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ABSTRACT

This paper demonstrates how taking differences in end user behavior and differing interdepartmental perspectives on metadata into account can strengthen the digital object workflow to serve a greater variety of users. The University of Illinois Chicago University Library has successfully collaborated on metadata initiatives since establishing a cross-departmental Metadata Working Group. The article examines the perspectives of archivists, digital librarians, and catalogers on digital object metadata. It outlines the workflow established to enable each of these stakeholders to contribute their unique strengths to metadata and considers how bringing those strengths together serves different end user groups. It presents two examples of this workflow in action and considers the next steps for improving that workflow. Future efforts to strengthen the content/context balance of metadata are discussed in three areas: aggregated digitization and description, technology enhancements, and moving from a linear to a circular workflow model.

Keywords: Content, Context, Metadata Collaboration, Case Study

INTRODUCTION

As the demand for metadata work grows in proportion to the increase of digital collections, it has become a collaborative process that draws on the expertise of multiple library departments. The University of Illinois Chicago (UIC) Library has recognized the benefit of metadata collaboration for greater end user success. A 2019 paper by librarians from the authors' institution showcased the success of metadata collaboration through a cross-departmental Metadata Working Group (Darcovich et al., 2019).

However, with more in-depth collaboration on our institution's digital collections metadata, various access and discovery behaviors of digital collection users and the different interdepartmental perspectives have highlighted diverse expectations for metadata. With a migration to a new Digital Asset Management System (DAMS), these differences have become more apparent. Generally, archivists are concerned about maintaining valuable contextual information and intellectual control of original items, so it is important for the metadata to maintain the archival context. Catalogers focus more on precise content description, which improves the user's access and discovery. Digital Services staff are more focused on how the metadata will be searched and presented in the DAMS. These varying perspectives can present challenges to metadata collaboration. We need not only to balance the tension between various departmental perspectives but also to meet the needs of diverse end users according to search task type, cognitive style, or user status.

LITERATURE REVIEW

The following literature review considers three areas: how end user perspectives influence the use of digital collections, how departmental perspectives influence collaboration when creating digital collections, and the logistics of establishing metadata workflows. This review is not meant to be either a scoping review or a systematic review. Rather, it is a background review aimed at grounding the reader in the three concepts relevant to the environment and cases that follow.

End User Perspectives

There has been a considerable amount published concerning the use and usability of digital libraries, though the definition of what constitutes a digital library can vary. These articles define digital libraries as collections of imagery or text scanned from manuscript collections or university archives. The following articles also focus less on the system than on the user. Rather than simply asking whether a system is well-liked by users, these articles dig deeper to evaluate what users need based on their tasks, cognitive styles or user status.

Fukumoto (2006), Conway and Punzalan (2011), and Chassanoff (2018) all linked patterns in user behavior to the types of tasks users were engaged in. Fukumoto distinguished between open and closed tasks. In an open task, users were asked to find images of their choosing, such as something that would make a good greeting card. In a closed task, users were asked to find a specific, known image. Fukumoto found that more actions were executed when the task was presented as an open question. Task type also prompted different strategies: keyword options including the number of input keywords and the number of unique keywords are significantly more used for open tasks than for closed tasks. Conway and Punzalan defined tasks in terms of discovering, storytelling, and landscaping. In the discovering mode, "users seek to obtain visual information from individual digitized photographs that have not been seen or noted previously" (p. 76), and need tools to investigate or compare images at high resolution. In the storytelling mode, users "view images as centerpieces of intellectual puzzles that when assembled in just the right way tell stories visually" (p. 79). In the landscaping mode, users "view digitized photographs as a window on historical space and time" and "as a lens on events and activities that took place beyond the view of the camera itself" (p. 85). Chassanoff's study with historians found that "broad visual browsing of collections is an integral part of the research process" (p. 143). The interviews also raised the importance of trustworthiness of provenance and metadata for images found in digital collections from archives.

Other authors noted patterns in user behavior based on the topic of research. Bogaard et al. (2019) used session log analysis to analyze facet-selecting behavior by users based on different research topics. They found that users chose different kinds of facets (date, type) depending on their topical focus. Matusiak (2012) conducted field observations and interviews with undergraduate students in two geography courses to better understand where users looked for digital images and why. The study found that the students were more inclined to consult library digital collections when looking for textual material and were more inclined to search the web for imagery.

Both Goodale et al. (2014) and Matusiak (2006) considered cognitive style in their assessments of end user behavior with digital collections. Goodale et al. distinguished between "analytic" versus "wholistic" learners based on a pre-test to identify cognitive style. "Analytic individuals

are more adept at structuring and analytical activity when compared to their wholistic counterparts. Wholistic individuals thrive more in situations where learning is structured and analyzed for them" (p. 973). Their findings showed that wholistic users were more inclined to use tag clouds and facets and took more time to complete tasks than analytic users. Matusiak considered both cognitive style and user status in a 2006 paper that evaluated how users interacted with a digital collection focused on Milwaukee neighborhoods. While the design of the study was a straightforward "think-aloud" protocol with students and local community members, Matusiak applied cognitive style distinctions to the interpretation of the results and found that students favored an analytical search approach, while community users preferred a more open-ended browse approach.

Library Departmental Perspectives

Many of the papers that discussed differences in departmental perspectives focused on the tension between providing contextual metadata about a collection (as provided in a finding aid) and descriptive item-level metadata expressed in standards such as Dublin Core and supported by most digital collection platforms. Zhang (2012) provided an in-depth discussion of how crucial the provenance and archival order – the archival context – of digitized materials was to archivists. Zhang also acknowledged that for digital objects, the contextual data derived from a finding aid was insufficient for effective discovery, and that access based on the content itself, such as subject, name, form, genre, and other criteria was crucial. Given that many digital library platforms are based on Dublin Core metadata that favors the item-level description of content, the archival context was often lost. Zhang presented three examples of digital collections that managed to preserve the archival context, each offering a different balance between archival context and content discovery.

Zhang & Mauney (2013) also reflected on the tension between context and content. Their research on the relationship between archival description and descriptive metadata of digital objects focused not only on the differing perspectives of archivists and librarians, but on their differing purposes when they created descriptive records. Archival description focused on contextualizing the material, while digital object description focused on item discoverability. They note that "the traditional minimal metadata approach that relies on archives context to retrieve archival items may lead to limited digital accessibility, but it is equally unacceptable when granular access to digital content may have to be achieved at the expense of archival context" (p. 191). Niu (2015) used the terms "item-level control" and "aggregate control" to distinguish between content and context, and noted that the focus on aggregate control is core to what archivists consider their work to be. The author noted that new tools and platforms had enabled archival intellectual control to evolve to include the content, especially the intellectual control of digital records. These new advances meant that item-level control did not signify a loss of contextual information as it used to, and "is affordable in many scenarios" (p. 186). Therrell (2019) attempted to test the application of the "More Product, Less Process" (MPLP) theory arising from the archival discipline to digital object metadata. More Product, Less Process (MPLP) is an approach to archival processing proposed by Greene and Meissner (2005) which advocates for minimally arranged and described collections over large collection backlogs. Therrell tested the discoverability of two sets of the same images, one with contextual metadata derived from the finding aid and the other enhanced with topical tags. The results suggested that lesser description levels hindered resource retrieval of

digital collections. Therrell concluded that without content-based metadata, digitized materials might remain as inaccessible as if they had never been digitized.

Both Zhang (2012) and Niu (2015) addressed differences in perspective across departments as archivists tried to maintain archival context in systems largely implemented in digitization or digital programs departments. Other papers examined these varying perspectives more directly. Hunter et al. (2010) described the differing perspectives and strengths of a cross-departmental team engaged in building a digital collection at Colorado State University. The team consisted of an archivist, a metadata librarian, and a digital projects librarian. The paper described the project's inception and workflow and pointed to moments in the workflow where different team members came to understand each other's perspectives. For example, the archivist provided a tour of the physical collection to all team members, including those who would usually not encounter the physical objects. This helped all team members understand certain things about that collection that previously only the processing archivist was aware of. The project details addressed the tension between describing individual items well enough to be discoverable and preserving the aggregation and context of the original archival collection.

Anderson et al. (2021) also described the triad of perspectives between archivist, digital librarian and cataloger in a case study of digital library collaboration at the University of Arkansas Libraries. They noted that catalogers tend to strike a balance between the aggregate focus of archivists and the item focus of digital librarians, and that while almost all employees from each department share the same degree, "best practices and standards in their specialized fields may vary widely, and these frameworks in turn shape how they conceive of projects, users, use cases and description" (p. 46). Allison-Bunnell et al. (2021) discussed how the design of digital library platforms has been tilted toward a bibliographic model of digital objects and away from the contextual information about the collections those objects come from. The authors offered advice for collaboration, communication and system design that can help to restore the contextual archival information that has been lost. They stated:

> It may not be common for practitioners who come to a digital archives project from the library world, software development, archival administration and museology to have the same understanding of the nature of what is being represented and what a system needs to do. (p. 62)

They noted that establishing that shared understanding is critical, particularly in a way that incorporates the expertise of archivists.

Metadata Workflow

The authors also consulted publications that examined the workflow logistics of developing metadata for digitized archival material. Sweetser and Orchard (2019) sought to understand how different departments collaborate on metadata creation for both archival collections and for objects digitized from those collections. The survey included the development of EAD finding aids or MARC records for collections, and Dublin Core (or other) records for digital objects. According to their survey, archivists were responsible for archival descriptive work at most institutions, and cataloging colleagues generally were not involved. Other papers provided a contrast to that finding. Maron and Pickle (2013) showed that the degree of collaboration varied for different kinds of metadata. Finding aids were most commonly created by archivists while collection-level MARC records prompted more collaboration with catalogers (39.6 percent), and the development of item-level metadata showed the broadest collaboration across departments (41.5 percent). Still, for most

respondents, metadata creation at all levels was handled exclusively by archival staff, with no engagement or review by other departments. They also found that management of digitized special collections was often dispersed across many departments, and that no one department emerged as the dominant locus of primary responsibility. More recently, Ho (2020) offered a comprehensive summary of the literature on surveys of metadata staffing which shows an increasing role for catalogers in the creation of non-MARC metadata over time. That same summary showed increasing numbers of positions for metadata creation outside of cataloging departments as well. Ho's own survey also sought to determine which departments create metadata and whether they collaborate. The survey results indicated that 71.05% of the initial 114 respondents had their cataloging departments work with non-MARC metadata. Regarding the personnel categories of non-catalogers involved in the workflow, "Digital" positions (62%) and "Archivists" (52%) (p. 739-740) are both high in the proportion. The survey also found that even respondents who were "generally satisfied" with their metadata workflow still emphasized "the need for better communication and coordination across library units" (p. 743).

Darcovich et al. (2019) described the development of the metadata workflow that the UIC Library now uses. Darcovich et al. discussed how metadata created for legacy collections did not adhere to a single standard. To address this issue, UIC established "a cross-departmental Metadata Working Group to develop a new Metadata Guideline" (p. 1) and a new metadata workflow, which will be further discussed in this paper.

BACKGROUND

University of Illinois Chicago (UIC) Library provides access to over thirty digital collections through a consortium-based platform, CONTENTdm[1], shared with over ninety libraries in the state. The library had never had a platform for managing and preserving the original high-resolution digital files for those materials, and because the CONTENTdm platform is shared with other libraries, users could not search effectively across UIC's collections. Because institution-wide search was not an option, no common metadata standard had been enforced across these thirty CONTENTdm collections. CONTENTdm also represented only a small fraction of what the library had digitized. The library had a noteworthy digital backlog stored on university-managed file systems and local storage devices, largely without metadata beyond what could be inferred from the directory structure and filenames.

To address these challenges, UIC began to analyze the needs for a comprehensive preservation, management, and discovery environment in 2016. After careful analysis and comparison, the Library selected LibSafe[2] from LibNova. The LibSafe Digital Content Management System (DAMS), offers comprehensive digital preservation features, format migration, a customizable user interface and the ability to search across all of our collections. Among the features that the LibSafe DAMS offers is full use of the International Image Interoperability Framework (IIIF). In many digital collection platforms, including CONTENTdm and LibSafe, IIIF is most commonly noted for its Image API, which enables the user to efficiently zoom in on image detail. But the IIIF Presentation API also allows for new possibilities by using a IIIF manifest to control the layout of selected images on the screen. IIIF manifests can also include information that is not contained in the digital object metadata. Unlike CONTENTdm,

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[1] https://www.oclc.org/en/contentdm.html

[2] https://www.libnova.com/#products

LibSafe allows libraries to customize the IIIF manifests so that the distinct nature of certain objects or collections can be highlighted.

LibSafe also allows for multiple metadata standards, though we chose to enforce a single local standard for all materials. Given the multiple sources of data and inconsistent metadata standards for legacy material, the project is larger than a simple system-to-system migration, though it has been referred to internally as the DAMS migration project. To prepare for the migration, a cross-departmental metadata working group was established to develop and implement the institutional Metadata Guidelines, in conjunction with a project to analyze and clean up legacy metadata.

The migration prompted the UIC Library to examine all of its digitized material and metadata and to commit to cross-departmental collaboration on a deeper level going forward. Traditionally, only two departments were involved in metadata creation for digital collections, Special Collections & University Archives (SCUA) and Digital Programs & Services (DPS). Further, in some cases, these two departments did not collaborate; some collections were developed almost entirely by SCUA staff and student workers while other collections were scanned and described by DPS staff. With the migration to LibSafe, the Resource Acquisition & Management Department (RAM) also began participating in the workflow, and all three departments are now engaged in each digital collection. This work has also prompted fundamental consideration of what end users are trying to accomplish when they use our Library's digital collections, with the goal of better serving them in the new DAMS.

DIGITAL PROJECT WORKFLOW

To better understand how different library stakeholders work together and what shapes their perspectives, it will help to convey the overall digital project workflow. While each project may vary, it generally goes through the workflow stages pictured below. As it moves through each stage, all contributors work in the same spreadsheet stored on Google Drive. (This contrasts to earlier workflows, where there were sometimes multiple competing versions of Excel spreadsheets for the same collection stored on a shared drive).
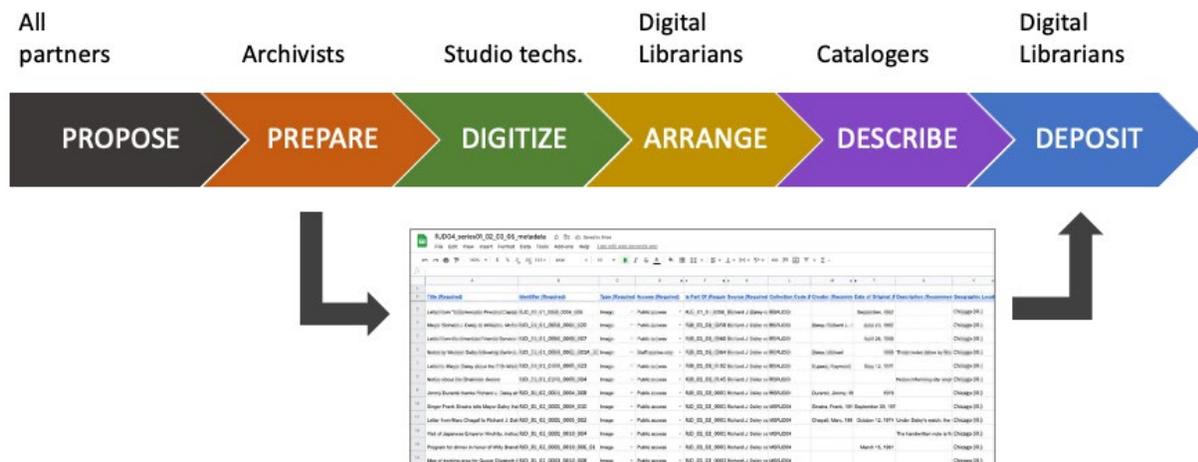

Figure 1. Digital project workflow

Propose: Projects begin with a proposal developed through multiple discussions with all stakeholders. Digital Imaging Studio technicians from DPS assess the material for reformatting issues, archivists convey key information about the collection and how the collection is structured, RAM catalogers and SCUA archivists work together to identify topical, name and geographic themes in the collection, and digital librarians look for challenges and opportunities the collection might pose. The team also consults the established file identifier conventions and agrees on how digital files from the proposed collection will be named. By the end of this stage, there should be a written project proposal with a strong estimate of the project size (total files), and preliminary lists of common subjects, names and forms associated with the collection.

Prepare: Archivists use a metadata template to describe the materials to be digitized. They may have initial folder titles from the finding aid, and they have information about the original format or condition of the material. In some cases, they may create identifiers for each item to be scanned, or provide box and folder numbers. They physically prepare the material for digitization, removing staples or flagging versions to be scanned. Archivists may also provide metadata about material qualities that can't be discerned after the items are scanned, such as the medium of the analog material, captions on the verso of an item, or notes from the envelopes that hold the original material.

Digitize: The Studio staff track scanning progress using the same spreadsheet that was used to request scanning. They provide the final filename and indicate whether scan masters have undergone quality assurance (QA). The Studio staff are the last people to see the analog material and can augment metadata about the form and medium of the material as needed. The Studio staff post the files to a local drive for deposit into the DAMS. While the DAMS implementation is underway, they also post derivatives to a photo viewing platform for the catalogers to use.

Arrange: Digital librarians then work on the arrangement of the metadata and files. Digital image objects in the DAMS can be either single, stand-alone images or complex, multi-part images. (The CONTENTdm term for this is "compound objects.") The decisions about whether objects will be single images or complex multipart images will have been made during the project planning stage. If the collection uses complex objects, the digital librarians create "parent" rows for each object and populate the "Has Part" and "Is Part Of" values that define the boundaries of each complex object.

	Title (Required)	Identifier (Required)	Is Part Of (Required)	Has Part (Required if applicable)
38	Photographs of Century of Progress Band Shell, 1934	COPM_02_005_005	COPM_02_005_005	COPM_02_005_005_001.tif - COPM_02_005_005_003.tif
39		COPM_02_005_005_001.tif	COPM_02_005_005	
40		COPM_02_005_005_002.tif	COPM_02_005_005	
41		COPM_02_005_005_003.tif	COPM_02_005_005	
42	Photograph of Martha Nomden in front of Klompenmakery, Dutch Village 1933-1934	COPM_02_005_007_001.tif	COPM_02_005_007_001.tif	
43	Copper Ticket for Arizona Exhibit, 1934	COPM_03_B_005_006	COPM_03_B_005_006	COPM_03_B_005_006_001.tif - COPM_03_B_005_006_002.tif
44		COPM_03_B_005_006_001.tif	COPM_03_B_005_006	
45		COPM_03_B_005_006_002.tif	COPM_03_B_005_006	
46	Souvenir spoon	COPM_03_C_07_00	COPM_03_C_07_00	COPM_03_C_07_00_001.tif - COPM_03_C_07_00_002.tif
47		COPM_03_C_07_00_001.tif	COPM_03_C_07_00	
48		COPM_03_C_07_00_002.tif	COPM_03_C_07_00	

Figure 2. Metadata and file arrangement of a typical complex object

Digital librarians also set field values that are consistent for the entire collection or that can be set with a formula or script, such as Box, Folder, Repository, Type and other fields. Finally, the digital librarians move the master files into the DAMS at this stage and prepare instructions for catalogers working on the next stage.

Describe: Catalogers in the RAM department augment the metadata for discoverability. This stage includes finalizing titles according to the Metadata Guidelines, creating descriptions, and assigning metadata such as geographic location, subject—topic, subject—name, and other terms, and ensuring that controlled vocabularies and appropriate standardizations are followed.

Deposit: Digital librarians conduct a final round of QA on the metadata, then run scripts to transform the spreadsheet metadata to XML files for each digital object that follow the in-house metadata schema. The XML files are deposited to the DAMS and object-build scripts are run to link the metadata to high-resolution master files. There are variations to this workflow, depending on the material. Sometimes catalogers are also engaged in defining complex objects when files are clearly related. Archivists might play a larger role in descriptive metadata when they have strong subject expertise in the collection.

DEPARTMENTAL PERSPECTIVES

In this cross-departmental workflow, each department brings a set of unique perspectives to the work. These perspectives vary within departments and can be driven by a collection's unique qualities, but generally they can be seen as shown in the figure below.
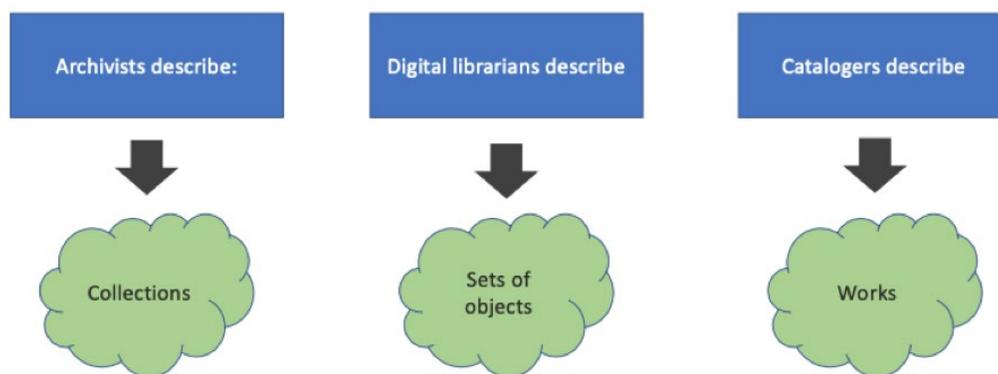

Figure 3. Cross-departmental perspectives

The goal of this workflow is to help library stakeholders understand one another's perspectives and to direct those perspectives towards creating the best access possible for researchers in a sustainable way. In the following section, each type of library stakeholder will describe their perspectives and concerns as they build digital collections.

The Archivist's Perspective

At the UIC Library, digitization projects often originate from the archivists for a variety of reasons. The archivists may have observed while processing the collection or through user statistics that digitization is necessary for preservation. They may know that the donor gave a collection with the expectation that it would be digitized to be as visible as possible. The collection may complement other digitized collections. For these reasons, archivists at the UIC Library are now stakeholders in digitization projects from the beginning, and assist with metadata creation, whether through preparing the metadata librarians with important information about the collection or creating the initial metadata. As stewards of the physical materials, archivists are uniquely positioned to use their knowledge of the collections in digitization projects. Their archival training influences the metadata they create, which is focused more on the context and intellectual control of the item than discoverability.

Although UIC archivists have instigated some of the past digitization projects, the staff creating the metadata usually only consulted the scans they had instead of the finding aids the archivists created. The first resource used to create metadata should be the finding aid, which is almost always created by the processing archivist. Though the archivists initiated many digitization projects prior to the founding of the Metadata Working Group, there was no set workflow or mandate to include any department. The resulting metadata generally did not reflect the finding aids, and it is difficult to infer the arrangement of these digitized collections from the CONTENTdm interface. In fact, many collections in CONTENTdm used different metadata standards. This inconsistency in the metadata sets threatened the loss of coherency of the collection. SCUA staff handles all reference questions about the digital collections, and inconsistent metadata may mean a reference question takes longer to answer or may make it impossible to solve. If digitized collections do not refer to the original document as described in the finding aid, especially including its physical location, important contextual information may be lost.

Issues have arisen in the past when the metadata has been disconnected from its archival context. A particular challenge was (and currently remains) the collection of "Comer Archive of Chicago in the Year 2000" (CITY2000), which is made up of over 500,000 images, audio recordings, and official files. The collection comprises over 2,800 individual photography projects, many of which contain the same metadata for all the material in each project, even if the creator captured images of multiple people, places, and subjects. Soon after its acquisition in 2001, approximately 15,000 images were digitized and placed on CONTENTdm. A task force was created to strategize how to handle this collection as well as other photographic collections, but surprisingly did not initially include personnel from Special Collections and University Archives, even though the department took physical control of the project upon its donation. A finding aid was not begun for this collection until 2019.

The project team for CITY2000 metadata went through a number of transitions. An original grant team from outside of the library developed the initial metadata. A second team was formed within the library to continue the work, but unfortunately did not include archivists. The second team evaluated the initial metadata and decided to substitute "keywords as finding aids for the digital image" (Austin, 2003). Each image was assigned keywords, but CONTENTdm's interface merged all the keywords together. For example, one image's metadata lists "African Americans artists" and "Mural painting and decoration" as separate subject headings, but in the overall collection's search facets, the headings are merged into one, which leads to many options in the

subject heading search facet suggesting only one result. In this situation, the facets are essentially useless. Though the collection could still be browsed on CONTENTdm, the reliance on keywords coupled with the sheer volume of available images made it difficult for users to complete specific searches. There is no archival context for the smaller projects that make up a whole. Users had to contend with the entire project at once.

Additionally, using only a few keywords to describe each project led to many projects being misrepresented. A project focused on a particular neighborhood has unfortunately been titled as a result of the keyword substitutions as "dead bodies, junked cars" when in reality those keywords represent only a minor part of the whole project (and in fact the project does not show dead bodies). This misrepresentation damages the perception of the neighborhood to both researchers and community members wanting to see historical photos of their area. This issue also makes it difficult for the archivists to fulfill reference requests and to sustain a relationship with community members. For all these reasons, upgrading the metadata became a primary project.

In 2017, SCUA staff and DPS began to discuss how to upgrade the CITY2000 metadata to bring it in line with the library's metadata standard which had just been completed. The Metadata Working Group returned to the original metadata that was inherited from the donors and in the following twenty years had gone through multiple system migrations, muddling it further. Additionally, the donors had barcoded each contact sheet and created identifiers based on these barcodes, which do not follow SCUA's standard. The only way the archivists could physically locate the material is with the barcode or the original project number, which was kept in an Excel spreadsheet. The visibility of the collection was geared toward the donor photographers who make up the bulk of the reference requests and to help the archivists find the material, but it did not work for end users, who did not have access to this information and only knew about the portion available on CONTENTdm.

The CITY2000 metadata is now under review by SCUA, DPS, and RAM, allowing everyone to bring their particular expertise to this massive collection. Work is still underway, but many changes have already occurred. The identifiers were updated to include the project number. Closer attention is being paid to the Description and Caption fields so that they no longer describe the entire project, but those particular image(s). Many projects have audiovisual and research files in addition to their photographic material, but the links weren't previously explored or described. A finding aid is being created to link everything together, ideally leading to successful public discovery and use.

Having SCUA staff officially serve on the Metadata Working Group and participate in meetings for all digitization projects mitigates the concern about the loss of contextual information. Having documentation like the metadata worksheet and the guidelines has been helpful for the archivists to know what basic fields and information are necessary to add. Participating in the working group gives the archivists the opportunity to influence the documentation and add their knowledge gained from processing the collection and working with the donors. The fact that archivists can access the shared metadata spreadsheet as DPS staff and RAM continue the work instills confidence in the projects, especially the standardization of the context and location of the object.

The Cataloger's Perspective

At the UIC library, metadata was often created by SCUA staff and edited by DPS staff. However, there was a bottleneck in metadata creation due to the large workload. In the fall of 2017, metadata

staffing was expanded to include catalogers in RAM who traditionally worked with print materials. The catalogers started to become involved in the digital project workflow from the pilot project the Richard J. Daley collection, which included digital images of people, places, and events connected with Mayor Daley. After this project, the catalogers collaborated on several other digital projects and eventually became a key part of the workflow. Currently at UIC, a group of catalogers led by the metadata librarian in RAM are creating metadata for digital collections on a regular basis. In the case study by Darcovich et al. (2019), some important metadata issues were identified in UIC's legacy metadata, which included lack of standardization and lack of controlled vocabularies. One of the most significant contributions the catalogers bring to the digital projects now is the awareness of controlled vocabularies and standardization.

Per UIC's new Metadata Guidelines, the metadata terms should always follow international, national, or regional standards. For example, Faceted Application of Subject Terminology (FAST) is used as the schema for topical subjects, the Library of Congress Name Authority File is consulted for creator name, contributor name, and geographic location. The Date element now follows the International Organization for Standardization (ISO) 8601 and the Language Code now follows ISO 639-2 Registration Authority. The Type element adopts DCMI Type Vocabulary. With the catalogers' participation, these standards and controlled vocabularies are strictly applied to the metadata. This not only ensures the metadata's consistency, but also enhances its interoperability.

With the creation of a cross-departmental Metadata Working Group of librarians from SCUA, DPS and RAM, catalogers were exposed to the perspectives of library colleagues from other departments. These conversations also helped them to view the metadata from the end user's perspective. Unlike traditional book cataloging, a description of a single image that is too detailed may also cause usability issues. For example, if a cataloger is exhaustive and adds every subject term that could be relevant to a single image, they start amassing a set of terms that is only ever applied to one or two images within a collection. However, end users depend on these subjects as facets to browse the whole collection. For users, the list of subjects reveals the major themes in the collection's content. That list becomes difficult to use when it is filled with dozens of topics that only lead to a single item.

The concept of usefulness (Matusiak, 2012) is crucial here in shedding light on the limitations of the cataloger's traditional perspective. Matusiak's field observations and interviews with undergraduate students showed that to judge how useful a library's digital collections will be, a user must already have a strong sense of what they contain, which requires some familiarity with the holdings of Special Collections. Therefore, metadata should be able to generate a browsable list of subjects, which is brief enough to quickly give end users a basic idea of the entire collection's content. A lengthy list of subjects might not necessarily lead to the best user experience, especially if those subjects appear only once or twice. This requires catalogers to view an image not only individually, but also with respect to how it fits in the context of similar/related images or even in the whole collection.

The Digital Librarian's Perspective

Digital Programs & Services staff are influenced by the fact that they work most directly with the DAMS and are attuned to how the DAMS will respond to patterns in the metadata. Building on earlier experiences with digitization projects, digital librarians have been strong proponents of being engaged in the workflow from the very outset – from the proposal stage – and remaining

engaged throughout the process. Digital librarians have also been most inclined to insist that the same metadata spreadsheet be used at every stage of the workflow, so that they don't receive multiple versions of the metadata from different sources.

Digital librarians are also invested in the management and preservation of the original, high-resolution master files. The digital master files are what enable the Studio to fulfill reproduction requests, but more importantly, they enable a digital collection to continue to meet end users' needs over time. A JPEG that was generated ten years earlier will not look as impressive on today's monitors and devices. Managing the masters well enables libraries to regenerate new access copies for a collection to remain engaging over time. The LibSafe digital asset management system is the first digital preservation system used at UIC, despite having over forty-five terabytes of digitized material. The new DAMS workflow puts preservation early in the process, so that by the time a new digital collection is released, the masters are indexed, preserved, and well-stewarded. These qualities of the digital librarians' work environment and experience all point to seeing the big picture: the lifespan of a digital collection well beyond the day of public release. An early phase of the cross-departmental collaboration on UIC Library's DAMS migration, as outlined by Darcovich et al. (2019), was to bring the metadata fields and structure for each CONTENTdm collection into alignment and to ensure not only that they used the same fields, but also that metadata creators mean the same thing by each field. For example, older collections did not have a consistent definition for the fields "Type", "Form", and "Medium", and the term "Photographs" could have appeared in any one of these fields. Digital librarians are far less inclined to be focused on a single collection and are more concerned with how this data set – the totality of materials in the DAMS – will behave when people search or browse it. If that interface is providing a facet for "Form" or "Medium," all collections should be using compatible terms in those fields, so that end users have a consistent and successful experience regardless of which collection the content comes from.

Prior to developing a workflow where all contributors communicated from the outset, the Digital Programs staff sometimes received metadata spreadsheets that had been developed without prior consultation. In some cases, the data was derived from item-level inventories that were meant to serve a different purpose than searches in an online system. These inventories were meant to be read from top to bottom, so titles contained references "up" to earlier items in the list. Once extracted into digital object records, the user can find any item independently, so a title with a "See above" reference may not make sense. Titles derived from finding aids might also assume that the user is reading the entire finding aid, so might contain terms that are highly contextual, such as "Photo of donor's uncle." Once in a DAMS search system, and away from the context of the original finding aid, these terms no longer make sense in an item title. These experiences made digital librarians advocates of using a metadata template that reinforces standards and guidelines at every stage of the workflow, and of beginning each digitization project with a careful, collaborative review of the finding aid.

THE COLLABORATIVE METADATA WORKFLOW

As many researchers have suggested, metadata work has inevitably become a highly collaborative process. In the UIC library, the current metadata workflow is highly collaborative. As the diagram below indicates, archivists first create basic metadata from the collection's content and context using their experience working with or processing the collection. The DPS staff then establish the metadata structure, such as the complex objects in the James Parker Collection. Next, the

catalogers from RAM enhance and validate the descriptive metadata, making sure the metadata fields follow standardizations as indicated in the metadata template and using controlled vocabularies. After this step, the metadata returns to DPS to review, format, and upload to the DAMS where the now-digital collection becomes available to the public. Librarians and archivists from the three departments communicate throughout the whole workflow to address issues we encounter due to different perspectives.
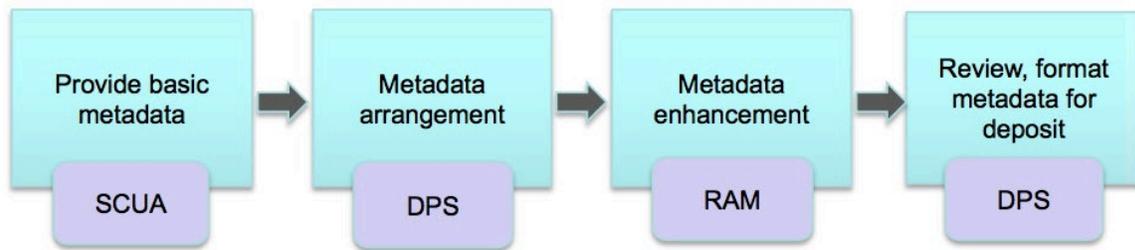

Figure 4. Metadata workflow

The following two cases illustrate how we have begun to balance the different perspectives and values outlined above. In both cases, the metadata for the collections was developed for our old CONTENTdm environment when cross-collection search was not an option and metadata work did not necessarily engage more than one department. The cases below describe the changes we made as we collaboratively revised the metadata for the new LibSafe environment.

Richard J. Daley Collection

As mentioned earlier, from the perspective of the catalogers, the metadata should generate a list of browsable subject headings which tell end users what the collection is about. To reach this goal, a thorough analysis was conducted of existing subjects of the Richard J. Daley collection in CONTENTdm. To create a usable list of subjects, one approach was to agree on a single term where multiple similar terms were available. For example, catalogers used "Charities" instead of "Fund raising," and other similar subjects. Figure 4 shows how we analyzed and selected the preferred subjects.

RJD-Kondor collection, Subject-Topic terms. 49 active terms	Term Usage
African Americans	
Airplanes	
Architecture	
Asian Americans	
Athletes	
Awards	
[Baseball]	Use Sports
Birthday parties	
[Bridges]	Use Public works (Public facilities and improvements financed by the government for the public good. Public works include hospitals, **bridges**, highways, and dams. These projects may be funded by local, state, or federal appropriations.)
Charities	
Christmas	
City council members	includes Aldermen
Clergy	Use for male clergy only (including Cardinals). Do not use for nuns.
Consuls	
County government	
Demonstrations	
Dinners and dining	
Elections	
Entertainers	Use for Actors, Dancers, Musicians, Singers
Ethnic groups	Used for folder "Holiday Folk Fair"
Exhibitions	
Families	
[Fund raising]	Use Charities
Funeral rites and ceremonies	
Governors	
Hispanic Americans	
Holidays	Use for Easter

Figure 5. Analysis and selection of subjects

To limit the number of subjects, the subjects of the same category were grouped, and a broader term was chosen. For example, "Sports" is now used instead of "Baseball." Using a broader subject as a facet sacrifices some metadata accuracy for that image since more specific subject terms will not be retained in the "Subject" field. However, it has simplified the browsing experience. To maintain the specificity of metadata, the catalogers applied relatively detailed information in the "Description" field, which can be retrieved by a keyword search.

Using a group of five images from the same event as an example (Figures 5 & 6), the same subjects "Mayors; Inauguration" and name headings "Daley, Richard J., 1902-1976; Daley, Eleanor, 1907-2003" were applied to each one of the five images. They all have the same title as well. However, each image has a very detailed description that gives more information to end users.
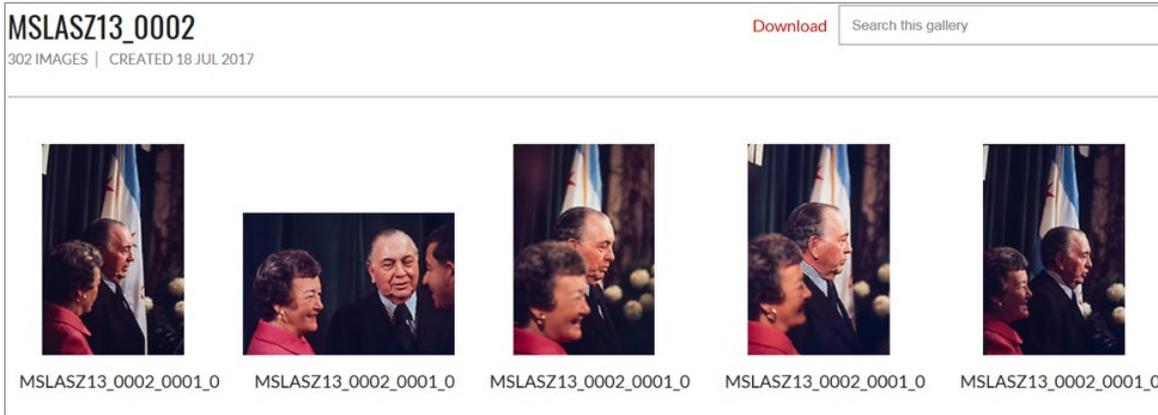
Figure 6. Images from the same folder of the Richard J. Daley Collection

	Description	Caption	Folder Title
Eleanor and Richard J. Daley at City Hall	Eleanor "Sis" Daley and Mayor Richard J. Daley at Chicago City Hall after his inauguration.		Daley, Richard J. (Mayor) and Eleanor slides
Eleanor and Richard J. Daley at City Hall	Eleanor "Sis" Daley and Mayor Richard J. Daley in conversation with an unidentified attendee at Chicago City Hall after Daley's inauguration.		Daley, Richard J. (Mayor) and Eleanor slides
Eleanor and Richard J. Daley at City Hall	Eleanor "Sis" Daley and Mayor Richard J. Daley at Chicago City Hall after his inauguration.		Daley, Richard J. (Mayor) and Eleanor slides
Eleanor and Richard J. Daley at City Hall	Eleanor "Sis" Daley and Mayor Richard J. Daley at Chicago City Hall after his inauguration.		Daley, Richard J. (Mayor) and Eleanor slides
Eleanor and Richard J. Daley at City Hall	Eleanor "Sis" Daley and Mayor Richard J. Daley at Chicago City Hall after his inauguration.		Daley, Richard J. (Mayor) and Eleanor slides
Eleanor Daley with others outside Chicago City Hall	Eleanor "Sis" Daley (center) with three unidentified women outside Chicago City Hall.		Daley, Richard J. (Mayor) and Eleanor slides
	Mayor Richard J. Daley walks past a		

Figure 7. Metadata for the five images from the same folder of the Richard J. Daley Collection

The efforts above took various user behavior and needs into consideration. A browsable subject list helps users survey what was occurring during a certain area and time period. The enriched description provides valuable clues to help users locate a certain group or type of image to fulfill some specific information needs. For example, if a user is looking for images of entertainers, the broader term "Entertainer" will lead to more relevant search results instead of searching for "Actors", "Singers", and "Dancers" one by one, etc. In this case, it not only enables catalogers to create higher quality metadata with higher efficiency, but also improves the end user experience.

James Parker Collection

This collection includes 23,491 photographic negatives and prints that extensively document Chicago's built environment. It also contains a strong representation of public events held during the administration of Mayor Richard J. Daley.

One quality of the James Parker Collection that stands out is that it includes folders of images all of which are very similar to one another. For example, one folder might contain 70 images of the same bridge. When first digitized in the CONTENTdm environment, the folder title was applied to every image from that folder. When we migrated to the LibSafe environment, we revised the object structure to create a one-to-one match between complex digital objects and archival folders. This strategy both preserves the original archival arrangement and prevents scores of very similar images from overwhelming the end user in search results.

Each complex object is composed of a parent record and many child records under its umbrella. Figure 7 is a screenshot of the metadata of a typical complex object. The line which is highlighted in yellow is the "Parent Record"; each of the line's underneath is a "Child Record." Every Child Record relates to an individual image in this group. Since these child objects share lots of common features, metadata which applies to the whole group of images such as "Subject," "Geographic Location," "Description" was recorded only once in the "Parent Record." Specific metadata of a particular child object will be recorded in the particular "Child Record" only, such as "Alternative Title," "Caption," "Address," etc. (See Figure 8).

Title (Required)	Description (Recommended)	Geographic Location (Recommended)	Subject--Topic (Recommended)
Bridges, viaducts, and underpasses: 18th St. Bridge 5 (Folder 53)	Bridges, viaducts and underpasses included: 18th St. Bridge 5 (1966)	Near South Side (Chicago, Ill.); South Loop (Chicago, Ill.)	Floors, Concrete; Refuse and refuse disp (Containers); Metal containers; Tires; Ra Street-railroads; Windows; Wooden doo
Bridges, viaducts, and underpasses: 18th St. Bridge 5 (Folder 53), Image 1			
Bridges, viaducts, and underpasses: 18th St. Bridge 5 (Folder 53), Image 2			
Bridges, viaducts, and underpasses: 18th St. Bridge 5 (Folder 53), Image 3			
Bridges, viaducts, and underpasses: 18th St. Bridge 5 (Folder 53), Image 4			
Bridges, viaducts, and underpasses: 18th St. Bridge 5 (Folder 53), Image 5			

Figure 8. Metadata of a typical complex object – parent record level

Title (Required)	Alternative Title	Caption
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 6		
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 7	Third W. Harrison St. Bridge	14032-HARRISON-460 Third Bridge over S. Branch of Chicago River 1960
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 8		Indiana Ave. Bridge. 1914.
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 9		6847-INDIANA-88A
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 10		LKG. S.W 'LY 6848-INDIANA-89A
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 11		LKG. S.W 'LY 6848-INDIANA-89A
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 12		LKG. S.W 'LY 6848-INDIANA-89A
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 13		LKG. S.W 'LY 6848-INDIANA-89A
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 14		LKG. S.W 'LY 6848-INDIANA-89A
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 15		11707-CALUMET RIVER-26A Indiana Ave. Br., lk'g. W'ly (M717-7) 6-2-59
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 16		15552-S. INDIANA-37 Lk'g.N.W.9-22-64 Copelin
Bridges, viaducts, and underpasses: Harrison St. Bridge through S. Kedzie Ave. Bridge (Folder 9), Image 17	Calumet Sag Navigation Project	

Figure 9. Metadata of a typical complex object – child record level

In this way, similar and related images are well organized and presented in search results as a group, which leads to a more satisfying user experience. This organization also successfully restored the archival context of this collection. Figure 10 is a screenshot of the James Parker Collection in LibSafe that shows the archival context by folder. Figure 11 is also a screenshot from LibSafe that shows the archival context by series.
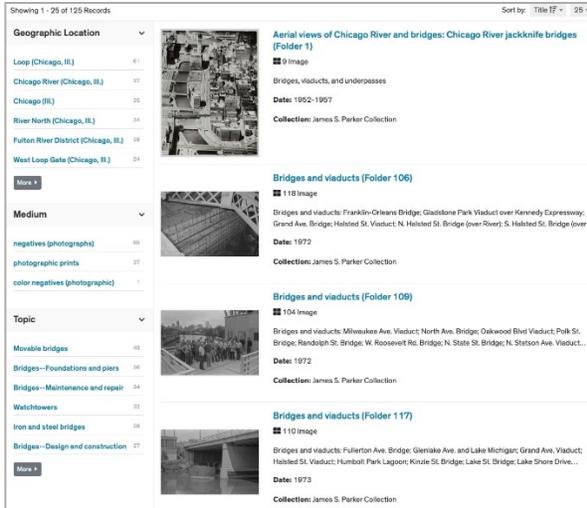
Figure 10. James Parker Collection in LibSafe that shows the archival context by folder
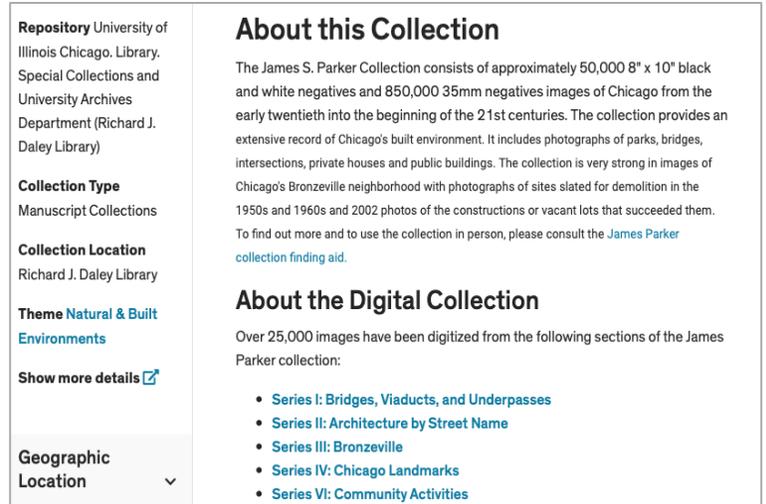

Figure 11. James Parker Collection in LibSafe that shows the archival context by series

FUTURE DIRECTIONS

The UIC Library is currently adjusting practices in the metadata creation workflow to produce a new Digital Collections interface that better serves a wider range of users and strikes a better balance between the content description with which catalogers and digital librarians are most concerned, and the contextual information that concerns archivists. There are three ways the UIC Library will continue to try to improve that content/context balance in future work: aggregated digitization and description, technology enhancements, and moving from a linear to a circular workflow.

Aggregated digitization and description

The James Parker collection, described above, was the UIC Library's first attempt to deliver a large image collection without having to develop item-level metadata, instead drawing from the folder titles to describe images in the aggregate. This strategy uses the digital object arrangement to restore archival context to digitized material. The library has eight more forthcoming digitized collections that have been scanned with this approach. Each of these collections will offer nuances and lessons learned as to when this aggregate approach is a good strategy for a given collection. It appears to work well for collections where all materials in each folder are highly homogenous. The UIC Library has also largely focused on scanning photographic materials, and it is possible that providing folders as digital objects will be a better option as the Library begins to scan more full text documents. Initial experiences with the James Parker collection and the early steps of the next eight collections suggest that a crucial first step to aggregated digitization and description is a thorough review of the finding aid by all stakeholders. If the finding aid is to become the basis for digital object discovery, it must be error-free and folder titles must be constructed with repository-wide keyword search effectiveness in mind. The risk of the "folder-as-digital-object" approach is that it can tip the balance between content and context so far toward the side of context

that materials inside folders will be impossible for users to retrieve in a keyword search. Maintaining content-based discovery will be an important consideration for catalogers as they begin working with the next eight collections.

Technology enhancements: IIIF

As noted earlier, the LibSafe DAMS enables libraries to customize the IIIF manifests that control digital object layout and can provide supplemental metadata. This technology may help to bridge the gap between content and context – that tension between the perspectives of archivists, catalogers, and digital librarians. Several libraries have begun to use the IIIF manifest to present objects in a digital collection according to their context in the finding aid.

The Getty Research Institute (2021) has developed the Research Collections Viewer, which uses IIIF to reconnect digitized materials to their archival context. The Edward Ruscha photographs of Sunset Boulevard and Hollywood Boulevard, 1965-2010 is one Getty collection that enables end users to browse digitized materials using the finding aid inventory. The United States Holocaust Memorial Museum (2021) also uses IIIF to balance context with content in their digital collections. Users can search digitized material across all of the museum's collections and once they select an item, they can also browse by the collection structure.

These collections are not the first to show robust archival context; Zhang (2012) highlights examples of digital collections that present the digitized material to the end user in the context of the finding aid inventory. Links to digitized items from a finding aid were likely among the first approaches to delivering digital content. Developments like the widespread adoption of CONTENTdm enabled users to find material based on the content, but at the expense of context. The use of IIIF manifests offers the opportunity to do justice to both modes of discovery, thereby meeting the needs of users who may see the same material in very different ways. The following example from Getty offers a balanced view into a digitized image from a collection. Users can not only browse through digitized content from the Ed Ruscha collection by the finding aid order, but also see any given item displayed in that contextual order. The image display shows both content-based and contextual metadata on the same screen.
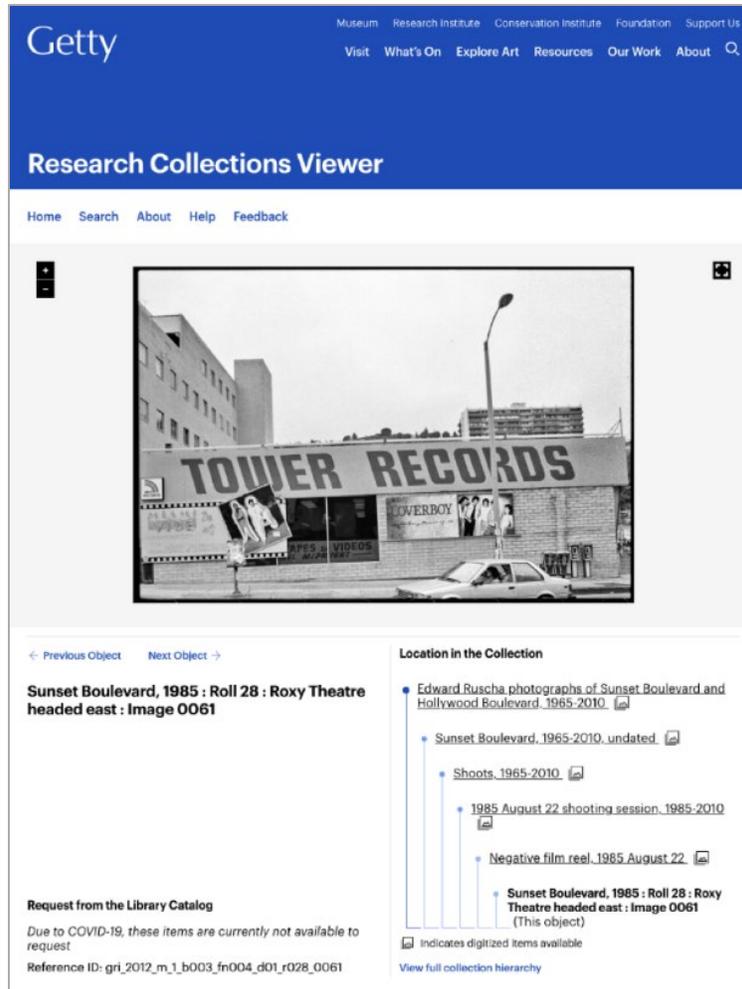
Figure 12. Getty Research Institute research collection viewer

While this work won't be undertaken at UIC until much more of the digital backlog has been brought into public view, the work of libraries like the Getty provides an inspiring example of what can be done when libraries have more access and control over the IIIF manifest.

Moving from Linear to Circular Workflow Model

While our workflow was improved to increase collaboration, the current workflow model is a straight line with archivists at the beginning of the process. This means that archivists develop the first draft of digital object metadata, which is then revised by two other departments. What the end user sees may be quite different from what the archivist originally provided. In the future, it is imperative to build in a more circular project workflow. The cross-departmental team that meets during the project proposal phase to envision and define the project now stays in contact via Microsoft Teams throughout the entire project. We will also implement a project close meeting to review the resulting digital collection before it is published to end users.

CONCLUSION

This paper demonstrates how differences in end user behavior and different interdepartmental perspectives on metadata can strengthen the digital object workflow to serve a wider variety of users. Significant progress has been made to UIC's metadata collaboration since the establishment of the cross-departmental Metadata Working Group. New digitization projects now routinely engage the SCUA, RAM and DPS departments from the outset, which we hope will lead to more consistent metadata which is compatible across collections for effective repository-wide search. Adjustments and refinements have been applied to the metadata workflow to successfully address these differences and to strengthen the content/context balance. With all the further improvements mentioned above, we are excited to continue integrating the diverse strengths of these departments into our metadata workflow to serve a range of digital collection users.

References

Allison-Bunnell, J., Cresci Callahan, M., Gueguen, G., Kunze, J., Matiusak, K., Wiedeman, G. (2021). Lost Without Context: Representing Relationships between Archival Materials in the Digital Environment. In M. Matienzo & D. Handel (Eds.), *The Lighting the Way Handbook: Case Studies, Guidelines and Emergent Futures for Archival Discovery and Delivery* (pp. 55-72). Stanford, CA: Stanford University Libraries. https://doi.org/10.25740/gg453cv6438

Anderson, M., Exckard, M., Griffin, M. Hastings, M., Kulczak, D. Powell, C., Virakhovskaya, O., Wells, C. and Windon, K. (2021). Facilitating Seamless Access Through Collaborative Workflows, Advocacy and Communication, In M. Matienzo & D. Handel (Eds.), *The Lighting the Way Handbook: Case Studies, Guidelines and Emergent Futures for Archival Discovery and Delivery* (pp. 39-52). Stanford, CA: Stanford University Libraries. https://doi.org/10.25740/gg453cv6438

Austin, D. (2003). CITY2000: A holistic approach to administering image resources. *Journal of Library Administration, 39*(2–3), 5-13. https://doi.org/10.1300/J111v39n02_02

Bogaard, T., Hollink, L., Wielemaker, J., van Ossenbruggen, J., & Hardman, L. (2019). Metadata categorization for identifying search patterns in a digital library. *Journal of Documentation, 75*(2), 270-286. https://doi.org/10.1108/JD-06-2018-0087

Chassanoff, A. (2018). Historians experience using digitized archival photographs as evidence. *The American Archivist, 81*(1), 135-164. https://doi.org/10.17723/0360-9081-81.1.135

Conway, P., & Punzalan, R. (2011). Fields of vision: toward a new theory of visual literacy for digitized archival photographs. *Archivaria, 71*(Spring), 63-97.

Darcovich, J., Flynn, K., & Li, M. (2019). Born of collaboration: The evolution of metadata standards in an aggregated environment. *Visual Resources Association Bulletin, 45*(2), Article 5. https://online.vraweb.org/index.php/vrab/article/view/35/33

Fukumoto, T. (2006). An analysis of image retrieval behavior for metadata type image database. *Information Processing & Management*, *42*(3), 723-728. https://doi.org/10.1016/j.ipm.2005.01.008

Getty Research Institute. (n.d.). *Edward Ruscha photographs of Sunset Boulevard and Hollywood Boulevard, 1965-2010*. Getty research collections viewer. Retrieved June 22, 2022, from https://www.getty.edu/research/collections/collection/100001

Goodale, P., David Clough, P., Fernando, S., Ford, N., & Stevenson, M. (2014). Cognitive styles within an exploratory search system for digital libraries. *Journal of Documentation*, *70*(6), 970-996.https://doi.org/10.1108/JD-03-2014-0045

Greene, M. and Meissner, D. (2005) More product, less process: Revamping traditional archival processing. *The American Archivist*, *68*(2), 208-263. https://doi.org/10.17723/aarc.68.2.c741823776k65863

Ho, J. (2020). The roles of cataloging vs. non-cataloging librarians and staff in non-MARC metadata related workflows: a survey of academic libraries in the United States. *Cataloging & Classification Quarterly,* 58(8), 728-768. https://doi.org/10.1080/01639374.2020.1863889

Hunter, N., Legg, K., & Oehlerts, B. (2010). Two librarians, an archivist, and 13,000 images: Collaborating to build a digital collection. *The Library Quarterly, 80*(1), 186-197. https://doi.org/10.1086/648464

Maron, N., & Pickle, S. (2013). *Appraising our digital investment: Sustainability of digitized special collections in ARL libraries*. Association of Research Libraries.

Matusiak, K. (2006). Information Seeking behavior in digital image collections: a cognitive approach. *The Journal of Academic Librarianship, 32*(5), 479-488. https://doi.org/10.1016/j.acalib.2006.05.009

Matusiak, K., (2012). Perceptions of usability and usefulness of digital libraries. *Journal of Humanities & Arts Computing: a Journal of Digital Humanities, 6*(1-2), 133-147. https://doi.org/10.3366/ijhac.2011.0044

Niu, J. (2015). Archival intellectual control in the digital age. *Journal of Archival Organization, 12*(3/4), 186-197. https://doi.org/10.1080/15332748.2015.1154747

Passehl-Stoddart, E. (2018). Playfulness in the Archives: Enhancing Digital Collections through Card Sorting. *The Reading Room 2*(1), 39-54.

Sweester, M., & Orchard, A. (2019). Are we coming together? The archival descriptive landscape and the roles of archivist and cataloger. *The American Archivist, 82*(2), 331-380. https://doi.org/10.17723/aarc-82-02-18

Therrell, G. (2019). More product, more process: Metadata in digital image collections. *Digital Library Perspectives, 35*(1), 2-14. https://doi.org/10.1108/DLP-06-2018-0018

United States Holocaust Memorial Museum. (n.d.). *Hafftka and Jonisch families photographs*. Search our collections. Retrieved Juen 22, 2022, from https://collections.ushmm.org/search/catalog/irn551417#?rsc=170700&cv=0&c=0&m=0&s=0&xywh=-823%2C-88%2C2676%2C1753

Xie, I., Joo, S., & Matusiak, K. (2018). Multifaceted evaluation criteria of digital libraries in academic settings: Similarities and differences from different stakeholders. *The Journal of Academic Librarianship, 44*(6), 854-863. https://doi.org/10.1016/j.acalib.2018.09.002

Zhang, J. (2012). Archival representation in the digital age. *Journal of Archival Organization, 10*(1), 45-68. https://doi.org/10.1080/15332748.2012.677671

Zhang, J., & Mauney, D. (2013). When archival description meets digital object metadata: A typological study of digital archive representation. *The American Archivist, 76*(1), 174-195. https://doi.org/10.17723/aarc.76.1.121u85342062w155

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