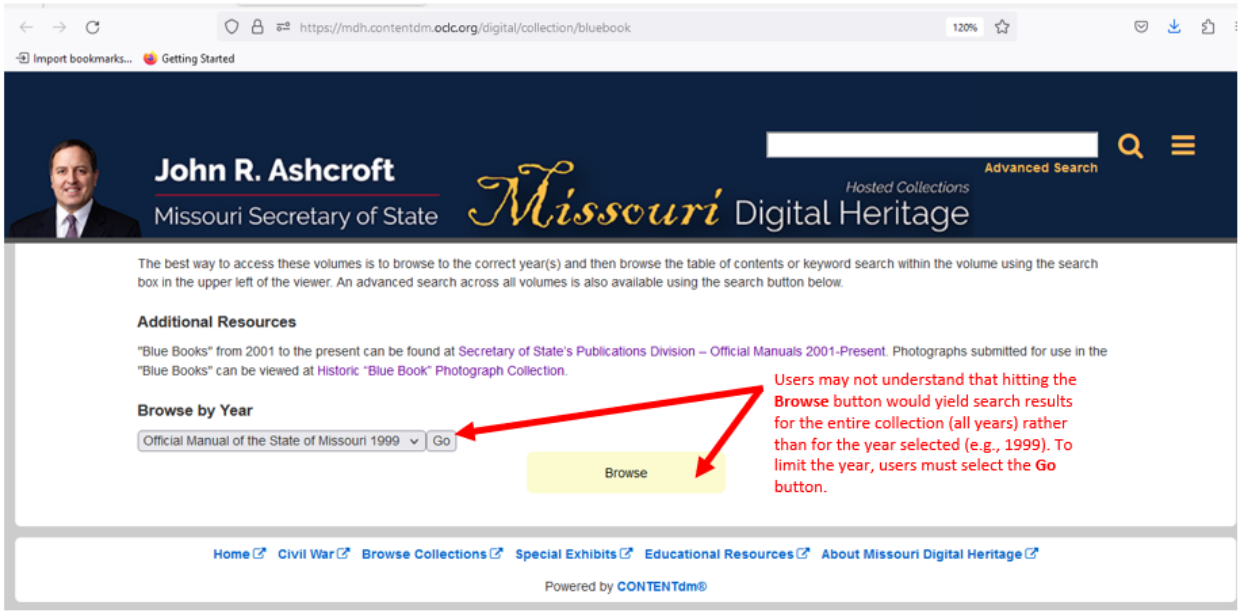
- Searching for a specific year or other qualifier within a collection effectively (i.e., users should currently select “go” instead of “browse”).
- Jumping through results of keyword search pages (instead of all pages), within texts that have been read by the CONTENTdm OCR technology.
- Downloading artifacts (texts, images).

Rationale

A major issue of CONTENTdm is effective searching through documents; it does not respond as users would expect to simple Boolean searches with operators like **and** and **or**. While this is true, the navigational aspects of CONTENTdm seem more relevant to the content of our Interaction Design coursework and lend themselves to creating low and high fidelity prototypes of improved interfaces. Thus, our tasks focus on navigational issues.

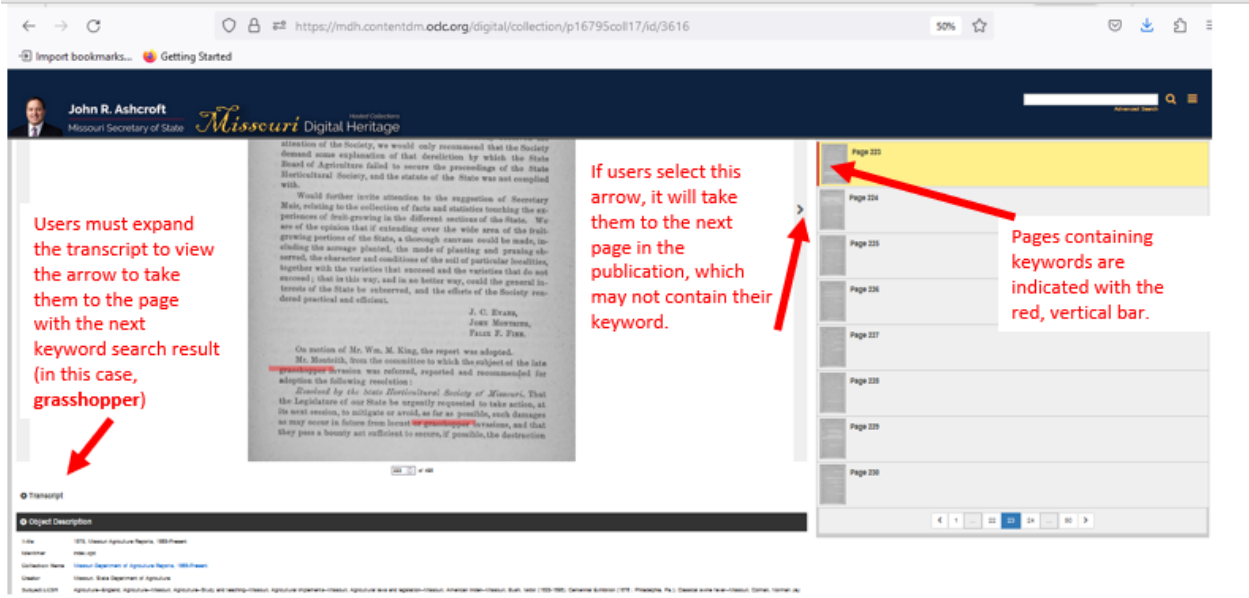
Below are screenshots illustrating some of the major navigational issues (copied from the “Introduction to the Problem” section).

- On a collection page (e.g., for Blue Books), after users select a year, there is a "Go" button but also a "Browse" button, which is confusing for users.



- The arrows are misleading for scrolling through searches. Users may think the arrow on the central page takes them to the next search result, but it takes them to the next page of the publication (probably without their keyword). To jump to the next result, users must use the arrow at the bottom of the text image, which sometimes is not visible on the

screen. An example with the keyword grasshopper is shown below, searching inside this *1875, Missouri Agriculture Reports, 1865-Present* publication: https://mdh.contentdm.oclc.org/digital/collection/p16795coll17/id/3616



Part B: Project Management

Milestones

	Week of:										
	Sept 25	Oct 2	Oct 9	Oct 16	Oct 23	Oct 30	Nov 6	Nov 13	Nov 20	Nov 27	Dec 4
Problem Analysis											
Revise Problem Analysis based on feedback											
Design Plan											
Low Fidelity Prototype											
Revise Design Plan and Low Fidelity Prototype											
High Fidelity Prototype											
Revise High Fidelity Prototype											
Evaluation Report (Parts I and II)											
Evaluation Report (Parts III, IV and V)											

Individual Roles and Estimated Task

Roles were assigned on a bi-weekly basis based on team members' strengths and interests with each individual completing a portion of the specific task at hand. Team leadership responsibilities rotated throughout the semester, allowing each member to serve and have an opportunity to lead.

Part II: Design Plan and Low Fidelity Prototype

Part A: Design Specifications

Conceptual Model

The proposed Missouri State Archives website is designed to accommodate the needs of various users, such as the less experienced high school student, the moderately experienced university student, and the highly experienced archivist. When users access the proposed website, they encounter a simple home page with an introduction to the archives, instructions for searching and browsing, a search bar, and a browse button. More experienced users may immediately interact with the search bar, while novice users may choose to read the introduction and instructions first.

The look and functionality of the proposed website is familiar to its visitors, who will use it to search using specific keywords, browse and explore historical content, and download needed materials. Most users will feel comfortable performing these actions since the interface is similar to other programs and tools they are accustomed to using, described more in the “Interface Metaphors” section. For example, typing in the archives search bar is comparable to typing in an Internet browser to search. Browsing in the archives site is like strolling through a library to look for material that catches one’s eye. Users of the archives site can scan through lists of results after doing keyword searches or selecting to look within a collection; scanning is a familiar activity people do regularly when reading through restaurant menus, looking through a book’s table of contents, or scrolling through Google search results.

There are several improvements to the website. Important among these are a clearer location of download buttons, intuitively placed arrows for moving to the next keyword search result, and font size buttons to accommodate people with visual impairments. Moreover, the website offers more responsive features to accommodate less experienced users. These features include tooltips, which users can opt to select for deeper instructions as they search. Another such feature is specific error messages, which will provide more guidance to users about how to modify their own searches to produce desired results.

Interface Metaphors

The Missouri State Archives CONTENTdm site effectively incorporates several interface metaphors and analogies to assist users in quickly comprehending how to navigate and use the site. These metaphors will serve as a guiding principle during the redesign process, enabling us to enhance the site's capabilities while maintaining its integrity.

Physical Archives:

- The site can be metaphorically likened to a physical archive, where items are meticulously organized by collection, date, topic, etc., just as they would be stored in files and folders at a physical archive storage site.

E-book/Book:

- When viewing an item on the site, users have access to a page displaying a scan of the physical item. Large buttons on the side allow users to navigate back and forth through pages, reminiscent of older e-reader models with similar page-turning buttons.
- Users searching for keywords can easily spot them highlighted on the page, resembling annotations made with a physical highlighter, thereby facilitating user engagement with the content.
- The page also displays document sections similar to a table of contents, which can also be found in physical and e-books.

Card:

- Certain pages within the site, such as the "Browse Collections by Media Type" page, employ a card metaphor. Each "card" includes a representative picture corresponding to the type of media.
- These cards are arranged in a grid, making it easy for users to identify a media type and initiate their search.

Search Engine:

- The search functionality in CONTENTdm can be metaphorically related to well-known search engines like Google. Users can enter search queries into a search bar, a common and intuitive interaction.
- The system then returns results in a format reminiscent of a search engine results page, complete with titles, snippets, and brief item descriptions, akin to the presentation style of Google or Bing. This familiar page format reduces cognitive load for most users.

Visual Aesthetics

Design Element	Aesthetic Evaluation	Outcome	Moderating Variable	Plan for Application
COLOR	The website features dark blue as its base color, complemented by accents of light blue, yellow, and red. Various shades are used amongst accent colors, leading to inconsistencies.	Blue is frequently linked with qualities such as professionalism and trustworthiness, particularly within Western cultures. This makes it a well-suited selection for the archive, as it aligns with the values associated with reliability and competence.	It's essential to recognize that the interpretation of blue can vary depending on cultural contexts. However, since the archive's target audience is Western based, the choice of blue remains appropriate.	We will create an updated color scheme, keeping dark blue as the primary color, while ensuring the accent colors are consistent throughout the website.
LINE	Lines serve as dividers and content borders throughout the website, with the majority being straight and varying in both length and weight. For instance, thin, straight lines in white or black are frequently placed directly under headlines to indicate titles.	The presence of lines on the page contributes to a perception of proximity among related content, thereby reducing cognitive load. Lines also function as signifiers, emphasizing the importance of specific elements on the page.	It's important to note that while lines are a valuable design element, excessive use within a page can introduce clutter if not applied judiciously.	We will continue to use lines to divide content appropriately, while also removing unnecessary lines to reduce clutter. Lines will also be used to highlight or emphasize content.

Design Element	Aesthetic Evaluation	Outcome	Moderating Variable	Plan for Application
SHAPE	Shape is used throughout the website to contain related information.	Utilizing shapes to enclose related information aids users in locating and accessing content effectively.	It's important to exercise caution with the extent of shape usage within a page, as an overabundance can lead to clutter if not employed thoughtfully.	We will leverage the use of shapes to guide users through the website, facilitating the grouping of related content and actions for improved navigation and usability.
WHITE SPACE	White space is deliberately incorporated throughout the website to draw attention to important page elements and create contrast with other page items.	The strategic use of white space plays a pivotal role in balancing the overall aesthetics of the website. Ample white space is essential for achieving a clean and minimal design, resulting in an enhanced user experience by reducing cognitive load.	The moderating variable for white space usage might involve considering the specific visual preferences of the target audience. Some users may prefer a more densely packed layout, while others may appreciate a more spacious design. Therefore, it's important to tailor the amount of white space to align with the preferences of the user base.	Given the positive impact of white space on user experience and design aesthetics, we will continue to maintain a generous amount of negative space during the website redesign, keeping in mind the preferences of our audience to strike the right balance

Interaction Types

Task	Interaction Type	User Action
Selection of Preferred Method	Instructing	When using the system, users will be given the option to search for a volume of interest using a keyword or browse the collections by topic, by media type, by institution, or view all. On the first page, instructions will state “Type a search term in the field below or select an option to browse our collections by specific criteria.” A search box will appear directly under these instructions and to the left of the screen. A column will appear to the right of the search bar with the text “Select one of the following options if you prefer to browse collections by a specific criteria.” Below this, links will point to “By Topic,” “By Media Type,” “By Institution,” or “View All.” Efforts will be made to ensure the differences in these functionalities are made clear to the user.
Accessing a Volume	Instructing	If users decide to access the collection by browsing, users will interact with the existing pages on the site which categorize these collections. After locating the collection of interest, they will click the name of it to open the collection. Next, users will select the volume of interest from a list which will open the volume and allow for further interaction with the document. If users choose to search for the volume of interest using keywords, they will enter their search term on the first page and select the volume in the list of search results. This is indicative of an instructing interaction type as users are providing instructions to the system by selecting options.
Button Interaction	Instructing	If the user accesses the collection by browsing, instead of selecting one volume of the collection, users can choose a button to “Browse all volumes in the collection” to launch the database where all volumes will be listed, allowing users to open each at their convenience. This is indicative of an instructing interaction type

Task	Interaction Type	User Action
		as users are clicking buttons within the interface to launch new pages.
User Guidance and Onboarding	Responding	The proposed design will provide tooltips to users and guide them through the use of the tools they can use when searching or interacting with a document. Users can opt in or out of viewing these tooltips. When users are presented with these tooltips, their act of opting in or out is an example of responding to a system-initiated interaction. Therefore, this fits best with the responding interaction type.
Searching within a Volume or Document	Instructing	Once a volume is open, the user can enter a keyword or phrase to search within the volume and then use next and previous arrows to identify each instance of that keyword or phrase.
Downloading Artifacts	Instructing	Users will select an icon to download the artifact or volume of interest. This is an instructing interaction type as the user is providing instructions to the system to begin a download process.
Error Handling	Responding	When an error occurs, such as no search results appearing for the keyword, the system will provide an error message. The user can respond to this message by adjusting their actions based on the error description. This is indicative of a responding interaction type.
Menu Navigation	Instruction	A menu system allows users to return to the home page at any point. They can also use the browser's back button to navigate to the previous page. This is an instructing interaction type as users are giving navigation instructions to the system.

Inclusivity and Cultural Decisions

The aim of the proposed design is to understand the broad range of users—of differing cultures, ages, economic backgrounds, abilities, and levels of expertise—and to empower them to use the Missouri State Archives website to fulfill their needs. To this end, effort was made to enhance the inclusivity of the site.

First, by following Gestalt principles such as figure-ground and similarity (described in the "Gestalt Principles" section of this report), the proposed website facilitates the access of information to a broader range of users. For example, the contrast of the dark text against the light background is easier for most people to read, and the grouping of buttons of similar sizes and styles adds to user familiarity and ease of use.

Second, the site already supports screen readers for text, which provides some help to those with visual impairments.

Three features were added to the proposed design to enhance usability and are described in the table below.

Design Feature	**Rationale**
Easy translations into other languages	Allowing users to easily translate text on the page (e.g., the instructions or a historical text) into another language opens the resources to users including those whose first language is not English and those who live in non-English speaking countries.
Spell checker for searches	A spell checker function was added to the search. Joyce (2022) recommended integrating a spell checker into searches to assist those with spelling difficulties or for those whose first language is not English. The predictive searching function can also facilitate accurate spelling.
Font size buttons	A button to increase the font size on pages was added to enhance the use of the site for people with visual impairments. Since farsightedness tends to increase with age, this feature can accommodate older users of the site (Joyce, 2022).

Interaction Design Principles, Theories, and Guidelines

Care was taken to ensure critical design principles, theories, and guidelines were addressed when designing the proposed interface and interactions. Below are descriptions of four of these most relevant to the project at hand.

Nielsen's Heuristics

Nielsen's Heuristics for Usability are a foundational set of principles for evaluating and enhancing the usability of a variety of interfaces and tools (Nielsen, 2020). Each principle is addressed below along with a description of how it is addressed in the proposed design.

- **Visibility of System Status**
    - This principle states that an interface should always inform users about what is going on through feedback mechanisms.
    - In the proposed design, this is employed by providing clear instructions to users regarding options for searching and browsing. Should errors occur, these will be immediately indicated to the user.
- **Match between System and Real World**
    - This principle indicates that the language used in the design should match that of the user instead of using complex jargon.
    - In the proposed design, the language used will be appropriate for the tasks the user is completing and will, as much as possible, refrain from the use of complex jargon.
- **User Control and Freedom**
    - This principle states that users should be given the option to undo an action or leave a process.
    - In the proposed design, users can use the main menu to navigate to the home screen or use the back button to leave an unwanted screen.
- **Consistency and Standards**
    - According to this principle, designs should follow industry conventions so that users do not have to wonder about what certain words mean or what certain actions achieve.
    - This is achieved in the proposed design by maintaining consistent placement of elements such as the search box within different volumes, next and previous buttons, and the like. Additionally, industry-standard terminology is used throughout the interface, ensuring that users don't have to decipher unfamiliar terminology.
- **Error Prevention**
    - This principle explains that designs should do their best to prevent errors from happening, such as slips and mistakes.
    - This is achieved in the proposed design by providing tooltips for interactions that could result in the most errors, such as viewing and searching within a volume, to help users understand how to use the system.

- **Recognition Rather than Recall**
    - According to this principle, the design should make elements, actions, and options visible to the user to minimize the amount of content they have to remember from one part of the interface to the next.
    - In the proposed design, clear instructions and visual cues or signals will be integrated to minimize the amount of content a user has to remember.
- **Flexibility and Efficiency of Use**
    - This principle indicates that processes should be flexible so that users can employ whichever method works best for them.
    - In the proposed design, this is most evident through the searching tools versus the browsing tools. More experienced users might know the exact volume or document they need and can access that quickly with a keyword search. Some users, whether more inexperienced or those with less specific goals, may prefer browsing collections based on criteria.
- **Aesthetic and Minimalist Design**
    - According to this principle, interfaces should only contain information that is relevant to the user or needed. Irrelevant or unneeded information diminishes the visibility of more important information.
    - In the proposed design, efforts will be made to ensure no irrelevant information. Elements and content will only be included if they aid in usability or support users' goals.
- **Help Users Recognize, Diagnose, and Recover from Errors**
    - According to this principle, error messages displayed to users should contain plain language and clearly describe the problem as well as suggest a resolution to said problem.
    - In the proposed design, the interface will display relevant error messages when needed to clearly illustrate the problem and provide a suggestion for resolving it.
- **Help and Documentation**
    - This principle identifies that an effective system provides documentation that helps users to achieve certain objectives.
    - In the proposed design, tooltips also address this need. These display for the most complex interactions, viewing and searching within a volume, to help users understand how to use the system. Experienced users can bypass these if needed.

Managing Cognitive Load

Cognitive load theory refers to the framework that explores how the cognitive system processes information as well as the impact of cognitive load on a variety of tasks. This theory identifies three types of cognitive load: intrinsic, extraneous, and germane (Sweller, 2011). By addressing these effectively, the user experience can be optimized by minimizing the cognitive effort required to complete tasks in the system. To some extent, addressing each of Nielsen's heuristics will help manage cognitive load, but additional methods for addressing each type are identified below.

- **Intrinsic Cognitive Load**
    - In interface design, this refers to the inherent complexity of a task.
    - Intrinsic cognitive load is addressed in the proposed design by providing straightforward options for users to complete a task. Tooltips are embedded to help users understand the capabilities of specific tools and effective use of them. Additionally, clear instructions are provided where appropriate to help users with a task.
- **Extraneous Cognitive Load**
    - This is the difficulty of completing a task due to elements that are not directly related to the task at hand.
    - To manage cognitive load, a minimalistic interface will be used that excludes content not directly related to the content or goals of the users. Furthermore, efforts will be made to ensure the layout of the interface is logical and unconfusing.
- **Germane Cognitive Load**
    - This is the cognitive effort required to integrate new information into schemas.
    - This is not a direct requirement of utilizing the interface.

Organizational Schemes and Structures

When it comes to information architecture, organizational schemes and structures help to organize the content so that users can effectively access the information and resources they need to achieve their goals (Affairs, 2013; Affairs, 2014). Below are the organizational scheme and structure leveraged in the proposed design.

- **Task-Oriented Scheme**
    - In the proposed design, users are typically performing specific tasks. For example, users either search for a volume using keywords or browse collections, open and explore a volume, search within the volume, and download the volume. All of these are highly task-focused, and, thus, the organization of the design is meant to facilitate the completion of these tasks. Each page has different functionalities that a user can leverage to address their goal.
- **Hierarchical Structure**
    - The act of searching within a volume or archival document is very hierarchical in nature. This is apparent when users select a collection, open one or more volumes of that collection to find information they need, and then further interact with that volume. This process of locating a collection and then working within individual volumes in that collection reflects a clear hierarchy that mirrors the organizational structure of the proposed design. This structure allows users to methodically explore and locate the information they need.

      Additionally, users can search for volumes by keyword without having to browse through the collections. This is essentially a different path on the hierarchical structure that allows for direct access to the volumes, which may be preferred for more experienced users.

Gestalt Principles

In order to ensure that users are able to interact with the content in an intuitive manner, Gestalt principles are leveraged. These principles describe how people perceive objects and patterns. These are often used in interaction and interface design to help users understand the presentation of content, but they can also increase aesthetic appeal (Interaction Design Foundation, 2016). While all twelve of the principles are important, below are the ones most applicable to the proposed design.

- **Common Region**
    - The proposed design places elements that are related to one another in close proximity in a defined region to communicate their relationship.
    - For example, volumes on a will be presented individually in search results but also grouped so that users clearly understand that grouping represents the volumes of the collection that can be selected for further investigation or review.
- **Similarity**
    - Elements of the interface that have similar function or meaning will be presented with similar visual characteristics, such as size, shape, color, and the like. For example, buttons will all have similar styling.
- **Continuity**
    - The design will employ a consistent layout and visual flow. When users browse through collections and interface with volumes, they will be greeted with a uniform presentation style and navigation pattern. The design of pages will also have a layout that conveys the logical flow of information and the path that should be followed to reach the end of the page.
- **Figure-Ground**
    - Efforts will be made in the design to ensure that there is a clear distinction from the content, or the foreground, and the background. For example, a light-colored background will be used with darker text. Interactive elements such as buttons, search boxes, clickable icons, and the like will be designed so that they have appropriate contrast against the background.
- **Symmetry and Order**
    - In the proposed design, pages will be designed with appropriate amounts of symmetry, order, and balance to ensure that the interface is visually appealing and that users are able to identify relationships between content as appropriate. This will also support efficient navigation among users.

Information Needs

To perform the tasks, Missouri Digital Archives users must know how to read and follow instructions, do simple keyword searches for target information, and browse sources.

Data Requirements

The table below shows important tasks that users do on the website and corresponding data requirements.

Task	Data Requirements
Search using keywords	Historical texts that have been scanned, OCRed when possible, and labeled with metadata. Images that have been labeled with metadata.
Browse and explore historical content	Historical texts that have been grouped and titled, described, scanned, OCRed when possible, labeled with metadata. Images that have been grouped and titled and labeled with metadata.
Select Preferred Method (instructions)	Instructions for browsing and searching for information on the Missouri Digital Archives site.
Receive Guidance and Onboarding Tips	Tooltips to provide more in-depth information for novice users

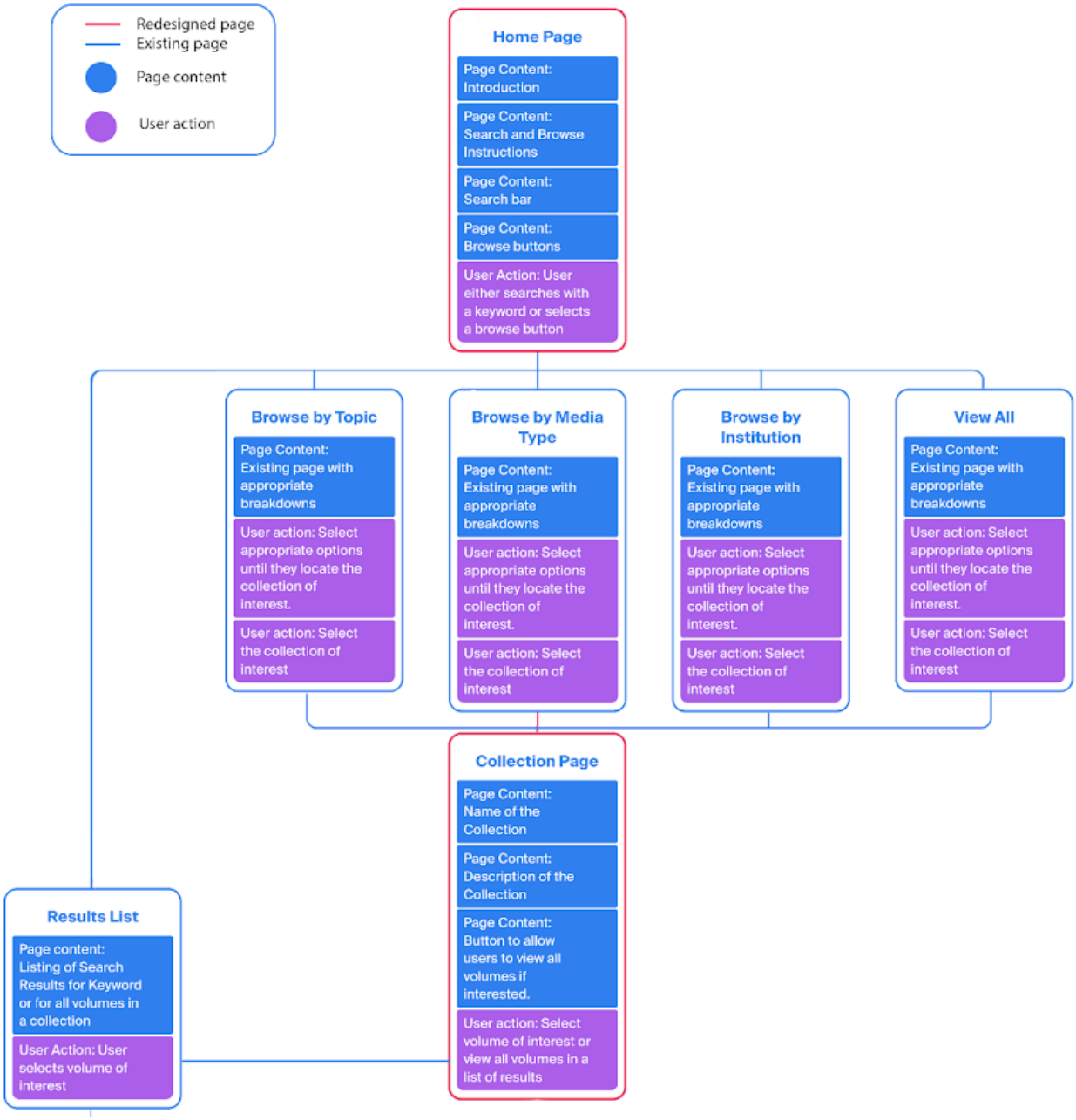
How the Data is Transformed by the System

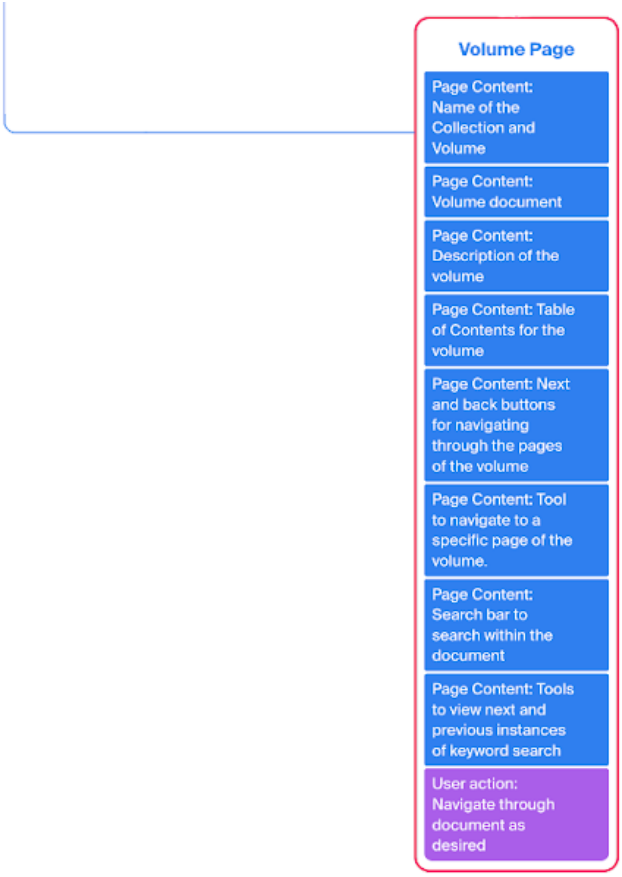
The Missouri Digital Archives site transforms data in two major ways:

- First, when a user searches for a keyword, the system scans and identifies this keyword in the metadata of the extensive number of texts and images and within thousands of texts that have been OCRed. Once identified, the system displays the limited set of texts containing the keyword to the user.
- Second, when a user misspells a keyword in a search bar, the spell checker identifies the keyword by checking it against the dictionary and approved words, and marks it as misspelled for the user; it suggests a list of similar words as alternatives so that the user can modify the search accordingly. Likewise, the predictive search function recognizes parts of words typed by the user and suggests common search phrases.

High-Level Architecture Blueprint

Below is the high-level architecture blueprint for the proposed system. The image continues onto the next page.




Volume Page
Page Content: Name of the Collection and Volume
Page Content: Volume document
Page Content: Description of the volume
Page Content: Table of Contents for the volume
Page Content: Next and back buttons for navigating through the pages of the volume
Page Content: Tool to navigate to a specific page of the volume.
Page Content: Search bar to search within the document
Page Content: Tools to view next and previous instances of keyword search
User action: Navigate through document as desired

One Plus and One Minus Scenario

To assess a proposed design solution, Bødker (2000) recommended creating a plus scenario (the best result) and a minus scenario (the worst result) of the proposed design solution (as cited in Preece, Rogers, & Sharp, 2019). In this case, a plus scenario and a minus scenario were created for the spell checker tool in the search bar of the proposed design.

Plus Scenario: This plus scenario shows the advantages of the spell checker in the search bar.

Fred, a retired painter from Springfield, Missouri, is interested in history. He was talking to some fellow history buffs one day about how much Springfield has changed over the years, and his friend recommended he search the Missouri State Archives site for the Domino Danzero Family Photograph Collection for some photos of Springfield about a century ago.

Fred gets on his computer and opens the Missouri State Archives site. He browses the listed collections on the site and soon comes across the Domino Danzero Family Photograph Collection, which he selects. He's especially interested in finding some historical photos of Sequiota Park in Springfield, one of his favorite places. Fred often struggles with spelling, so to keep it simple, he searches for **park**, but accidentally types **prk**. The spell checker in the search bar underlines his word to indicate the spelling error. Consequently, Fred right clicks **prk** and selects the correct suggested spelling: **park**. He then hits “Enter” and the system results in 44 park photos, and he is pleased that many of them are for the park he is looking for: Sequiota Park.

Minus Scenario: This minus scenario points out a potential weakness in the spell checker in the search bar.

Fred, a retired painter from Springfield, Missouri, is interested in history. He was talking to some fellow history buffs one day about how much Springfield has changed over the years, and his friend recommended he search the Missouri State Archives site for the Domino Danzero Family Photograph Collection for some photos of Springfield about a century ago.

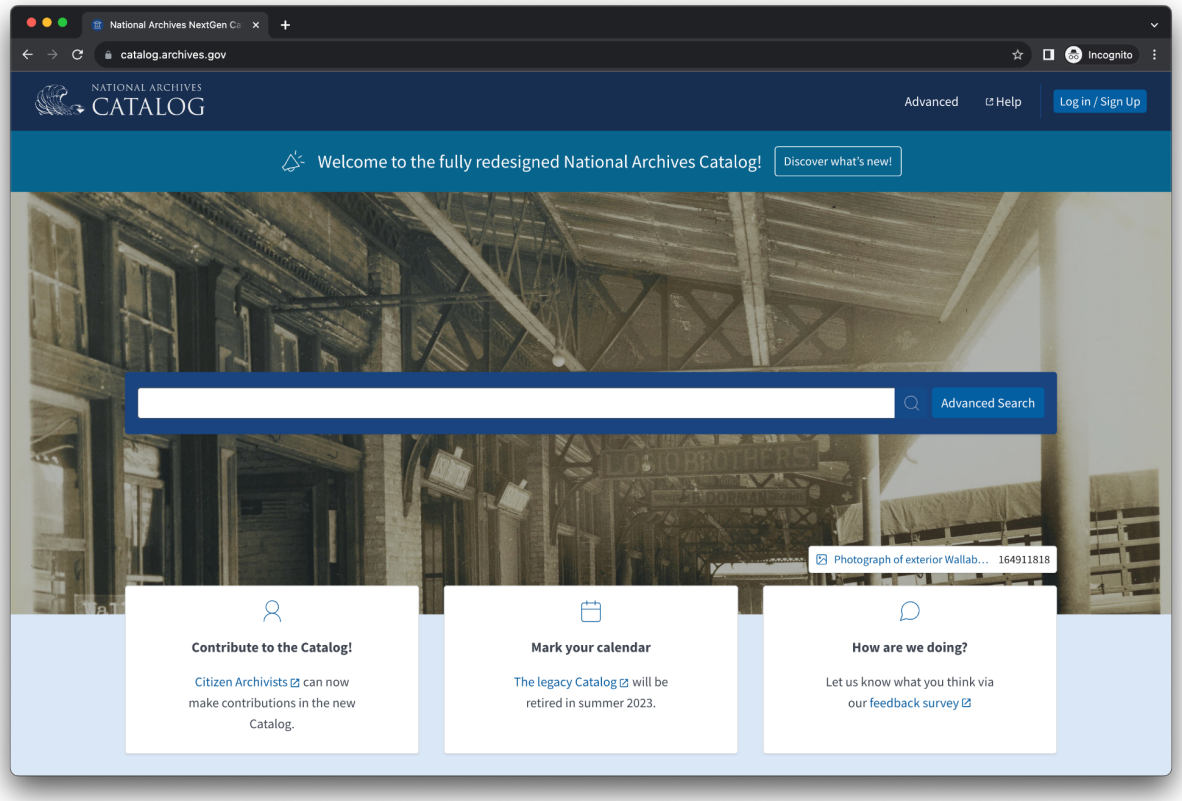
Fred gets on his computer and opens the Missouri State Archives site. He browses the listed collections on the site and soon comes across the Domino Danzero Family Photograph Collection, which he selects. He's especially interested in finding some historical photos of Sequiota Park in Springfield, one of his favorite places. Fred often struggles with spelling, but he decides to try spelling **Sequiota** as a search term, although this word is difficult to spell. The spell checker in the search bar underlines his word to indicate a spelling error. Consequently, Fred right clicks the word, but the system does not have any suggested spellings that he needs. The predictive searching tool suggests a few other options like **sequoia**, **sequoia national park**, and **sequoyah**, but he knows these are incorrect. He then leaves the program and searches for the name of the park in Google. It turns out that he was already correct, but the spell checker did not recognize the name of the park. He hit “Enter” to search for the park and was able to find 13 old photographs of the park.

Similar Products

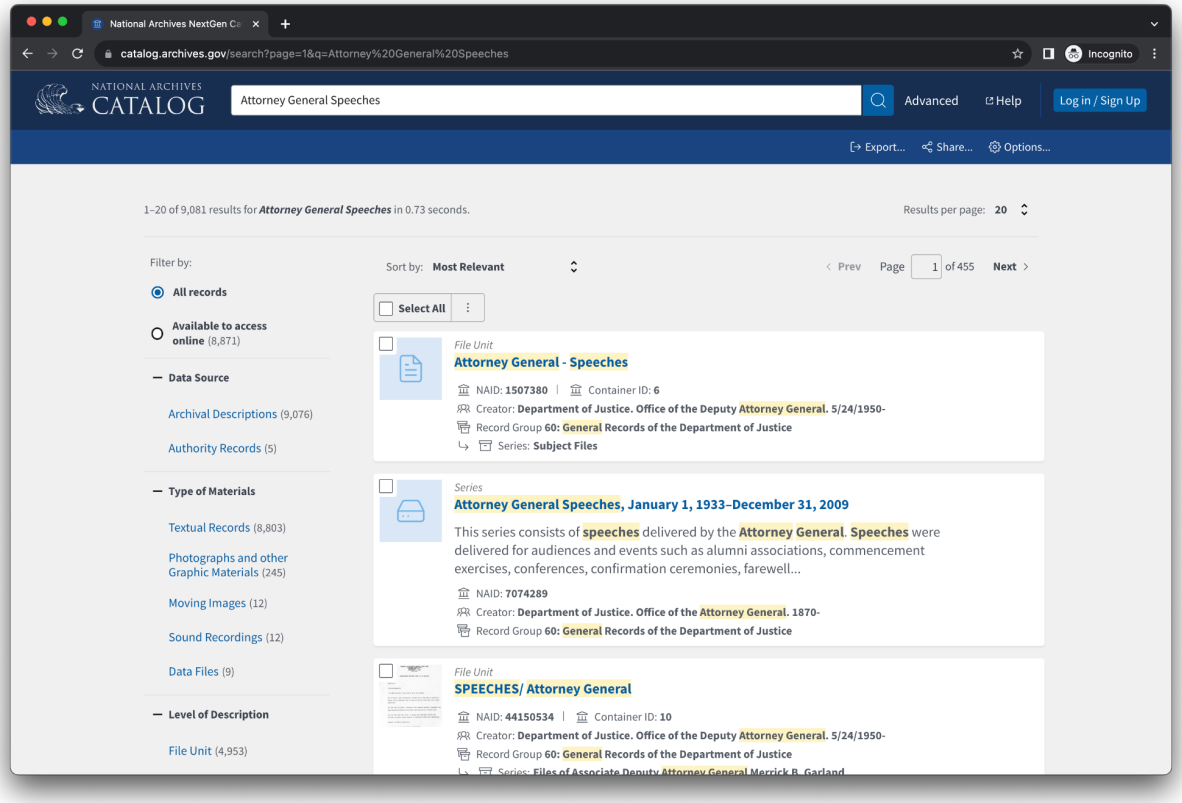
The National Archives Catalog is one of the best examples of a similar product as the Missouri State Archives. To understand the design of the National Archives Catalog and then compare that to the suggested redesign of the Missouri State Archives site, a walkthrough of a task in the National Archives Catalog is provided below. After this walkthrough, a description of the pros and cons of the National Archives Catalog site as compared to the proposed redesign of the Missouri State Archives site will be provided.

Walkthrough of National Archives Catalog

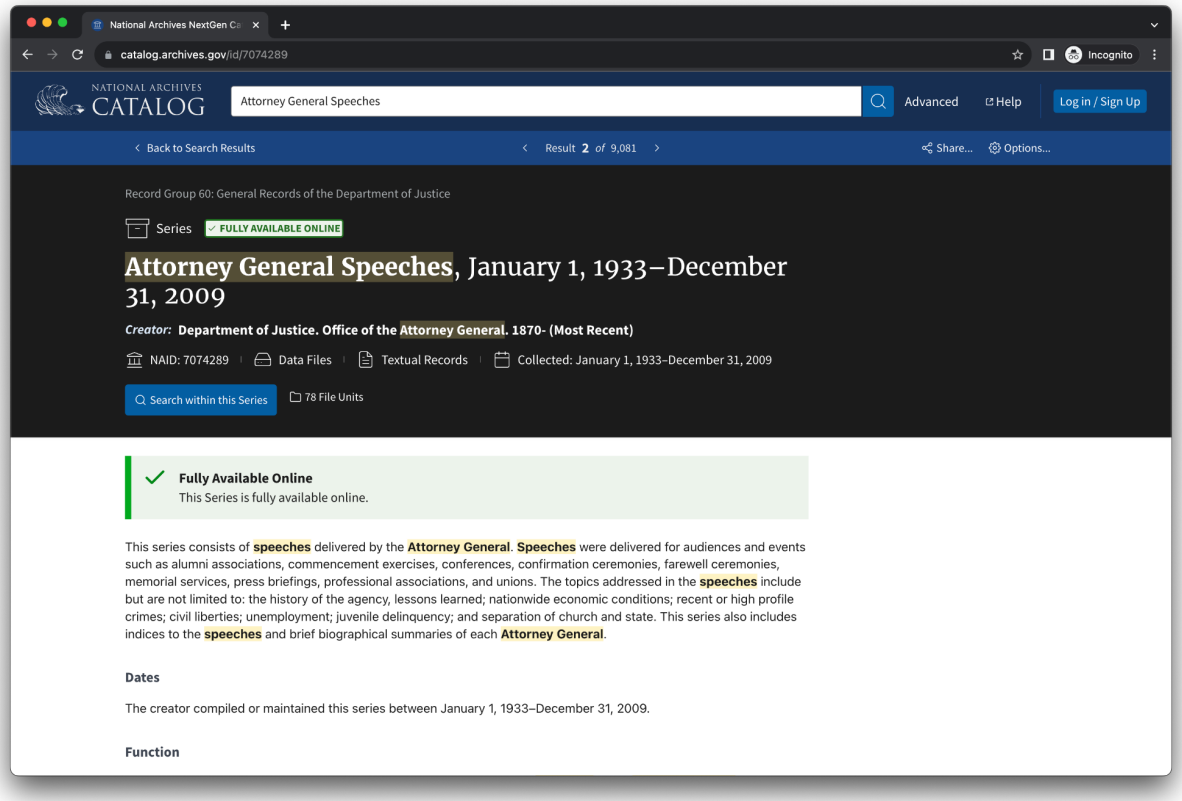
- Users are greeted with the below screen when accessing https://catalog.archives.gov

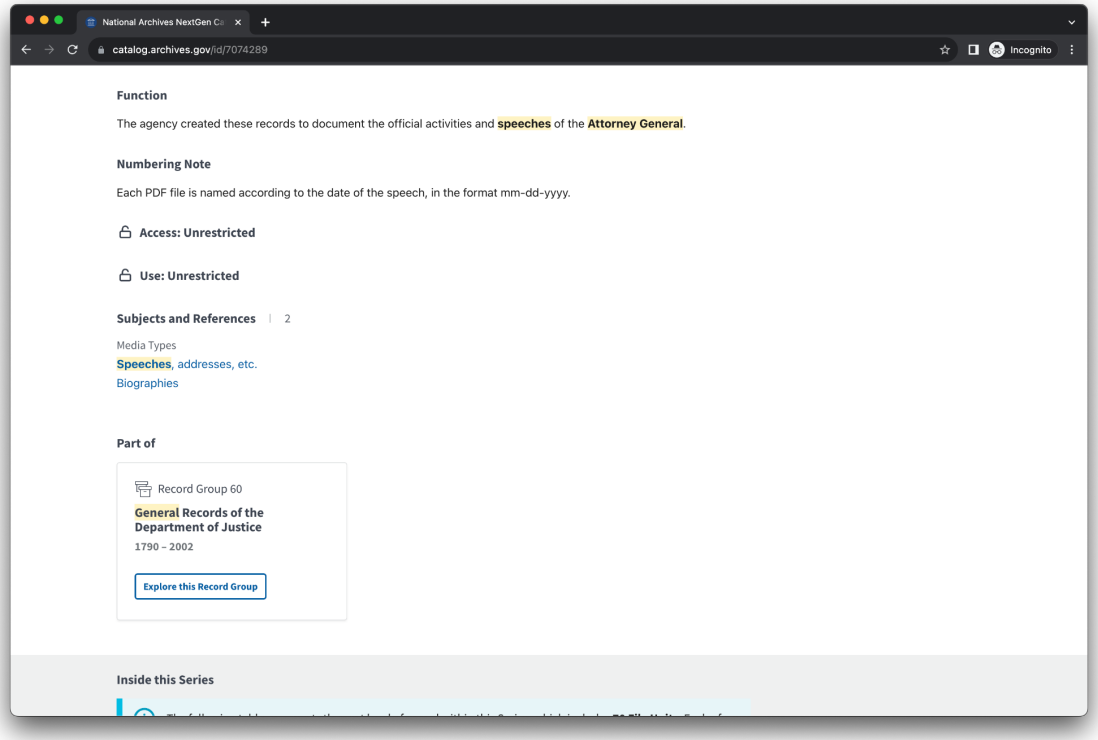


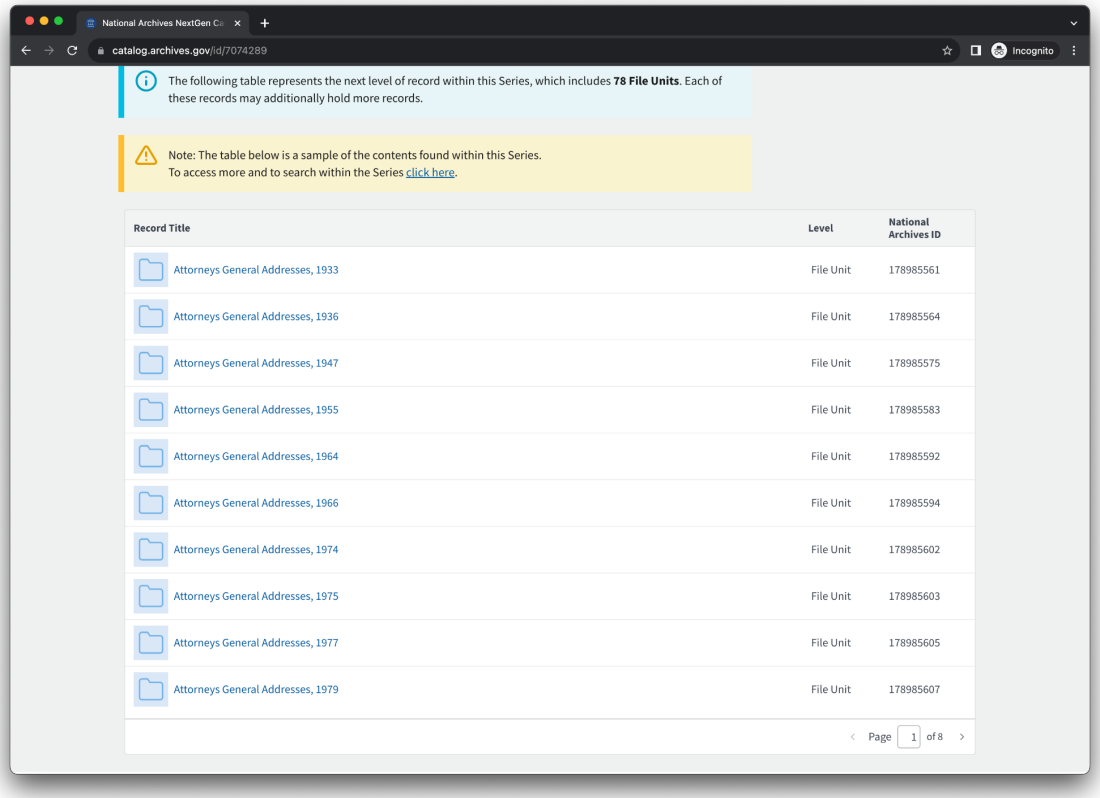
- To locate a document, collection, or volume, users can search by using a keyword or using advanced search. Below are the results for a keyword search of “Attorney General Speeches.”



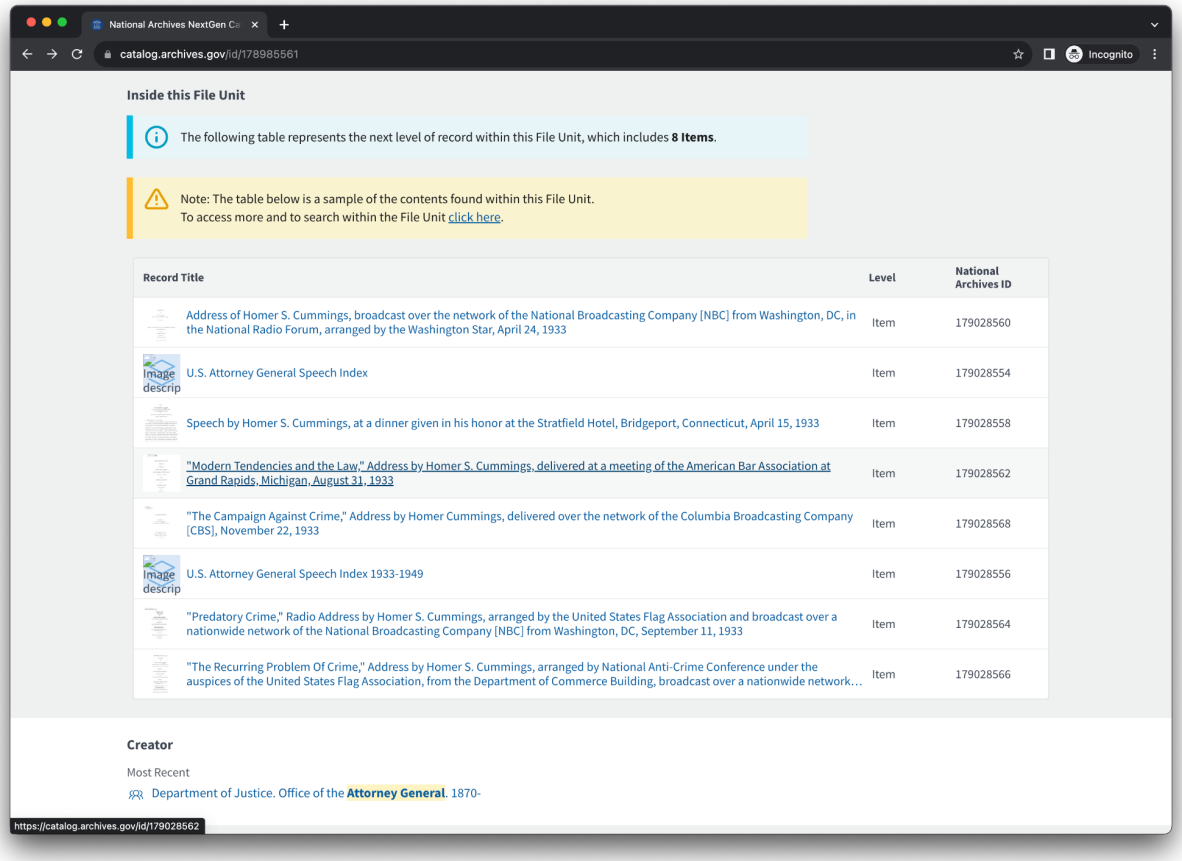
- The National Archives classifies records into record groups, collections, series, file units, and items. For purposes of this demonstration, the second item, a series, was selected. The page in the three screenshots below lists information about the series and file units in that series.



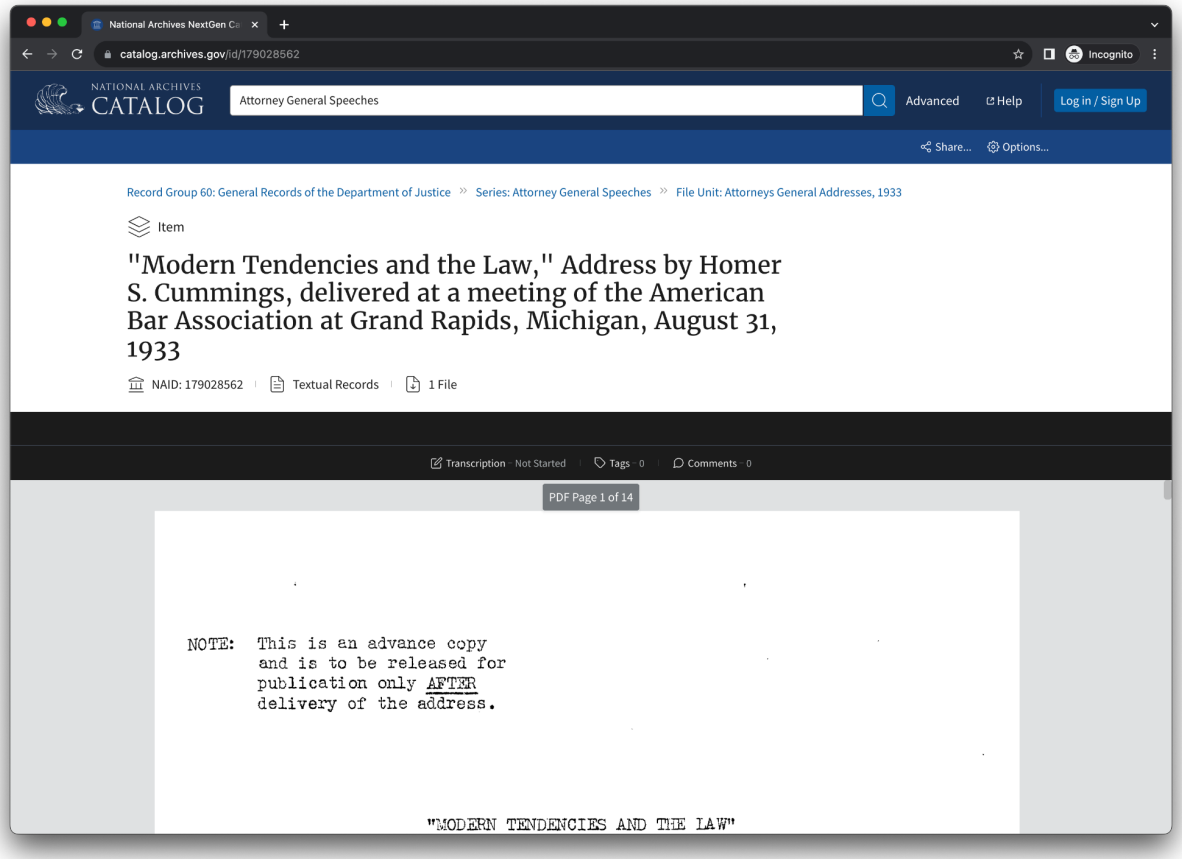

National Archives NextGen Ca
catalog.archives.gov/id/7074289
Incognito
Function
The agency created these records to document the official activities and speeches of the Attorney General.
Numbering Note
Each PDF file is named according to the date of the speech, in the format mm-dd-yyyy.
Access: Unrestricted
Use: Unrestricted
Subjects and References | 2
Media Types
Speeches, addresses, etc.
Biographies
Part of
Record Group 60
General Records of the Department of Justice
1790 – 2002
Explore this Record Group
Inside this Series

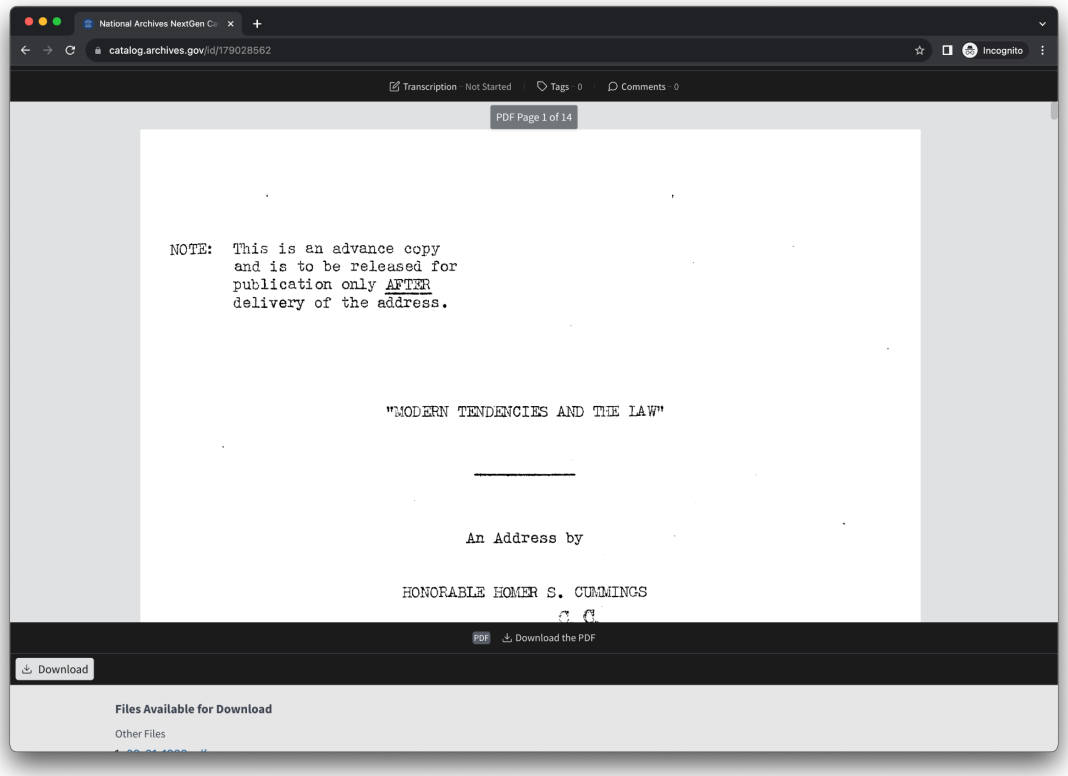

National Archives NextGen Ca
catalog.archives.gov/id/7074289
Incognito
The following table represents the next level of record within this Series, which includes 78 File Units. Each of these records may additionally hold more records.
Note: The table below is a sample of the contents found within this Series.
To access more and to search within the Series click here.
Record Title
Level
National Archives ID
Attorneys General Addresses, 1933 File Unit 178985561
Attorneys General Addresses, 1936 File Unit 178985564
Attorneys General Addresses, 1947 File Unit 178985575
Attorneys General Addresses, 1955 File Unit 178985583
Attorneys General Addresses, 1964 File Unit 178985592
Attorneys General Addresses, 1966 File Unit 178985594
Attorneys General Addresses, 1974 File Unit 178985602
Attorneys General Addresses, 1975 File Unit 178985603
Attorneys General Addresses, 1977 File Unit 178985605
Attorneys General Addresses, 1979 File Unit 178985607
Page 1 of 8

- Within the page in the images above, users can click on a file unit. This loads a very similar page which displays items that exist in that unit. For purposes of this demonstration, the first file unit was selected. Below is the listing of items that appear in that unit.



- Users can select one of these items to investigate it further. For purposes of this demonstration, the fourth item was selected. The page below, consisting of three screenshots, was loaded.




National Archives NextGen Ca
catalog.archives.gov/id/179028562
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Transcription · Not Started
Tags · 0
Comments · 0
PDF Page 1 of 14
NOTE: This is an advance copy and is to be released for publication only AFTER delivery of the address.
"MODERN TENDENCIES AND THE LAW"
An Address by
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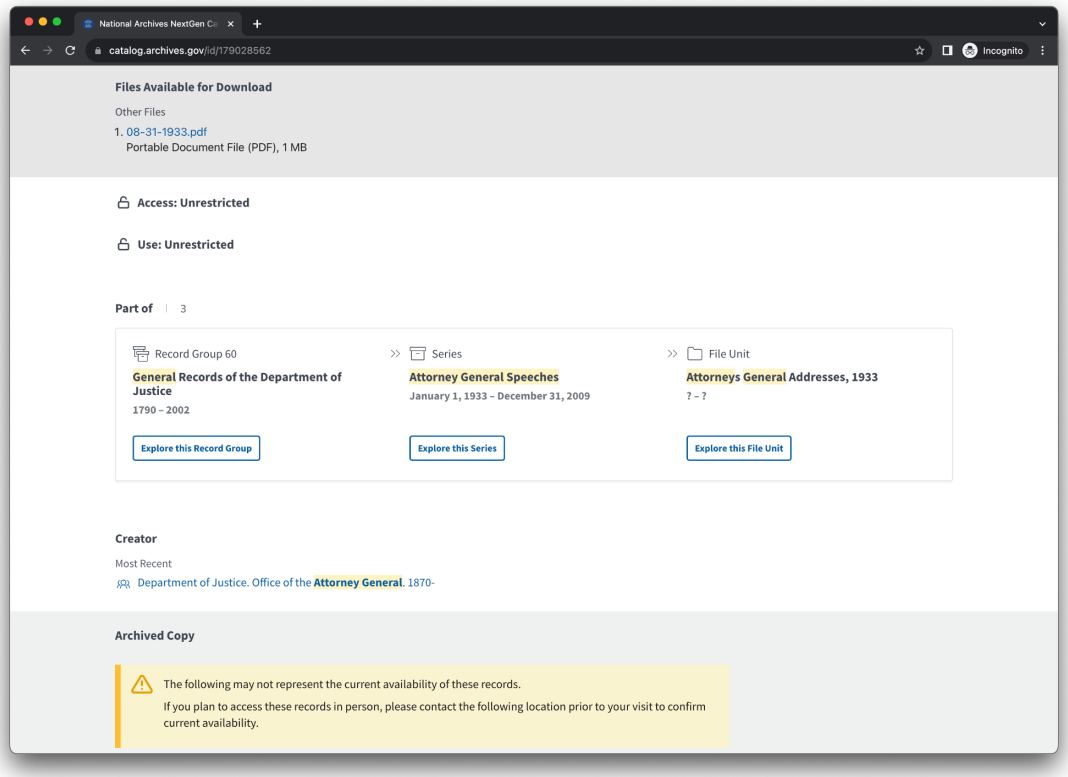
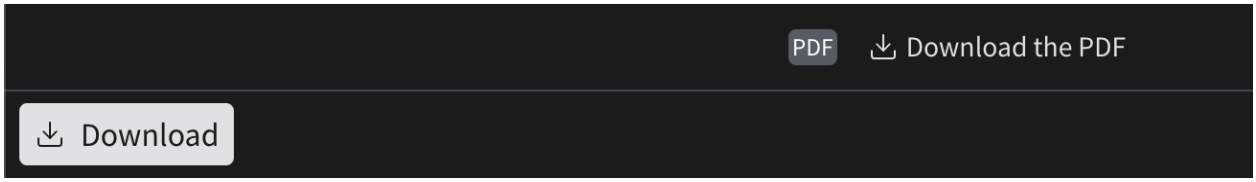
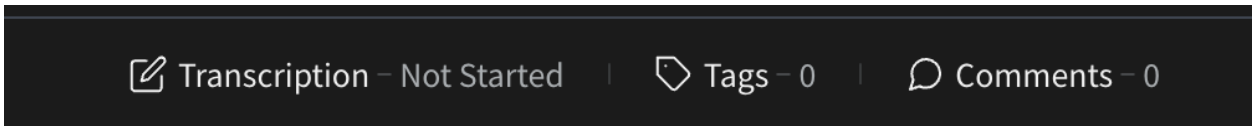

National Archives NextGen Ca
catalog.archives.gov/id/179028562
Incognito
Files Available for Download
Other Files
1. 08-31-1933.pdf
Portable Document File (PDF), 1 MB
Access: Unrestricted
Use: Unrestricted
Part of | 3
Record Group 60
General Records of the Department of Justice
1790 – 2002
Explore this Record Group
Series
Attorney General Speeches
January 1, 1933 – December 31, 2009
Explore this Series
File Unit
Attorneys General Addresses, 1933
? – ?
Explore this File Unit
Creator
Most Recent
Department of Justice. Office of the Attorney General. 1870-
Archived Copy
The following may not represent the current availability of these records.
If you plan to access these records in person, please contact the following location prior to your visit to confirm current availability.

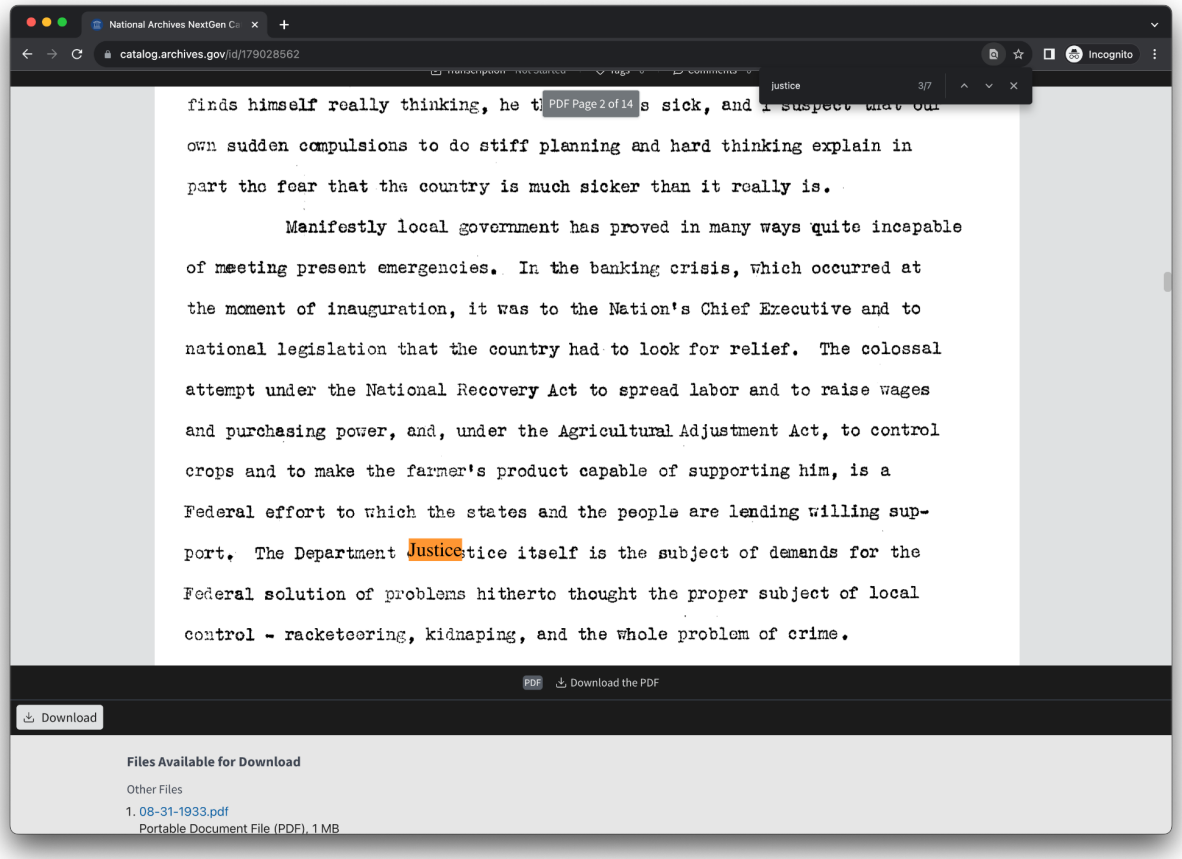
- On this page, users have the option to download the file using two different buttons at the bottom of the document:



- Users can also view any transcriptions, tags, or comments associated with the file using tools at the top of the document:



- While there are no built-in tools for searching the document, users can use keyboard shortcuts, CTRL+F on Windows or CMD+F on Mac to search within the document:



Pros and Cons of the National Archives Catalog Site

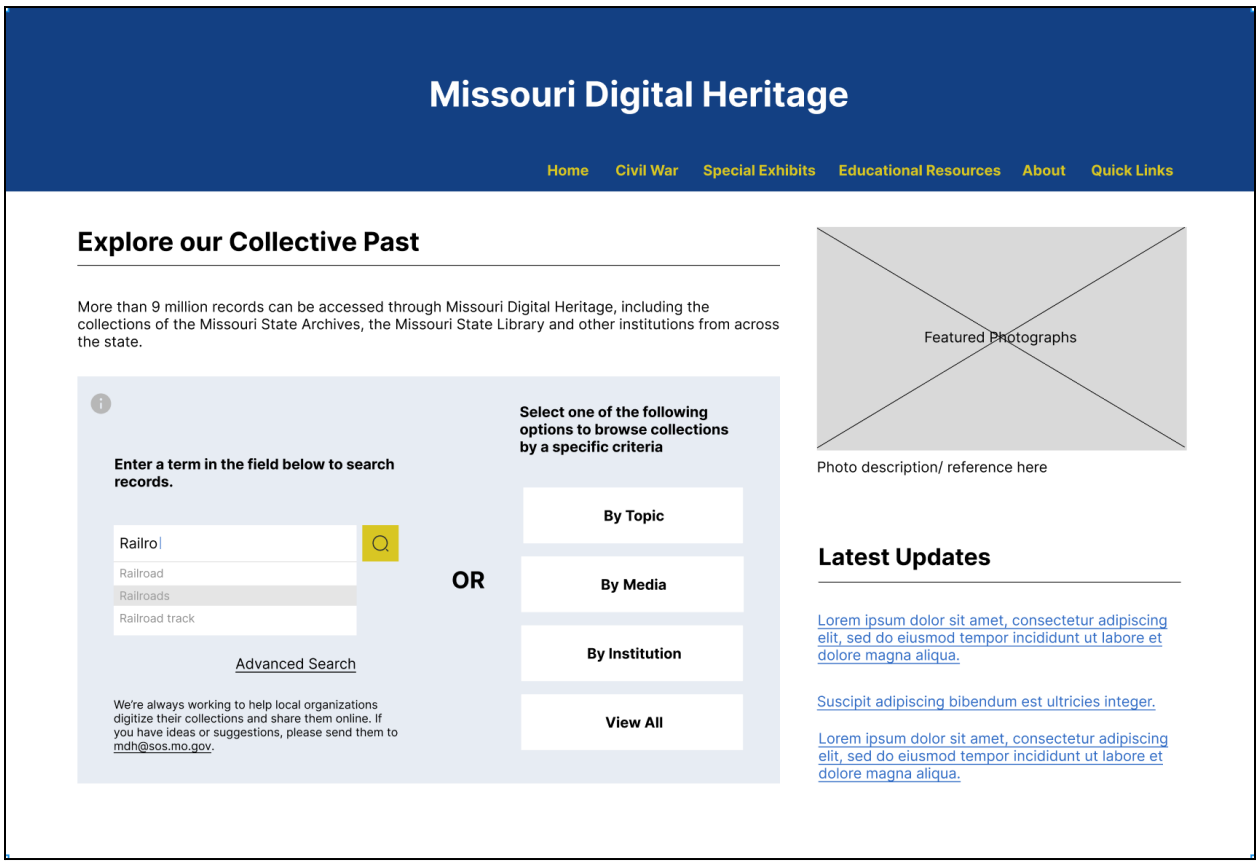
While the goals of the National Archives Catalog and the Missouri State Archives redesign are very similar, there are aspects of each that are better or worse than the other. Below is a description of the pros and cons of the National Archives Catalog in light of the proposed changes to the Missouri State Archives site.

- **Pros**
    - Comprehensive Classification system
        - The National Archives Catalog categorizes content into record groups, collections, series, file units, and items. This is a more developed hierarchy than the Missouri State Archives redesign and allows users to clearly understand the relationships between records.
        - This structure also helps with the handling of large collections.
        - However, it does add a layer of complexity when searching for an item.
    - Transcriptions, Tags, and Comments
        - Each record in the National Archives provides an option to view any transcriptions, tags, or comments associated with the file. This information might be helpful for users when trying to determine the relevance or context of a document. Transcriptions may also help with accessibility or searching within an item, but these transcriptions appear to be partially dependent on users to generate them.
    - Advanced Searching
        - Advanced searching allows users to provide more detailed criteria for finding a specific item.
- **Cons**
    - No Options for Browsing
        - The National Archives Catalog only lets users search using a keyword or an advanced search for an item, file unit, etc. This makes it difficult for users who just want to browse a certain type of archive or do not know which keywords they should use to find a particular item.
    - Complex User Interface
        - If a user clicks on a record group, collection, or series, there can be many pages that must be sifted through until they reach a specific item of interest. This may be overwhelming to novice users.
    - Lack of Built-in-Search Within Documents:
        - While users can use keyboard shortcuts to search within documents, there are no actual tools in the interface to support this. Therefore, only users who are familiar with the keyboard shortcuts might know to search within the documents using that method.
    - Redundancy in Download Options:
        - There are two download buttons beneath each file. This is redundant and confusing. Only one button is needed.

Part B: Low Fidelity Prototype/ Mockups

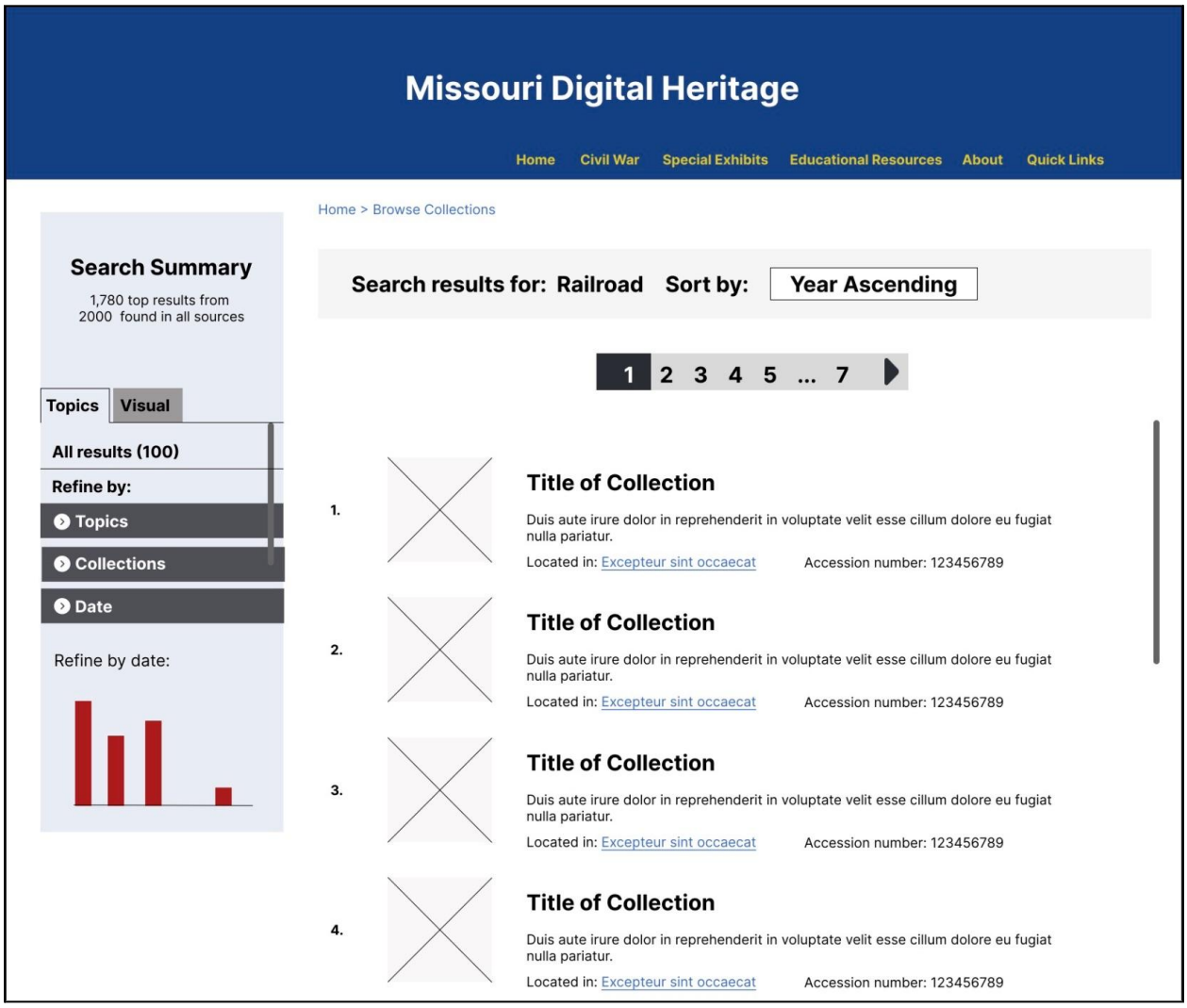
Link to lo-fi mockup files: Low Fidelity Prototype - Click Wizards-2.pdf

1. Users start at the home page and can navigate to collections via 2 options: Search for collections using specific terms or browse collections based on a general criterion.
View original home page: https://www.sos.mo.gov/mdh



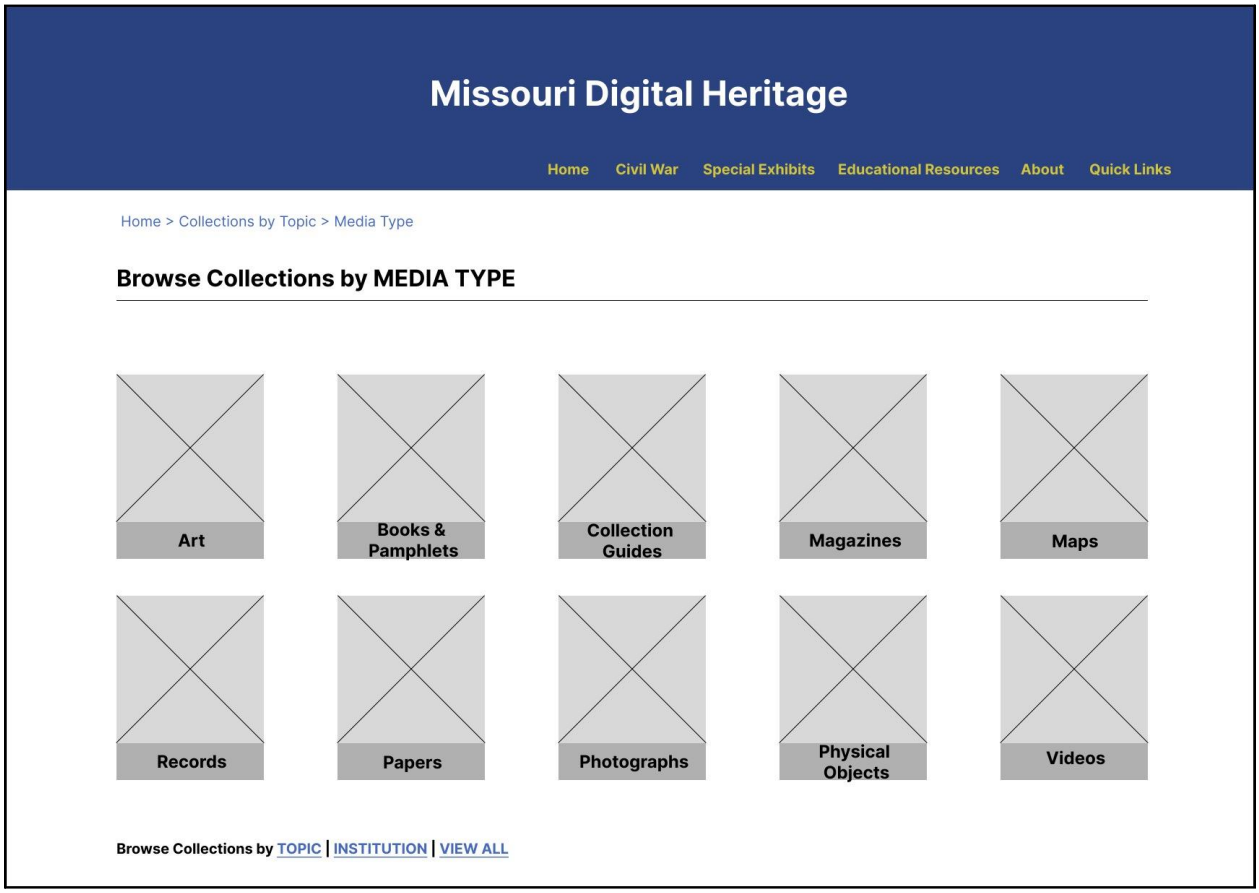
- The homepage has undergone a redesign aimed at emphasizing the various search methods. Adhering to the Gestalt principle, specifically the Common Region concept, we've enclosed the search options within a box to suggest similarity in functionality.
- Tooltips were added to help users understand search options
- Updated search bar with predictive search function added

2. When users search using a specific term, they are directed to a search results page that displays collections related to the entered search term. Through this page, users can directly access various collections.



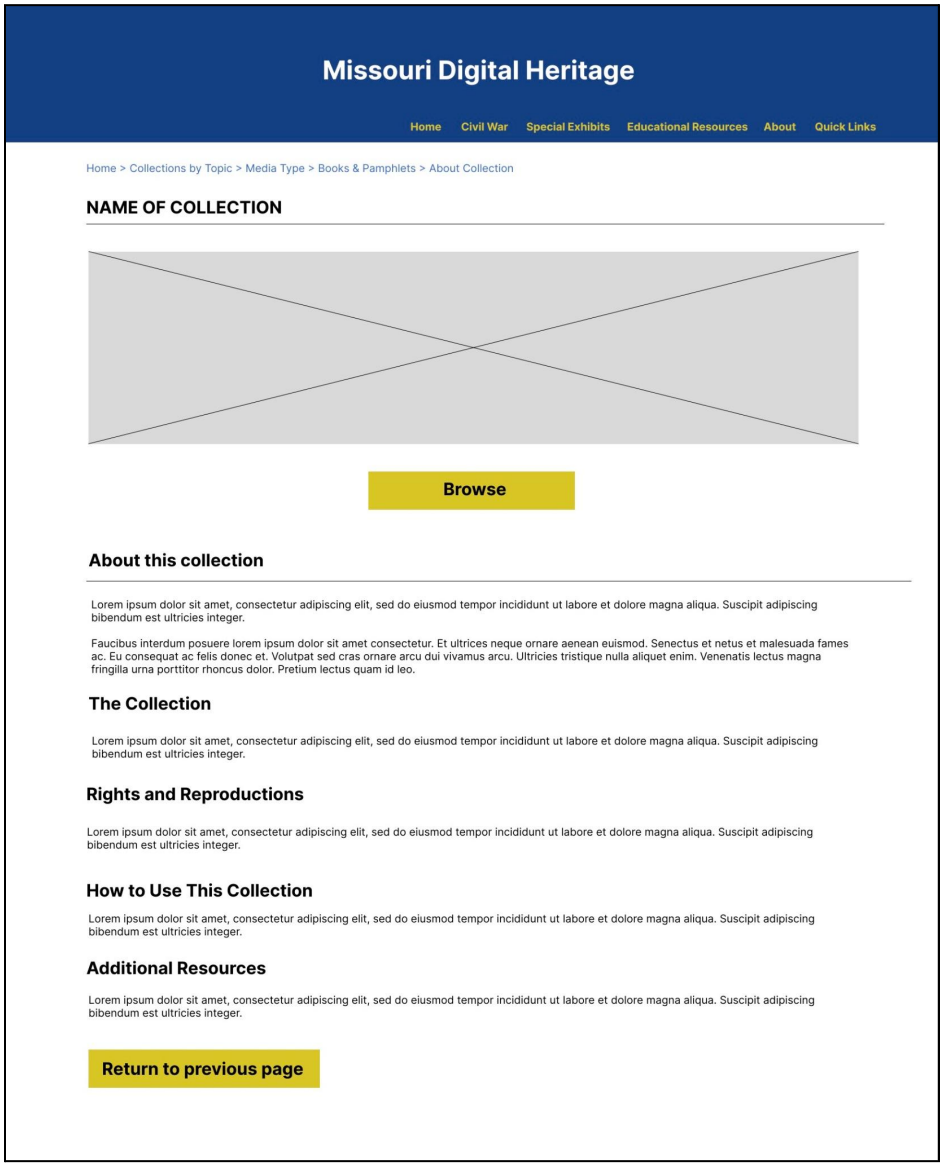
- Added scroll bars in search topic column
- Added option to sort by ascending/descending year
- Added breadcrumbs to top of page

3. If users search using a general criterion, such as "browse by Media Type," they are directed to a page that offers a range of options for further refining their search (e.g. type of media).



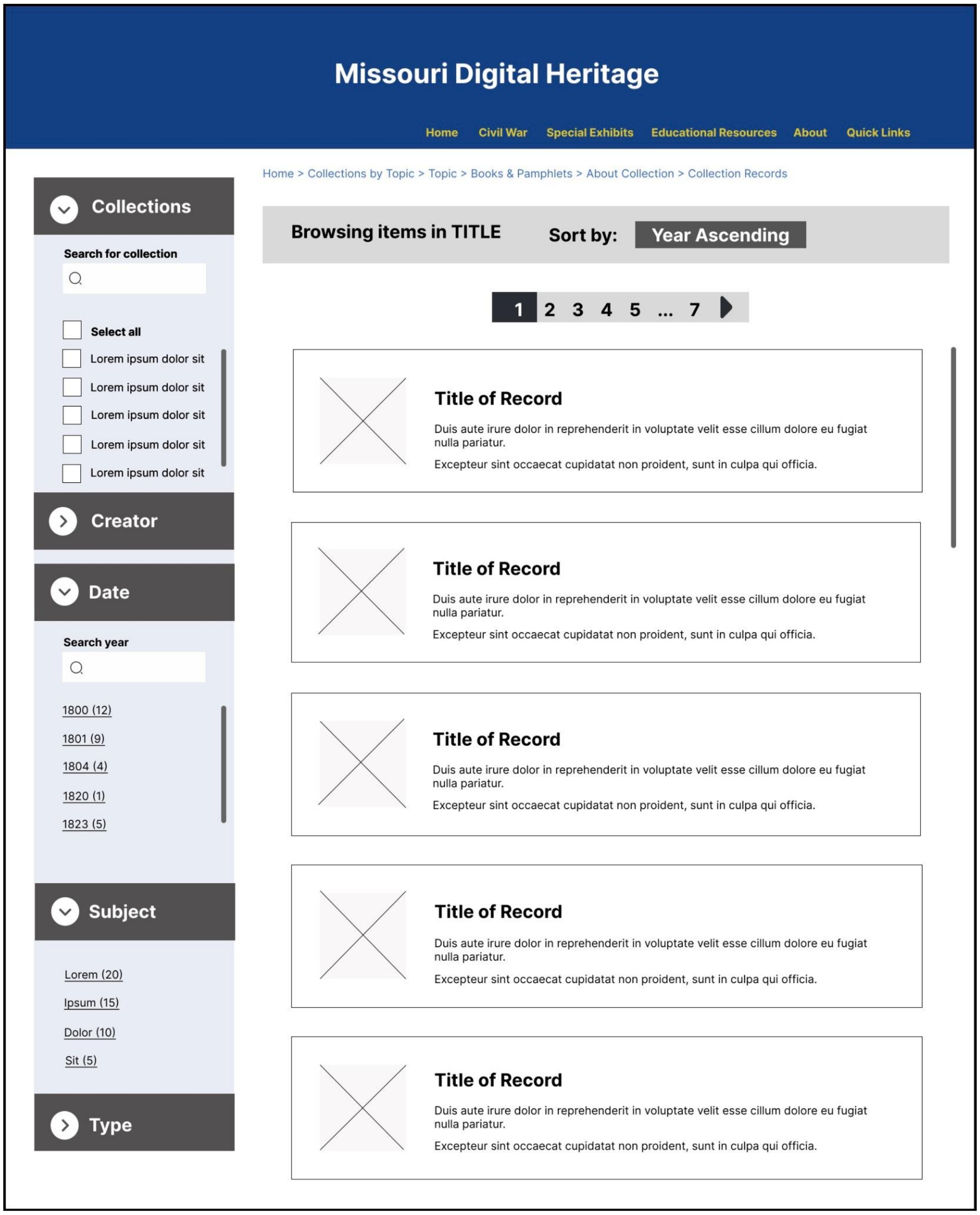
- Increased white space between media type squares

4. After users select type of media, they are directed to another results page of collections, similar to *screen #2*. Once clicking on a specific collection, they are taken to the collection's title page. Users can select "Browse" to view a list of items/records in the collection.



- Added "return to previous page" button.
- Moved the location of the "browse" button from the bottom of page to above the fold.
- Added breadcrumbs

5. After entering the results page containing various items, users can narrow their search by date, collection, creator etc.



- A search bar was added to the Collections & Date boxes to further improve custom search capabilities
- Column containing search criteria topics were reorganized alphabetically
- Scroll bars were added for ease of use
- Added option to sort by ascending/descending year
- Breadcrumbs added to top of page

6. After opening an item, users are able to view the text/image and navigate through the document using content sections or by searching for a specific term within the text. Here, they can also download or print pages.

- Side arrows moved closer to document, using rule of proximity to show relation
- Moved location of page name to show relationship to the document.
- Updated search box with arrows instead of + - for consistency
- Added option to translate transcript into different languages
- Added option to increase font size

7.From this page, users also have the option to search for a specific term within the text. When users are done, they can use breadcrumbs to navigate back to a specific page or home page.

- Removed page preview image and replaced with context text.
- Added scroll bar to results.
- Added the ability to jump to pages only containing keywords (red arrow).
- Added spell check to all search bars

Part C: Peer Evaluations of Low-Fidelity Prototypes

Peer Feedback Summary:

Design Alignment with User Tasks:

- *Positive*: Excellent alignment with user tasks, especially highlighted in the updated Homepage and improved accessibility features.
- *Positive:* Refined search pane addition is praised for its convenience.

Placement of Key Functions/Features:

- *Positive:* Generally good placement supporting user interactions.
- *Recommendation:* Consistent placement of the document search panel, with a suggestion to move it to the left for uniformity.

Information Organization:

- *Positive:* Good use of whitespace, boxes, and grouping for effective information organization.
- *Positive:* Praise for collapsible boxes under documents, enhancing information presentation without overwhelming the page.

Visual Aesthetics:

- *Positive:* Generally good aesthetics, but suggestions for improvement.
- *Recommendation:* Consider tweaking font selections, color schemes, images etc., to make the website's purpose more visually evident.

Navigation:

- *Positive:* Excellent focus on navigation improvement, including a refined search bar and predictive text feature.
- *Positive:* The addition of the "search within a document" feature is praised for enhancing user search capabilities.
- *Recommendation:* Suggestion to add a "back to top" button for long pages.

Consistency and Standards:

- *Positive:* Generally good consistency with some areas for improvement.
- *Recommendation:* Ensure consistent placement of elements, recommended that all search detail boxes are placed on the left.
- *Recommendation:* Suggest enlarging and standardizing buttons, such as those on the "browse collections by media type" frame, for improved consistency and functionality

Part III: High Fidelity Prototype

Part A: Descriptions

Version 1 of the high-fidelity prototype is described below regarding its features, functionality, tools used to create it, and limitations.

Description of the Functionality and Features

Using peer evaluations and feedback of the low-fidelity prototype, several features were included and updated in the high-fidelity prototype.

Features

Consistent Look

All pages in the high-fidelity prototype have a consistent appearance in terms of color and design elements. Page margins are similar throughout.

Color Scheme, Buttons, and Shapes

- The color palette of the prototype draws upon the blue, red, yellow, and brown colors of the Missouri State Seal; in fact, the state seal appears as a faded background element on the top left corner of each page.
- All pages have a white background, allowing images and text to be more prominent.
- Major headings like those on the “Search Results” page and the “Browse by Institution” are contained in dark blue boxes with white text.
- At the top right corner of the browse pages, red buttons for “Topic,” “Institution,” “Media Type,” and “View All” are consistently-sized with a rectangular shape; the text is white and centered.
- Tooltips on the home page and in the “search within the volume” page are indicated to users with a white circular button with “i” in the center, a recognized symbol for “information.” When hovered over, the button displays a rectangular white box with helpful text in a dark gray color, providing contrast for easy reading.

Engaging Images Showcasing Content

Compared to the low-fidelity prototype, the high-fidelity version welcomes users into the site with ample images throughout.

- On the home page, for example, there is a picture carousel displaying a variety of historically and culturally important images in Missouri history, including the Gateway Arch, Meramec Caverns, and the Missouri Farmers Association Building.
- The “Browse by Topic” page also draws users in with thirteen images, one for each topic. These colorful images reinforce the topic, with a red tractor in a green field next to the topic of “Business, Industry, and Agriculture”, and a train near a camel and cart next to

the topic of “Transportation.” The images are aligned vertically to the left, and the text describing them is on the right. The titles of each topic are in the same large brown font, while the more detailed description of each topic is in a smaller black font.

- The “Browse the Collections: Magazines and Journals” page has a similar look to the “Browse by Topic” page since it also contains vertically arranged images on the left of the page. These images display images of sample publications. For example, the “Missouri Conservationist” is shown by an issue featuring a brown bird standing on a branch. Like the “Browse by Topic” page, a larger brown title of the publication is directly to the right of the image, and more description about each publication is given beneath the title in smaller black text.
- The “Browse by Media Type” page also features many engaging images, ten in total. This page has a slightly different look compared to the other browse pages since these images are displayed horizontally as buttons for each media type, which may be enjoyable for users to press. Each image suggests the media type well. For instance, an image of a book is used for the “Books and Pamphlets” button, and an image of a strip of film is used for the “Videos” button. Based on feedback, these buttons are now larger and more rectangular than in the original prototype.

Intuitive Location of Information

Several elements on the high-fidelity prototype web pages were moved to better align with peer expectations.

- In the top right corner of the pages, there is now a hamburger button. When it is selected, there is a pop-out, red sidebar that provides a list of links to important pages. This feature helps users to navigate to other areas of the website more easily, such as to the Home Page or Special Exhibits.
- The “search in volume” pages (i.e., search within the publication *The Missouri Conservationist* pages) now have a search bar on the left side, instead of the right side. Searching from the left side corresponds to the left-sided placement of the search bar on other pages like “View All” / “Search Results.”
- Accessibility features (e.g., translation and zoom) occur consistently on pages. For example, the translate button is placed under the “transcript” accordion menu on the bottom of the “search in volume” pages. On this same page, users can zoom in or enlarge the publication page by selecting the appropriate icons in the upper right corner of the publication preview.

Functionality

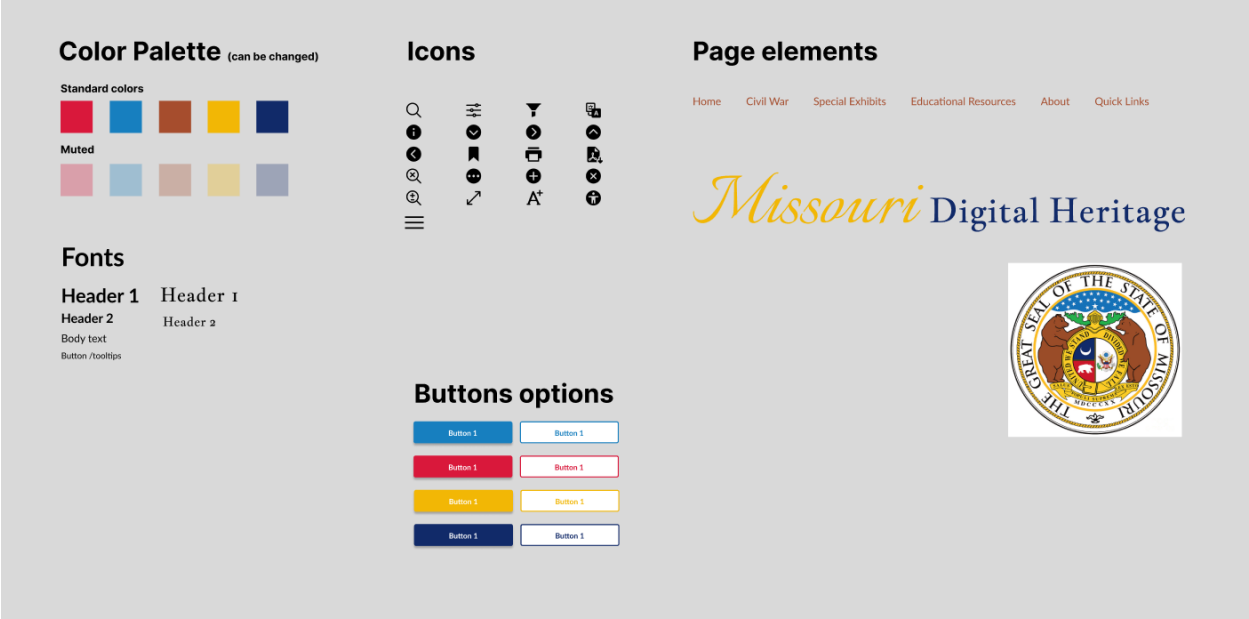
The high-fidelity prototype includes many functions that allow users to complete several tasks, seven of which are listed and described below. Images corresponding to each function are in the "Images Illustrating Key Elements" section of this report.

1. **Collapsible accordions for displaying and hiding content:** Several of the pages include accordions so that users can expand information to read below a heading and then collapse it when it is no longer needed. Examples of such pages include the "Browse by Institution" page, the "View All" page, and *The Missouri Conservationist* pages.
2. **Tooltips:** The home page and *The Missouri Conservationist* document preview/search pages have a white circular information button (labeled "i"). When users hover over this button, instructions for using that page are displayed in a white rectangular text box.
3. **Pop-out sidebar:** By selecting the hamburger button in the top right corner of pages like the "View All" page, users are given a list of links, displayed in a red sidebar. These links can take users to other pages of the website quickly (e.g., the Home Page).
4. **Return-to-top button:** Users can select the golden "Return to Top" button at the bottom of the "Results" page. This button can be a convenience with a long page of results.
5. **Buttons for browsing by (e.g., topic, media type):** Users can press the red buttons in the upper right corner of the browse pages to navigate to another desired page (e.g., topic, media type, institution).
6. **Red-arrow button for jumping to next page within a document search**: When previewing a document, such as from *The Missouri Conservationist*, users can press the red arrows to move to the next next page of the publication containing the target search word.
7. **Download button:** Users can select the download button on the pages of the April 1939 issue of *The Missouri Conservationist*. By clicking this button, the page downloads onto the device.

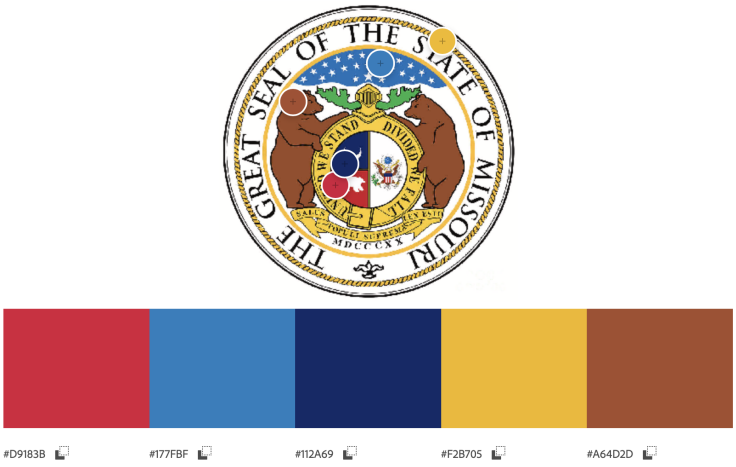
Description of the Tools, Applications and Technology to Create the Prototype

Figma was the primary tool used to create the interactive prototype. This tool allows for collaborative work and the use of many interactive elements such as accordion menus and picture carousels.

Within Figma, we developed a UI toolkit composed of basic design elements. This toolkit served to maintain consistency throughout the prototype development process, encompassing font types, predefined text sizes, icons, buttons, the main menu bar, and the site title.



The Missouri State Seal, shown below, inspired the color palette of the prototype since it symbolizes the history and culture of Missouri well, which connects appropriately to the Missouri State Archives Site. We used Adobe Color to pick colors from the seal and create a cohesive color palette. The color hex color codes listed below, which correspond to the colors of the seal, were used in Figma.



Images Illustrating Key Elements of the Final User Interface Design

The seven images below show key functions of the final user interface design.

1. Collapsible accordions for displaying and hiding content

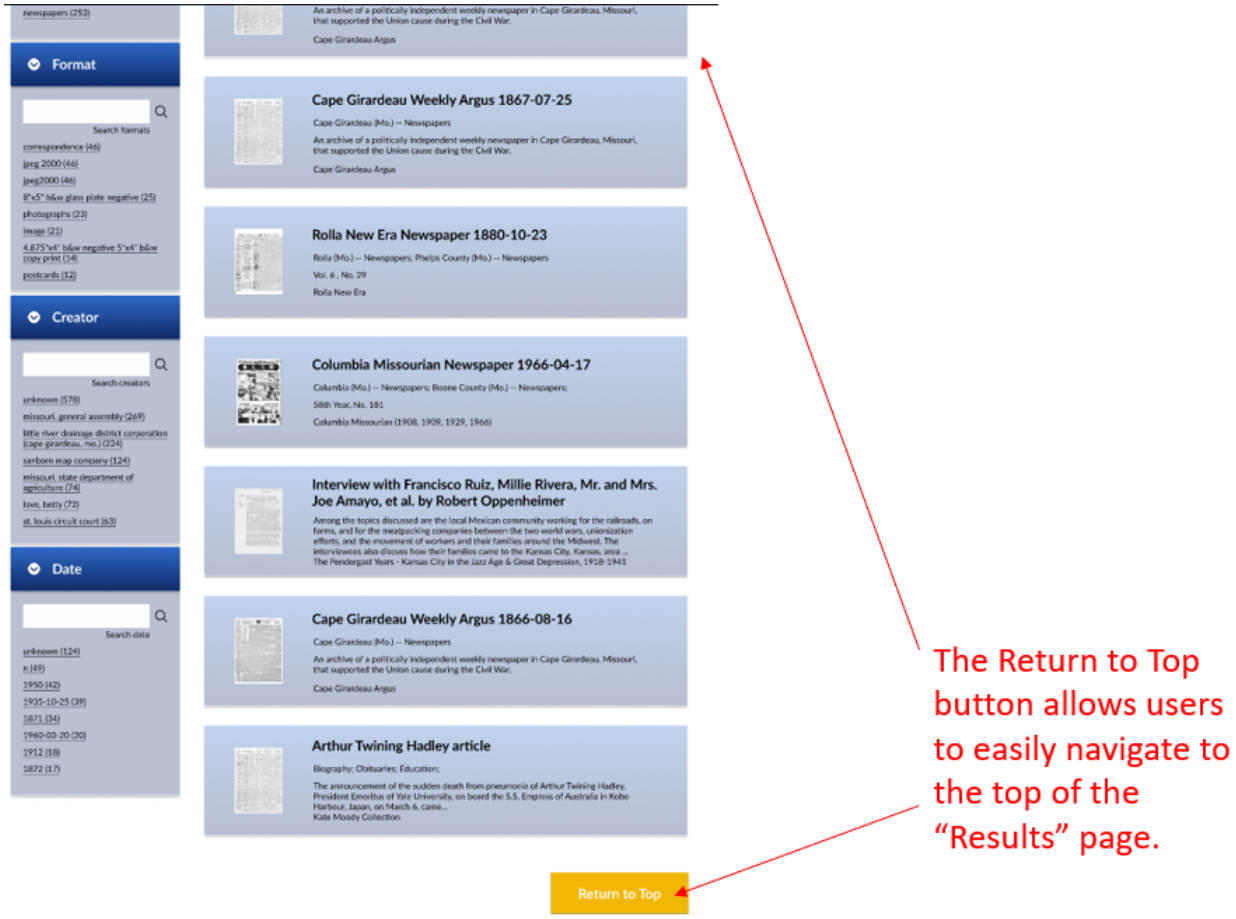
Collapsible (accordion) menu for hiding and displaying content; notice the movement of the arrows with the extending and collapsing of content.

2. Tooltips

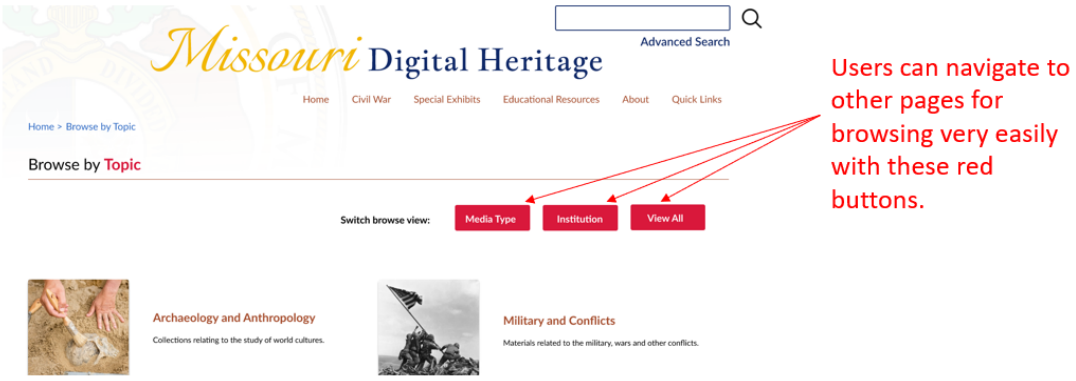
When hovering over this icon on the Home Page, at tooltip appears providing instructions to users.

3. Pop-out sidebar (red bar on the right)

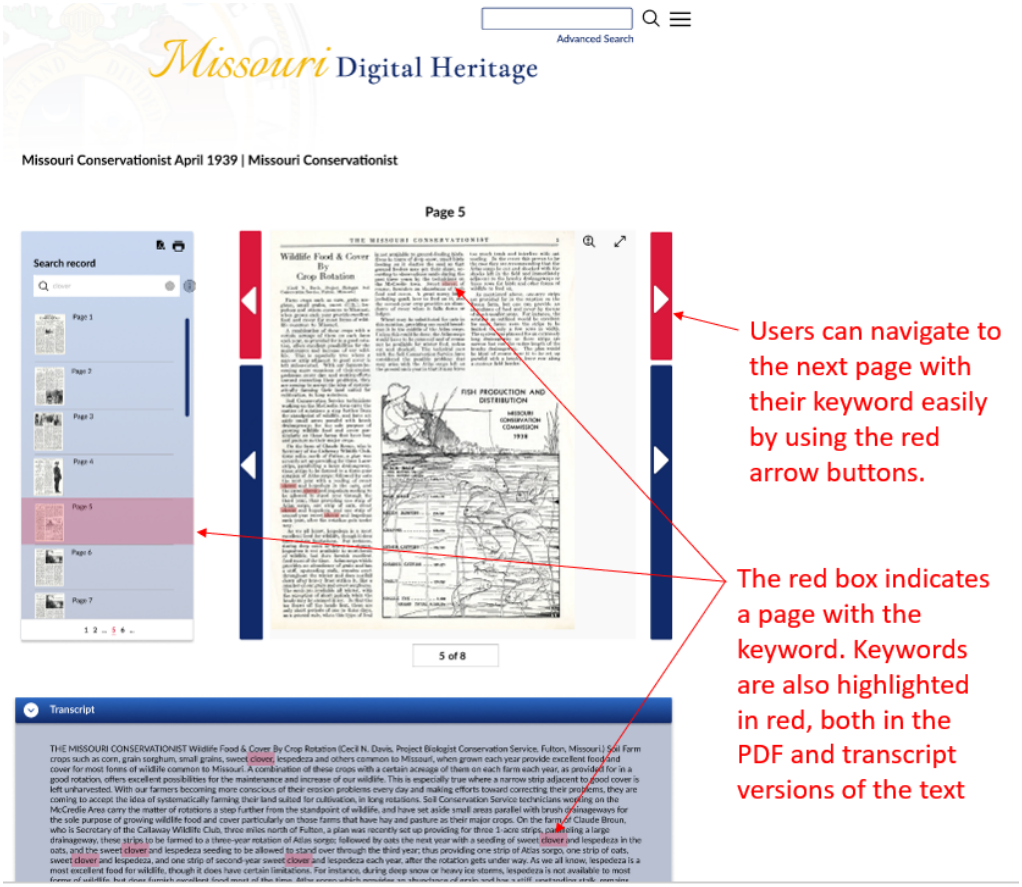
4. Return-to-top button added on search pages (Results page)



5. Buttons for browsing by topic, media type, institution



6. Red-arrow button for jumping to the next page within a document search



7. Download the pages of the April 1939 issue of *The Missouri Conservationist*.

Description of Unimplemented Features and Rationale

There were a few features that were unimplemented in the high-fidelity prototype. First, the scroll features in the search bar area of *The Missouri Conservationist* pages are not functional. Second, some text enhancement features like translating and zooming in are not possible with the icons, although it is possible to select a page from a *Missouri Conservationist* page and expand it to full screen. Third, the search boxes are not operational on the pages, especially the “View All” page and the search within a document of the *Missouri Conservationist* web pages.

The reason these features were not included may be a lack of technical skills to execute them in Figma and/or the limitations of Figma itself. Figma does not have many user-friendly features, for example, for entering search terms. To do so may be very complicated and still not very functional. A true search would require a body of texts, which is beyond the scope of this prototype. Likewise, translating would also be impractical in this situation.

Part B: Prototype (Version 1)

Below are two tasks that users can complete using version 1 of the high-fidelity prototype for the Missouri State Archives Website: Figma prototype

Task 1: Download the Front Page of the April 1939 issue of *The Missouri Conservationist*.

- Step 1: On the home page, click the button to view by “Media Type.”
- Step 2: Select the option to view by Magazines.
- Step 3: Click the “View Collections” button for *The Missouri Conservationist*.
- Step 4: Click the “Browse” button.
- Step 5: In the list of volumes, select the “Missouri Conservationist April 1939” record.
- Step 6: With the record open, click the download button to save a PDF of the front page to the computer.

Task 2: Jump through results of keyword search pages in the April 1939 issue of *The Missouri Conservationist*.

- Step 1: On the home page, click the button to view by “Media Type.”
- Step 2: Select the option to view by Magazines.
- Step 3: Click the “View Collections” button for *The Missouri Conservationist*.
- Step 4: Click the “Browse” button.
- Step 5: In the list of volumes, select the “Missouri Conservationist April 1939” record.
- Step 6: Click the search bar to search the record for the keyword **clover**.
- Step 7: Click the red button to move to the next page containing the keyword **clover**.

Part C: Peer Evaluations of High-Fidelity Project

Peer Evaluation Summary:

Design Alignment with User Tasks:

- Positive: The design effectively supports expected user tasks and goals.
- Positive: Appropriate content amount for user navigation and task support.

Placement of Key Functions/Features:

- Recommendation: Suggests improvement in using different colored links for better guidance.
- Recommendation: Recommends better navigation clarity; positive remarks on accordion features.

Information Organization:

- Positive: Clear organization into distinct categories, reducing cognitive load.

- Positive: Effective use of white space and consistent design elements.
- Positive: Positive comments on the accordion menu for segmenting and reducing information overload.

Visual Aesthetics:
- Positive: Vibrant color scheme and visually pleasing aesthetics.
- Positive: Transparency overlay enhances credibility and visual interest.

Navigation:
- Recommendation: Suggests improving colored links and adding a hover feature for the accordion menu.
- Recommendation: Suggests including a traditional back button; confusion regarding the "Browse" button.
- Recommendation: Clean and well-organized visual aesthetics, but some dead links noted.

Consistency and Standards:
- Positive: Consistency in action buttons, links, and design elements.
- Positive: Positive remarks on the color scheme and visual cues, aligning with common standards.

Conceptual Models and Interaction Theories:
- Positive: Represents conceptual models well, showing minimalist design and effective use of recognizable icons.
- Positive: Positive feedback on contrasting color choices and readable fonts for accessibility.

Part IV: Evaluation Report

Part A: Evaluation Framework

Evaluation Purpose and Questions

The purpose of this evaluation is to determine how the updated design of the Missouri State Archives website enhances the user experience and better supports user needs when searching for archival materials. Specific attention will be given to user efficiency, and error reduction during search tasks. The following evaluation questions will be addressed:

1. What impact does the new design have on the number of mistakes made by users when locating a volume of interest?
2. Do design improvements impact the efficiency with which users can identify and access relevant pages pertaining to their keywords within a volume?
3. What is the difference between the new design and the old design when it comes to the successful download of pages from volumes?
4. To what extent do users report higher satisfaction with the overall user experience after using the newly designed site?

Evaluation Methods

1. User Observations
    a. To determine the effectiveness of the new design, observations were conducted with three participants who represented potential users of the site. Participants were asked to perform a series of tasks on both the existing and redesigned versions of the Missouri State Archives website. Tasks were designed to mimic typical tasks users complete on the site such as searching for specific volumes, searching for a particular keyword within a volume, paging through a volume, and downloading pages from a volume. Observations were recorded should they need to be referenced later for evaluation purposes. The following data points were collected:
        i. Time to complete tasks
        ii. Mistakes made when completing tasks
        iii. Number of pages accessed
        iv. Number of clicks to complete tasks
2. Post-Observation Questions
    a. After each observation, participants were asked to answer a series of questions so that qualitative data could be gathered regarding their experiences. Questions were specifically aimed at ascertaining the ease and efficiency of use of the redesigned site versus the existing site, clarity of information, visual appeal, and overall satisfaction with the site. The full set of questions are provided in Appendix A. Sample questions are as follows:

i. How easy was it to locate the specific volume you were looking for on the redesigned website? How did this compare to the ease of locating it on the existing website?
ii. On either site, did you encounter difficulties navigating to pages where the specific keyword of interest was located within the volume? If so, please describe.
iii. Did you find the information presented on the redesigned website clear and well-organized? Were there any areas where you felt the information could be presented more effectively?

3. Usability Form
    a. The Usability Form, provided in Appendix C, was generated in Qualtrics and provided to the participants via email to be completed after observations took place. The form allowed for comprehensive feedback regarding the user experience and usability of the updated website. The form contains ten items and leverages a 5-point likert scale ranging from strongly disagree to strongly agree. Below are the elements evaluated in the form:
        i. Ease of Use and Navigation
        ii. Overwhelm by Options and Complexity
        iii. Performance Expectations
        iv. Orientation within the Tool
        v. Interaction Elements
        vi. Visual Design Appeal
        vii. Content Clarity and Alignment
        viii. Technical Functioning
        ix. Cohesiveness of Design and Media
        x. Overall User Experience

Questions, Methods, Instruments, and Analysis

Evaluation Question	Data Collection Instrument/Method	Data Analysis Method
What impact does the new design have on the number of mistakes made by users when locating a volume of interest?	Observations, Post-observation questions	● Count of number of errors before and after redesign ● Qualitative descriptions of participant's experience and perceived errors
Do design improvements impact the efficiency with which users can identify and access relevant pages pertaining to their keywords within a volume?	Observations, Post-observation questions	● Time measured to access all relevant pages within a volume as measured in observation before and after redesign ● Number of clicks required to access all relevant pages within a volume as measured

		in observation before and after redesign ● Qualitative descriptions of participant's experience and perceived efficiency on each site
What is the difference between the new design and the old design when it comes to the successful download of pages from volumes?	Observations, Post-observation questions	● Number of attempts to download page versus successful attempts before and after redesign ● Qualitative descriptions of participant's experience and perceived ease of use of each site
To what extent do users report higher satisfaction with the overall user experience after using the newly designed site?	Post-observation questions, Usability form	● Qualitative descriptions of participant's experience with the tool ● Scores on the usability form

Part B: Observation Process

User 1

The user was a 57-year-old male content creator with an advanced level of experience using the internet and web interfaces. The user accessed both the existing site and the high-fidelity prototype using a MacOS computer and the Google Chrome browser to complete observations on 12/4/23. Tasks included searching for the word "Railroads," downloading the first page of the April 1939 issue of *The Missouri Conservationist*, and searching for the keyword "clover" within the same volume. Below are the findings for this user:

- Task Performance on Existing Site
    - Task 1 (Search for "Railroads")
        - Difficulty: Easy
        - Duration: 10 seconds
        - Mistakes: 0
        - Number of Clicks: 2
        - Number of Pages Accessed: 2
    - Task 2 (Download the front page of *The Missouri Conservationist*, April 1939)
        - Difficulty: Difficult
        - Duration: 2 minutes, 50 seconds
        - Mistakes: 4
        - Number of Clicks: 11
        - Number of Pages Accessed: 17

    - Task 3 (Search for "clover" in the same magazine issue)
        - Difficulty: Easy
        - Duration: 25 seconds
        - Mistakes: 0
        - Number of Clicks: 2
        - Number of Pages Accessed: 3
- Task Performance in High-Fidelity Prototype
    - Task 1 (Search for “Railroads”)
        - Difficulty: Easy
        - Duration: 9 seconds
        - Mistakes: 0
        - Number of Clicks: 2
        - Number of Pages Accessed: 2
    - Task 2 (Download the front page of *The Missouri Conservationist*, April 1939)
        - Difficulty: Easy
        - Duration: 1 minute, 17 seconds
        - Mistakes: 0
        - Number of Clicks: 6
        - Number of Pages Accessed: 6
    - Task 3 (Search for "clover" in the same magazine issue)
        - Difficulty: Easy
        - Duration: 20 seconds
        - Mistakes: 0
        - Number of Clicks: 2
        - Number of Pages Accessed: 3
- User Feedback
    - The prototype site was easier for locating specific volumes, especially if users are unfamiliar with keyboard shortcuts.
    - Navigation for finding the keyword “clover” and the April 1939 volume of *The Missouri Conservationist* was more intuitive in the prototype.
    - The prototype was identified as being more user-friendly, especially for those who may not have advanced technical experience.
    - The information presentation of the prototype was logical.
    - The process for downloading pages was more straightforward.
    - The user appreciated the large icons in the new prototype.
    - Overall satisfaction with the prototype was rated at an 8 out of 10.
    - The user’s only negative comment was that the prototype is incomplete in its current state as it doesn’t support all of the functionalities that are apparent in the existing site.
- Usability Form:
    - Participant rated all statements as “Strongly Agree”:

Q1. Please rate your level of agreement with each of the following.

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I think the tool was easy to use and navigate.	○	○	○	○	◉
I was not overwhelmed by the numerous options and complexity of the tool.	○	○	○	○	◉
The tool performed the way I expected.	○	○	○	○	◉
I found it easy to determine my location in the tool (i.e., path, linear or hierarchical order, etc.).	○	○	○	○	◉
All interaction elements, such as buttons or movable objects, worked as expected.	○	○	○	○	◉
I thought the visual design was pleasing.	○	○	○	○	◉
The content was easy to understand and was aligned with the purpose of the tool.	○	○	○	○	◉
I found the technical functioning very good regarding audio, video, animation speed, and content display.	○	○	○	○	◉
The visual design and media (text, audio, video, and animation) work together to form one cohesive program.	○	○	○	○	◉
My overall experience with the tool was very good.	○	○	○	○	◉

User 2

The user was a 44-year-old female Visual Materials Archivist with an intermediate level of experience using the internet and web interfaces. The user accessed both the existing site and the high-fidelity prototype using a Windows computer and the Google Chrome browser to complete observations on 12/5/23. Tasks included searching for the word "Railroads," downloading the first page of the April 1939 issue of *The Missouri Conservationist*, and searching for the keyword “clover” within the same volume. Below are the findings for this user:

- Task Performance on Existing Site
    - Task 1 (Search for “Railroads”)
        - Difficulty: Easy
        - Duration: 49 seconds
        - Mistakes: 0
        - Number of Clicks: 2
        - Number of Pages Accessed: 2
    - Task 2 (Download the front page of *The Missouri Conservationist*, April 1939)
        - Difficulty: Easy
        - Duration: 51 seconds
        - Mistakes: 0
        - Number of Clicks: 8
        - Number of Pages Accessed: 6
    - Task 3 (Search for "clover" in the same magazine issue)
        - Difficulty: Easy
        - Duration: 38 seconds
        - Mistakes: 0
        - Number of Clicks: 3
        - Number of Pages Accessed: 3
- Task Performance in High-Fidelity Prototype
    - Task 1 (Search for “Railroads”)

        - Difficulty: Okay
        - Duration: 38 seconds
        - Mistakes: 0
        - Number of Clicks: 11
        - Number of Pages Accessed: 2
    - Task 2 (Download the front page of *The Missouri Conservationist*, April 1939)
        - Difficulty: Easy
        - Duration: 1 minute 7 seconds
        - Mistakes: 0
        - Number of Clicks: 5
        - Number of Pages Accessed: 7
        - Task 3 (Search for "clover" in the same magazine issue)
        - Difficulty: Okay
        - Duration: 59 seconds
        - Mistakes: 1
        - Number of Clicks: 5
        - Number of Pages Accessed: 3

- User Feedback
    - The redesigned site did not have the helpful year/month dropdown menu like the original.
    - Delayed recognition of the use of red keyword jump arrows.
    - The redesigned homepage felt more intuitive and buttons were in an obvious location, eliminating the need for the menu bar.
    - Liked that the document view page gave a thumbnail instead of just text.
    - Redesigned site was logical and more visually appealing.
    - Recommended labeling red arrow buttons with instructional text eg, “next hit”
    - The homepage, browse by buttons, and thumbnail results were appealing. Nothing was distracting.
    - Overall satisfaction with the prototype was rated at a 9 out of 10.

- Usability Form:

Q1. Please rate your level of agreement with each of the following.

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I think the tool was easy to use and navigate.	○	○	○	○	◉
I was not overwhelmed by the numerous options and complexity of the tool.	○	○	○	○	◉
The tool performed the way I expected.	○	○	○	◉	○
I found it easy to determine my location in the tool (i.e., path, linear or hierarchical order, etc.).	○	○	○	○	◉
All interaction elements, such as buttons or movable objects, worked as expected.	○	○	○	◉	○
I thought the visual design was pleasing.	○	○	○	○	◉
The content was easy to understand and was aligned with the purpose of the tool.	○	○	○	○	◉
I found the technical functioning very good regarding audio, video, animation speed, and content display.	○	○	○	○	◉
The visual design and media (text, audio, video, and animation) work together to form one cohesive program.	○	○	○	○	◉
My overall experience with the tool was very good.	○	○	○	○	◉

User 3

The user was a 32-year-old analyst with an advanced level of experience using the internet and web interfaces. The user accessed both the existing site and the high-fidelity prototype using a MacOS laptop and Safari browser to complete observations on 12/3/23. Tasks included searching for the word "Railroads," downloading the first page of the April 1939 issue of *The Missouri Conservationist*, and searching for the keyword “clover” within the same volume. Below are the findings for this user:

- Task Performance on Existing Site
    - Task 1 (Search for “Railroads”)
        - Difficulty: Easy
        - Duration: 8 seconds
        - Mistakes: 0
        - Number of Clicks: 2
        - Number of Pages Accessed: 2
    - Task 2 (Download the front page of *The Missouri Conservationist*, April 1939)
        - Difficulty: Difficult
        - Duration: 4 minutes 22 seconds
        - Mistakes: 3
        - Number of Clicks: 14
        - Number of Pages Accessed: 8
    - Task 3 (Search for "clover" in the same magazine issue)
        - Difficulty: Easy
        - Duration: 29 seconds
        - Mistakes: 0
        - Number of Clicks: 2
        - Number of Pages Accessed: 1
- Task Performance in High-Fidelity Prototype
    - Task 1 (Search for “Railroads”)
        - Difficulty: Easy

        - Duration: 20 seconds
        - Mistakes: 0
        - Number of Clicks: 2
        - Number of Pages Accessed: 2
    - Task 2 (Download the front page of *The Missouri Conservationist*, April 1939)
        - Difficulty: Easy
        - Duration: 1 minute
        - Mistakes: 0
        - Number of Clicks: 6
        - Number of Pages Accessed: 6
    - Task 3 (Search for "clover" in the same magazine issue)
        - Difficulty: Easy
        - Duration: 33 seconds
        - Mistakes: 0
        - Number of Clicks: 5
        - Number of Pages Accessed: 1

- User Feedback
    - Using the redesigned site was more intuitive to navigate because content was less hidden.
    - No issues finding the keywords within the volume on the redesigned site.
    - The redesigned prototype better supported user goals and was more straightforward
    - Information was presented logically in the redesigned prototype
    - Easy to download pages between both sites, however the icon was too small in the redesigned site, so it was harder to recognize the function.
    - Visual design was non distracting and minimal.
    - Since keywords and search results were highlighted in red, it was easy to recognize the red arrows as related to keywords.
    - Site functioned well, but could use improvements in visual design, as it felt safe and unmemorable.
    - Overall satisfaction with the prototype was rated at a 9 out of 10.

- Usability Form:

Q1. Please rate your level of agreement with each of the following.

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I think the tool was easy to use and navigate.	○	○	○	○	◉
I was not overwhelmed by the numerous options and complexity of the tool.	○	○	○	○	◉
The tool performed the way I expected.	○	○	○	○	◉
I found it easy to determine my location in the tool (i.e., path, linear or hierarchical order, etc.).	○	○	○	○	◉
All interaction elements, such as buttons or movable objects, worked as expected.	○	○	○	○	◉
I thought the visual design was pleasing.	○	○	○	◉	○
The content was easy to understand and was aligned with the purpose of the tool.	○	○	○	○	◉
I found the technical functioning very good regarding audio, video, animation speed, and content display.	○	○	○	○	◉
The visual design and media (text, audio, video, and animation) work together to form one cohesive program.	○	○	○	○	◉
My overall experience with the tool was very good.	○	○	○	○	◉

Part C: Evaluation Results

1. Summary of the Data Analysis for All Evaluation Methods

While developing the high fidelity prototype version 2, we received feedback at various stages of development from peers and the instructor of IS_LT 9461 for the initial low fidelity prototype and later high fidelity prototype version 1. For the high fidelity prototype version 2, we received feedback from three target users.

In the initial stages of development, issues were mainly related to visual aspects, layout, and functionality of the design. For the latest iteration of the project, users also had a few recommendations related to visual elements and functionally, but they were far fewer than in the initial stages. Below is a description of the feedback received at all stages of the project in more detail, followed by a table summarizing this information.

Low fidelity prototype - Peer feedback on the low fidelity prototype was mostly positive. The three peers reviewing the prototype highlighted visually appealing features and search enhancements. However, they also suggested improving visual features and navigation. Visual recommendations mainly focused on including colors, images, and more consistency in areas like collapsible (accordion) menus and the look of buttons. Navigation recommendations consisted of

- moving the search panels to the left for the selected volume pages for consistency;
- moving the navigation on the results page to the far right part of the top bar to match standard search engines; and
- including a “back top top” button on the results page.

High fidelity prototype version 1 - As with the low fidelity prototype, the feedback on the high fidelity prototype version 1 was generally positive, but there were some suggestions primarily centered around visual features and navigation in addition to some recommendations about functionality.

First, with regard to visual features, peers reported that the text was too dense in some areas. This feedback was corroborated by the instructor. The instructor pointed out additional visual features to improve including being consistent with the color of buttons on the homepage, using higher-contrast color for gray text boxes, making images less flat by adding borders, using higher-resolution images, and segmenting the transcript texts to enhance readability.

Second, with regard to navigation, peers recommended the following:

- adding visual cues to buttons to make accessing the record for downloading easier;
- adding traditional back buttons;
- clarifying the meaning of the “Browse” button on *The Missouri Conservationist* page; and
- limiting the buttons to the one target button that allows users to proceed to *The Missouri Conservationist* page.

Third, in terms of functionality, the instructor suggested making the scroll bar functional on the selected volume page. In addition to this suggestion, a peer recommended reducing the number of dead hyperlinks and providing more options for the search bar (e.g., date, collection type) on the homepage.

Observations

While monitoring users complete the three tasks in Zoom, observers attended to the following: the average difficulty, time spent, number of mistakes, pages accessed, and clicks made. These observations revealed that users were successfully able to complete each task in the redesigned site. Most users found the tasks on the redesigned site easy (attributing them with a score of 1), while two of the tasks were described by a single user as okay (2, less easy).

For Task 1 (searching for **Railroads**), users made no mistakes on the redesigned site. Similarly, for Task 2 (finding and downloading a volume), users also made no mistakes on the redesigned site, which was an improvement from the average of 2 mistakes on the original site. This reduction in mistakes may have been because users became more familiar with the organization of the material when doing the task again on the second site and/or the redesigned site was more intuitive. For Task 3 (searching for keyword results), the average number of mistakes was slightly higher on the redesigned site (0.3) than on the original site (0). A possible explanation for this is that one user did not recognize the red arrows to navigate the keyword search pages and initially thought the scroll bar would take users to the next keyword search hit.

Time spent and number of clicks suggest that Task 2 was more efficient in the redesigned site than the original site. However, Task 1 and Task 3 took slightly longer and slightly more clicks on average seemingly due to limited functionality (not being able to type in the prototype) and not recognizing the function of some buttons immediately in the redesigned site (i.e., the purpose of the red arrows and the location of the download button).

Post Observation Questions

The replies to the ten post observation questions suggested that the redesigned site was effective.

- Two users reported that finding a specific volume was easy, while one thought it was just okay since there was no dropdown menu as on the original site.
- All three users indicated no difficulty in navigating the new site, with the exception of one user experiencing some difficulty recognizing the use of the red arrows to search through keyword results.
- Two users said the redesigned site was easier to navigate, while one said it was about the same to navigate as the original site.
- All three users indicated that the redesigned website better supported their goals.
- All three users indicated that the redesigned website was logically organized.
- Two users indicated that downloading on both the original and the new sites was relatively easy, but one user reported that he experienced a delay downloading from the redesigned website since the download icon was too small.
- No users reported any distracting features of the redesigned site, but all three pointed out appealing features.
- Two users provided suggestions for the site including expanding the search function on the homepage and labeling the red arrows to jump through keyword results.
- On a 10-point scale with 10 as the highest rating, the average rating for the redesigned site among the three users was 8.7.
- Final suggestions for the redesigned site included it being more complete and allowing users to type in keywords for searches.

Post Observation Form

The responses from the three users on the 10-item Post Observation Form were mostly very positive. On the Likert scale with 5 indicating highest agreement, 70% of the scores were a 5. However, there were three items in which a single user selected 4, which indicated less strong agreement. Overall, users reported the redesigned site was easy to use, attractive, and functional. It matched what they thought it should be able to do.

The three items indicated less strong agreement (averaging 4.7 out of 5) in the following areas:

- the tool performing as expected;
- all interaction elements, such as buttons or movable objects, working as expected; and
- the degree to which the visual design was pleasing.

Table Summarizing the Data Analysis for All Evaluation Methods

	Areas to Improve	Strengths
Low Fidelity Peer Evaluations N = 3	● **Visual Features** ○ Update the color palette throughout the site. ○ Add historical images and highlight content/history ○ Be consistent with design/layout, wording of buttons, all page margins, and collapsing sections. ○ On the “Browse Collections by media type” page, make the browse buttons large and rectangular instead of really small at the bottom of the page. ● **Navigation** ○ On the selected volume pages, keep all search panels on the left to improve consistency. ○ On the results page, move the navigation to the far right part of the top bar to be more in-line with standard search engines ○ On the results page, include a “back top top” button.	● The design aligns with expected user tasks. ● The site was organized well. ● Adding the keyword search to the homepage results in a smoother search experience. ● The “Browse Collections by Media Type” was designed especially well with blocks and grouping of the buttons. ● The use of collapsing sections to break up information is effective. ● The sorting feature was designed well when searching a volume. ● The addition of the translation feature to the records page increases its accessibility. ● The interface in general is much more aesthetically pleasing in the wireframe than the current website; there was effective use of whitespace, boxes, and grouping to keep related information together.
High Fidelity Prototype Peer Evaluations N = 3	● **Visual Features** ○ Make the text/lists less dense (add spacing). ● **Navigation**	● The design supports expected user tasks and goals. ● There was an ample amount of content (images, links, and

	Areas to Improve	Strengths
	○ Add visual cues to buttons to make accessing the record for downloading easier. ○ Add traditional back buttons, ○ Clarify the meaning of the "Browse" button on *The Missouri Conservationist* page. ○ Limit the buttons to the one target button that allows users to proceed to *The Missouri Conservationist* page. ● **Functionality** ○ Reduce the number of dead hyperlinks. ○ Provide more options for the search bar (e.g., date, collection type) on the homepage.	categories) to support the user's navigation and tasks. ● The design and organization is good. ● The website includes visually pleasing aesthetics with its color scheme that includes contrast that helps draw attention to key elements. ● The pages are all consistent by color, theme, font, and layout.
High Fidelity Prototype Instructor Evaluation N = 1	● **Visual Features** ○ Be consistent with color of homepage buttons. ○ Use higher contrast for gray text boxes. ○ Make images less flat by adding borders. ○ Use higher resolution for images. ○ Segment the transcript text to enhance readability. ● **Functionality** ○ Make the scroll bar functional on the selected volume page.	● The accordion menus are pretty cool. ● There is good information and plenty of content throughout. ● On the "Media Type" page, the borders around the image buttons are good (they pop).
Observations	● Task 1 and Task 3 took slightly more time and more clicks on	● Task 2 took less time and fewer clicks on the redesigned site than the original site.

	Areas to Improve	Strengths
	the redesigned site than on the original site. ● Task 1 and Task 3 were slightly more difficult on the redesigned site, both scoring an average of 1.3 compared to the average of 1 (easy) on the original site.	● Task 2 was easier on average on the redesigned site (1, easy) than on the original site (2.3, nearing difficult).
Post Observation Questions N = 3	● There were occasional mismatches between user expectations and the redesigned site. **Visual Features** ○ Indicate what the red arrows do (e.g, **next hit**) ○ Increase the size of the download icon to make it more noticeable. ● **Functionality** ○ Expand the search function capabilities (more search options on the homepage and allow for typing)	● Finding a specific volume was mostly easy. ● Navigating the redesigned site was mostly easy. ● The redesigned site supported user goals, was logically organized, and was appealing. ● On a 10-point scale with 10 as the highest rating, the average rating for the redesigned site among the three users was 8.7.
Usability Survey N = 3	While the lowest scores were still positive (averaging 4.7 out of 5, the most positive), the three lowest scores (4.7) were for the following: ● The tool performed the way I expected. ● All interaction elements, such as buttons or movable objects, worked as expected. ● I thought the visual design was pleasing.	The feedback was mostly very positive (average scores were 5 out of 5 for 7 of 10 questions) Users indicated the redesigned site was easy to use, attractive, and functional. It met their expectations overall.

2. Tabulation of Ratings, Average Scores

Data collected by observers during the Zoom session is indicated below in the User Observation Data table. This is followed by a table summarizing the 10 responses to the Usability Form.

User Observation Data

The table below summarizes the three tasks that users completed on both the original Missouri State Archives site and the redesigned site. For each task, the following was averaged for the three users: the average difficulty, time spent, number of mistakes, pages accessed, and clicks made.

	Task 1	**Task 2**	**Task 3**
Task Description	Search for the word **Railroads**	Download the Front Page of the April 1939 issue of *The Missouri Conservationist*.	In the April 1939 issue of *The Missouri Conservationist*, search for the keyword **clover**. Then, jump through the first two results of keyword search pages.
Existing Website: https://www.sos.mo.gov/mdh/			
Average difficulty rating in completing task (1 = easy, 2 = okay, 3 = difficult)	1 ● 3 users reported easy	2.3 ● 2 users reported difficult ● 1 user reported easy	1 ● 3 users reported easy
Average time spent to complete the task (in minutes: seconds)	0:22	2:41	0:31
Average number of mistakes made when completing task	0	2.3	0
Average number of pages accessed	2	8.3	2
Average number of clicks to complete task	2	13	2.7
High Fidelity Prototype v1: **Figma prototype**			
Average difficulty rating in completing task (1 = easy, 2 = okay, 3 = difficult)	1.3 ● 2 users reported easy ● 1 user reported okay	1 ● 3 users reported easy	1.3 ● 2 users reported easy ● 1 user reported okay
Average time spent to complete the task (in minutes: seconds)	0:22	1:08	0:37
Average number of mistakes made when completing task	0	0	0.3

Average number of pages accessed	2	6.3	2.3
Average number of clicks to complete task	5	5.7	4

Summary of Usability Form Results

The results from the Usability Form suggest that users had a very positive response to the redesigned website.

Scores indicated the following:

a. Strongly disagree - 1
b. Disagree - 2
c. Neutral - 3
d. Agree - 4
e. Strongly agree - 5

Usability Form Question	Average Score
1. I think the tool was easy to use and navigate.	5
2. I was **not** overwhelmed by the numerous options and complexity of the tool.	5
3. The tool performed the way I expected.	4.7
4. I found it easy to determine my location in the tool (i.e., path, linear or hierarchical order, etc.).	5
5. All interaction elements, such as buttons or movable objects, worked as expected.	4.7
6. I thought the visual design was pleasing.	4.7
7. The content was easy to understand and was aligned with the purpose of the tool.	5
8. I found the technical functioning very good regarding audio, video, animation speed, and content display.	5
9. The visual design and media (text, audio, video, and animation) work together to form one cohesive program.	5
10. My overall experience with the tool was very good.	5

3. Synthesis of Comments from Observations and Other Evaluation Methods

Below are summarized responses from the three users to the ten Post Observation Questions. In addition, there is a table containing an analysis of each question driving this evaluation.

Summary of Post Observation Questions

1. How easy was it **to locate the specific volume** (i.e., in *The Missouri Conservationist*) you were looking for on the redesigned website? How did this compare to the ease of locating it on the existing website?

   Both user 1 and user 3 thought it was easier to locate the specific volume of *The Missouri Conservationist* on the redesigned website. User 1 remarked that unlike with the original website, he did not have to use keyboard shortcuts. User 3 noted that the content of the redesigned website was less hidden.

   However, user 2 thought finding the specific volume was a bit more difficult on the redesigned website since there was no dropdown menu (with the year and month) in the page about the collection. Filtering options were unavailable until browsing within the collection, which was an unexpected change from the original website.

2. On either site, did you encounter difficulties navigating to pages where the specific keyword of interest (i.e., **clover**) was located within the volume? If so, please describe.

   Both user 1 and user 3 reported having no difficulty navigating to pages with the keyword **clover** in the redesigned site, whereas user 2 said she had a 20-second delay while realizing the red arrows move through the keyword pages, unlike in the original site (where the arrows are further down with the transcript).

3. Can you describe your experience with the navigation for each site? Did one feel more intuitive than the other? Explain.

   User 1 said that finding *The Missouri Conservationist* was harder on the original website, but once he found it, both websites were similar to navigate.
   However, user 2 and user 3 felt the redesigned website was more intuitive to navigate. User 2 pointed out the usefulness of the red navigation buttons in the middle of the homepage of the new site. Likewise, User 3 described the navigation of the new site as having content that is less hidden.

4. Which site did you feel better supported your tasks or goals as a user? Explain.

   All three users indicated that the redesigned website better supported their goals. User 1 thought that most users would consider the redesigned site to be easier to use since it did not require him to use the find function (Ctrl F). User 2 thought the

red buttons on the homepage were easier to see than the menu bar on the original site and found the thumbnail buttons (rather than simple text) more visually appealing. Finally, user 3 noted the redesigned site was more straightforward.

5. Did the information presentation seem logical in the new site? Were there any areas where you felt the information could be presented more effectively?

   All users indicated that the redesigned website was logically organized. However, user 2 recommended the red arrow buttons, used to search for keywords within the volume, should be labeled on the side with a phrase like **next hit**.

6. Were you able to easily download pages from a volume on the redesigned website? Did your experience differ from the existing site?

   User 1 and user 2 indicated that downloading on both the original and the new sites was relatively easy, although user 1 remarked that he was only able to find the download button on the new site and had to download the image itself on the original site. While user 3 also reported that downloading from both sites was easy, he admitted that the icon on the redesigned site was too small, so he did not recognize it initially.

7. Were there any visual aspects of the new design that you found particularly appealing or distracting? Explain.

   No users reported any distracting features of the redesigned site, but all three pointed out appealing features. User 1 appreciated the magazine page with its large icons of magazine covers. User 2 especially liked the homepage, browse by button, and thumbnail results. User 3 commended the minimal design of the new site and the use of red in the keyword search buttons, highlighted keywords in the text, and search results/pages.

8. What features would you add or change in the new design to better support your needs?

   Two users provided suggestions to better support their needs in the redesigned website. User 1 recommended expanding the search functions to avoid navigating to the “browse by media type” page. In addition, user 2 suggested labeling the red arrows while jumping through keyword search results.

9. On a scale of 1 to 10, with 1 being very unsatisfied and 10 being very satisfied, how would you rate your overall satisfaction with the redesigned website? Explain.

   Users’ ranking of the site suggests they were satisfied with it. One user rated the redesigned site as 8, and the other two rated the site as 9. Two users noted the site was visually appealing/pretty. Other positive attributes were that is easier to use than the original site, intuitive, and functional. One user described it as “not the prettiest” with a design that is “too safe and unmemorable.”

10. Is there anything else you would like to add regarding the redesigned website's usability, accessibility, or any other aspect that stood out to you during your experience?

While user 3 did not have any additional feedback, the other two users did. User 1 said the redesigned site looks “really really good,” and the only downside is that it is incomplete. User 2 reported frustration that she could not type **Railroads** in the search bar.

Evaluation Questions

Evaluation Question	Analysis
What impact does the new design have on the number of mistakes made by users when locating a volume of interest?	For task 2 (finding a volume), users made an average of 2.3 mistakes on the original website compared to no mistakes on the redesigned site. This may have been because they became more familiar with the organization of the material when doing the task again on the second site.
Do design improvements impact the efficiency with which users can identify and access relevant pages pertaining to their keywords within a volume?	While users responded positively to the site in the Post Observation Form questions, the time spent for each task and the number of clicks was higher for Task 1 and Task 3. Task 2 was more efficient on the redesigned site. Task 1 - Users spent the same amount of time on average for both sites (0:22, minutes:seconds). Also, there was an average of 5 clicks for the redesigned site versus 2 for the original site. The reason for the similar time and extra clicks could be that one user took longer than the others while waiting for search results to load for the original site. Also, one user took longer figuring out that she could not type the word **Railroads** in the redesigned site, resulting in more time and clicks on the new site. Task 2 - Users spent an average of 2:41 on the original site versus 1:08 on the redesigned site. They clicked much more on the original site, averaging 13, versus the redesigned site, averaging 5.7. The increased efficiency with the new site could be explained by increasing familiarity with how the original site was organized, which was similar to the organization of the redesigned site.

	Task 3 - Users spent slightly longer on average completing the third task in the redesigned site (0:37) compared to the original site (0:31). Likewise, there were more clicks on average (4) than on the original site (2.7) One reason for the slightly longer time and additional clicks on the new site was that one user did not recognize the red arrows to navigate the keyword search pages and initially and thought the scroll bar would take take users to the next keyword search hit.
What is the difference between the new design and the old design when it comes to the successful download of pages from volumes?	Users were able to download successfully from both sites, but they had far fewer clicks to do so on the redesigned site (average of 5.7) compared to the original site (average of 13). Part of the reason for this increased efficiency could be learning the general organization of the material, and part of it could be from a more straightforward design of the new website.
To what extent do users report higher satisfaction with the overall user experience after using the newly designed site?	Users' ranking of the site in the Post Observation Form questions suggests they were satisfied with it. One user rated the redesigned site as 8, and the other two rated the site as 9, for an average of 8.7. Two users noted the site was visually appealing/pretty. Other positive attributes were that it is easier to use than the original site, intuitive, and functional. One user described it as "not the prettiest" with a design that is "too safe and unmemorable."

4. Explanation of Inefficient Performances and "Negative" Scores and Feedback

During the observations of the three users, a few inefficiencies were identified, which are described in more detail below. Furthermore, through the post interview questions, users provided a few pieces of "negative" feedback, elaborated below as constructive feedback.

Inefficient Performances

Compared to the other two users, user 2 had two inefficient performances in the redesigned site, as follows.

> Task 1 - *Search for the word **Railroads***: While users 1 and user 3 clicked their cursors only twice to complete Task 1, user 2 clicked 11 times. The reason for this difference is user 2 was confused about not being able to type the keyword in the prototype, resulting in more clicks & more time spent. In other words, the extra clicks were the result of the limited functionality of the prototype.

Task 3 - *In the April 1939 issue of The Missouri Conservationist, search for the keyword clover. Then, jump through the first two results of keyword search pages*: 3 - Use 2 took about 59 seconds to complete Task 3 in the redesigned site, which was about twice as long as for user 1 (20 seconds) and user 2 (33 seconds). The reason for this delay was that user 2 initially thought the scroll bar would take the user to the next keyword search hit, rather than the intended red arrow buttons.

Constructive Feedback from Users

The three users suggested several ways that the high fidelity prototype version 1 could be improved in terms of navigation, functionality, and aesthetics.

Navigation

User 2 recommended the red arrow buttons, used to search for keywords within the volume, should be labeled on the side with a phrase like **next hit**.

User 3 said the icon for the download button on the redesigned site was too small, so he did not recognize it initially. This remark suggests that the download button should be larger.

Functionality

User 1 recommended expanding the search functions to avoid navigating to the “browse by media type” page.

User 2 reported frustration that she could not type **Railroads** in the search bar. Her comment suggested that she would have liked a higher-functioning prototype.

User 2 thought finding the specific volume was a bit more difficult on the redesigned website since there was no dropdown menu (with the year and month) in the page about *The Missouri Conservationist* collection, which was a difference from the original site. This difficulty could be attributed to a gulf of evaluation since the user 2’s mental model for the site did not fit the layout of the redesign (Norman, 1986; Hutchins et al., 1986, as cited in Preece, Rogers, & Sharp, 2019). User 2 is very familiar with the original site.

Aesthetics

User 3 described the redesigned website as “not the prettiest” with a design that is “too safe and unmemorable.” This description suggests that a more creative or unusual design would have been more appealing to some users.

Part D: Design Evolution

Throughout the project's duration, numerous significant design updates were implemented to better align with user needs.

The low-fidelity prototype primarily focused on enhancing the functionality of the original website, with an emphasis on improving navigation and ease of use. Notable updates were made to the homepage, keyword search features, and the overall design of all pages.

The first version of the high-fidelity prototype further polished the page structures established in the low-fidelity phase. Attention was given to visual design, including updates to the color palette, and the addition of tooltips for enhanced user guidance.

The final version of the high-fidelity prototype integrated feedback from both peers and instructors, aiming to refine the design further. This involved enhancing contrast across pages and ensuring consistency throughout. For a comprehensive overview of our design evolution, please refer to **Prototypes 1-3.**

We found the peer and instructor evaluations to be very helpful during the design process to gather concrete and actionable feedback. Observations on target users were also very insightful, as we were able to gather more information from actual users of the site.

For a detailed account of design updates, please view the Change Log.

Change Log

Source (UT, IE, PE)	**Issue Priority (Low, Medium, High)**	**Issue Description**	**Recommendation**	**Changed (Yes/No)**
PE - low fidelity	High	“Browse Collection By” links/buttons were inconsistently styled between pages	Update “Browse Collection By…” links to better match the homepage buttons.	Yes

Source (UT, IE, PE)	Issue Priority (Low, Medium, High)	Issue Description	Recommendation	Changed (Yes/No)
PE - low fidelity	Low	Prototype does not highlight enough historical images and content	Add more historical images throughout prototype	No: Due to its nature, the prototype contains a lot of information, and adding additional images may have caused additional crowding.
IE - low fidelity	Low	Colors used were safe and outdated	Updated color palette	Yes
PE - low fidelity	High	The location of search record box was not consistent between pages	Moved the search record box from the right to left side page.	Yes
IE - low fidelity	Medium	Difficult to scroll back to the top of the search collections page	Add return to top button	Yes
IE - high fidelity v1	Medium	On the homepage, the view all button is a different color than the rest & inconsistent button styling throughout	Update button color	Yes
IE - high fidelity v1	High	The text in the gray accordion menus is difficult to read because	Add more contrast to the gray boxes in accordion menus.	Yes

Source (UT, IE, PE)	Issue Priority (Low, Medium, High)	Issue Description	Recommendation	Changed (Yes/No)
		the gray background is too dark.		
IE - high fidelity v1	Low	Blurry images on Magazines and Journals, pages that don't stand out from the background.	Add borders around the image and use higher resolution images.	Yes
IE - high fidelity v1	Low	Title of high-fidelity prototype says "low-fidelity"	Change the title to High Fidelity Prototype (instead of low).	Yes
IE - high fidelity v1	Medium	Scroll bar is not functional	Add vertical scrolling to "Selected Volume" page	Yes
IE & PE - high fidelity v1	Medium	The transcript pages are difficult to read because of color choices and dense text.	For the transcript, make the background lighter and have more white space (e.g., put it in segments).	Yes
PE - high fidelity v1	Medium	Confusion about how to access the target record for downloading	Make the target links green when people hover over them so they are easier to find.	Yes: We added visual cues. However, we did not use green as the peer suggested since it did not fit our color palette. Instead, target options darken and have an inner shadow when hovered over.

Source (UT, IE, PE)	Issue Priority (Low, Medium, High)	Issue Description	Recommendation	Changed (Yes/No)
PE - high fidelity v1	Medium	Many dead ends within the prototype	Ensure all hyperlinks are functional	No: we decided fixing all links was beyond our scope for the project
PE - high fidelity v1	Medium	Lack of traditional back buttons in website	Use a traditional back button rather than a scroll-triggered back button.	No: We decided the breadcrumb trail was sufficient.
PE - high fidelity v1	Medium	On *The Missouri Conservationist* page, some users were confused about the function of the red “Browse” button.	Change the text of the button from “Browse” to “Browse This Collection.”	Yes
PE - high fidelity v1	Medium	The search function on the homepage may be too simple.	Add a filtering function to the initial search to limit certain criteria such as date, collection, media type, etc.	No: We decided the simplicity of the search was desirable.
PE - high fidelity v1	Medium	Within the results page for Magazines and Journals, every collection button links to *The Missouri Conservationist*, not just the correct button.	Make *The Missouri Conservationist* the only publication that links to the pages for that publication.	Yes

*UT= Usability Test, IE = Instructor Evaluation, PE = Peer Evaluation

Part E: Project Reflections and Recommendations

Throughout the project and design process, many valuable lessons were learned, one being the importance of iterative design. Peer and instructor evaluations were very helpful, completing testing on actual users provides direct and more relevant feedback. One way we could have improved our design is by conducting evaluations and observations with a greater number of users from the target audience, as well as incorporating a more diverse range of users within our target audience.

Another key lesson involved the need for improved instructions and annotations during prototype and wireframe evaluations. While we had instructions, tips and notes on the user journey within the project document, no notes were included in the actual prototype itself, so users didn't have proper instructions to fully understand the website during early stages of development.

During the design stage itself, particularly during the creation of low-fidelity wireframes, we should have tried creating multiple versions of the pages, promoting creativity. Greater creativity and iteration on wireframe designs would have contributed to crafting optimal versions of each page. The same could be said during the high-fidelity prototypes, which should have been transformed more. If we had more time, this is something that could have been improved within the design process. Time constraints also impacted the prototype's functionality compared to the original website. Future improvements involve allocating more time to enhance the prototype's functionality, addressing shortcomings identified during evaluation and incorporating advanced features.

Enhancing accessibility is also crucial, and during the project, we learned the importance of visual contrast. Screen reader ease of use, font sizing, and language settings. More time to work on the project would have allowed us to complete thorough research on accessibility standards and features, ensuring inclusivity. Incorporating features like alternative text, keyboard navigation, and other enhancements is imperative.

Maintaining detailed records of all prototype versions is essential, as we did not properly record all pages of the high-fidelity prototype version 1. Keeping a comprehensive documentation of changes made and the evolution of the prototype ensures a transparent and traceable design process, facilitating better project management and future iterations.

In conclusion, with additional time and resources, this project could attain greater completeness through additional user testing, meticulous observations, and conscientious design considerations.

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Appendices

Appendix A: Usability Questionnaire for the Missouri Archives System

Please select your age group:

- o Under 18
- o 18-24
- o 25-34
- o 35-44
- o 45-54
- o 55-64
- o 64-74
- o 75 or older

Please specify your gender:

- o Male
- o Female
- o Non-Binary
- o Prefer not to say
- o Prefer to self identify:

_____

What is your highest level of education completed?

- o Some high school
- o High school or equivalent
- o Some college
- o Bachelor’s degree
- o Master’s degree

o Doctoral degree

Which race or ethnicity best describes you?

o American Indian or Alaskan Native
o Asian / Pacific Islander
o Black or African American
o Hispanic
o White / Caucasian
o Multiple ethnicity/ Other (please specify)

_____

What is your current occupation?

_____

In what country, state, and city do you reside?

_____

In what location do you typically access the Missouri Archives CONTENTdm system?

o Home
o Library
o School/University
o Professional office
o Other (please specify)

_____

How would you describe the characteristics of the environment in which you access the Missouri Archives CONTENTdm system? (spacious, quiet, well-lit, etc.)

_____

During what time of the day do you typically access the Missouri Archives CONTENTdm system? (select all that apply)

- ▢ Morning
- ▢ Afternoon
- ▢ Evening
- ▢ Night

How often do you use the Missouri Archives CONTENTdm system?

- o Daily
- o Weekly
- o Monthly
- o Sporadically
- o Other _____

What type of device do you use to access the Missouri Archives CONTENTdm system? (select all that apply)

- ▢ Mobile phone
- ▢ Tablet
- ▢ Laptop
- ▢ Desktop
- ▢ Other _____

What brand is the device you use to access the Missouri Archives CONTENTdm system? (select all that apply)

- ▢ Apple
- ▢ Dell
- ▢ HP
- ▢ Acer
- ▢ Samsung
- ▢ Lenovo
- ▢ Asus

- ▢ Android
- ▢ Microsoft (Tablet or Mobile Only)
- ▢ Other _____

What browser do you use to access the Missouri Archives CONTENTdm system? (select all that apply)

- ▢ Google Chrome
- ▢ Microsoft Edge
- ▢ Internet Explorer
- ▢ Mozilla Firefox
- ▢ Opera
- ▢ Safari
- ▢ Other _____

What are your primary goals or reasons for using the Missouri Archives CONTENTdm system?

_____

Do you have any specific preferences regarding the design, features, or functionality of the system?

_____

Are there any particular frustrations you have when using the system?

_____

What do you like about using the system?

_____

Do you or anyone you know have physical, visual, or other type of disability that affect the ability to use the system?

_____

What specific tasks do you typically perform in the system?

_____

Can you explain your process for achieving the tasks identified in the previous question?

_____

Are there any other topics or concerns you would like to address regarding your use of the Missouri Archives CONTENTdm system?

_____

Appendix B: Post-Observation Questions

1. How easy was it to locate the specific volume you were looking for on the redesigned website? How did this compare to the ease of locating it on the existing website?
2. On either site, did you encounter difficulties navigating to pages where the specific keyword of interest was located within the volume? If so, please describe.
3. Can you describe your experience with the navigation for each site? Did one feel more intuitive than the other? Explain.
4. Which site did you feel better supported your tasks or goals as a user? Explain.
5. Did the information presentation seem logical in the new site? Were there any areas where you felt the information could be presented more effectively?
6. Were you able to easily download pages from a volume on the redesigned website? Did you experience differ from the existing site?
7. Were there any visual aspects of the new design that you found particularly appealing or distracting? Explain.
8. What features would you add or change in the new design to better support your needs?
9. On a scale of 1 to 10, with 1 being very unsatisfied and 10 being very satisfied, how would you rate your overall satisfaction with the redesigned website? Explain.
10. Is there anything else you would like to add regarding the redesigned website's usability, accessibility, or any other aspect that stood out to you during your experience?
11. We'll wrap up by gathering some basic demographic information and technical information.
    a. What is your age?
    b. What is your gender?
    c. What is your profession?
    d. What type of device are you using?
    e. What browser are you using?

Appendix C: Usability Form

Please rate your level of agreement with each of the following.

1. I think the tool was easy to use and navigate.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
2. I was **not** overwhelmed by the numerous options and complexity of the tool.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
3. The tool performed the way I expected.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
4. I found it easy to determine my location in the tool (i.e., path, linear or hierarchical order, etc.).
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
5. All interaction elements, such as buttons or movable objects, worked as expected.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
6. I thought the visual design was pleasing.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
7. The content was easy to understand and was aligned with the purpose of the tool.

    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
8. I found the technical functioning very good regarding audio, video, animation speed, and content display.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
9. The visual design and media (text, audio, video, and animation) work together to form one cohesive program.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree
10. My overall experience with the tool was very good.
    a. Strongly disagree
    b. Disagree
    c. Neutral
    d. Agree
    e. Strongly agree

Appendix D: User Observation Worksheet

IS_LT-9461: Interaction Design - User Observation Form for HiFi Prototype v.2

Name of Observer:

Orientation Script:

Hello. Thank you for participating in today's session. The purpose is to evaluate the usability of a redesigned version of the Missouri State Archives website. This website makes Missouri-related historical documents available to the public. In particular, we will focus on using the website to accomplish 3 tasks. We would like to keep this session to about 45 minutes.

In this session, I will ask you a few questions about yourself. Then I will ask you to complete 3 tasks in both the existing Missouri State Archives website and then the redesigned version of the website. As you complete these tasks, please do whatever comes naturally to you, and I will observe you and take notes while you do them. To aid in my observation, please try to think out loud while you're working on the tasks; in other words, let me know whatever comes to mind. I will also record our session with Zoom to support my observation. Please be aware that this recording is only for reference purposes and the recording will be deleted after the transcriptions of our interaction are completed. Do you consent to this session being recorded?

> ***Note: If the participant declines to be recorded, thank the participant and conclude the interaction. A new participant must be found.***

After you complete each task or need to move on, please let me know, and I will ask you to rate the difficulty of each task. At the end of our session, you will answer some questions about the redesigned website.

Be aware this session is not a test, and there are no incorrect answers. If you have any questions during the process, please ask. Additionally, if you feel uncomfortable, you may stop at any time. Your feedback is valuable and will help us determine the usability of the redesigned Missouri State Archives website. Do you have any questions before we begin?

Users and Usability Tests

Participant (1-3)		
User Profile	**Age**	
	Gender	**Woman** **Man** **Transgender** **Non-binary/non-conforming** **Prefer not to respond**
	Internet Experience	**Advanced / Intermediate / Elementary**
	Profession	
Test Context	**Usability Test** **Method**	**Recorded Observation on Zoom with oral interview**
	Date of Test	
	Platform	

	Browser	

Observations for The Missouri State Archives website

Directions: Have users go to the existing website:https://www.sos.mo.gov/mdh/. Ask users to complete each task, one at a time.

After each task, ask how difficult the task was on a scale of 1-3.

	Task 1	Task 2	Task 3
Task Description	**Search for the word Railroads**	**Download the Front Page of the April 1939 issue of *The Missouri Conservationist*.**	**In the April 1939 issue of *The Missouri Conservationist*, search for the keyword clover. Then, jump through the first two results of keyword search pages.**
Difficulty rating in completing task	**1 = easy 2 = okay 3 = difficult**	**1 = easy 2 = okay 3 = difficult**	**1 = easy 2 = okay 3 = difficult**
Time spent to complete the task			
Mistakes made when completing task			
Number of pages accessed			
Number of clicks to complete task			

Observations for the Figma prototype

Directions: Have users go to the redesigned website:

https://www.figma.com/proto/pbU1SzyYvJ50N4VRpg5l0g/Low-Fidelity-Prototype---Click-Wizards?type=design&node-id=95-3&t=WVtfnidOGzhGNC90-1&scaling=min-zoom&page-id=95%3A2&starting-point-node-id=95%3A3&show-proto-sidebar=1&mode=design

Ask users to complete each task, one at a time.

After each task, ask how difficult the task was on a scale of 1-3.

	Task 1	Task 2	Task 3
Task Description	Search for the word Railroads	Download the Front Page of the April 1939 issue of *The Missouri Conservationist*.	In the April 1939 issue of *The Missouri Conservationist*, search for the keyword clover. Then, jump through results of keyword search pages.
Difficulty rating in completing task	1 = easy 2 = okay 3 = difficult	1 = easy 2 = okay 3 = difficult	1 = easy 2 = okay 3 = difficult
Time spent to complete the task			
Mistakes made when completing task			
Number of pages accessed			
Number of clicks to complete task			

Script: ***Thank you for completing these tasks. Next, we would like to gather some more information about the redesigned site. We will ask you 10 questions followed by a 10-item online survey.***

1. How easy was it to locate the specific volume (i.e., in *The Missouri Conservationist*) you were looking for on the redesigned website? How did this compare to the ease of locating it on the existing website?

Ease of finding *The Missouri Conservationist* on the redesigned site	**Ease of finding *The Missouri Conservationist* on the existing site**

2. On either site, did you encounter difficulties navigating to pages where the specific keyword of interest (i.e., clover) was located within the volume? If so, please describe.

Difficulties navigating to keyword pages the existing site

Difficulties navigating to keyword pages in the redesigned site

3. Can you describe your experience with the navigation for each site? Did one feel more intuitive than the other? Explain.

4. Which site did you feel better supported your tasks or goals as a user? Explain.

5. Did the information presentation seem logical in the new site? Were there any areas where you felt the information could be presented more effectively?

6. Were you able to easily download pages from a volume on the redesigned website? Did your experience differ from the existing site?

Ease of downloading *The Missouri Conservationist* on the redesigned site	**Ease of downloading *The Missouri Conservationist* on the existing site**

7. Were there any visual aspects of the new design that you found particularly appealing or distracting? Explain.

8. What features would you add or change in the new design to better support your needs?

9. On a scale of 1 to 10, with 1 being very unsatisfied and 10 being very satisfied, how would you rate your overall satisfaction with the redesigned website? Explain.

10. Is there anything else you would like to add regarding the redesigned website's usability, accessibility, or any other aspect that stood out to you during your experience?

Script: ***Thank you for answering my questions. As a final step, could you please complete this brief 10-item questionnaire about the redesigned Missouri State Archives Site:*** **https://missouri.qualtrics.com/jfe/form/SV_9RBFng5Nk7LLpwq**. ***Your participation in this project is appreciated.***

Please summarize the results this spreadsheet:
https://docs.google.com/spreadsheets/d/1oARRCIH4ViuI4uAKMt5VAPC8OKEt-wFstsBYW4uM_x4/edit?usp=sharing

Appendix E: Summary of Users and Usability Tests

Participant 1		
User Profile	**Age / Gender**	57 / Man
	Internet Experience	advanced
	Profession	Content Creator
Test Context	**Usability Test Method**	Recorded Observation on Zoom followed by oral interview
	Date of Test	12/4/23
	Platform / Browser	Mac / Chrome
Strengths		● The prototype site was easier for locating specific volumes, especially if users are unfamiliar with keyboard shortcuts. ● Navigation for finding the keyword “clover” and the April 1939 volume of *The Missouri Conservationist* was more intuitive in the prototype. ● The prototype was identified as being more user-friendly, especially for those who may not have advanced technical experience. ● The information presentation of the prototype was logical. ● The process for downloading pages was more straightforward. ● The user appreciated the large icons in the new prototype.
Areas for Improve		● The prototype is not as complete as a website. ● There could be more search option on the homepage
Overall Satisfaction		8 out of 10

Participant 2		
User Profile	**Age / Gender**	44 / Woman
	Internet Experience	intermediate
	Profession	Visual Materials Archivist
Test Context	**Usability Test Method**	Recorded Observation on Zoom followed by oral interview
	Date of Test	12/5/23
	Platform / Browser	Windows / Chrome
Strengths		● The redesigned homepage felt more intuitive and buttons were in an obvious location, eliminating the need for the menu bar. ● Liked that the document view page gave a thumbnail instead of just text. ● Redesigned site was logical and more visually appealing. ● The homepage, browse by buttons, and thumbnail results were appealing. Nothing was distracting.
Areas for Improve		● The redesigned site did not have the helpful year/month dropdown menu like the original. ● Delayed recognition of the use of red keyword jump arrows. Recommended labeling red arrow buttons with instructional text eg, “next hit”
Overall Satisfaction		9 out of 10

Participant 3		
User Profile	**Age / Gender**	32 / Man
	Internet Experience	advanced
	Profession	Analyst
Test Context	**Usability Test Method**	Recorded Observation on Zoom followed by oral interview
	Date of Test	12/3/23

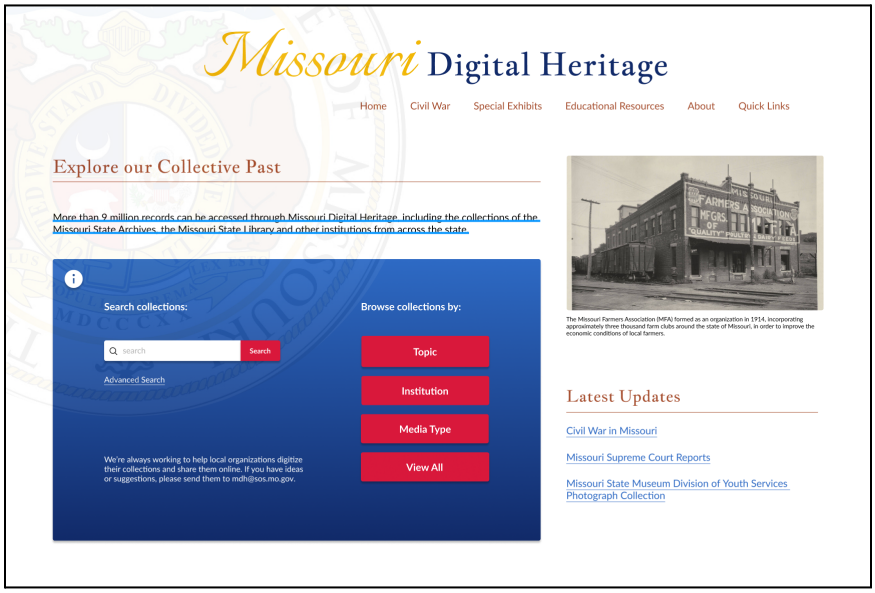
	Platform / Browser	Mac / Safari
Strengths		● Using the redesigned site was more intuitive to navigate because content was less hidden. ● No issues finding the keywords within the volume on the redesigned site. ● The redesigned prototype better supported user goals and was more straightforward. ● Information was presented logically in the redesigned prototype ● Visual design was non distracting and minimal. ● Since keywords and search results were highlighted in red, it was easy to recognize the red arrows as related to keywords.
Areas for Improve		● Easy to download pages between both sites, however the icon was too small in the redesigned site, so it was harder to recognize the function. ● Site functioned well, but could use improvements in visual design, as it felt safe and unmemorable.
Overall Satisfaction		9 out of 10

Summary of Observations for Redesigned Site

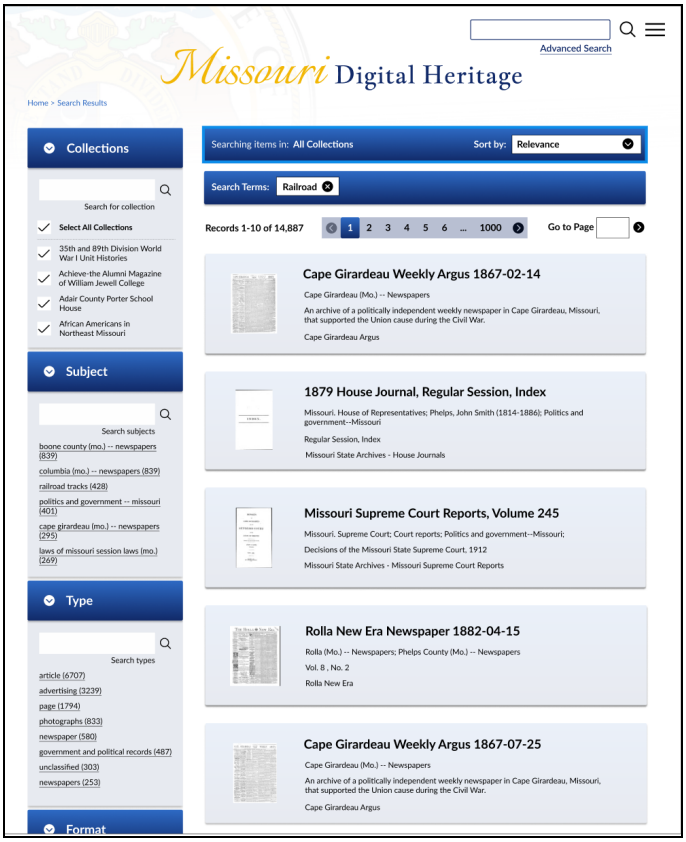
	Task 1	Task 2	Task 3
Task Description	**Search for the word Railroad**	**Download the Front Page of the April 1939 issue of T*he Missouri Conservationist*.**	**Jump through results of keyword search pages in the April 1939 issue of *The Missouri Conservationist*.**
***Difficulty rating in completing task**	User 1: 1 User 2: 2 User 3: 1 **Average: 1.3**	User 1: 1 User 2: 1 User 3: 1 **Average: 1**	User 1: 1 User 2: 2 User 3: 1 **Average: 1.3**
Time spent to complete the task (minutes: seconds)	User 1: 0:09 User 2: 0:38 User 3: 0:20 **Average: 0:22**	User 1: 1:17 User 2:1:07 User 3: 1:00 **Average: 1:08**	User 1: 0:20 User 2: 0:59 User 3: 0:33 **Average: 0:37**
Mistakes made when completing task	User 1: 0 User 2: 0 User 3: 0 Average: 0	User 1: 0 User 2: 0 User 3: 0 Average: 0	User 1: 0 User 2: 1 User 3: 0 Average: 0.3
Number of pages accessed	User 1: 2 User 2: 2 User 3: 2 **Average: 2**	User 1: 6 User 2: 7 User 3: 6 **Average: 6.3**	User 1: 3 User 2: 3 User 3: 1 **Average: 2.3**
Number of clicks to complete task	User 1: 2 User 2: 11 User 3: 2 **Average: 5**	User 1: 6 User 2: 5 User 3: 6 **Average: 5.7**	User 1: 2 User 2: 5 User 3: 5 **Average: 4**

***Difficulty rating: 1 = easy, 2 = okay, 3 = difficult**

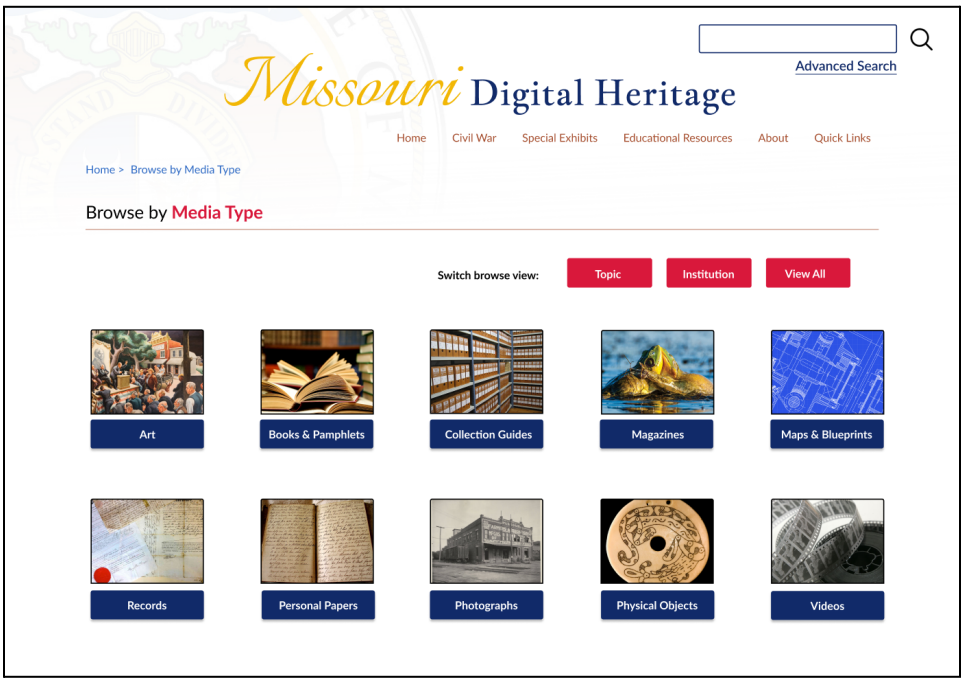
Appendix F: Prototype 3 (High-fidelity v2)



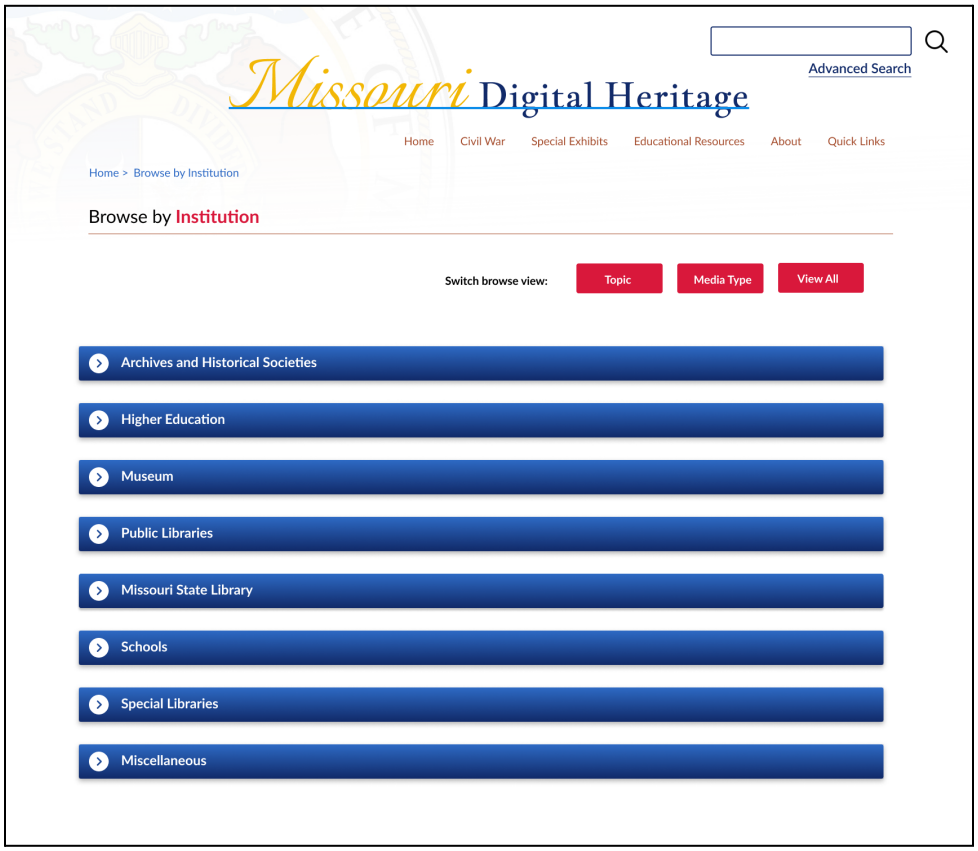
Home page



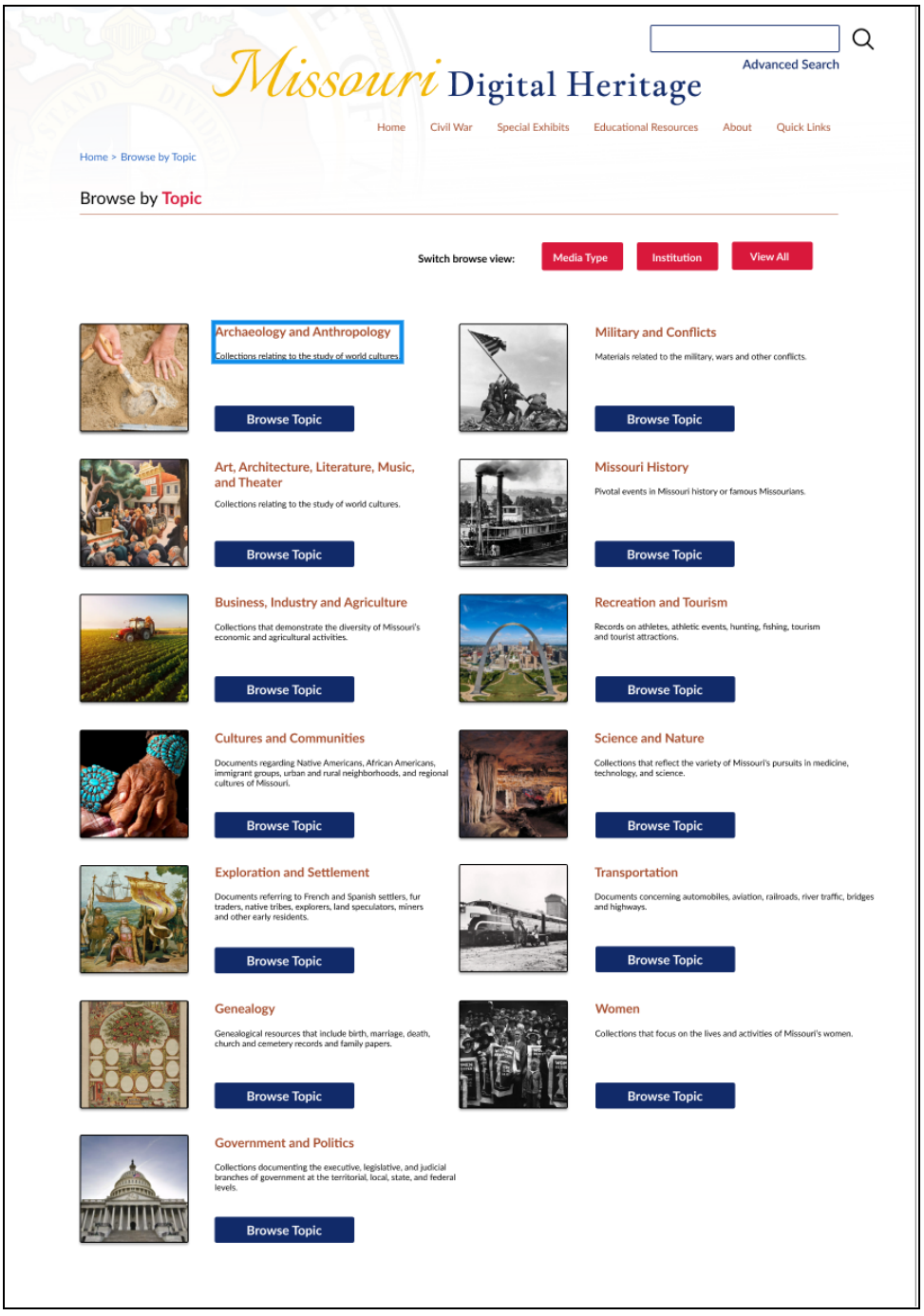
Search Results Page



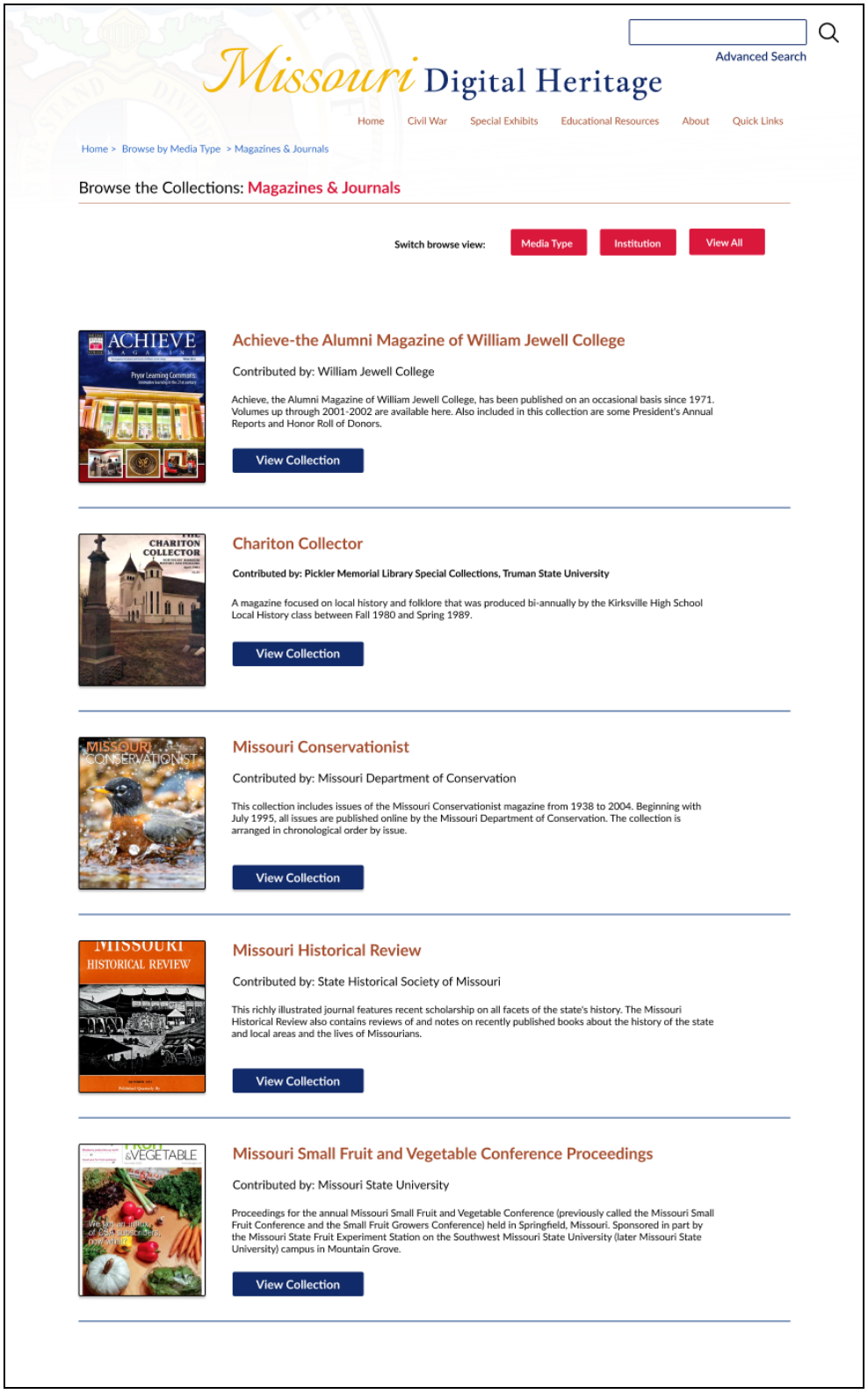
Browse by Media Type



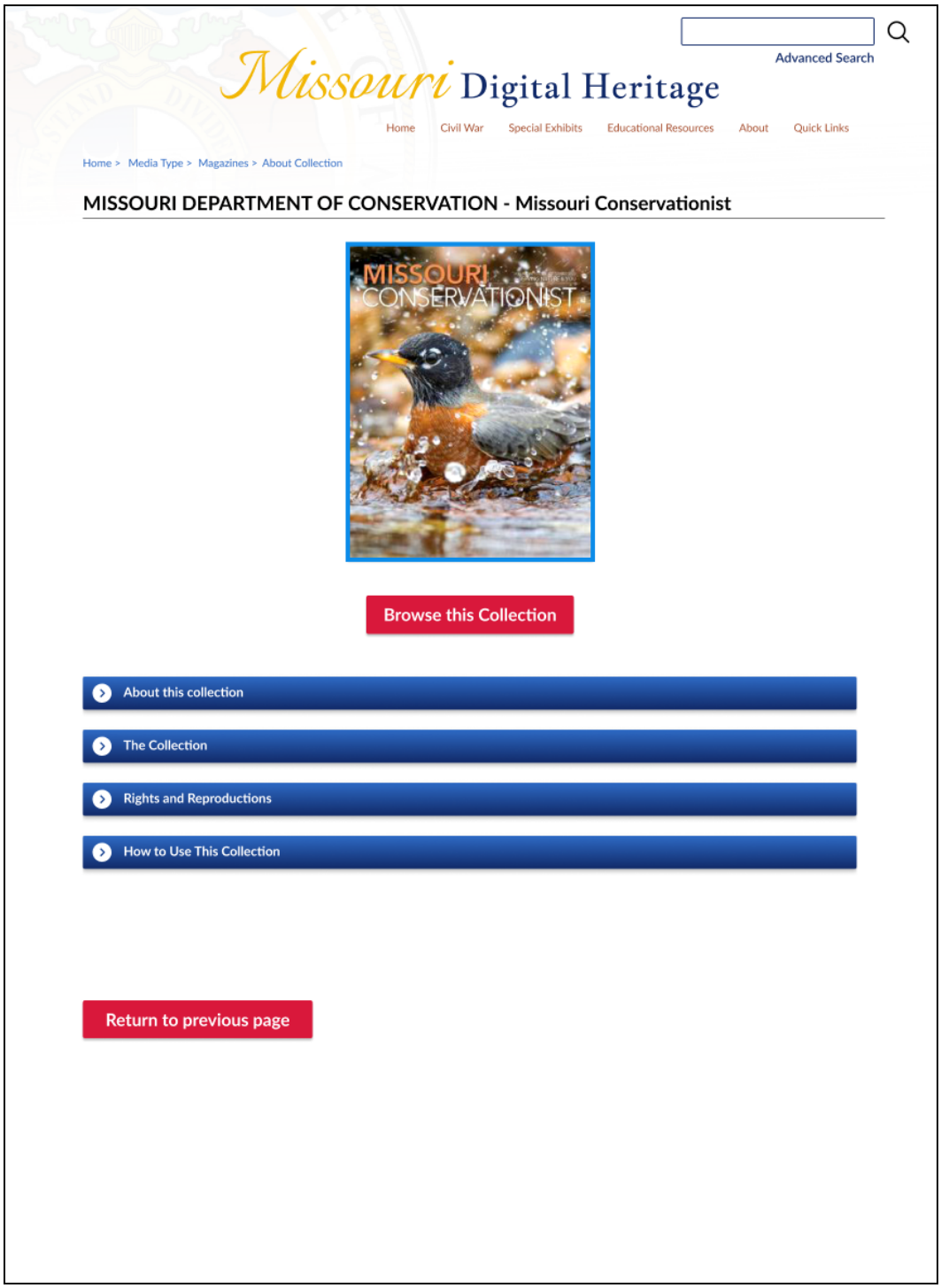
Browse by Institutions



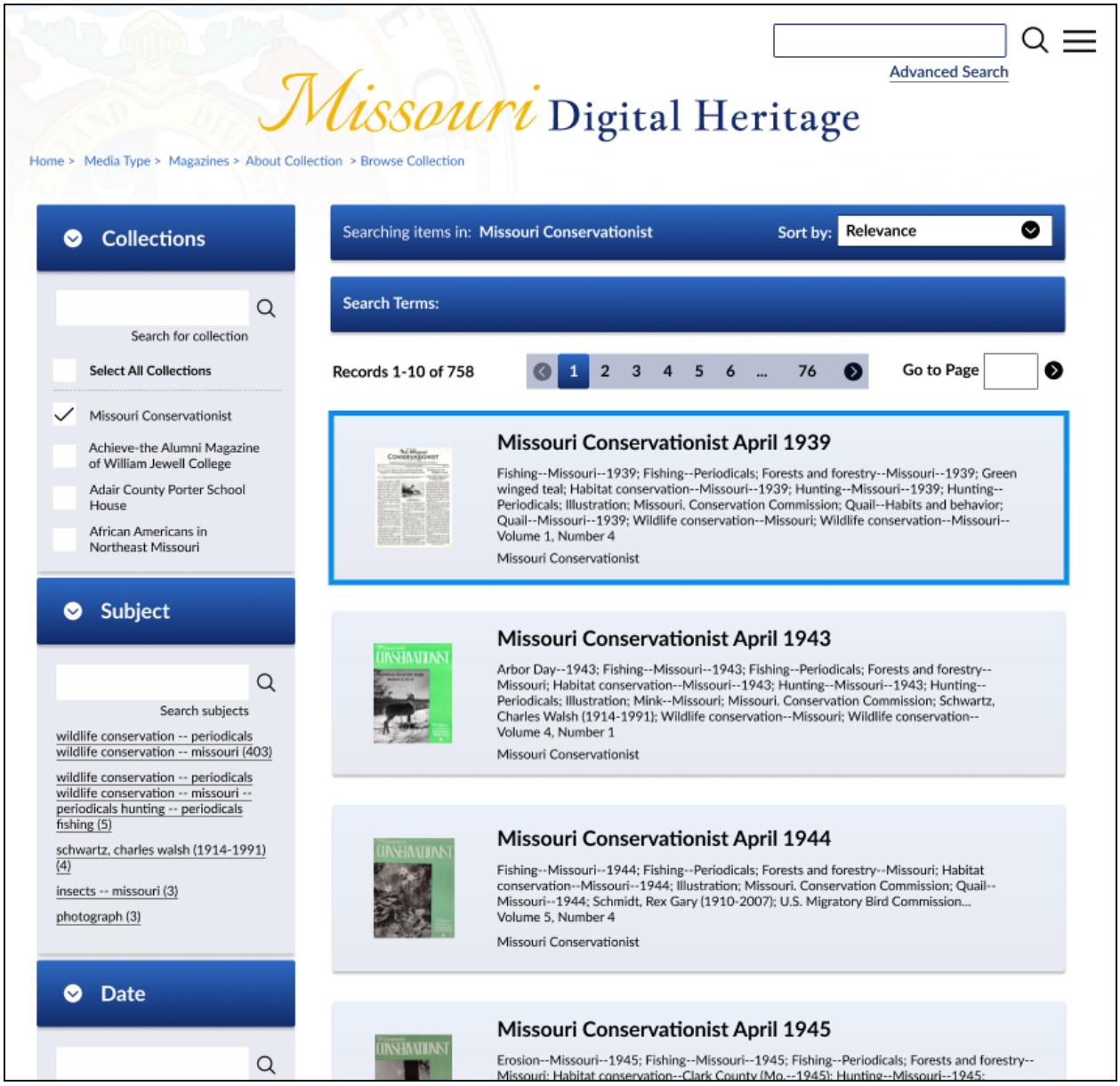
Browse the Topic



About the Media Type



About Collection



Browse Collections

Selected Volume

Search keywords