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This study discusses best practices in describing architectural records in special collections repositories through encoded finding aids. It argues that metadata elements within these finding aids could serve as more effective access points if end users were more easily able to develop their own ways of highlighting relationships which exist within and across collections. Based on the information gathered from semi-structured interviews, this paper reports how other archivists developed institutional standards with which to catalog and process their architectural collections. Finally, this paper provides examples of what could be achieved in the realm of data visualization in an attempt to inspire repositories to make it easier for end users to extract the metadata that archivists and librarians spend so much time collecting.

Headings:

Architectural drawings

Faceted classification

Finding aids

Libraries--Special collections

AN ANALYSIS OF FINDING AID STRUCTURE AND AUTHORITY CONTROL FOR LARGE ARCHITECTURAL COLLECTIONS

by
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Introduction

The following study is in large part inspired by the 2010-2012 project, "Changing the Landscape: Exposing the Legacy of Modernist Architects and Landscape Architects." Staff of this two-year archival processing project purported to arrange and describe collections of drawings and other papers produced by influential modernist architects and landscape architects. These architects are credited for not only influencing their professions, but literally changing the national and regional landscape. Funded by a Council on Library and Information Resources (CLIR)'s Hidden Collections grant, the project involved collections housed at the North Carolina State University (NCSU) Libraries' Special Collections Resource Center (SCRC). The SCRC has collected representations of modernist works to make them widely accessible to scholars, practitioners, and students of architecture, design, and landscape architecture. All of the represented designers practiced in North Carolina, and their work and influence often intersected. Through this grant, the SCRC staff also accessioned and processed several architectural and landscape architectural records collections of varying sizes from two or three boxes to over five hundred linear feet of oversized flat folders and drawing tubes.

After processing each of these collections, Changing the Landscape project staff created finding aids through Archivists' Toolkit software. A finding aid is "a description of records that gives the repository physical and intellectual control over the materials and that assists users to gain access to and understand the materials."[1] The staff's

principle goal was to create container lists that would make the materials easily retrievable. These container lists are divided into series by material type (e.g. project drawings, project files, office records, personal papers) and are organized within each series alphabetically by project name. Additional metadata in the container lists include—depending on availability—the architect's name, client, dates, geographic location, and format. Figure 1 is a sample of the drawings series for the Lewis Clarke Collection, with projects listed in alphabetical order. Due to constraints placed by Archivists' Toolkit, each and every tube, file folder, or other container gets its own line in the container list. However, there is disagreement as to what point the patron should have an idea as to the physical extent of the records in question. SCRC archivists think there is danger in not letting users know up front the physical extent of any part of the collection. The major problem with this workflow is that the Lewis Clarke Collection contains roughly one thousand projects. Many of these one thousand projects exist in multiple formats and span several boxes, file folders, and tubes. Therefore, cataloging the collection in accordance with the SCRC's processing workflows for traditional manuscript collections resulted in a large and cumbersome finding aid.

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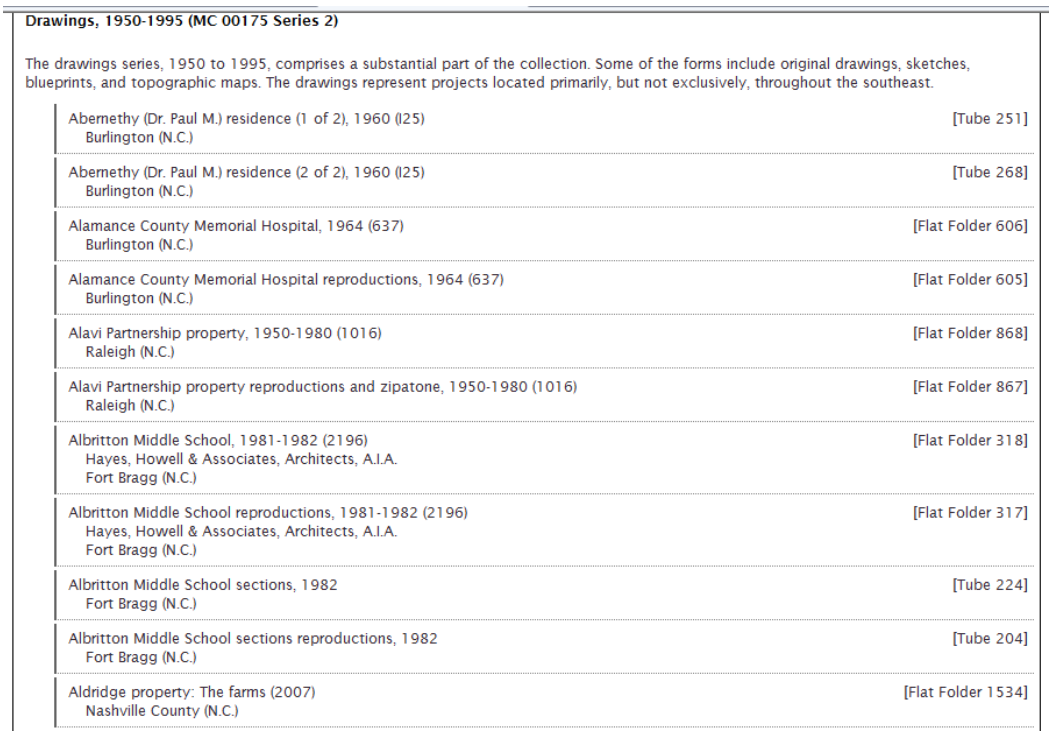
[1] Society of American Archivists, available at http://www.archivists.org/glossary/term_details.asp?DefinitionKey=66.



Drawings, 1950-1995 (MC 00175 Series 2)

The drawings series, 1950 to 1995, comprises a substantial part of the collection. Some of the forms include original drawings, sketches, blueprints, and topographic maps. The drawings represent projects located primarily, but not exclusively, throughout the southeast.

Abernethy (Dr. Paul M.) residence (1 of 2), 1960 (I25) Burlington (N.C.)	[Tube 251]
Abernethy (Dr. Paul M.) residence (2 of 2), 1960 (I25) Burlington (N.C.)	[Tube 268]
Alamance County Memorial Hospital, 1964 (637) Burlington (N.C.)	[Flat Folder 606]
Alamance County Memorial Hospital reproductions, 1964 (637) Burlington (N.C.)	[Flat Folder 605]
Alavi Partnership property, 1950-1980 (1016) Raleigh (N.C.)	[Flat Folder 868]
Alavi Partnership property reproductions and zipatone, 1950-1980 (1016) Raleigh (N.C.)	[Flat Folder 867]
Albritton Middle School, 1981-1982 (2196) Hayes, Howell & Associates, Architects, A.I.A. Fort Bragg (N.C.)	[Flat Folder 318]
Albritton Middle School reproductions, 1981-1982 (2196) Hayes, Howell & Associates, Architects, A.I.A. Fort Bragg (N.C.)	[Flat Folder 317]
Albritton Middle School sections, 1982 Fort Bragg (N.C.)	[Tube 224]
Albritton Middle School sections reproductions, 1982 Fort Bragg (N.C.)	[Tube 204]
Aldridge property: The farms (2007) Nashville County (N.C.)	[Flat Folder 1534]

Figure 1. Lewis Clarke Collection Guide, available at: http://lib.ncsu.edu/findingaids/mc00175. Each individual container is listed and series are separated by format. If a container has more than one project within it, then the container is listed multiple times.

When working on large architectural collections, Archivists' Toolkit as an information system sometimes conflicted with the systematic and efficient workflow that the project librarian wanted to establish. For example, Archivists' Toolkit does not have the sorting functionality of an Excel spreadsheet. During the Changing the Landscape project, there were up to three students working on the container list for the Lewis Clarke collection. Hence, the SCRC wanted to develop a way to work first from Excel and then ingest the container list into Archivists' Toolkit. Jason Ronallo, who was a Digital Collections Technology Librarian at the SCRC during the time of the Changing the Landscape project—created such a work-around, called Stead which allowed processors to build the container lists in Excel, run a script over them to convert them from a

comma-separated value format to EAD, and import the EAD into Archivists' Toolkit.[2] Unfortunately, there does not seem to be a simple way to run that process backwards—to export corrected records from Archivists' Toolkit to Excel.

Concurrently with this grant, the SCRC Finding Aid Committee formed in an effort to brainstorm ways of redesigning and updating the repository's collection guides. With the existence of such a committee, it follows that the SCRC was willing to consider creative changes to its finding aids. Keeping this committee in mind and wishing to help inform its plans, I considered how a redesigned Lewis Clarke Collection finding aid could more adequately serve researcher's needs (see Figure 1 for the current version). Architectural collections create unique intellectual challenges for archivists due to their relatively large size, existence of multiple collaborators, and—particularly in the case of repositories with a regional focus—the high rate of related materials existing in multiple collections. As a processing graduate student archivist on this grant, my work on a finding aid that was consistent with institutional practices for manuscript collections resulted in a detailed inventory so large as to threaten to crash older browsers and to respond slowly in newer ones. In other words, the finding aid created access barriers, which is inconsistent with its purpose as an access tool. Creating and editing these finding aids for architectural collections prompted me to analyze the SCRC's processing workflows, including the identification, collection, and structuring of the metadata elements. I wondered if the time spent creating the metadata for the resultant encoded online finding aid was justified. In other words, does the finding aid do enough to meet the needs of researcher? If not, what could make the metadata more valuable? Seeking

[2] Technical specifications available at GitHub, https://github.com/jronallo/stead.

answers to these questions, I interviewed archivists with experience processing architectural records.

This paper shares my findings from these semi-structured interviews. It also discusses the desired functionality requirements in future finding aids that these interviews inspired. For example, researchers should be able to quickly and dynamically search across collections based on the access points such as project name, creator name, geographic location, and date. Noah Huffman of Duke University Libraries observes:

> Librarians and archivists spend a lot of time creating structured data…and describe digital objects in a seemingly endless variety of metadata structures. Now that archival researchers are relying more on web search engines like Google to discover collections, some in the profession have begun to question the value of structured archival data, noting that most web-scale discovery systems do little to exploit the potential or justify the costs of creating structured data (Huffman, 2011, p. 2-3).

Metadata can be envisioned as "a surrogate record for an information package, treating it as a collection of descriptions associated with an entity or object" (Glushko, et al, 2012). I hypothesize that these surrogate records have the potential to reveal useful information through creative reuse by end users. If metadata elements were more easily divorced from the encoded structure of the finding aid—meaning archivists would have to accept a lessened degree of primacy over their metadata—end users could create their own access points and/or develop ways of highlighting relationships which exist within and across collections.

I sought evidence to test my anecdotal experiences from working on this project. How did other professionals provide access to large, bulky architectural collections? Did they alter or adjust their traditional manuscript processing workflow to address user concerns and satisfaction? Semi-structured interviews revealed how other archival

professionals developed institutional standards with which to catalog their architectural collections, as well as solutions and work-arounds they implemented to tackle complications faced while processing architectural records.

Literature Review

Where do the needs of the researcher and the archivist collide? Do researcher needs specific to architectural records exist? Upon considering how to move forward, it is important to look backward and trace the trajectory of the finding aid in order to avoid re-inventing the wheel. At present, the analog finding aid forces a static interface, an inventory that reflects the physical arrangement of the collection. Ciaran B Trace and Andrew Dillon describe how "with the adoption of MARC AMC, authority work moved beyond the traditional administrative history or biographical sketch to include access points and controlled vocabulary, and administrative and collection management data became more of an integral component of archival description" (Trace and Dillon, 2012). Consequently, this paper focuses on the access points most commonly used by researchers of architectural records, how authority control on those access points is or is not employed, and how archivists might more effectively make available the metadata associated with these access points to further justify the cost of collection. Further, in an electronic finding aid, discrete metadata elements can and should break out of the document-centered model. As demonstrated in the first section of this literature review, there is consensus among archival professionals that the finding aid could better address user needs, particularly those needs specific to architectural collections present for archival processors and researchers. The second section provides a brief overview of the functionality of database-driven finding aids. Finally, the third section discusses the rise

of the EAD-structured finding aid and its role as a communication tool between the archivist and researcher.

Processing Architectural Records to Address Research and Archival Needs

It is important here to bear in mind, as Joyce Chapman holds, that "the goals of descriptive standards should not and do not include display. User needs and the principles of Web design, rather than the structure of the EAD XML standard, should dictate how finding aids are displayed" (Chapman, 2010, p. 5). Archivists need not remain beholden to display models that mimic the analog finding aid. When digital formats of documents supersede the analog, the shift "has often been accompanied by two competing goals: to mimic the established forms of paper so as to ease the transition for creators and users, while exploiting the power of the new medium to enhance access, navigation, and location" (Trace and Dillon, 2012). With the advent of new researchers—often referred to as digital natives—in the archives, it is conceivable that many of today's researchers have never worked with a paper finding aid. Perhaps the profession can (or must) afford to transition away from a reflection of the analog format at a quicker rate in order to address this generation's research needs.

However, the archivist also needs to know how to navigate the user's needs and maintain realistic expectations of what can be accomplished with limited resources. Describing the archival records of architect Bruce Goff, one architectural historian opined: "Among the ordinary household items, the deaccessioning of pans, dishes, furniture, and the like is more understandable. Yet even these record Goff's taste and interests, and I hope they can be photographed and listed in some useful manner before dispersal" (de Long, 1996, p. 161). As far as most archival institutions are concerned,

this item-level cataloging of a donor's personal effects runs counter to institutional processing standards. Time, space, and other essential resources are far too limited.

Architectural records present unique challenges to archival processors when compared to other manuscript collections. Archivist Inés Zalduendo explains that these collections are complicated, comprehensive, and different from traditional manuscript collections because they

> are not only comprised of architectural drawings, but also of photographs, slides, meeting notes, clippings, miscellaneous legal and technical documents such as contracts and building specifications, and three dimensional models that document the professional work of an individual or firm (Zalduendo, 2004, p. 8).

The implicit conflict here is that intellectually, the materials are arranged in accordance with a project (i.e. building), but physically it is best practice for the archivist to arrange the materials in accordance with genre (e.g. photographs, drawings). When writing a finding aid, archivists disagree as to whether they should arrange their inventories in accordance with the materials' physical arrangement or their intellectual arrangement. Zalduendo suggests an alternative, "make use of a system that provides for appropriate field tags that can then generate relevant indices for further access" (Zalduendo, 2004, p. 10).

Balancing inherent resource limitations with reported user needs and preferences, in 2010, Kelcy Shepherd and Waverly Lowell of the University of California in Berkeley's Environmental Design Archives quite literally wrote the book on archival description for architectural collections. Entitled *Standard Series for Architecture and Landscape Design Records: A Tool for the Arrangement and Description of Archival Collections* (hereafter *Standard Series*), this guide is an international standard for the arrangement and description of architectural records. In the authors' words, "This guide

to standard series for architectural records was intended to provide a method to tame big, beautiful, and unwieldy collections of architectural records" (Shepherd & Lowell, 2010, p. 1). The *Standard Series* resulted from roughly a decade of architectural papers processing experience and user feedback. This standard addresses the unique user needs and processing challenges relevant to architectural records and has been widely adopted by architectural repositories, including the SCRC. Consequently, Shepherd and Lowell's work also greatly influenced the processing strategies employed in the Changing the Landscape project.

Databases and Structure Standards for Archival Metadata

Structure standards can be defined as "envelopes" or containers in which descriptive data are stored and content standards as rules for the descriptive data that are stored within those containers. This descriptive data, or metadata, "is a class of information that helps people or automated agents identify, use, or otherwise interact with the entity it describes" (Glushko, et al, 2012). A key component of modern finding aids is the American archival community's widespread adoption of encoded archival description (EAD) during the 1990s as the structure standard used for sharing archival finding aids and the metadata contained within. As someone who has only very recently come onto the archival scene, I wondered why archivists developed EAD rather than modeling their finding aids off of a relational database management system (hereafter RDBMS). After all, many of the problems I faced—such as linking projects with multiple creators and controlling the project names across collections—when editing the Lewis Clarke Collection Guide (the SCRC uses the term collection guide synonymously with finding aid) seemed to warrant an RDBMS solution. The answer to this question,

however, lies within the literature of how archivists were using and thinking about databases at the time that EAD was being developed. What is the context behind the American archival profession's decision to abandon database-driven finding aids for EAD?

Databases of the late 1980s and early 1990s insufficiently met archival needs because of the limits posed by fixed-length fields and storage space. With computer memory being so expensive, commercial database management systems required quite a bit of customization in order to intellectually control beyond the collection level. Since the archival processing standard at the time required control at the document level, "the overall inflexibility and occasional unreliability of these specialized offerings" frustrated archivists (Zboray, 1987, p. 211). Proffered solutions included paring down fields, substituting codes for subject headings, and creating multiple dependent databases. But, as Ronald Zboray astutely observes, this degree of customization "may in its actual implementation on small data base management systems lead archivists to construct, based on knowledge of their holdings, a myriad of computer applications as unique as their own collections" (Zboray, 1987, p. 221). Since American archivists create structure standards in order to promote interoperability of their catalog records, they were wary of a solution that would entail the degree of customization Zboray predicted.

Other projects included Richard Carter Davis' report on Idaho's Centennial Database, which began at a time when "MicroMARC:amc, developed at Michigan State University under a NHPRC grant, was the only software known to us for implementing the USMARC Archives and Manuscripts Control (AMC) format on personal computers" (Davis, 1992, p. 601). As their first computerized manuscript catalog, the University of

Idaho Library chose authority control and the "capabilities of rearrangement and the ability to search on specific parts of the record provided by a database over the advantages of ease of entry and formatting of a word processor" (Davis, 1992, p. 604). However, this system grew "awkward" after only six hundred records and roughly two thousand subject entries, underscoring how database capacity was not yet at a point to sufficiently meet the needs of archival repositories. The difficulties inherent in the continuous growth of information are reflected in much more recent writing: "Every day more information resources are created or become available. This presents a conundrum: the more resources there are, the more we need metadata to help us find things, but the more things we have, the harder it is to assign metadata to them" (Glushko, et al, 2012). However, the functionality requirements of data rearrangement and more targeted searching as methods of contending with these growing resources are still ideals not yet fully implemented in today's EAD finding aids.

Lastly, Bruce Wheaton's report on his library's use of a computer database system to "display archival data on correspondence of historical significance" is another example of pre-EAD (1982) re-use of archival metadata. The database contained relevant access points such as author, recipient, location, and date or, "Put most plainly, we provide here a complete system to inventory useful descriptive information on correspondence, whatever the subject or period of the exchanges." (Wheaton 456). Wheaton's inventory of correspondence is relatable to an inventory of architectural projects except that Wheaton's inventory went to the item-level of each piece of correspondence and an ideal project inventory, in my opinion, would list each project as an aggregate of its corresponding records. This aggregation, especially with large

collections or within a repository of related collections, would require authority control in much the same way as Wheaton describes:

> The interactive format used for data entry requires other types of records. We started with a sub-index of 5,500 records, each containing a physicist's name and biographical data. This is an authority list to standardize spelling and form…The interactive searches of previously entered data maintain consistency and prevent, for example, creating an unnecessary duplication of correspondent name records (Wheaton 460).

With at least five different student workers adding and editing a spreadsheet of Lewis Clarke's projects, such an interactive interface that promoted authority control could have prevented the extensive metadata clean-up work that resulted. This authority control would allow for more sophisticated querying and faceted searching. However, the bulkiness and wealth of access points inherent in large architectural collections made the database model unfeasible in the 1980s and 1990s. With the increasing demand for archival information to go online, archivists needed a structure standard that would be flexible enough to work for collections of varied sizes, subjects, and formats.

EAD's Replacement of Database-driven Finding Aids

EAD was developed as a way to catalog records in a manner that databases and online machine-readable catalogs were not yet capable. EAD combined with the archival content standard commonly referred to as DACS (*Describing Archives: A Content Standard*) have proven to be quite the panacea for inflexibility, though I argue that it may be *too* flexible as to prevent archivists from fully utilizing its potential for intellectual control. The rise of this encoding standard prompted *The American Archivist* to publish special issues on EAD in 1997. Within the issue containing case studies, Nicole L. Bouché explained how Yale implemented the standard in their finding aids. As an "early implementer" of FindAid Document Type Definition, now EAD, Bouche highlighted the

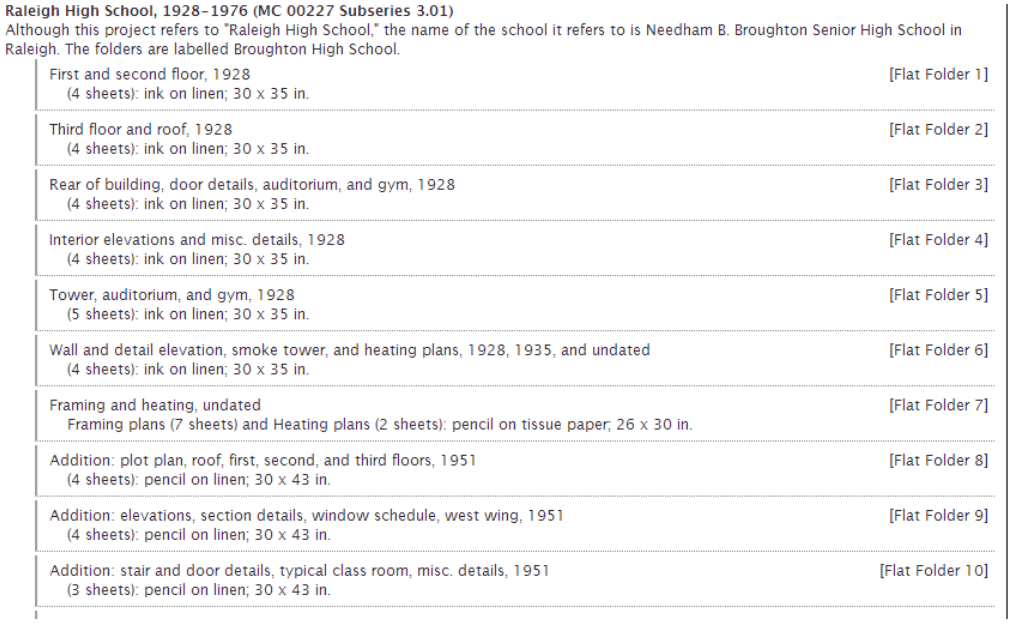
features of this structure standard. The finding aids were cross-indexed so that one could search across all three contributing Yale libraries holdings or restrict the search to the finding aids of a single library unit. Users could also search the SGML-encoded files by specific EAD tag regions. However, she claims that as a standard for structure rather than content, expecting anything more from EAD would complicate the process too much to be feasible: "We followed the advice of experienced SGML consultants, who encourage those facing massive legacy file conversions to keep the markup simple and to focus on tagging structure, not content" (Bouché 413). This makes sense, as Yale and other repositories grappling with this new standard would naturally first want to convert their legacy finding aids so they may all display online. The physical structure of the document includes tags for series headings, cross references, front matter, and container lists. As for the question of content markup, Bouche remarked that Yale took a "wait and see" approach, but that they were skeptical of the promised benefits (Bouché 414). This approach is reasonable given the extensive legacy data with which Yale libraries had to contend. As they underwent the conversion process, it would only seem rational to shy away from investing too much time into structuring data in a way that would fail to later be interoperable or easily ingestible into the next major change.

However, as I looked at the contemporary literature on database administration, it became clear that although the archival move from the database structure to the EAD-XML structure made sense at the time, the underlying logic no longer holds as much weight. If we return to Davis' 1992, we learn that "when the number of records in the descriptive database grew to over six hundred and the number of subject entries rose to over two thousand, the awkwardness of a flat-file bibliographic database became

obvious" (Davis, 1992, p. 604). Processing speeds and memory storage have come such a long way since the 1990s that it seems the promises of EAD tagging can be better fulfilled within a database-run discovery interface. The hierarchical nature of the encoded container listing is a helpful communication tool between archivists, but as Elizabeth Yakel notes, this structure relies on users' understanding of archival jargon and standards. She further indicates that "archivists need to incorporate design principles from human, computer interaction and cognitive psychology into EAD interfaces" (Yakel, 2004, p. 75).

Reconciling inherent resource limitations with reported user needs and preferences is a balancing act. In recent years, many repositories have adapted their processing workflows in the style proposed in 2005 by Mark Greene and Dennis Meissner. Greene and Meissner famously coined the term "more product less process," also known in the archival world as MPLP. In essence, MPLP is a strategy that directs archivists to provide at least minimal descriptive metadata for all of its collections and prioritize further processing based on expressed researcher needs and usage statistics. MPLP is an approach to processing that introduces a lot of flexibility with an emphasis on prioritization. This approach holds that some of the tasks that take up the greatest amount of time for archivists, such as removing staples and paper clips or re-arranging individual papers in chronological order within folders are not always necessary for every collection. Archivists should focus on calculating the amount of work necessary to get a collection usable for research purposes rather than investing months making every collection pristine. In the not-distant-enough past, the expectation was that architectural

collection finding aids would list every individual drawing including type, medium (e.g. pencil on tracing paper), and dimensions (see Figure 2).



Raleigh High School, 1928–1976 (MC 00227 Subseries 3.01)
Although this project refers to "Raleigh High School," the name of the school it refers to is Needham B. Broughton Senior High School in Raleigh. The folders are labelled Broughton High School.

First and second floor, 1928 (4 sheets): ink on linen; 30 x 35 in.	[Flat Folder 1]
Third floor and roof, 1928 (4 sheets): ink on linen; 30 x 35 in.	[Flat Folder 2]
Rear of building, door details, auditorium, and gym, 1928 (4 sheets): ink on linen; 30 x 35 in.	[Flat Folder 3]
Interior elevations and misc. details, 1928 (4 sheets): ink on linen; 30 x 35 in.	[Flat Folder 4]
Tower, auditorium, and gym, 1928 (5 sheets): ink on linen; 30 x 35 in.	[Flat Folder 5]
Wall and detail elevation, smoke tower, and heating plans, 1928, 1935, and undated (4 sheets): ink on linen; 30 x 35 in.	[Flat Folder 6]
Framing and heating, undated Framing plans (7 sheets) and Heating plans (2 sheets): pencil on tissue paper; 26 x 30 in.	[Flat Folder 7]
Addition: plot plan, roof, first, second, and third floors, 1951 (4 sheets): pencil on linen; 30 x 43 in.	[Flat Folder 8]
Addition: elevations, section details, window schedule, west wing, 1951 (4 sheets): pencil on linen; 30 x 43 in.	[Flat Folder 9]
Addition: stair and door details, typical class room, misc. details, 1951 (3 sheets): pencil on linen; 30 x 43 in.	[Flat Folder 10]

Figure 2. Guide to the Guy E. Crampton and William Henley Deitrick papers and drawings (available at http://lib.ncsu.edu/findingaids/mc00227). This finding aid was created by SCRC staff who followed the older standards of architectural processing. This brand of item-level processing was determined to be an unsustainable standard by current SCRC staff.

From this literature review, I surmise that archivists are concerned with how effectively their finding aids provide researchers with access points to collections. After all, input from researchers was a factor in the considerable changes to description standards for architectural records that have occurred over the past two decades. An upswing in user studies also promotes the notion that finding aids are meant to be communication tools between archivists and researchers (Chapman, 2010). The literature also suggests that architectural collections differ from traditional manuscript collections enough to warrant their own set of description standards. This led to the following research questions: Do processing workflows for traditional manuscript collections work well for architectural papers? How do users ask about or for information related to these

records? Does the EAD finding aid work well as an access tool for architectural collections that contain hundreds of projects? To what information technology resources do repositories with large architectural collections have access?

Interviews with Comparable Repositories

Methods

Between reviewing the literature cited above and my experience processing architectural records, I sensed a tension between user expectations and the way architectural metadata is gathered and displayed by archivists. In order to answer my research questions, I needed to compare and contrast my experiences at the SCRC with the challenges, workflows, and user groups at other architectural repositories. I was particularly interested in the display and functionality of other institutions' architectural finding aids. For example, these finding aids often include inventory lists with identifying information for projects that are represented in the collections. This information is typically organized by project or by material type (e.g. drawing, photograph, project file), or some combination of the two. However, there is some variation as highlighted in Figures 1, 3, and 4.

In order to collect data for comparative purposes, I drafted a questionnaire for professional archivists who had experience processing architectural collections. This comparative information broadened the scope of this study beyond my anecdotal experiences with a grant-funded project. The questionnaire consisted of open-ended questions concerning the respondent's records, users, and finding aid publishing technologies. I selected archivists from repositories that had both a university affiliation and a collecting policy which emphasized architectural records. I initially emailed the

questionnaire to eight different repositories and received responses from the following: Tulane University's Southeastern Architectural Archives (SEAA), University of California at Berkeley's Environmental Design Archives (EDA), University of Texas at Austin's Alexander Architectural Archive (AAA), Virginia Tech's International Archives of Women in Architecture (IAWA), and Harvard University's Frances Loeb Library Special Collections (FLL). I received additional information from three of the respondents (SEAA, EDA, and AAA) and thus focus more on their experiences for this paper. In these cases, the questionnaire served as a framework for a longer conversation that gave both myself and the interviewee the opportunity to ask clarifying questions.

Appendix A lists the questions posed to each interviewee. The questions are divided into three categories: the users typically served by the institution; the structure of the institution's finding aids; and information about the technological resources accessible to the institution. The results presented below are divided between repository users and finding aid structure and then subdivided by institution. Through the collected data, I identified desired features of architectural finding aids by analyzing additional institutional standards. I learned how these professionals catalog their records and identify problems they face while processing architectural papers.

Repository Users

Keli E. Rylance is head of the SEAA. Established in 1980, the SEAA collects with the regional focus of the southeastern region of the Gulf of Mexico, particularly New Orleans. The SEAA's scope is comprehensive and consequently, their user group is broad. Rylance described a busy repository, answering around 1900 reference inquiries a year stemming from a varied assortment of research needs. She hears from the typical

architectural archive base: preservationists, architects, faculty, students, architectural historians, and engineers. But the repository also receives attention from lawyers, genealogists, government sector employees, documentary film makers, urban planners, geographers, environmentalists, activists, property owners, non-profit organizations, and demolition companies. Hurricane Katrina (2005) seems to have engendered an environment for these varied reference inquiries, as before that disaster hit, Rylance reports they had fewer than 500 requests a year.

The Alexander Architectural Archive the (AAA) began as a collection of resources to be used in conjunction with an architectural education program. The archive was established in 1958 due to Professor Blake Alexander's requirement for his architectural history class to measure and draw historic buildings. The drawings were initially kept in Alexander's office, but soon outgrew the space, hence the archive. Several years later, the first professional records to be deposited in the collection were donated by a relative of Galveston architect Nicholas Clayton. The architectural collections, which were transferred to the university library in 1979, now contain over 250,000 drawings and over 900 linear feet of papers, photographic material, models and ephemera, representing thousands of projects in Texas.

Donna J. Coates, curatorial assistant for technical services at AAA, described three user groups that the repository targets: school of architecture students, who often look for a particular building for preservation purposes; architects doing renovations; and architectural historians, who sometimes ask for topical or geographical requests. Users typically request materials by the project as their primary access point to the collection.

Hence, processors try to use as many descriptives as possible which results in the AAA's users commenting that the finding aids are rich in information.

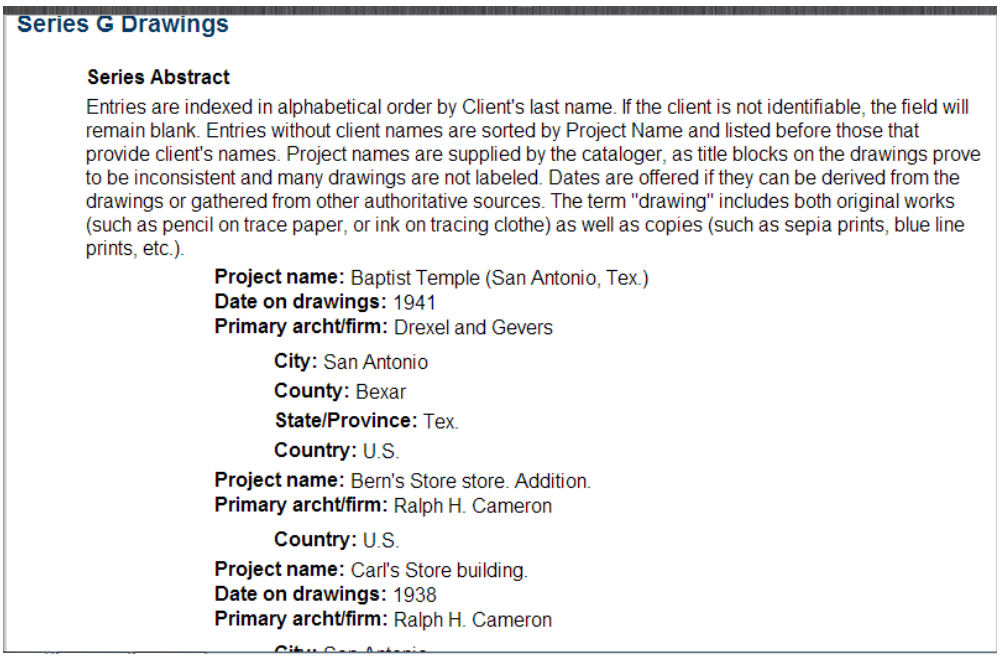
Naturally, after developing the *Standard Series*, Lowell and Shepherd implemented it at the Environmental Design Archives (EDA). The EDA holds historic and landscape architecture collections that document the lives and works of landscape architects, as well as large projects. The EDA's mission is to provide primary sources to its user base in support of scholarly research, teaching, preservation, and public service. These users include members of the campus community, scholars, architects, landscape architects, preservationists, and the general public. The repository's online finding aids, like at the AAA, are accessible through a state-wide catalog.

Finding Aid Structure

In spite of the heavy usage of the SEAA, Rylance and her colleagues operated with limited IT support. They do what they can with Microsoft Word and Adobe Acrobat to create, edit, and make available finding aids which emphasize the following access points at the project level: architect(s), architectural firms (including associates), identified projects (by project number and/or building name and/or client and/or street address and/or project dates). Because these Microsoft Word-created finding aids do not conform with Tulane University's functional requirements for standardized bibliographic records, the SEAA finding aids are not cataloged in the institutional catalog and are therefore not available on any sort of cooperative cross-institutional database such at the OCLC.

Rather than side-step the institutional catalog, Coates explained how working within the parameters set by Texas Archival Resources Online (TARO) affected

processing workflows. The AAA staff had to work around constraints placed by the federated state-wide finding aid database TARO. Until recently, TARO limited the file size of ingestible finding aids. Since architectural collections can often require much larger than normal finding aids, this constraint forced the staff at the AAA to employ one of two strategies for approaching particularly large collections. Both strategies involve prioritizing based on perceived usage. The first is to break finding aids into parts. Each series (project files, drawings, photographs) would be catalogued as a separate finding aid linked together through the related material field. Each series would have an assigned letter for box labels in order to easily accommodate additional accessions. The preferred solution by users was to intellectually put all the materials belonging to a particular project together in the finding aid, even though for storage reasons the materials were stored separately. Coates explained that in practice this was a cumbersome solution for the processor, but that it was particularly useful and popular during the days of paper finding aids since it eliminated much of the need to flip back and forth in large binders for all the materials related to the same project. Coates believes there is such a thing as too much information on a finding aid as displayed to users. Yet another way the AAA kept its finding aids shorter is to eliminate redundancy by not displaying the container information and range (compare Figures 1 and 3). Lastly, as a way to address the static nature of EAD finding aids, Coates and other processor embed spreadsheets with project information into PDF finding aids so that users can download them for sorting. Coates explained that the process was semi-automated with script but that she had to do a little metadata cleanup after ingest.



Series G Drawings

Series Abstract

Entries are indexed in alphabetical order by Client's last name. If the client is not identifiable, the field will remain blank. Entries without client names are sorted by Project Name and listed before those that provide client's names. Project names are supplied by the cataloger, as title blocks on the drawings prove to be inconsistent and many drawings are not labeled. Dates are offered if they can be derived from the drawings or gathered from other authoritative sources. The term "drawing" includes both original works (such as pencil on trace paper, or ink on tracing clothe) as well as copies (such as sepia prints, blue line prints, etc.).

Project name: Baptist Temple (San Antonio, Tex.)
Date on drawings: 1941
Primary archt/firm: Drexel and Gevers
City: San Antonio
County: Bexar
State/Province: Tex.
Country: U.S.
Project name: Bern's Store store. Addition.
Primary archt/firm: Ralph H. Cameron
Country: U.S.
Project name: Carl's Store building.
Date on drawings: 1938
Primary archt/firm: Ralph H. Cameron

Figure 3. Ralph Cameron drawings inventory available at http://www.lib.utexas.edu/taro/utaaa/00008/aaa-00008.html. This drawing inventory reflects the description standards at the AAA and can be compared against the SCRC's standards in Figure 1.

The EDA's finding aids contain a "Project Index" that lists architectural projects of a collection, organized alphabetically by project or client name (see Figure 4). The list includes dates, locations, project type, collaborator, physical location, and whether the item has been microfilmed. As echoed in other interviews with practitioners, Waverly Lowell emphasized that most of her repository's users are looking for a particular building or garden and that far fewer approach the repository searching for a particular designer or building type. Hence, the project name is the main point of entry and is thereby emphasized in the project index.

Job #	Client	Location	State	Date	Project Type	Collaborator (Role)	Photographer /Firm	Manuscript Box/Folder	Drawings Box/Folder	Photographs Box/Folder
	216 Pine	San Francisco	CA	1939	commercial			39|3	FF28, 39|3	39|3
5184	Ach, Russell	San Francisco	CA	1950-1952	residential			123|1	189|1547	
5682	Ach, Russell	San Francisco	CA	1956-1960	residential			123|2	T	123|2
4539	Adams, Frank P.	Piedmont	CA	1945-1946	residential			123|3		
	Adams, Frederick & Marion	Lake Tahoe	CA	1927	residential				FF29, 39|3	
	Adams, George P.	Berkeley	CA	1934	residential			39|4	FF30, 39|4	
4212	Adkins, A.L.	Vallejo	CA	1942	residential			39|5		
	Adler, Herman	Berkeley	CA	1931	residential			39|6	FF31, 39|6	
5723	Aggeler, Paul M.	San Francisco	CA	1957-1958	residential			123|4	T	123|4
3757	Aird, Robert	San Francisco	CA	1938	residential			39|7		
70069	Akron	Mountain View	CA	1970	?				T	
	Alameda South Shore Development Plan, consultation	Alameda	CA	1962	planning			123|5		

Figure 4. William W. Wurster/WBE collection project index available at http://www.ced.berkeley.edu/ced archives/pindex/wurster.xls. This project index reflects the descriptive standards of the EDA as outlined in Standard Series. This figure contains many of the same metadata elements that are described in Figures 1 and 3, but since Figure 4 is delivered in a spreadsheet, the user has more options to dynamically use and sort the data. Figures 1 and 3, in contrast, are displayed as static webpages.

The surveyed professionals were asked to speak to their user group, how and if their finding aids met their user's needs, and what technological support, if any, existed. The respondents agreed that the majority of their users value the project name as the most used and useful access point in the finding aid. Hence, each of the institutions organizes the container listings of their finding aids around the project name. Upon reflection on what I learned from these practitioners, I understood that the root of my problem with the Lewis Clarke finding aid I had edited for the SCRC was its relative inflexibility for the user. Lowell described how ten years earlier she felt the same way I have come to feel about architectural finding aids: that they just were not working. However, the SCRC partially follows Lowell and Shepherd's workflow for the drawings series of large collections by gathering metadata via an Excel spreadsheet. But since the SCRC treats the project files and photographs as separate series, the project staff had to take an extra step—the part where I felt we were forcing the metadata to behave as though it belonged to a traditional manuscript collection—of ingesting the data from the spreadsheet into

Archivists' Toolkit. The interesting result was that we seemed to do extra work with questionable return value.

Metadata Demonstrations

Emboldened by the interviews—where I learned that many of my experiences were indeed mirrored in other architectural repositories—the second part of this study involved metadata demonstrations that would illustrate how a changed workflow could more efficiently satisfy user needs. There is consensus in the archival field that structured data is beneficial, but that we can only fully take advantage of these benefits if we

> not only improve current archival data standards, but also develop and promote shared tools for creating structured archival description more efficiently. Moreover, we should move beyond the paper inventory metaphor and begin thinking of EAD more as data and not just text with tags around it (Huffman, 2011, p. 15-16).

I worked with free or readily available programs such as Microsoft Notepad, Google Refine, and Google Fusion Tables. In doing so, I hoped to demonstrate how a dynamic search experience could benefit researchers of architectural papers.

The SCRC recently launched a discovery platform meant for digital objects themselves, but that could easily be transformed into a tool to support iterative searching of architectural records (d.lib.ncsu.edu/collections). For example, the platform makes all of the metadata elements attached to an object (or finding aid) into facets that the user can include and exclude in searching (see Figure 5). The finding aid document currently serves two purposes: to contextualize information through intellectual organization and to provide location information as to where documents are stored. When one document attempts to scale this with over 500 linear feet of materials, it creates the burden of

information overload. The dual purposes of the finding aid are directed toward two separate audiences. As an internal document, the finding aid communicates to archivists a collection's physical organization. As a collection guide, the same finding aid communicates to users a collection's intellectual organization. These dual purposes seem to come into conflict when a user seeks related records that exist in multiple collections. If each project had a standardized name, then users could dynamically search across collections based on subject access points (project name, collaborator, geographic location, date) rather than be restricted solely to provenance.

Figure 5. from d.lib.ncsu.edu. This interface allows for faceted searching of individual digital objects. Note how the structured metadata coupled with authority control allows for this faceted searching. I envision something similar to point to records within collections that are not necessarily digitized, but have some sort of relationship (project name, location, architectural firm, etc.)

Methods

Inspired partially by Jenn Riley and Kelcy Shepherd's 2009 article, "A Brave New World: Archivists and Shareable Descriptive Metadata," I experimented with reusing archival metadata to create alternative visualizations of manuscript collection information. They promote "descriptive metadata itself as a valuable resource, to be

shared widely in machine-readable ways, rather than only being displayed to human users" (Riley and Shepherd, 2009, p. 93). They thereby indicate a need for more stringent *content* standards as well as structure standards. Riley and Shepherd claim that open access to descriptive metadata benefits end users: "Records with a geographic component, such as architectural records, could be plotted on historic or contemporary maps and integrated into services such as Google Earth" (Riley and Shepherd, 2009, p. 94). As illustrations of this argument, Figures 6, 7 & 8 display my re-use of the architectural collection metadata originally gathered at SCRC for EAD finding aids. I developed a metadata clean-up process using tools such as Microsoft Notepad, Google Refine, and Google Fusion Tables to create visualizations that potentially illustrate the relationships among the SCRC's collections that are not apparent through their finding aids alone. This solution is therefore analogous to Glushko, et al's argument that library information systems should be developed in such a way that explicates relationships between items so that related and derivative works are linked (Glushko, et al, 2012). They, like Riley and Shepherd, point out that while catalog records are displayed online, the metadata within the records is not easily available for repurposing or reuse.

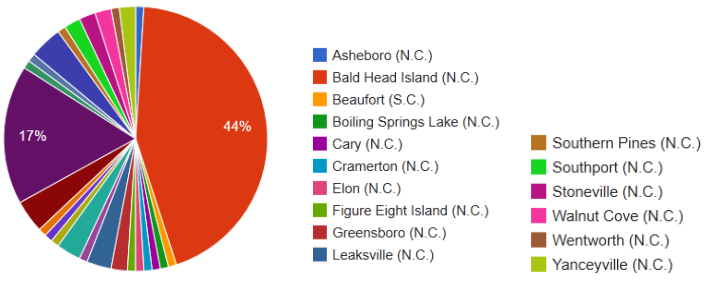


Figure 6. Richard Schnedl North Carolina projects by city features an alternative visual that demonstrates the scope of the Schnedl collection

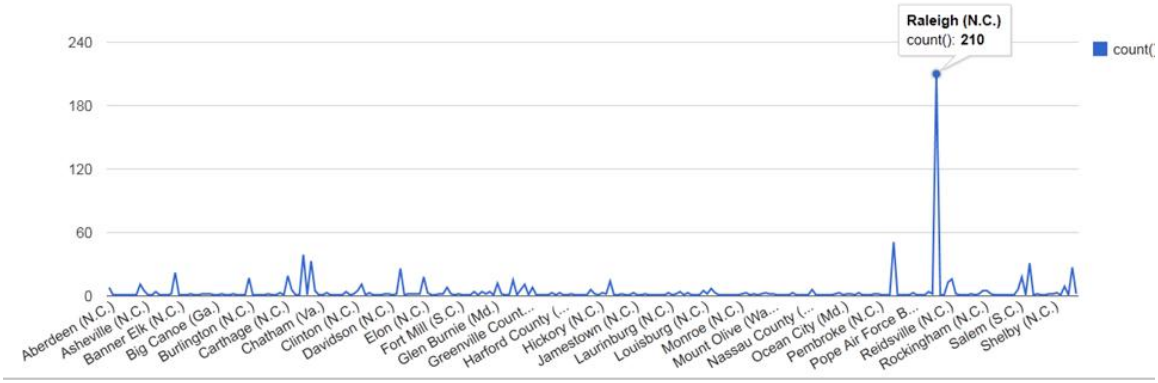


Figure 7. Experimental Zoomable line graph of cities represented in the Lewis Clarke Collection. This feature could only partially handle the large dataset (~1000 projects) in the collection. Adding the date values could make this graph into a helpful timeline for users interested in a particular practitioner's career or the history of the work on a building.

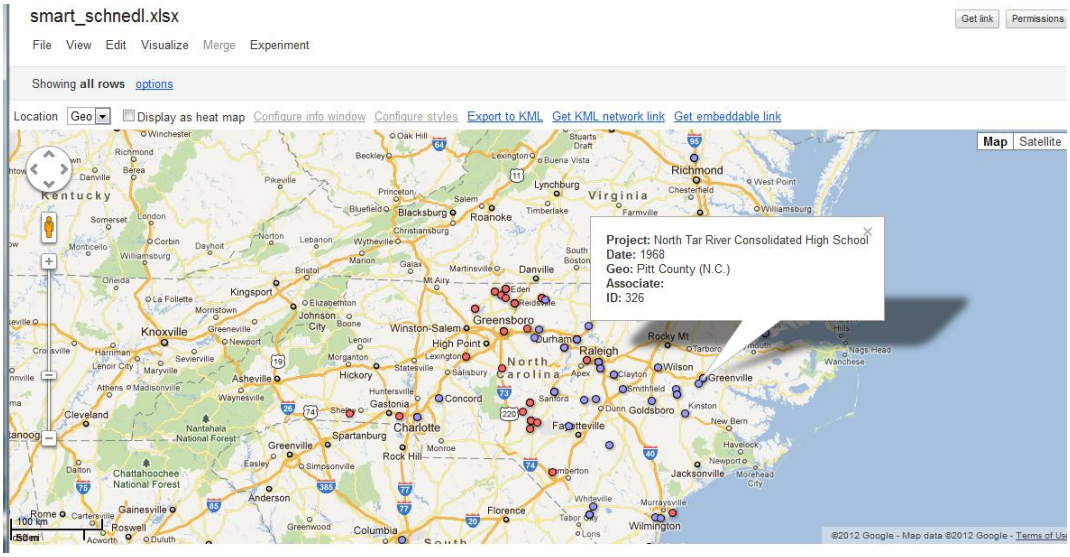
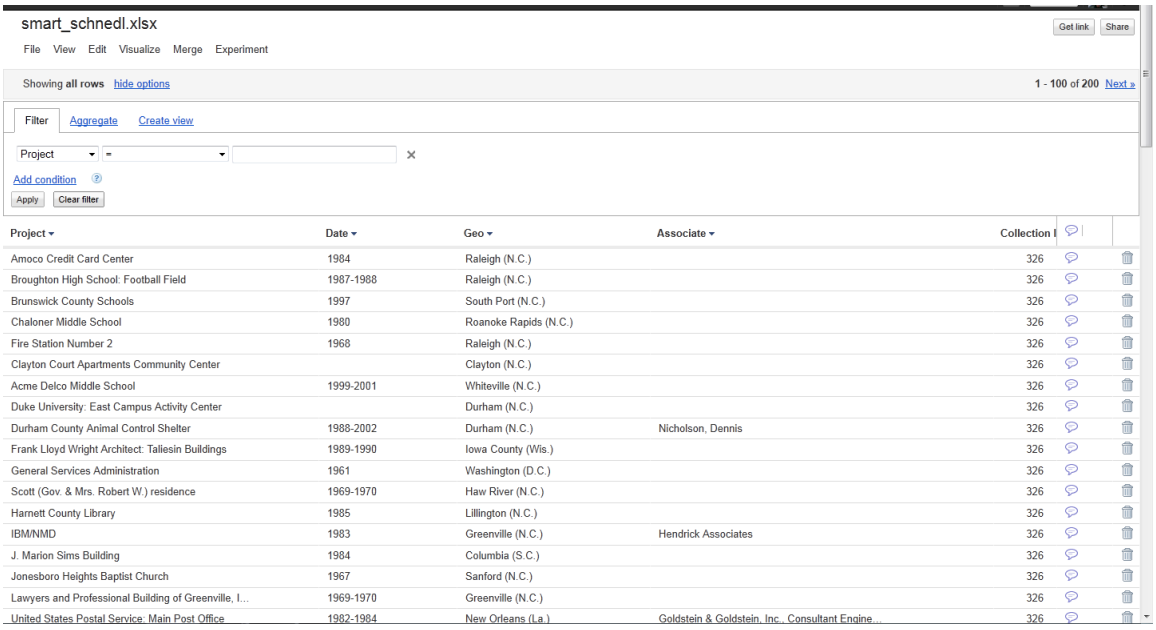


Figure 8. George Smart and Richard Schnedl NC projects as Google Map. This visualization gives users a visual access point to a collection's scope and as well as a particular architect's zone of influence. Schnedl is in red and Smart is in purple. There are possibilities for more sophisticated data visualization that could make use of chronological data and layering to display change over time.

Riley and Shepherd's suggestion of using Google Earth to display architectural projects prompted me to consider reusing publicly-available metadata from SCRC architectural finding aids. A simplified account of my process follows:

1. Retrieved the archival metadata from the Richard Burke Schnedl Papers the George Smart Papers finding aids. The XML version of these pages is available as the HTML source code and contains the needed metadata, which Archivists' Toolkit had translated from EAD.
2. Saved the XML as two separate .txt files. Uploaded one txt file to Google Refine and separated records by tags or in rows.
3. Used Google Refine to mass-edit the records into human-readable language, standardize the project names, and connect the geographic tags.
4. Saved the data as a csv spreadsheet and then uploaded into Google Fusion Tables (Figure 9).

Google automatically recognized the geographic tags—which had been selected from the Library of Congress Name Authority File for geographic headings—and used the "Visualize" option for a variety of data visualizations.



Project	Date	Geo	Associate	Collection I
Amoco Credit Card Center	1984	Raleigh (N.C.)		326
Broughton High School: Football Field	1987-1988	Raleigh (N.C.)		326
Brunswick County Schools	1997	South Port (N.C.)		326
Chaloner Middle School	1980	Roanoke Rapids (N.C.)		326
Fire Station Number 2	1968	Raleigh (N.C.)		326
Clayton Court Apartments Community Center		Clayton (N.C.)		326
Acme Delco Middle School	1999-2001	Whiteville (N.C.)		326
Duke University: East Campus Activity Center		Durham (N.C.)		326
Durham County Animal Control Shelter	1988-2002	Durham (N.C.)	Nicholson, Dennis	326
Frank Lloyd Wright Architect: Taliesin Buildings	1989-1990	Iowa County (Wis.)		326
General Services Administration	1961	Washington (D.C.)		326
Scott (Gov. & Mrs. Robert W.) residence	1969-1970	Haw River (N.C.)		326
Harnett County Library	1985	Lillington (N.C.)		326
IBM/NMD	1983	Greenville (N.C.)	Hendrick Associates	326
J. Marion Sims Building	1984	Columbia (S.C.)		326
Jonesboro Heights Baptist Church	1967	Sanford (N.C.)		326
Lawyers and Professional Building of Greenville, I...	1969-1970	Greenville (N.C.)		326
United States Postal Service: Main Post Office	1982-1984	New Orleans (La.)	Goldstein & Goldstein, Inc., Consultant Engine...	326

Figure 9. George Smart and Richard Schnedl metadata in Google Fusion Tables. This clean spreadsheet is in some ways easier for users to navigate than a finding aid. For example, the finding aid lacks a sorting function and cannot be reorganized to fit a particular user's needs.

Discussion

The professional literature cited in Chapman's literature review (Chapman, 2009) makes clear that users are more interested in the subject matter of a collection than its physical organization. However, processing standards focus more on standardizing the structure of data rather than the content. Without more authority control on the content of the collection—especially the project names for architectural collections—archivists receive a limited return for their investment in collecting this metadata. Processing workflows could include some sort of template with enforced authority control that could still allow for collaboration. For example, the current processing workflow for large architectural collections at the SCRC involves multiple students working from Excel spreadsheets for each collection. As a result, there are many un-standardized creator and subject names, geographic locations, and project names in the resultant finding aids. Hence, there are many irregularities and variations among names that should actually be the same. I found that uploading these spreadsheets to Google Refine helped to quickly identify inconsistencies before creating an authority list. This authority control is necessary for the architectural collection discovery interface I imagine. Such an interface could answer quickly and easily user questions like the following:

1. Which projects are attributed to Hayes, Howell & Associates, Architects, A.I.A.?
2. Which collections contain materials associated with the William Henley Deitrick residence?
3. How many collections are represented?
4. How many projects are in each collection?

5. How many buildings are represented in the repository?
6. Which projects were done in Raleigh, North Carolina?
7. What are the different formats of the Ford's Colony records?
8. List of all represented projects
9. List of all represented collection creators and subjects (e.g. architects, landscape architects).
10. List all represented geographic locations

Archival processors spend the bulk of their hours foldering and rehousing records and devising a container list that can translate to a usable finding aid so that researchers can quickly and easily find the records that serve their needs. My principal argument is that the metadata collected, even through the MPLP approach, is underutilized when restricted to a static EAD-structured finding aid. Making the metadata more easily extractable proves that it has additional uses. For any of these visualizations to work properly, archivists must exercise authority control on each of the following metadata elements: Project name, Firm, Client, Geographic heading. Here, Google Refine has potential to simplify the process of applying authority control on large collections.

Bolstering the relatively simple examples presented above, more extensive examples from good work I have seen further illustrates the discovery interface I imagine. First, I believe the idea behind the AAA's subject guide, which lists geographic headings and architectural firms, could be tweaked as a useful portal (see Figure 10). Second, Naaman, et al, define the useful parameters for organizing and retrieving photographs from personal collections. How might library and information professionals utilize this research for other kinds of collections? Naaman, et al, described the ideal interface as having the following aspects (Naaman, et al, 2004):

- Non-intrusive. The context selection/filtering mechanism should not take too much screen space, nor create clutter that requires additional mental effort.

- Simple and clear. Metadata categories should be represented by very few general groups and not by dozens of possibilities.
- Able to accept range specifications.
- Allow exclusion of categories easily.
- Be flexible enough to simultaneously apply multiple filters.

As described above, the SCRC already has an effective digital image display structure that could potentially be adapted to consider the aggregated project records as the digital object.

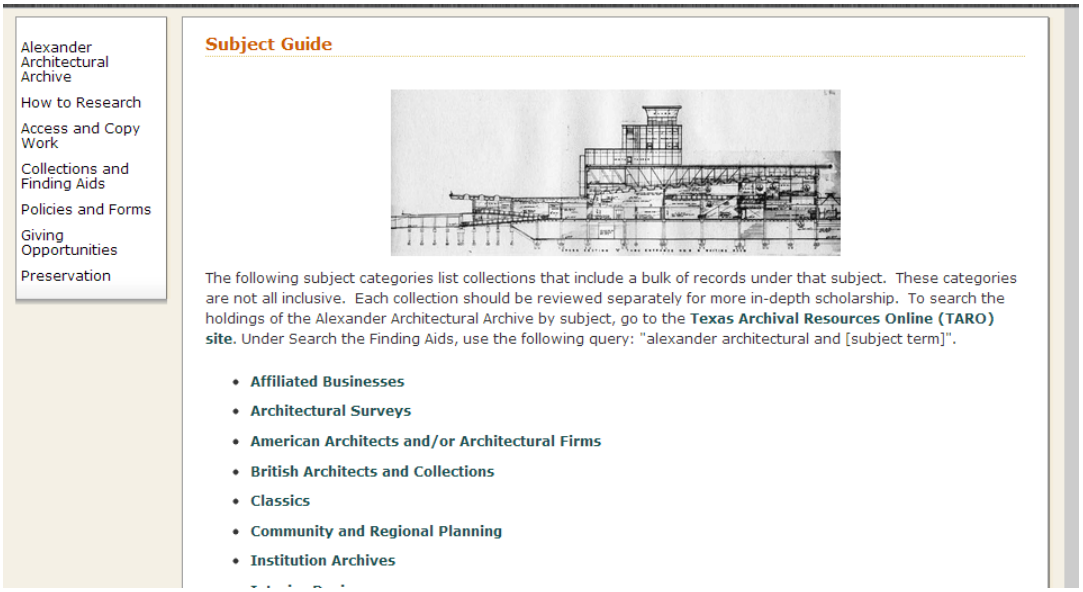


Figure 10. AAA subject guide available at www.lib.utexas.edu/apl/aaa/subjectguide.html. This guide points users to collections containing records relevant to each subject. I envision a similar portal separated out either geographically or by project that then links users directly to the records within the collections they seek.

Yet another model comes from the NCSU Libraries itself: the Course Views content delivery system. As a way of creatively handling the nearly constant need for new and updated course pages and the curated content and customized resources for students within, a development team at NCSU decided to "organize the system's content around a shared campus data structure. Course Views uses the standard course identifiers (e.g., ENG 101) managed by the campus registration and records system" (Casden, et al, 2009). This data structure coupled with a widget-style web service provided a partially

automated content delivery system that produced "customized content in a scalable way." A widget-style web service also allows for the easy re-use of information and could conceivably become an attractive and easy to use delivery system for users seeking archival records and information concerning a particular building.

Essentially, if we reconceptualize the architectural collections in the SCRC as having potential links, we could reuse the metadata elements captured by making them into facets. Faceted searching better serves the iterative nature of research by facilitating a more dynamic search than browsing an EAD-encoded finding aid. Linking metadata elements would reveal relationships both among collections and series of the same collection. The status quo—the static web finding aid—is described by Trace and Dillon thusly: "Despite the early promise of digital documents and hypertext linking, it became clear that simply copying the paper form and replicating it digitally offered limited chances of successful transfer, and researchers identified a series of process and outcome differences between media that affect most users" (Trace and Dillon, 2012). The dynamic search experience more fully takes advantage of the web environment. Of course, in terms of information, the tradeoff between the investment in organization and investment in retrieval persists in nearly every information system. The more resources an institution puts into one side of it, the fewer resources needed for the other.

Although the map option did not work with the larger SCRC collections such as the Lewis Clarke Collection, Fusion Tables is in beta and presumably will become better apt to handle large datasets. I hope in sketching out what could be achieved in the realm of data visualization, I might inspire repositories to make it easier (i.e. eliminate the need

for Google Refine) for end users to extract the metadata that archivists and librarians spend so much time collecting.

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Appendix A – Questionnaire

Interview guide for email and questionnaire

Greetings,
My name is Carie Chesarino and I am working on research through my library science program at the University of North Carolina at Chapel Hill. I was you could help me find some points of comparison among architectural archives. My study, tentatively titled "An Analysis of Finding Aid Structure and Authority Control for Large Architectural Collections," is drawn from my experiences processing architectural records at North Carolina State University's Special Collections Research Center. I identified your repository because it, like NCSU's, grew out of a university architectural program. I have appended some questions below. If you are able to respond to any of them, I would greatly appreciate it. Alternatively, if you would prefer to have a conversation about some of the issues addressed in my study, I can be reached at XXX.XXX.XXXX. Please let me know if you have any questions.

Best regards,
Carie

Users

- Could you describe your general sense of user satisfaction with your institution's architectural finding aids?
- Can you characterize the typical architectural records user's question? E.g. Do they ask about a particular building, geographic area, or architect?
- Are there any experiences you'd like to tell me about your repository's users?

Finding Aids

- What access points do your architectural finding aids emphasize?
- To what level in the materials' organization does your typical architectural finding aid describe?
- Could you describe to me anything about your finding aids that you would characterize as particular to your institution?

Information Technology/Support

- What software does your institution use to create finding aids? What, if any, are the advantages and disadvantages of this particular program and/or developed workflow?
- Do/did finding aids describing larger collections (at least one hundred linear feet of materials) cause any technological problems?
- Is there anything else you can tell me about your institution's Information Technology support?