The Graphic Design Archive: Generating Higher Levels of Scholarship Through a User Experience Approach to Scholarly Image Database Design

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The Graphic Design Archive

Generating Higher Levels of Scholarship Through a User Experience Approach to Scholarly Image Database Design

By Jenna Shay

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Fine Arts in Visual Communication Design

School of Design | College of Imaging Arts and Sciences
Rochester Institute of Technology, Rochester, New York

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The Graphic Design Archive

Generating Higher Levels of Scholarship Through a User Experience Approach to Scholarly Image Database Design

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Innovations in the user experiences of digital image collections have taken image-based searching from the realm of basic one-way searches and sorts and delivered users a new world of dynamic and interactive explorations that offer mechanisms for higher-level cognitive functions such as comparing, analyzing, sorting, sharing, designing, and creating in an intuitive environment. While innovations in image search functionality often occur first in non-academic applications (e.g., social media), image archives meant to amass and preserve visual information for the ages would benefit by adopting and adapting search innovations.

Students and scholars that access image-based archives of information to gather resources and conduct research employ high-level thinking during the user experience of the digital archive. By using Bloom's Taxonomy to categorize levels of user cognition during a search, user experience functions will be assessed and new functions will be developed and implemented to give users of the Graphic Design Archive a level of search functionality and flexibility that meets the demands of scholarly research. The methods used will include conversational interface design and they will be applied to both a desktop and web application. Generating higher levels of scholarship through the use of this new, adaptable interface is the intended outcome.

**KEYWORDS**

- graphic design
- interaction design
- user experience design
- digital image collections
- image archive
- preservation
- scholarly research
- Bloom's Taxonomy
- modernism
DEDICATION

Thank you to my advisors Nancy Bernardo and Chris Jackson, and to my chief advisor, Nancy Ciolek, for all of their guidance and expertise. Thank you to Steven Galbraith and Amelia Hugill-Fontanel of the Cary Graphic Arts Collection for sharing information on image databases and the Graphic Design Archive, and thank you to Cathleen Chou for her insight on graphic design taxonomies.

Thank you to Roger Remington for the incredible wealth of information and inspiration that he has so graciously shared.

Dedicated to MK.
# TABLE OF CONTENTS

1. Title page  
2. Signature page  
3. Abstract and keywords  
4. Dedication  
5. Table of Contents  
6. Introduction  
   - Problem Statement  
7. Situation Analysis  
   - Bloom’s Taxonomy  
   - User Engagement  
8. Competitive Analysis  
9. Research Review  
   - Survey of Literature  
   - Interview 1: The Graphic Design Archive  
   - Interview 2: Graphic Design Terminology  
   - Interview 3: The State of Public Database Templates  
10. Design Process: Ideation  
    - Paper Wireframes  
    - Low Resolution Wireframes  
    - Low Resolution Feedback  
11. Design Process: Methodology  
    - Target Audience  
    - User Personas  
    - High Resolution Flowcharts  
    - Branding  
    - Typeface  
    - Logo Exploration  
    - Final Logo  
    - Color Palette  
12. The Graphic Design Archive  
    - High Resolution Wireframes
High Resolution Feedback

88  Conclusion
89  Appendix A: Survey
95  Appendix B: Survey of Literature
116 Bibliography
118 Credits
INTRODUCTION

The Graphic Design Archive is a comprehensive collection of works of American Modernism housed predominantly in The Cary Library at Rochester Institute of Technology. The Archive’s online access point makes some of the hundreds of examples of historic designs as well as bibliographical notes on the creators and supplemental information publicly available. It is used by university students and professors, as well as people around the world including designers, artists, historians and others in various disciplines related to the graphic arts.

Students at Rochester Institute of Technology have the particular benefit of having many of the physical items available to view upon request in the Cary Library. Based on a survey of undergraduate students, the online entrypoint to this visual data is critical to successfully introduce graphic design students to this collection, and the effectiveness of the site determines the level of scholarship students are able to achieve with these resources. While the ways in which users apply the information they discover include high-level cognitive functions including sorting, analyzing, designing, judging, and creating, the current user experience provided during the discovery process is typical to most scholarly cataloguing systems—it limits them to discovering this information via “one-way” functions of keyword searching and sorting.


3 Doucette, iii.
In recent years, innovative image collections have appeared throughout the digital world—from social media sites like Instagram, Pinterest, Flickr, and Tumblr to marketing campaigns that entice customers to compare products in a collection and analyze them for optimum personalized consumption.4

Some scholarly image archives are also innovating the ways users interact with the material. “Object Phone,” an interactive chatbot of the Cooper Hewitt’s collection,5 and Steve.Museum, a community-driven “folksonomy” image tagging project6 are examples of innovative ways that institutions are providing users with ever-more useful access points to their visual information.

To facilitate levels of scholarship appropriate for academic research and to best serve the native digital user base, the Graphic Design Archive may be adapted to have updated userflow cues, a user experience that is visually guiding, and more conversational and higher-level cognitive search functions.

**Problem Statement**

*What innovations in the user experience design of Rochester Institute of Technology’s Online Graphic Design Archive might lead to information discovery that inspires higher levels of scholarship?*

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4 Gatorade NATA. Mirror Show Management. 30 September 2016.
SITUATION ANALYSIS

The objectives are to make a user experience that keeps up with the demands of the nuanced searches of an image-based creator or scholar, and to make those tools optimally placed for ease of use. To accomplish this, the level of cognition achieved with certain tools and the data on user drop-off rates are considered to understand the current system and to point to the components needed to provide the optimal experience.

Bloom's Taxonomy

Bloom’s Taxonomy is a set of markers that are used as criteria to assess teaching and learning based on metacognitive outcomes. The categories represent cognitive skills and range from basic levels to the highest based on complexity and the depth of learning.

![Bloom's Taxonomy](image)

Figure 1 Bloom's Taxonomy

Using Bloom’s Taxonomy, we can assess how deeply the user of an image database is able to engage with the material and infer that the more useful the tool, the deeper the engagement and the more fruitful the research. By categorizing the levels of cognition a user experience supports, a system will be implemented of designing with a new set of criteria of usefulness in mind which examines the purpose of the design and offers an appropriate Bloom level of user experience functionality.

Scholarly digital image databases are typically hosted by a library, university, or similar institution and are accessed by users who are conducting research in disciplines including but not limited to the fields of design, history and the arts. The intention of a user in accessing these repositories of images is to apply the visual information and supporting data they find to their scholarly activity, often using the highest Bloom level of cognitive functions in the process including analyzation, design, creation, and judgement.⁸

Yet the current state of most scholarly image databases is conservative in its approach to presenting access points to the information. The level of cognition the Graphic Design Archive interface invites is the base level of Bloom’s taxonomy, which is knowledge acquisition. The key actions of this first level are identifying, listing, and quoting.⁹

There are several reasons why our scholarly searches are so static. Underneath most image databases hosted by libraries and similar insti-

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⁸ Bloom’s Taxonomy, 17 October 2016.
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8 Bloom’s Taxonomy, 17 October 2016.
institutions, there is a metadata schema called Dublin Core\textsuperscript{10} that provides a universal framework of fifteen fields such as author or keyword. If the data is organized using this standardized cataloguing system, the information may be applied to any database. This universal structure benefits the larger research community with its consistent and thus adaptable structure, but the structure also creates limitations.

This system hearkens back to the traditional method of searching for information with a library card catalogue. The user provides an input, such as a search term, and receives a list of results. This user experience inevitably lacks efficiency when a user travels down many dead-ends before finding, often by chance, the information that propels their research forward.

Another reason scholarly image databases typically feature a one-way, basic search functionality is because many templates exist which lock the user interface design into an existing framework. In a lecture at the Wallace Center Library, librarian Frances Andreu described a widely-used collection management and digital exhibit building tool—Omeka.\textsuperscript{11} This open source web template provides institutions with a fast and structured method to digitize a collection,\textsuperscript{12} but the convenience comes at the cost of serious limitations to the search functionality, design customization, and user experience. While templates like Omeka are pragmatically

\begin{flushleft}
\footnotesize


\textsuperscript{12} Omeka. https://omeka.org/.
\end{flushleft}
designed for users with limited resources and do offer an opportunity for the development of plugins, a void exists in which institutions may desire to offer more dynamic search options to their users, but there are no templates available on the web that provide a more dynamic search experience. By investigating successful applications of dynamic searches and applying those principles to a new format, a successful alternative to tools like Omeka will be created.

User Engagement

While identifying how tools are performing in regard to levels of learning, the placement of these tools are based on pragmatic adherence to a template, but the ideally they are strategically placed along a path of discovery.

Figure 2. Tracking user drop-off rate of searches

Andreu, 14 September 2016.
User engagement data shows that a search experience is affective; it engages the emotions of the participant. By understanding the emotional state of an individual throughout all stages of a search, tools may be developed that provide invitations, incentives, support, and encouragement during difficult points as well as freedom during points in the search the user is most confident and engaged.

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While dynamic search functions are not yet common in scholarly image databases, many image databases using traditional search methods are still successful. One instance of an effective, traditionally designed image database is Gallica. This digital library of Bibliothèque nationale de France uses effective user experience design, including a thoughtfully and artfully designed interface, advanced search options which are immediately accessible and adjustable, autofilling search text, many explorative options including moments of delight like “Gallica by numbers” design, and a mobile app.¹⁵ Innovative search elements do not need to replace, but may simply enhance the existing interface.

Some databases attempt to create dynamic search environments within the constraints of traditional database structures. Europeana Regia attempts to reunite dispersed collections of historic figures, such as old monarchs, so that sources may be searched and categorized by the original collections from which they came. Art historian Sarah Thompson describes the user experience as dynamic and exciting in the ways it allows connections between items to be discovered, but in regard to the design, she said, “I find the search function less than intuitive.”¹⁶ Thus more complicated searches require careful thought of the user experience in order to be effective.

With user experience guiding the design, the digital environment is conducive to moving beyond traditional search methods to explore more complex searches, and there are several benefits to doing so. Making the search process more human-centered includes eliminating time

wasted, creating more opportunities for discovery of relevant information, and considering the attention and well-being of the user by making the interface comfortable and enjoyable to use with moments of delight.\footnote{Jackson, Chris. “Pioneers–Human-Centered Design.” Lecture, UX Fundamentals. Rochester Institute of Technology. Rochester, NY. 22 August 2016.}

The Cooper Hewitt digitized their entire collection and have made it freely accessible to the world. This open environment has allowed the public unprecedented exposure to their collection with incredible outcomes. In one notable instance, an expert in Europe correctly attributed a drawing sitting in the Cooper Hewitt’s museum storage to Michelangelo,\footnote{Baumann, Caroline. “Design at Cooper Hewitt.” Vignelli Design Conversations. 8 March 2016.} according to director Caroline Baumann.

The Cooper Hewitt is also offering a conversational interface through a chatbot called Object Phone.\footnote{“Object Phone: The Continued Evolution of a Little Chatbot.” Cooper Hewitt. Accessed 20 September 2016. http://labs.cooperhewitt.org/2016/object-phone-the-continued-evolution-of-a-little-chatbot/} The chatbot sends a daily text message of an object from the collection to users’ phones and invites a conversation. Users may ask anything via text, including requests like, “send only textile objects,” and the chatbot will process the request generatively or through the assistance of an employee monitoring the requests via a Slack feed. This method of interface design allows for less button tapping and more human-like exchanges of information.
## RESEARCH REVIEW

### Survey of Literature


This source offers the fundamental objectives of Bloom's Taxonomy used to assess levels of learning.


After releasing over a million images on flickr, the British Library called on the public to access their github and improve their tagging and data collection system, as well as crowdsourcing data input.


Arstor is a repository of over one million art images which began when institutions began digitizing their slide collections. It aided in avoiding digitization redundancy, and today allows images to be shared. Shared shelf is a web-based digital cataloguing service started by Artstor in 2011.


Over one million images on a flickr photostream. Special features include metadata (data about the data) of the objects available. The generic flickr platform is used to make a photostream, albums, favorites, and groups available to search and explore. The browsing/social nature of flickr makes the user instantly lost in the collection—for example finding an illustrative, colorful album of historic drop caps that have been compiled by user tagging.

Amelia Hugill-Fontanel and Steven Gailbraith discussed the basic systems and underlying structures of digital image databases and the librarian’s perspective of database development and use.


The search function and user interface of this collection is the most unique combination of thorough scholarly content with innovative and colloquial search functions. The impressive examples of UX design include its own open source typeface (representing the spirit of open source of its collection), search by color, and recently photographed. There is a customizable chatbot feature (text a number to receive an object a day, and text human phrases to get it catered to your preferences, ie. ‘send only textiles’ or ‘send the objects at 5am daily’ or ‘when does the museum open today?’) This collection serves as a reference point to how experimentation may result in limited success, but will be the impetus of future successes in user experience innovation.

The visit to the Cooper Hewitt also inspired a consideration of the ways to measure the success of design beyond the efficiency of use (quicker speeds, less clumsy design) and to look at the ways the information architecture and tools lead to goals quicker. Rather than observing that the Collection Browser’s design tool is easy to learn, for example, I want to examine if it is useful in assisting the user in reaching the intended information. A user experience can be fun and engaging, efficient, and easy to use, but nevertheless not accomplish the original intention. Changing original intention during use is a typical flow of the Collection Browser. This would probably not be a valid outcome of user experience in a scholarly image database, but “getting lost” in the data is an experience I am continuing to explore for my application.


This article describes a tool for assessing teaching and learning based on metacog-
nitive outcomes. While the subject was biology, the information and tools provided about Bloom’s Taxonomy are useful when applied to assessing digital image archives for the opportunities they provide users for higher levels of thinking.


This thesis describes ways in which the National Gallery of Canada can evolve the “one-way” digital image archive they offer to be more “open, collaborative, and social.” It references other instances of successful application of these methods, including the steve.museum project and the Art Matters blog of the Art Gallery of Ontario.


Dspace is an open source repository application. While it provides a framework to install a database of written information, the implementation often is not responsive, riddled with text that is very busily bulleted, customizations appear limited, and it does not appear to have many/any image applications. This provides examples of a limited user experience.


A crowdsourced application makes additional information about the images available to be added by users. This provides an example of how the data lives and evolves; maintaining its accuracy and timeliness through user contributions.


This site pulls fragmented collections (ie. the library of a monarch) documented on various sites back together into whole collections via links. Sarah Thompson (art historian): “I find the search function less than intuitive.” She uses this site to access expert-level scholarly information, like the study of the whole library of a
certain individual whose collection had been dispersed. The site is not responsive, and the path to the various fragments of the collections is not clear. The serif, low x-height type is hard to read. It is available in many languages. This is an example of an interface that is offering low-levels of critical thinking connections yet is being accessed for high-level applications of critical thinking.


Gallica is the national digital library collection of France. With a thoughtfully and artfully designed interface, advanced search options immediately accessible, many explore options including moments of delight like “Gallica by numbers” design, and a mobile app, this has been the standard of excellence in visual archives from what I have researched so far. Rich in displays of the photographs of the objects, full of supplemental information. Interface is well-crafted and current (responsive), but not cutting-edge (it does not incorporate experimental or innovative user experience elements. The accessibility page and language option is still under construction, so it may only be accessed in French text.)

**Gatorade NATA. Mirror Show Management. 30 September 2016.**


This article describes the record-breaking speed with which Cooper Hewitt staff processed its full collection and went live. The article also describes how unique Cooper Hewitt is in the amount of information it shares, and the groundbreaking variety of ways the objects can be searched, sorted, and shared. The image archive should provide a back-end that facilitates mass-processing, like excel spreadsheets, as mentioned in the OMEKA lecture. Curious to know how to input process works at Cooper Hewitt.

**Jackson, Chris. “Pioneers–Human-Centered Design.” Lecture, UX Funda-**
In this lecture, Professor Chris Jackson laid out the fundamentals of user experience design, highlighting the necessity for empathy in realizing the needs of the user. This lecture included historic examples of ways in which the field of design was propelled forward using data collected from human observation. I later connected this lecture to the Cooper Hewitt Collection Browser interface and the question of effectiveness.


McTear, Michael, Zoraida Callejas, and David Griol. The Conversational Interface: Talking to Smart Devices. Switzerland: Springer. 2016. This eBook defines the history, present application, and future of interfaces which require fewer button pushes and more exchanges with technology that resemble the patterns of human conversation. Most notably at this point in the research, this explanation of chatbots and their possible future uses is relevant to image archives via the Cooper Hewitt’s implementation of a chatbot as an access point to its collection.

MoMA. http://moma.tumblr.com/. Strongly image-based, current, and trendy, this tumblr uses colloquial image search and browse features to draw users into its rich collection of splashy photos. Cheeky hover state gifs define the category at the top. Gray/white text over image hoverstates. Infinity scrolling image results. (Masonry style used)

“Object Phone: The Continued Evolution of a Little Chatbot.” Cooper Hewitt. Accessed 20 September 2016. http://labs.cooperhewitt.org/2016/object-phone-the-continued-evolution-of-a-little-chatbot/ This blogpost describes the implementation of a chatbot in the Cooper Hewitt collection. Now, by texting a number, users can receive a daily object and description to their phone. They can ask questions and make requests. As the chatbot learns,
unknown questions are deferred to a slack chat with staff and curators.

Omeka is an open-source web database template application.

In this lecture, Frances details the advantages and disadvantages of hosting an image collection through Omeka’s free and paid services. Basic components, plugins, advantages, and shortcomings were discussed. The overall sense was that Omeka accomplishes the task in theory, but a general dissatisfaction of the limitations or cost to override them make it often an impractical choice for institutions looking to host a collection of images.

This is an RIT online collection of graphic arts and supplemental information (ie. biographies) documenting “significant American graphic designers active from the 1920s to the 1950s.” Clearly and simply organized, it does not feature new additions, news, or a comprehensive search/sort function (search is only by keyword.)

Steve.museum is a community-driven project launched by the Indianapolis Museum of Art in which the public uses “folksonomy,” or phrases that a layman might use to describe an image, that would otherwise not be used by experts of information, like librarians, archivists, or cataloguers. The purpose of this project is to make art more accessible to everyone in the digital age, and many institutions are participating, including the Guggenheim, among others. Increasing the accessibility of images based on colloquial search terms would likely have a great impact on the ways designers search for inspiration from a variety of image sources using their own
technical language.

The Victoria and Albert Museum Collections. http://collections.vam.ac.uk/.
This image archive is an example of a thoroughly documented collection “expansive in scope” (Sarah Thompson) but a slightly aging interface. The interface welcomes exploration with tiled images, but the site is not responsive.

This image archive is a growing collection of images and descriptions of items in the Vignelli Archive. It has limited ways to search the information, but the entries often contain images as well as accompanying data in a blog-style language. For example, an entry for one image included the news of the day it was uploaded that Massimo Vignelli was falling ill. This site provided another example of how image databases may relate to time and raise questions whether the objective is to make a timeless reference or a living document.

"is a multi-disciplinary organization dedicated to furthering research and education in the field of image and media management within the educational, cultural heritage, and commercial environments."

This university resource offers the basic elements of Bloom’s Taxonomy in easily accessible tables of information. This site is the best Bloom resource for referencing while developing both the content of the new design as well as criteria for measuring the success of the new design.
Interview 1

The Graphic Design Archive
Amelia Hugill-Fontanel and Steven Gailbraith

1. What majors are most commonly represented in visitors to the Cary?
2. What professions or personal information represent the visitors of the Cary from outside the RIT community?
3. How do people discover the contents of the Cary Library?
4. Is there data on how often objects are requested to be seen from year to year?
5. Are there digital photographs of the objects available for some of the collection? Is digitizing the collection a part of the long-term plan for the Cary?
6. Would digital access to object information be included in statistics of the Cary’s use?

1. Digital vs Physical Archives
   a. Library technology science and technology abstracts: let's get virtual
   b. Public access of digital versions three-dimensional objects
   c. Field of librarianship called “visual resources”
      i. Visual Resources Associations: librarians who were once in charge of cataloguing slide libraries, now they are the ones who are setting the standards for digital images collections. How are they arranging these interfaces? They are doing it for patrons.

2. Digital Databases and Libraries
   a. Shared shelf
   b. OCLC: Content DM, New York Heritage collections
   c. Luna: Shakespeare library uses it. Luna.folger.edu
   d. OMEKA
   e. AIGA—look for Cooper Hewitt article/review
   f. Cooper Hewitt interface is large, blocky text
      i. Cooper Hewitt has used Dublin field and augmented it. They are building off that core then adding search terms that are helpful to designers.

3. About Metadata Schema
   a. Underneath a lot of these systems is a metadata schema, for images it is Dublin core (there is a users group that will provide info) there are 15 fields that go into a database (ie. author/keyword) if you fill in these categories correctly, it should be able to be applied to any database. Just must be catalogued correctly. This is for images specifically, versus books etc.

4. Critical assessment and redesign of this site to make it a discovery tool.
Interview 2

Graphic Design Terminology
Cathy Chou

Walking the quality line: use it or lose it

1. 2 phases of search
   a. Search input
   b. Browses-learning happens in the browsing phase
      i. faceted searching

1. Visual Resources Association Core
   a. Structure of xml. "metadata standard set of descriptors and the comprehensive
      ontology developed by International Committee for Museum Documentation
      Conceptual Reference Model (CIDOC-CRM)"

1. Semantic gap
   a. Image vs. textual description
   b. Controlled vocabulary and natural language
      i. Library of Congress
      ii. Thesauri (AAT)
         1. (controlled vocabulary for a field, ie. Getty's art and architecture
            thesaurus)
   c. Indexing vs. cataloguing
      i. Tagging: no structure at all
      ii. Indexing is like the index in the back of a book. It's a linear string of
          words. Less structured
      iii. Cataloguing: more hierarchical than indexing, has a universal structure
   d. Computer language vs. human language

2. Multi-Tiered indexing
   a. Indexing skills
   b. Software technology
   c. Controlled vocabularies
   d. Social tags
   e. Poise images for searching
   f. Poise images for browsing
   g. Organize for public viewing
   h. Organize for private collection

3. Importance of Curation
   a. Use value judgments to segregate and evaluate content for logical labeling,
      presentation, access
   b. """"The more activity and participation that occurs on different photo sharing sites,
      the more serendipity and cueing, understood in the literature as important
      browsing modes, become important.

4. Cueing
   a. Triggering memory for users who have seen the image before

5. Design for indexing
a. Semi-automatic annotation
b. Local tags versus public tags
c. "Customizable visual representations of controlled vocabulary?"
   i. Aids in cueing
   ii. Should be shallow
6. Cathy proposes uses search terms input by user, collecting them in a pool to be reviewed by librarian and ranked by frequency.
7. Feed people search terms.
8. Browsing not just results but the scheme under which the items in that collection are being described/catalogued.
9. Concept maps in three dimensions, tagging clouds
10. Customizable search portals. Let people choose how to search
Interview 3

The State of Public Database Templates
Frances Andreu

Topics Covered

1. Adding items
2. Creating collections
3. Developing
4. Two types

About

1. Omeka is an open source web-publishing platform. Display collections, build digital exhibitions. Designed for users with limited resources.

Adding Items

1. If you are using the basic Omeka version, you are limited to what they give you. Can’t put image on first page?
2. Logging out user frequently?
3. Example: silveragecomics.omeka.net/exhibits/show
4. To try it out: twcsandbox.omeka.net
5. What conventions do you want to use as a user? Copyright? Source? Type?
6. Make it public now or later. Make it private until pushed live.
7. Make option to use a spreadsheet, and upload the metadata that way.
8. Has themes: theme can be different than overall theme of your site?
9. Option to do html formatting
10. Page tabs not nestable
11. Can’t select which items of metadata to show and not show. Either metadata is private or not. **Plug in gives this option.
12. The tag option: librarian has not used them. It is sort of like, within collections, you can search by just...
13. Word cloud feature? Not
14. Option tab to have a search box. You can search tags. You can search title or description.

Creating Collections

15. The search bar will search your entire site. It is not exhibit specific. Aka, if you have a Vignelli show page, if you search “poaters”, Cary Library results will appear from another show, even if you are on the Vignelli page.
16. Want an exhibit? Log in to omeka, go to plug in, use Exhibit Builder. Also recommend CSV import, which is a comma separated values option that allows you to import a data doc
17. Omeka has a tiered payment system: gold, silver, and platinum: $1,000/year.
Two Types

18. Omeka.net vs. Omeka.org:
   a. Omeka is an open source software.
   b. .net is hosted by Omeka. You don’t have to install anything on your computer. It has a free basic plan, but you are only allowed to have one site per account.
   c. Omeka.org is completely free, but it requires an IT department. It is hosted by the institution, not Omeka. Themes must be manually installed.

Developing

19. Simple Pages is another good plugin, that allows you to create a basic page, like an about page.
20. You are given a fairly limited set of plugins. Docs Viewer allows the pdf to be built into the page without it having to be downloaded.
22. With .net, user expresses frustration that she can’t even change colors.
23. Explore battersea arts centre’s digital archive. Omeka basic platform, but coder had to customize it. They make it easy, but you are limited with the .net option.
24. You can kind of edit the css in .net, but editing css does not work.

Future and Examples

25. Future of Omeka:
   a. Omeka S is a new software package. It can be integrated with Dspace, Zotero, and Fedora. If you have an existing collection with these, you can transition?
   b. Omeka S allows multiple sites per installation (ie. for all of RIT, a site for RIT, for Cary, for Vignelli.)
26. Examples of Omeka being used well:
   a. University of Pennsylvania .net site Here and Over There: Penn, Philadelphia and the Middle East
   b. virginiamemory.com/transcribe (.org customized, powered by Omeka. Document viewer is nicer here than the .net template.) What does user look for in a doc viewer? View it inside the web page without having to download.
Parameters to judge current image databases

- Curated
- Shares with other databases
- Available to all audiences
- Mobile app / responsive
- Dublin Core field search criteria
- Additional search criteria
- Metadata uploadable by spreadsheet
- Conversational design element(s)
- User account / personal collection
- Customizable (categories are followable)
- Social (easy to connect to/share with other collectors)
- UX grade (0-5 based on frequency of repeat input of data, multiple searches to find item)
- UX grade (based on advanced options search, ability to narrow search)
- Multi-media available (video, audio, measurement vectors)
- Institution allows subsets/organizable by exhibition/collection
- Has supplemental material (timelines, maps, history briefs)
- Existing database can be transferred to this database system
**DESIGN PROCESS**

**IDEOATION**

**Design Ideation**

During initial stages of idea development, a target audience was still being investigated, and a tool that served strictly as a complement to the physical archive was the initial direction. This emphasis on the interaction of the tool with the collection in the Cary Library led to the exploration of concepts that involved a touchscreen table located outside of the archive that contained the image database in a welcoming, creative, and explorative format.
A second concept, a mobile app, was considered for its accessibility. With this approach, visitors to the physical archive could access supplementary material on their mobile devices anywhere. Several design directions for a mobile app were considered.

Figure 4 Mobile App Mockup
The mobile app concept had several benefits. First, it would be a self-driven teaching tool that would help students learn about the archive before viewing it, in conjunction with a visit, or it would serve as a resource after a visit. For many students, rather than serving as a supplementary source of information, it would serve as a primary one. For others, it would encourage them to make an appointment to visit the archive and see the works in person. Secondly, the interactive table would also open up the possibility of interaction with the archive to anyone passing through that area of the library, including non-majors, faculty, staff, and visitors.

This idea also had drawbacks. Once a target audience was chosen, (freshman graphic design students,) interviews were conducted with a class of fifteen freshman graphic design majors on their use of the archive.

They intended to use the online resource exclusively or in conjunction with a visit, but all desired the ability to access the archive tools on the same platform in which they were writing or creating, whether it be for design history papers or graphic design projects. The user reach would extend much further with a desktop web application available on the same high resolution device as a document editor or design software.
For its optimal display for high resolution images and its ease of use in conjunction with software, a desktop application became the chosen product to be developed. Much of the same spirit of exploration is present in the web application that was intended for the interactive table, but the web application additionally affords the opportunity for users to create an account and engage with the material on an ongoing research basis throughout their studies.
During the early stages of this project, a userflow for an interactive table was tested using paper prototypes. This quick method of interface mockup allowed for experimentation and exploration of the idea.

**User Flow**

![User Flow Diagram](image_url)
Figure 7 Paper Wireframe
Figure 9 Paper Wireframe
The low resolution wireframes were created in Adobe Experience Designer and the prototype was tested and interviews were conducted with several types of user groups including graphic design freshman, interaction design graduate students, and the general public.
Figure 11 Low Resolution Wireframes
The Low Resolution prototype was tested on a class of freshman graphic design students. Their feedback, as well as feedback from experts in the field, is compiled in the survey results below.

**Freshman students feedback**

- The changing hero image concept is beautiful and engaging
- The design is interesting and appealing. It feels updated and sophisticated
- The text is legible.
- Some buttons do not feel emphasized enough. They get lost.
- The three dot icon in the search bar does not communicate “drop down” and it is very small, so the dropdown items are easy to miss.
- The dropdown components could include more options for sorting like color and object type because artist/designer and typeface names are not common knowledge

**Expert feedback**

- Add more user flows
- Show the flow of adding a hashtag
- Add a citation feature
- Add a login feature specifically for the RIT community
- Consider site maintenance issues like incorrect tagging
- Create a way to see recently viewed or recent activity
- There is too much vertical scrolling. Consider adding horizontal scrolling
Is the design legible?
12 responses
- Yes: 41.7%
- No: 50%
- Some issues: 8.3%

Were there any points you felt lost?
12 responses
- Yes: 50%
- No: 50%

Which search tools would you like to see included?
12 responses
- Keyword: 11 (91.7%)
- Color: 9 (79%)
- Document dimension: 3 (25%)
- Category: 7 (58.3%)
- Hashtag: 3 (25%)
- Trending/popular: 2 (16.7%)
- Texture: 3 (25%)
- Object type: 9 (79%)
- Date: 4 (33.3%)

Figure 13: Low Resolution Feedback
**DESIGN PROCESS**

**METHODOLOGY**

**Methodology**

A methodology was developed based on the principle that the research process is a journey from initiation to action, and the tools chosen to help the user along all of the steps of this journey are assessed by their Bloom's level of cognition and placed strategically based on the affective state of the user during various points.

**Deliverables**

The project includes a high-fidelity prototype of the site. It is an interactive, vertically scrolling website made with Adobe Illustrator and Adobe Xd. The prototype demonstrates four user flows: Log In, Search, Explore, and Moodboard. The user testing was done in Adobe Xd.

To demonstrate the horizontal scrolling features within the site, a second type of deliverable was created—an animation of the carousel function of the Components of Information Design. This animation was created with Principle and exports as a gif.
Target Audience

The target audience is primarily freshman graphic design students at Rochester Institute of Technology because design history and introductory design courses are well-served by the resources on American modernism, graphic designer biographies, resources on formal visual aesthetics, and visual resources for budding designers. As a widely available web application, the target audience extends to all students, faculty, and scholars conducting research on the visual arts in the RIT community and the design and visual arts community beyond.
Adrien Ray

Biography
Adrien is a creative, tech-savvy freshman at a technical university. A graphic design major, she has an eye for art and design and a passion for learning. She enjoys traveling, eating, visiting museums, and sharing her experiences and her perspective with the world.

Goals
Learning as much as possible while studying at Rochester Institute of Technology is Adrien’s primary goal. She also wants to prepare for life after college and to have enriching experiences that point her toward happiness and fulfillment in a future career.

Skills
Adrien is a native user of digital media. She has extensive experience collecting, creating, archiving, and sharing digital imagery—mostly on social media platforms. Her burgeoning research skills are informed by a visually-guided eye and intuition.
TARGET AUDIENCE
USER PERSONA

Anna Nedelman

Biography
Anna’s is a university professor, writer, and professional calligrapher. She is a patron of the arts, an avid poster collector, and enjoys traveling to universities and institutions around the world to speak about the things she is passionate about in order to inspire others.

Goals
As a visiting scholar, Anna wants to learn as much as she wants to share her knowledge. She uses online resources to inform her about the institutions she will be visiting so that she can cater her lectures to best suit the interest of her audience.

Skills
Anna has seen technology transform greatly over the decades of her work. She uses mobile and desktop devices for research and publishing, and is active with some social media. Persistence and curiosity fuel her motivation to learn, adapt, and discover new things.
Meghan Matthews

Biography
Meghan is studying photography at RIT and is in her third year. She loves reading, yoga, and creating content for her zine and online blog.

Goals
Meghan is going to travel after graduation and plans to start a small photography business while on the road. She is looking for ways to better compile, display, and market her work. While her schedule is too full to take on additional classes, Meghan finds opportunities to learn the fundamentals of graphic design through her university’s online resources.

Skills
Meghan regularly uses photo editing software and image sharing tools. She is a social media expert, and has some experience building websites.
FLOWCHART
LOG IN

Figure 14 High Resolution Flowchart: Log In
FLOWCHART
SEARCH

Figure 15 High Resolution Flowchart: Search
FLOWCHART

EXPLORE

Figure 16 High Resolution Flowchart: Explore
FLOWCHART

MOODBOARD

Figure 17  High Resolution Flowchart: Moodboard
BRANDING

Visual Style

There are two priorities of the visual style. The first is to create visual interest for a primarily college-aged audience who has advanced user skills in web applications and expects up-to-date interfaces. The second priority is to have a neutral brand that serves as a quiet backdrop that lets the colorful and varied imagery of the archive images take primary focus.

Typeface

Open Sans is used for body text and headings.

Robot thin in all caps is used for labels and button text.

Figure 18: Typography
Logo Exploration

Some logo concepts were complex and colorful celebrations of the visual richness of the archive. Century Gothic, open and legible with roots in modernist Futura, is the selected typeface.

Simple monochromatic logos were also explored for their clarity and ease of use. Helvetica, which appears in many of the items in the archive, was the minimal logos' typeface.
Final Logo

The final logo features the letters GDA in a compact, connected form. The typeface used is Century Gothic. The letters can sit alone or nestle as negative space inside a circular form. It is clear and legible in many sizes. An extended version uses Century Gothic Medium beside the logo form.
Color Scheme

The color scheme is a monochromatic palette of white, gray, and black. Red serves as an accent color. It was chosen for its frequent appearance in the modernist palettes of the archive images.
Graphic Design Archive

The Graphic Design Archive is an online visual database that takes the user along a path of discovery that leads to the acquisition of a level of knowledge suitable for the analysis, judgement, and creation of new work.

Figure 24 Hero Image Mockup
Initiation

The journey begins with the landing page of the site. User engagement has a significant risk of drop-off within the first few moments of arriving at a search opportunity. The user must be convinced that there is something worth investigating. This is accomplished in several ways.

Upon entering the site, a series of changing hero images splashed across the screen entice users to explore with their changing color schemes and captivating designs. Clever phrases related to the hero images invite users to learn more. Clicking the featured designer text leads to an article page that contains a contemporary perspective on the works of a historic designer written by today's experts of the Graphic Design Archive.

Figure 25 Hero Image 1
Minimal treatment for Geigy Chemical by Troller

A quick run through the Tscherny collection
For users that immediately begin scrolling, contents below the hero image firstly include grounding information about the contents of the archive.

Figure 28 The Graphic Design Archive in Numbers

The Graphic Design Archive in numbers

With works primarily created in the United States during a 40 year span between 1920 and 1960, the collection is comprised of forty years of American modernist design. Also view more contemporary work made in the same design tradition as well.
Below the header entitled The Graphic Design Archive in Numbers (previous page), sections on groups of works are revealed, including quotes that introduce the aesthetics of various designers and scrollable window-style image matrixes of selected sections of the archive such as editorial works.

Whether attracted to quick facts, quotes and written content, or image matrices, the user will quickly find an avenue of exploration. The scope of the contents that the user will find on the site through exploration will help them formulate a search query later on.
News from the Archive

Amelia Hugill-Fontanel, Assistant Curator in the Cary Collection, alongside R. Roger Remington, Vignelli Distinguished Professor of Design, provided insights into the many interests of designer and educator Rob Roy Kelly during a tour of his personal collection of rare wood type.

Components of Information Design

1. Dot
   A small, single point that has enough visual energy to attract the eye, and that serves as a beginning point of focus.

Figure 29 Exploration on the Main Page
Figure 30 Exploration on the Main Page
The Graphic Design Archives are under the administrative care of the Cary Graphic Arts Collection and complement its extensive holdings in graphic communications history and printing technology. While many of the GDA collections represent the complete surviving work of a particular designer, some are smaller sample collections that document a portion of a designer’s career. Broadly summarized, the collections contain original source materials documenting the designers’ working lives, and include such unique items as original artwork, sketchbooks, sculptures, architectural models, reliefs, and printed samples (tissue sheets, proofs and sample issues of publications). In addition, many of the archives includes photographs and slides, as well as audio tapes and film.

Numerous scholars use the collections, including faculty or curators from such prominent institutions as Brigham Young University; the Museum of Decorative Arts, Prague; North Carolina State University; Rochester Institute of Technology; Rutgers University; and Yale University. In addition, the Graphic Design Archives contain significant visual artifacts which have been borrowed for exhibitions at national and international museums including the National Museum of American Art, Washington, D.C.; Walker Art Center, Minneapolis; London Design Museum; Maison Européenne de la Photographie, Paris; and the Museum Folkwang, Essen.

Figure 31 About the Cary Library
Below The Graphic Design Archive in Numbers, sections on groups of works are revealed, including quotes that introduce the aesthetics of various designers and scrollable window-style image matrixes of selected sections of the archive such as editorial works.

Whether attracted to quick facts, quotes and written content, or image matrices, the user will quickly find an avenue of exploration. The scope of the contents that the user will find on the site through exploration will help them formulate a search query later on.
Symbolize and summarize.”

News from the Archive

Components of Information Design

Figure 29 Exploration on the Main Page
Figure 30 Exploration on the Main Page
Figure 32 Designer Biographies
Figure 33 Designer Biographies: Quicklook Selection
News from the Graphic Design Archive Collection

Amelia Hugli-Fontanel, Associate Curator in the Cary Collection, alongside R. Roger Remington, Vignelli Distinguished Professor of Design, provided insights into the many interests of designer and educator Rob Roy Kelly during a tour of his personal collection of rare woodtype.

Amelia Hugli-Fontanel, Associate Curator in the Cary Collection, alongside R. Roger Remington, Vignelli Distinguished Professor of Design, provided insights into the many interests of designer and educator Rob Roy Kelly during a tour of his personal collection of rare woodtype.

Amelia Hugli-Fontanel, Associate Curator in the Cary Collection, alongside R. Roger Remington, Vignelli Distinguished Professor of Design, provided insights into the many interests of designer and educator Rob Roy Kelly during a tour of his personal collection of rare woodtype.

Figure 34 News from the Graphic Design Archive Collection
The Graphic Design Archive at RIT document and preserve the work of significant American graphic designers active from the 1920s to the 1950s. In addition, selected contemporary designers working in the modernist traditions are also included. The first collections came to RIT in 1984 through the vision of RIT Professor Roger Remington and have grown to include the works of twenty-five designers and typographers, including:


The Graphic Design Archives are under the administrative care of the Cary Graphic Arts Collection and complement its extensive holdings in graphic communications history and printing technology. While many of the GDA collections represent the complete surviving work of a particular designer, some are smaller sample collections that document a portion of a designer’s career. Broadly summarized, the collections contain original source materials documenting the designers' working lives, and include such unique items as original artwork, sketchbooks, sculptures, architectural models, reliefs, and printed samples (tear sheets, proofs and sample issues of publications). In addition, many of the archives includes photographs and slides, as well as audio tapes and film.

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Figure 35 Timeline of the Graphic Design Archive
20TH CENTURY EDITORIAL DESIGN

The online Graphic Design Archive is a networked learning resource on the history of design. An interactive collection of images and supporting textual documentation drawn from the RIT Libraries Graphic Design Archives, it provides the means to make the unique primary resources in these collections easily accessible to RIT users and promotes wider use of the collections while protecting the fragile and valuable items they include. GraphicDesignOnline creates opportunities for new interdisciplinary course development using related content materials and permits a wide range of interpretive outcomes based on a common networked resource. The image delivery tool is the database ARTstor and RIT students, faculty and staff can access the collections hosted in ARTstor.

20th Century Editorial Design focuses on the history of twentieth-century magazine design and photography, a subject central to the curricula of Art & Design, Photography and Printing, all units in the College of Imaging Arts & Sciences.

Full records for the periodicals are included in the library catalog. They are assigned the RARE location and Library of Congress classification numbers based on their content.

PERIODICAL INFORMATION

Avanti-Garde
Esso
Fortune
Harper’s Bazaar
Harper’s Bazaar Portfolio
Scope
Seventeen
Vanity Fair
2. Line
   A single stroke of a pen (or a computer mouse). A point is extended so that the dimension of length is primary, the form is called a line. Line is a powerful element that can be employed not only for communication, but also for organization.

3. Typography
   The arrangement and specification of type in preparation for creating applications. This applies to typesetting produced by any type-composition system.

4. Motion
   Motion is movement and time as they interact. The structuring of movement patterns in the film can articulate time, as mass articulates space. It can be manipulated to form a rhythmic flow and rhythm, whether the visual images are animate or inanimate.

5. Shape
   A shape is concerned with the boundaries of a mass. Shape may be inner or outer surfaces. Shapes may be combinations of straight lines or planes, or curved lines or planes.

6. Texture/Tone/Value
   A type of organization method in which a quality of an element is given by repeating a common element. Configuration may be either random or predictable.

7. Spatial Organization System
   A structural system or framework for organizing elements within a formal. A grid can be conceptual (i.e., mental) or physical (such as a typographic unit grid). It can be both open typographic, compositional or constructional devices. It can be regular, irregular or progressive in rhythm.

9. Color
   A syntactic aspect of visual form which adds the communication of information and functions as a tool of persuasion through the use of symbolic associations which has as its dimensions hue, value and chroma.

10. Imagery
    Symbols, illustrations, photos, and other types of images that effectively convey a concept and move, usually without the benefit of type. Imagery may even be decorative illustrations, such as folk patterns or other subject matter which add visual interest to the composition.

11. Figure and Ground
    Space is delineated by elements like form, line, and color create a composition which seemingly has positive and negative space. Gestalt Psychology explains this illusion of depth that the brain perceives.

12. Scale
    Size relative to other objects gives a sense of hierarchy and emphasis. Similar sizes versus contrasting sizes can create stillness or dynamism.

Figure 37: Information Design Carousel Cards
Selection

Once the user chooses the initial parameter of a specific query, they have left the initiation phase and have entered the selection phase. Apart from the final phase, the selection phase has the least risk of disengagement.

The user’s confidence is boosted by their new-found desire to investigate their initial chosen query. Narrowing the parameters is exciting and motivating work while the initial parameter is being explored. Ushering the user into this phase is accomplished as quickly as possible with a search bar at the top of the page that is always visible, even when scrolling.
Exploration

Some of the greatest moments of confidence are quickly dissolved in the next phase, which is characterized by its highest risk of disengagement. Fifty percent of users stop their search during the exploration phase. To help the user while they redefine their parameters, sift through possible selections, and modify their search, advanced options are available in a drop-down menu once the search bar is clicked.

Graphic design taxonomy built by user-derived tags and options to search by color are some examples of searches that are design-focused alternatives to a bibliographic search. Searching based on several parameters at once as well as the ability to save numerous results in moodboards and return to old searches in a user history are additional tools available for logged-in users.
An account system allows users to log in and return to past searches. The log in function is available for users in the RIT community as well as users who create an email-linked username and password. For users who do not want to save their search permanently, the same functions are available without a log in, but will not be stored.

Figure 39: Welcome Pop Up Window
Figure 40: Search Bar

Figure 41: Refine Search Bar
Figure 42: Autofill Search Bar
Figure 43: Search Results
Formulation

After exploration, the formulation phase is marked by increased confidence as the user solidifies the search parameters. Unease remains in the fact that they have not yet found their desired result. With the formulated query in mind, the user inputs the correct search parameters and views the results. If the results do not include what they are looking for, the user has several options for iterations on their previous search formulation. They may view the moodboards and forums of other users with similar queries or reach out to an archivist for further information via a contact form available on the site.
Figure 45: Search Result Hover State (Quick Look)
Goodbye, Jehovah. A survey of the New Directions in Christianity

Location: RIT Library
Client: William Robert Miller
Size: 14 x 33.5 cm
Format: Poster Design
Designer: Fred Tuttle

About Fred Tuttle

Fred Tuttle (1909-1980) was a distinguished American graphic designer and educator who emigrated from Switzerland. He was born in Zurich in 1909 and graduated from the Zurich School of Design in 1939. He worked for Ives Chemical Corporation and later established his own design studio in New York, working for clients such as Eastman Kodak, General Electric, IBM, and American Airlines, among others. He also taught at Harvard University.

Other works by Fred Tuttle

Figure 47: Details Page
Jenna Shay

Figure 48: Add tag
Figure 49: Tag Added
Collection

The next phase marks the point at which the user begins collecting results that match their query. Images, facts, and inspiration are extracted with citation material, shared, downloaded, and saved in moodboards. The results build a new scope and depth of knowledge for the user.

Figure 50: Item Details Page
Figure 51: Add Item to Board

Figure 52: Item Added
Action

Particularly crucial for creative applications, the final stage performed by the user indicates that the highest level of cognition has been acquired and the user is able to synthesize, analyze, judge, and create work based on the sum of their acquired knowledge. The app allows users to personally archive their found body of knowledge and allow it to grow throughout their studies.

Figure 53: Welcome Back
HIGH RESOLUTION
FEEDBACK

The High Resolution prototype was tested on a variety of users including graphic design students, professors, and the general public. The results indicate an improvement based on feedback from the previous iteration.

Feedback

• Consider a space for users to leave notes on an item
• The aesthetic fits the content yet is not Modernist
• Make the size of the Information Design definitions larger
• Add more hover states to images
• Make the buttons and indicator bolder with color or arrows so that the user has more visual prompts
• Create a footer with contact link and copyright
• Further develop the “more like this” feature
The prototype felt easy to use
9 responses

Was the type legible?
9 responses

Was the style appropriate for the contents?
9 responses

Figure 54: High Resolution Feedback
Figure 55: High Resolution Feedback

**Were the features easy to understand?**
- 44.4% answered Yes
- 55.6% answered Sometimes

**Did the search and explore functions feel like opportunities for learning?**
- 88.9% answered No
- 11.1% answered Sometimes

**I would use this application again**
- 33.3% answered Yes
- 11.1% answered No
- 55.6% answered Maybe
CONCLUSION

The inspiration for this thesis was the extensive archive of rare and beautiful examples of graphic design history available to visitors of the Graphic Design Archive. With a belief that great design should be both preserved and shared, the concept for an online digital archive was born.

While countless scholarly image archives exist, few often contain any of the advanced search functionality of popular image sharing apps like Instagram and other social media sites. This project aimed to assess the level of cognition and learning achieved with various search experiences and to strategically introduce them according to the needs of the user along a path of discovery. Providing useful tools to graphic design students creates opportunities for greater scholarship.

While students were the primary audience, the app was developed with other groups in mind, including professors, scholars, and design enthusiasts around the world. The app serves as a face to the archive that is innovative, conversational, explorative, engaging, and inspiring.

The prototype, which is composed of an interactive web design and an animation, demonstrate the scope of the user experience, from initiation to action. Preliminary surveys conducted indicated that nearly all graphic design freshman at Rochester Institute of Technology were either unaware of the archive or had never visited it. The freshman surveys from the finished prototype indicate that all would visit the prototyped site again, and 89% of all users would engage with the prototype contents again.
APPENDIX A

Target Audience Surveys

A survey was conducted to aid in defining a target audience and to identify their needs and preferences. The survey collected data on RIT graphic design students, and the results indicated that students were primarily collecting design inspiration on sites like Instagram.

The survey also showed that students were interested in using the Graphic Design Archive either exclusively through an online database or with the database in conjunction with a visit to the archive.

Figure 54: High Resolution Feedback
Figure 55: High Resolution Feedback
Figure 56: High Resolution Feedback
Figure 57: High Resolution Feedback
Generating Higher Levels of Scholarship Through a User Experience Approach to Scholarly Image Database Design

Jenna Shay
1 December, 2016
Generating Higher Levels of Scholarship
Through a User Experience Approach to
Scholarly Image Database Design

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Abstract

Innovations in the user experiences of digital image collections have removed image-based searching from the realm of one-way searches and sorts and are now allowing users to perform dynamic, interactive searches using higher-level cognitive functions during the process such as comparing, analyzing, filtering, sorting, designing, sharing and creating. While image search innovations often occur in non-academic applications such as social media and marketing environments, scholarly image archives are spaces that would benefit particularly from search innovations.

By using Bloom's Taxonomy to categorize levels of cognition, new search functions will be designed and applied to give users of the Graphic Design Archive a level of searching functionality that minimizes risk of disengagement and performs on par with the investigative demands of scholarly research. The fundamentals of a dynamic search will be built in an interactive prototype, and advanced search functionalities will be demonstrated in a motion graphic. The goal is generating higher levels of scholarship. Using assets of the Graphic Design Archive, a template for connecting the backend components (Digital Asset Management System and Archivist Toolkit) to this dynamic search user experience will be made open source for institutions to adopt and adapt to their needs.

Problem Statement

How might a redesign of Rochester Institute of Technology’s online Graphic Design Archive lead to deeper information discovery that inspires higher levels of scholarship?

The Graphic Design Archive is a scholarly image database that features the works of historically notable designers of the 20th Century. Designers, artists, historians and others in various disciplines access this visual information for research. While the ways in which users apply the information they discover include high-level cognitive functions including sorting, analyzing, designing, judging, and creating,1 the user experience provided during the discovery process is typical to most scholarly cataloguing systems2—it limits them to discovering this information via “one-way”3 functions of keyword searching.

In recent years, innovative image collections have appeared throughout the digital world— from social media sites like Pinterest, Flickr, and Tumblr to marketing campaigns that entice customers to compare products in a collection and analyze them for optimum personalized consumption.4 Some scholarly image archives are innovating the ways users interact with the material. “Object Phone,” an interactive

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3 Doucette, iii.
4 Gatorade NATA. Mirror Show Management. 30 September 2016.
chatbot of the Cooper Hewitt’s collection5 and Steve.Museum, a community-driven “folksonomy” image tagging project6 exemplify innovative ways that institutions are providing users with ever more useful access points to their visual information. Feeding the contents of the Digital Asset Management System into a dynamic user interface that serves as much as a learning tool as a searching tool would provide users with an effective scholarly image database search experience.

Using Bloom’s Taxonomy, we can assess how deeply the user is engaging with the material and infer that the deeper the engagement, the more fruitful the research. Bloom’s Taxonomy is a set of markers that are used as criteria to assess teaching and learning based on metacognitive outcomes.7 By categorizing the levels of cognition a user experience supports, a system of designing with a new set of criteria of usefulness in mind can be implemented which examines the purpose of the design and offers an appropriate Bloom level of user experience functionality.

Scholarly digital image databases are typically hosted by a library, university, or similar institution and are accessed by users who are conducting research in disciplines including but not limited to the fields of design, history and the arts. The intention of users in accessing these repositories of images is to apply the visual information and supporting data they find to their scholarly activity, often using the highest Bloom level of cognitive functions in the process including analyzing, design, creation, and judgement.8

Yet the current state of most scholarly image databases is conservative in its approach to presenting access points to the information. The level of cognition the Graphic Design Archive interface invites is the base level of Bloom’s—knowledge acquisition. The key actions of this first level are identifying, listing, and quoting. There are several reasons why our scholarly searches are so static. Underneath most of these image databases is a Digital Content Management System as well as a metadata schema, typically Dublin Core,9 that provides a universal framework of fifteen fields such as author or keyword. If the data is organized using this standardized cataloguing system, the information may be applied to any database. This universal structure benefits the larger research community with its consistent and thus adaptable structure, but the structure also creates limitations. This system harkens back to the traditional method of searching for information

8 Bloom's Taxonomy, 17 October 2016.
with a library card catalogue. The user provides an input, such as a search term, and receives a list of results. This user experience inevitably lacks efficiency when a user travels down many dead ends before finding, often by chance, the information that propels their research forward.

Another reason scholarly image databases typically feature a one-way, basic search functionality is because many templates exist which lock the design into an existing framework. In a lecture at the Wallace Center Library, librarian Frances Andreu described a widely-used collection management and digital exhibit building tool—Omeka.10 This open source web template provides institutions with a fast and structured method to digitize a collection,11 but the convenience comes at the cost of serious limitations to the search functionality, design customization, and user experience. While templates like Omeka are practically designed for users with limited resources and do offer an opportunity for the development of plugins,12 a void exists in which institutions may desire to offer more dynamic search options to their users, but there are no templates available on the web that provide a more dynamic search experience.

Nevertheless, many image databases using traditional search methods are successful. One instance of an effective, traditionally designed image database is Gallica. This digital library of Bibliothèque nationale de France uses effective user experience design, including a thoughtfully and artfully designed interface, advanced search options which are immediately accessible and adjustable, autofilling search text, many explorative options including moments of delight like “Gallica by numbers” design, and a mobile app.13 Innovative search elements would not need to replace, but simply would enhance the existing interface.

Some databases attempt to create dynamic search environments within the constraints of traditional database structures. Europeana Regia attempts to reunite dispersed collections of historic figures such as monarchs so that sources may be searched and categorized by the original from which they came. Art historian Sarah Thompson describes the user experience as dynamic and exciting in the ways it allows connections between items to be discovered, but in regard to the design, she said, “I find the search function less than intuitive.”14 Thus more complicated searches require careful thought of the user experience in order to be effective.

With user experience guiding the design, the digital environment is conducive to moving beyond traditional search methods to explore more complex searches, and there are several benefits to doing so. Making the search process more human-centered includes eliminating time wasted, creating more opportunities for discovery 10 “Omeka–for Collection Management and Digital Exhibit Building.” RIT Wallace Center Brown Bag Lecture Series. Rochester, NY. Frances Andreu. 14 September 2016.
12 Andreu, 14 September 2016.
The Cooper Hewitt digitized their entire collection and have made it freely accessible to the world. This open environment has allowed unprecedented exposure to their collection, even resulting in an expert in Europe correctly attributing a drawing sitting in museum storage as a Michelangelo, according to Cooper Hewitt director Caroline Baumann.

The Cooper Hewitt is also offering a conversational interface through a chatbot called Object Phone. The chatbot sends a daily text message of an object from the collection to users’ phones and invites a conversation. Users may ask anything via text, including requests like, “send only textile objects,” and the chatbot will process the request generatively or through the assistance of an employee monitoring the requests via a slack feed. This method of interface design allows for less button tapping and more human-like exchanges of information.

With various types of user interfaces in mind, what sort of user experience would best guide a person conducting research using RIT’s digital Graphic Design Archive? This archive is physically housed in the Cary Library at RIT’s Wallace Center. It contains the works of many 20th Century American graphic design pioneers, including Saul Bass, Paul Rand, and Bradbury Thompson. The digital archive currently includes browsing based on two major categories: editorial design and information design. A biographical search performs as the major search function and invites users to browse via the collected works of individual designers. This information is best accessed both off-site as well as on the premises in which the original documents are preserved.

A web-based platform provides the best solution. The interface will be adaptable to any device with web access so that users may begin or continue a search experience on any device. While a digital experience with a collection does not replace viewing collections in person, this solution suits busy professional and student designers who live and work in the digital world, and will encourage access to the physical archives by offering a digital entry point.

Based on the risk of disengagement present during initial stages of the design process, the image database will initially invite users to initiate a search by either coming up with their own search terms or selecting from a series of suggestions. At any point during this initial search process, the user is able to create an account and sign in to the collection using their university username and password.

The user experience includes searching images based on keywords, browsing pools.
of images that appear based on the searches, and collecting images and organizing them into moodboards. An automated feedback system will push alerts alongside the moodboard that invite the user to analyze their grouping more critically. For example, a design student given the assignment to create a kinetic type motion graphic may access the collection, begin compiling their moodboard, and find direction for their search when the computer-generated response to their moodboard returns, “two of the eight images you collected are by Saul Bass.” The user may then tap the name to find more works by the designer, or may explore other trends in their moodboard selections such as color, typeface, related tags, or user submitted links to relevant contemporary references.

Based on the museum social tagging project Steve.Museum, the moodboard will invite participation by allowing users to tag content with “folksonomy,” or informal phrases used to describe an image that may otherwise not be used by experts of information, like librarians, archivists, or cataloguers. The intention of this feature is to increase the accessibility of images in the Graphic Design Archive by making them discoverable by more terms, particularly words used by designers seeking inspiration for their own designs by searching for methods, components, or styles relevant to design production.

The deliverables of this project will be an interactive prototype of the redesigned Graphic Design Archive website as well as a 30 second motion graphic which will demonstrate what some advanced search components would look like. A user experience design pack will be made available on github for other institutions to adapt as a template to their dynamic scholarly image database search needs.


The British Library. Accessed 10 October 2016. https://www.flickr.com/photos/britishlibrary. Over one million images on a flickr photostream. Special features include metadata (data about the data) of the objects available. The generic flickr platform is used to make a photostream, albums, favorites, and groups available to search and explore. The browsing/social nature of flickr makes the user instantly lost in the collection—for example finding an illustrative, colorful album of historic drop caps that have been compiled by user tagging.


"Collection of Cooper Hewitt, Smithsonian Design Museum," accessed September 6, 2016. https://collection.cooperhewitt.org/. The search function and user interface of this collection is the most unique combination of thorough/scholarly content with innovative and colloquial search functions. The impressive examples of UX design include its own open source typeface (representing the spirit of open source of its collection), search by color, recently photographed. Customizable chatbot feature (text a number to receive an object a day, and text human phrases to get it catered to your preferences, i.e. 'send only textiles' or 'send the objects at 5am daily' or 'when does the museum open today?') This collection serves as a reference point to how experimentation may result in failure, but will be the impetus of future successes in user experience innovation.

The visit to the Cooper Hewitt also inspired a consideration of the ways to measure the success of design beyond the efficiency of use (quicker speeds, less clumsy design) and to look at the ways the information architecture and tools lead to goals quicker. Rather than observing that the Collection Browser's design tool is easy to learn, for example, the intention is to examine if it is useful in assisting the user in reaching the intended information. A user experience can be fun and engaging, efficient, and easy to use, but nevertheless not accomplish the original intention. Changing original intention during use is a typical flow of the Collection Browser. This would probably not be a valid outcome of user experience in a scholarly image
database, but "getting lost" in the data is an experience worth continuing to explore for an application.


This article describes a tool for assessing teaching and learning based on metacognitive outcomes. While the subject was biology, the information and tools provided about Bloom’s Taxonomy are useful when applied to assessing digital image archives for the opportunities they provide users for higher levels of thinking.


This thesis describes ways in which the National Gallery of Canada can evolve the "one-way" digital image archive they offer to be more “open, collaborative, and social.” It references other instances of successful application of these methods, including the steve.museum project and the Art Matters blog of the Art Gallery of Ontario.


Dspace is an open source repository application. While it provides a framework to install a database of written information, the implementation can be quite responsive, riddled with text that is very heavily bulleted, customizations appear limited, and it does not appear to have many/any image applications. This provides examples of a limited user experience.


A crowdsourced application makes additional information about the images available to be added by users. This provides an example of how the data lives and evolves, maintaining its accuracy and timeliness through user contributions.


This site pulls fragmented collections (ie. the library of a monarch) documented on various sites back together into whole collections via links. Sarah Thompson (art historian): "I find the search function less than intuitive." She uses this site to access expert-level scholarly information, like the study of the whole library of a certain individual whose collection had been dispersed. The site is not responsive, and the path to the various fragments of the collections is not clear. The serif, low x-height type is hard to read. It is available in many languages. This is an example of an interface that is offering low-levels of critical thinking connections yet is being accessed for high-level applications of critical thinking.

Gallica is the national digital library collection of France. With a thoughtfully and artfully designed interface, advanced search options immediately accessible, many explore options including moments of delight like “Gallica by numbers” design, and a mobile app, this has been the standard of excellence in visual archives. Rich in displays of the photographs of the objects, full of supplemental information, Interface is well-crafted and current (responsive), but not cutting-edge (it does not incorporate experimental or innovative user experience elements. The accessibility page and language option is still under construction, so it may only be accessed in French text.)

Gatorade NATA. Mirror Show Management. 30 September 2016.

Hyperallergic. “From Tiny Stairs to Taxidermy Earrings, 200,000 Objects from Cooper Hewitt Go Online,” accessed 8 September 2016. http://hyperallergic.com/321311/from-tiny-stairs-to-taxidermy-earrings-200000-objects-from-cooper-hewitt-go-online/?utm_medium=email&utm_campaign=TNW%20Wests%20Fetish%20Fashion%20Furniture%20Resolution%20Content%20from%20Wests%20Fetish%20Fashion%20Furniture%20Number%201_D_08o03973a6e5e1f22ed188eb1797f4&utm_source=hyperallergicNewsletter&utm_term=From%20Tiny%20Stairs%20to%20Taxidermy%20Earrings%20200000%20Objects%20from%20Cooper%20Hewitt%20Go%20Online

This article describes the record-breaking speed with which Cooper Hewitt staff processed its full collection and went live. The article also describes how unique Cooper Hewitt is in the amount of information it shares, and the groundbreaking variety of ways the objects can be searched, sorted, and shared. The image archive should provide a back-end that facilitates mass-processing, like excel spreadsheets, as mentioned in the OMEKA lecture. Curious to know how the input process works at Cooper Hewitt.


In this lecture, Professor Chris Jackson laid out the fundamentals of user experience design, highlighting the necessity for empathy in realizing the needs of the user. This lecture included historic examples of ways in which the field of design was propelled forward using data collected from human observation. This lecture connects to the Cooper Hewitt Collection Browser interface and the question of effectiveness.


Applying this JavaScript grid layout library to a website results in images that cobbled together in a responsive, customizable fashion.


This eBook defines the history, present application, and future of interfaces which
require fewer button pushes and more exchanges with technology that resemble the patterns of human conversation. Most notably at this point in the research, this explanation of chatbots and their possible future uses is relevant to image archives via the Cooper Hewitt’s implementation of a chatbot as an access point to its collection.

MoMA. http://moma.tumblr.com/. Strongly image-based, current, and trendy, this Tumblr uses colloquial image search and browse features to draw users into its rich collection of splashy photos. Cheeky hover state links define the category at the top. Gray/white text over image hover states. Infinity scrolling image results.


This blog post describes the implementation of a chatbot in the Cooper Hewitt collection. Now, by texting a number, users can receive a daily object and description to their phone. They can ask questions and make requests. As the chatbot learns, unknown questions are deferred to a slack chat with staff and curators.


In this lecture, Frances details the advantages and disadvantages of hosting an image collection through Omeka’s free and paid services. Basic components, plugins, advantages, and shortcomings were discussed. The overall sense was that Omeka accomplishes the task in theory, but a general dissatisfaction of the limitations or cost to overcome them make it often an impractical choice for institutions looking to host a collection of images.

RIT Graphic Design Archive. http://library.rit.edu/gda/. This is an RIT online collection of graphic arts and supplemental information (i.e., biographies) documenting “significant American graphic designers active from the 1920s to the 1950s.” Clearly and simply organized, it does not feature new additions, news, or a comprehensive search/Ark function (search is only by keyword.)


SteveMuseum is a community-driven project launched by the Indianapolis Museum of Art in which the public uses “folksonomy,” or phrases that a layman might use to describe an image, that would otherwise not be used by experts of information, like librarians, archivists, or cataloguers. The purpose of this project is to make art more accessible to everyone in the digital age, and many institutions are participating.
including the Guggenheim, among others. Increasing the accessibility of images based on colloquial search terms would likely have a great impact on the ways designers search for inspiration from a variety of image sources using their own technical language.

The Victoria and Albert Museum Collections. http://collections.vam.ac.uk/. This image archive is an example of a thoroughly documented collection "expansive in scope" (Sarah Thompson) but a slightly aging interface. The interface welcomes exploration with tiled images, but the site is not responsive.

The Vignelli Center. http://vignellicenter.tumblr.com/. This image archive is a growing collection of images and descriptions of items in the Vignelli Archive. It has limited ways to search the information, but the entries often contain images as well as accompanying data in a blog-style language. For example, an entry for one image included the news of the day it was uploaded that Massimo Vignelli was falling ill. This site provided another example of how image databases may relate to time and raise questions whether the objective is to make a timeless reference or a living document.

The Visual Resources Association. http://vraweb.org/about/ "is a multi-disciplinary organization dedicated to furthering research and education in the field of image and media management within the educational, cultural heritage, and commercial environments."

Writing Objectives Using Bloom’s Taxonomy. University of North Carolina Charlotte. Accessed 17 October 2016. http://teaching.unc Charlotte.edu/learning-resources/articles-books/best-practice/goals-objectives/writing-objectives. This university resource offers the basic elements of Bloom’s Taxonomy in easily accessible tables of information. This site is the best Bloom resource for referencing while developing both the content of the new design as well as criteria for measuring the success of the new design.
Using small samples of collections of images and metadata from the Cary Library and the Vignelli Archive, sketching out an app was the first step. The aim was to design a concept that incorporates three main components: the accessibility of familiar image databases such as Instagram, the underlying user interface choices that make scholarly metadata easier to input and manipulate with most efficient and effective results, and innovative methods of interface design pointing toward conversational interface design. I kept in mind the potential audience of users: both scholars using a desktop and students using a mobile interface.
As researching this project continued, discoveries were made of many examples of larger-format touch tables being used as tools of artifact discovery. Surface tablets allow group interaction for classroom or group exploration of archive materials without the fear of the original object deteriorating through handling.

The large format attempts to replicate the experience of digging through a collection in-person, especially if it displays the items at sizes closer to real life, and if it allows the user to glance around a “pile” of loose artifacts, sort them into new piles or moodboards, share them with others, and take notes. The downside is that it does not replicate the physical experience entirely, which is available at the Wallace Center. If a user is outside of the Cary Library, engaging with the physical collection is the best choice.
The interface needed to instead address the audience who is not physically able to engage with the material in person. This made a website, available to anyone from any mobile device with an internet connection anywhere in the world, the best option.
There is a trend in your moodboard.

Enter search term

Create Account

Select waterfall image

Unpack old moodboard

Examine Trend

Compare Create Contribute

Welcome

Sign in

Create Account

Sign in

Search results

There is a trend in your moodboard

There is a trend in your moodboard

There is a trend in your moodboard

Welcome
Persona One

Audrey, 24

Status: RIT Student
Major: Visual Communication Design
Occupation Outlook: Creative Director
Interface Expertise: Expert/Creator

Audrey is a graduate student studying design at RIT. Her assignments require implementation of novel, informed concepts, and the Graphic Design Archive provides visual inspiration during the brainstorming phase of her project. She wants to access visual references from her research from her apartment or the computer lab where she is working.

"While I'm a student at RIT, I'll use these rare design resources as much as I can."
Persona Two

- **Name:** David
- **Age:** 46
- **Profession:** Art Director
- **City:** London, UK
- **Occupation Focus:** Music and Media Integration
- **Interface Expertise:** Over-seer, intermediate

David is a designer and director of a digital media company. He has been invited to give a talk about the industry at RIT. Upon receiving the invitation, he browsed RIT’s website and discovered a wealth of resources integrating design and technology, and after browsing the interactive Graphic Design Archive, he collected a list of inspiring artifacts to see in person when he visits Rochester.

“A design nut gets lost exploring the gems in the Cary Library and Vignelli Archive.”
Research:
Observe students, scholars, and librarians conducting research and accessing the current archive. What are they trying to accomplish? What do they like about the process? What do they find difficult or challenging?

Prototyping with Low Resolution Wireframes:
Develop user flows for the web application and a storyboard for the motion graphic that demonstrates the following functions:
- Recognize the user experience as a time-based activity with varying degrees of risk of losing user engagement. Use Library Scientist Carol Kuhlthau’s information architecture studies on risk of falloff of engagement during research process to design an experience that decreases the risk of loss of engagement.
- Use Bloom’s Taxonomy to quantify levels of cognitive engagement: jumping into complex search functions during high-risk periods of search process will discourage users. Likewise, introducing more complex levels of engagement at the appropriate time increases the length and successful result of searches. Quantifying levels of cognitive engagement of the various user experience components will determine when they best fit in the timeline of user experience.
- Develop the user experience timeline based on Bloom and Kuhlthau. Avoid discouraging barriers like complex functions during the most vulnerable phases of a search, delaying their introduction until the user is “hooked.”

User Testing and High Resolution Development:
Test the prototype for ease of use, enjoyment, usefulness. Determine which areas of weakness need tweaking. Fix final tweaks to the interface based on user testing, then develop the high-resolution application and motion graphic.

Implementation:
Test the prototype for ease of use, enjoyment, usefulness. Determine which areas of weakness need tweaking. Fix final tweaks to the interface based on user testing, then develop the high-resolution application and motion graphic.
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