

# Applying Inheritance: Single-level Displays and Repurposeable Metadata

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**Abstract:** This paper examines the methods used in redesigning the interface for archival descriptions at Brigham Young University. Based on usability testing results, the project team sought to meet patron's desires for direct access to component-level descriptions, while at the same time meeting project requirements for repurposing metadata from the finding aid. The resulting interface, based on the application of the principle of inheritance, provides a contextualized single-level view of the collection components, as well as the capacity to export metadata at that level.

## Introduction

Archival description has traditionally been conceived in a linear, document-centric manner, with finding aids providing a comprehensive and static view of a collection's contents and arrangement. Documenting collections in this manner is a practical, economic way to describe large aggregates of materials. The second section of the General International Standard Archival Description (ISAD(G)) provides the basic rules under which multilevel descriptions are created. Among these is the principle of "non-repetition of information" (ISAD(G) 2.4),<sup>1</sup> which requires that information common to lower levels of description be recorded at the highest common level. This information is then assumed to be "inherited" by the subordinate descriptive levels. Through the application of the principles of inheritance archivists are able to reduce the level of description needed in subordinate levels of a finding aid while still providing adequate information about individual components. However, in many cases this inheritance is highly implicit and requires some interpretation on the part of the patron.<sup>2</sup> While this may be acceptable for human users, it can create problems during computer processing or other reuse of archival metadata.

This paper discusses a project at Brigham Young University to revise our finding aid presentation, and its use of the principle of inheritance to improve access to our holdings. It also

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<sup>1</sup> International Council on Archives, Committee on Descriptive Standards, *ISAD(G): General International Standard Archival Description*, 2nd ed. (Ottawa: International Council on Archives, 2000): p. 12.

<sup>2</sup> Mark A. Matienzo, "Linked Data and Archival Description: Confluences, Contingencies, and Conflicts" (paper presented at the Society of American Archivists EAD Roundtable, Austin, Texas, 2009), <http://www.slideshare.net/anarchivist/linked-data-and-archival-description-confluences-contingencies-and-conflicts> (accessed Sept. 22, 2010).



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briefly examines some of the ramifications of this design decision on our descriptive practices, both in the production of finding aids and associated digital collections.

## Research Problem

As the project team began the process of developing a new finding aid system for the L. Tom Perry Special Collections in 2007, we focused on two primary goals: improving the finding aid interface for our users, and making enabling the reuse and sharing of finding aid metadata in Dublin Core using the Open Archives Initiative (OAI). Over the course of the project, this second requirement was later expanded to include repurposing finding aid information for use in reformatting and digitization projects.

Early in the interface redesign, the project team conducted a competitive set analysis examining researcher interaction with finding aid systems. Among the systems reviewed in this analysis were the Online Archive of California, the Northwest Digital Archives, and the Denver Public Library. While the test participants testing liked some aspects of these systems, members of our primary audience expressed their dissatisfaction with traditional finding aid displays.<sup>3</sup> More familiar with library catalog displays and Web search results, the undergraduate researchers included in the study wanted direct access to full descriptions of files and items within the collections rather than traditional document-based finding aids.

This preliminary user analysis together with the initial project requirements presented the project team with two interrelated questions: How could we create and display robust, contextualized descriptions of files and items using Encoded Archival Description (EAD) data structures and existing metadata? And how could we repurpose these descriptions for use in other projects and systems?

## Methodology

While the user test participants demonstrated interest in file and item-level descriptions the project team noted with some irony that the system receiving the lowest rating did provide component-level displays. Pleade, developed by the French Centre historique des Archives nationales and released in 2003, provides a three-pane finding aid interface, with a component display on the right and a navigational menu on the left.<sup>4</sup> However, when using the Denver Public Library's implementation of the system, participants were often unable to understand file and item-level descriptions within a finding aid due to the limited information displayed. This information was often available at other hierarchical levels, and in a linear, document-centric view might be implicitly understood to be inherited. However, in a single-level display this information was not viewable, leaving it to the user to navigate the finding aid to contextualize the component descriptions.

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<sup>3</sup> Cory Nimer and J. Gordon Daines, III, "What Do You Mean It Doesn't Make Sense? Redesigning Finding Aids from the User's Perspective," *Journal of Archival Organization* 6, no. 4 (2008): 225-226.

<sup>4</sup> Martin Sévigny, "PLEADE -- EAD for the Web," *DigiCULT.info* 6 (Dec. 2003): 16, 18.

Later reviews of the finding aid display in the ICA-AtoM system, which also features a single-level display, revealed similar issues. With a component view on the left and a navigation menu with contextual links on the right, users are provided with direct access to component-level descriptions.<sup>5</sup> However, the information provided at lower levels may be cursory, requiring users to navigate up the descriptive hierarchy to look for missing information.

In order to make the lower hierarchical levels understandable, the project team decided to explore the possibility of making the data that was implicitly inherited in a document-based view explicitly inherit to complete a component-level display. We also decided to examine how inheritance might be applied to improving reuse of our EAD metadata in the creation of Dublin Core records for union discovery environments and digital projects.

Looking at the professional literature, it was clear that there has been interest and a growing expectation on the part of some archivists that EAD enables will enable the reuse of descriptive metadata in encoded finding aids.<sup>6</sup> Many institutions have developed workflows for deriving MARC catalog records from the collection-level description held in the EAD <archdesc> element.<sup>7</sup> However, there appeared to have been little work on implementing systems to repurpose component-level archival metadata.

One project exploring the reuse of finding aid metadata was the Mellon Foundation's Metadata Harvesting Initiative, which included work by the University of Illinois at Urbana-Champaign to aggregate archival descriptions with other cultural heritage materials using the Open Archives Initiative (OAI) protocols.<sup>8</sup> In order to provide access to the full content of EAD records, the description was broken into separate Dublin Core records that were contextualized through links to the complete finding aid.<sup>9</sup> While this approach showed some promise, variability in encoding and descriptive practices complicated both harvesting and display. This variability was most prevalent in component description, which did not implement inheritance rules, resulting in derivative records with a broad range of completeness. These complications appear to have created some reticence to implement OAI within the archives community.<sup>10</sup>

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<sup>5</sup> Peter Van Garderen, "The ICA-AtoM Project and Technology," [http://ica-atom.org/VanGarderen\\_TheICA-AtoMProjectAndTechnology\\_AAB\\_RioDeJaniero\\_16-17March2009.pdf](http://ica-atom.org/VanGarderen_TheICA-AtoMProjectAndTechnology_AAB_RioDeJaniero_16-17March2009.pdf) (accessed Sept. 28, 2010).

<sup>6</sup> Christopher J. Prom, "Reengineering Archival Access Through the OAI Protocols," *Library Hi Tech* 21/3 (2003): 208; Jenn Riley and Kelcy Shepherd, "A Brave New World: Archivists and Shareable Descriptive Metadata," *American Archivist* 72, no. 1 (Spring/Summer 2009): 93; Michael Rush, "Repurposing EAD," <http://www.slideshare.net/mikerush/repurposing-ead-encoded-archival-description> (accessed Sept. 22, 2010).

<sup>7</sup> For example, see William J. Patty, "Metadata, Technology, and Processing a Backlog in a University Special Collections," *Journal of Archival Organization* 6, no. 1/2 (2008): 102-120. Similar transformation have been done the other direction -- from MARC to EAD (see Peter Carini and Kelcy Shepherd, "The MARC standard and encoded archival description," *Library Hi Tech* 22, no. 1 (2004): 18-27).

<sup>8</sup> Christopher J. Prom and Thomas G. Habing, "Using the Open Archives Initiative Protocols with EAD," in *Proceedings of the 2nd ACM/IEEE-CS joint conference on Digital libraries* (New York: ACM, 2002): 171.

<sup>9</sup> Christopher J. Prom, "Reengineering archival access through the OAI protocols," *Library Hi Tech* 21, no. 2 (2003): 203-204.

<sup>10</sup> George MacKenzie and Göran Kristiansson, "How Real Archivists can Learn to Love the OAI" (lecture, Open Archives Forum, 2003), [http://www.oaforum.org/otherfiles/oaf\\_d44\\_cser2\\_kenzie-krist.pdf](http://www.oaforum.org/otherfiles/oaf_d44_cser2_kenzie-krist.pdf) (accessed Sept. 28,

In a more recent project by Ionian University, archivists worked to harvest component-level descriptions from EAD into the MODS metadata scheme. In this case, the transformation did implement inheritance rules to produce individual records with complete descriptive information.<sup>11</sup> The resulting records were then available for reuse in other applications, separate from the archival description of the collection.<sup>12</sup> While the transformation process proved successful, the process raised a number of questions for the researchers, such as:

Is it reasonable to assume that all EAD elements related to an archival component can be inherited to the description of the subcomponents of this component? For those elements that we can assume can be inherited, are there any constraints that should be fulfilled in order for this inheritance to be meaningful?<sup>13</sup>

Our review of the literature suggested to the project team that it was technically feasible to break the finding aid into component-level records, and that derivative records would be improved through the explicit inheritance of metadata into these records. It also suggested the need to institute consistent encoding and description practices that would enable element values to be inherited accurately. However, our project team also had concerns similar to the Greek project, questioning to what extent inheritance ought to be applied.

Fortunately, in the months prior to initiating the development of the new finding aid database, the department had conducted a thorough review of metadata practices used in producing finding aids, catalog records, and other descriptive outputs. As part of this process we implemented *Describing Archives: A Content Standard* (DACS), which includes the principle of inheritance from ISAD(G) 2.4 in its Principle 7.3.<sup>14</sup> Inheritance is also addressed in a more specific manner in DACS's requirements for multilevel descriptions, which states that

Each *subsequent* level of a multilevel description should include:

- All of the elements used at higher levels, unless the information is the same as that of a higher level or if it is desirable to provide more specific information.
  - *Name of Creator Element (2.6): At subsequent levels of a multilevel description, this element is required only if the person(s) or organization(s) responsible for the creation or accumulation of the material at the subsequent level differs from the higher level(s). This*

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2010): 17. Some systems are working to provide OAI-PMH harvesting, though, including ICA-AtoM as of release 1.0.5 (ICA-AtoM, "Release 1.0.5-beta," ICA-AtoM, [http://www.ica-atom.org/doc/Release\\_1.0.5-beta](http://www.ica-atom.org/doc/Release_1.0.5-beta) (accessed Sept. 28, 2010)).

<sup>11</sup> Lina Bountouri and Manolis Gergatsoulis, "Interoperability Between Archival and Bibliographic Metadata: An EAD to MODS Crosswalk," *Journal of Library Metadata* 9 (2009): 100.

<sup>12</sup> *Ibid.*, 108.

<sup>13</sup> *Ibid.*, 117.

<sup>14</sup> Society of American Archivists, *Describing Archives: A Content Standard* (Chicago: Society of American Archivists, 2005): xv.

*can also be accomplished by using the Name Segment of the Title Element (2.3).*

- *Scope and Content Element (3.1): Scope and contents are typically necessary for large units of aggregation and are not required at the file or item level if the Title Element (2.3) is sufficient to describe the material.*<sup>15</sup>

In our application of DACS we had implemented these provisions in a fairly literal way, requiring that elements listed in the standard be entered at subsequent levels explicitly when different. This included reference codes, titles, dates, extent statements, and other elements listed in the requirements. This meant, for example, that if the extent statement for a file varied from that of the series it was part of, that an extent statement for the file should be included rather than relying on the patron to extrapolate the extent from the number of folders in the inventory list. At the same time, we assigned levels of description to the hierarchical levels of the finding aid, requiring “optimum” and “value added” elements in the collection and series descriptions, while files and items were described only at the “minimum” level.

Along with our review of descriptive practice, we also had taken steps to normalize our EAD encoding practice to improve reuse of descriptive metadata for deriving catalog records. As it was designed, Encoded Archival Description attempts to address both the document- and data-centric aspects of traditional finding aids, leading to the inclusion of formatting elements such as tables, lists, runners, line breaks, and emphasis tags.<sup>16</sup> While useful in a print paradigm, this mixed content complicated the reuse of the data, leading us to deprecate their use in our local best practices guidelines.

The move toward standardized description and data-oriented metadata encoding simplified metadata transformations into MARC as well as the process of testing inheritance in the creation of component-level records. Once we agreed upon wireframes of the interface, we built a static HTML prototype of two recently-encoded finding aids based on single-level displays. As part of this process we manually inherited values down through the descriptive hierarchy, and quickly found that strict inheritance of all elements would, at times, misrepresent the nature of the materials being described.<sup>17</sup> This was particularly true for elements such as arrangement and scope and content notes, which were generally specific to the particular level of the hierarchy where they were recorded. These inherited values were then used to populate the finding aid system prototype.

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<sup>15</sup> Ibid., 10.

<sup>16</sup> Daniel V. Pitti, “Technology and the Transformation of Archival Description,” *Journal of Archival Organization* 3, no. 2/3 (January 2006): 15-16.

<sup>17</sup> This included such elements as custodial history, appraisal notes, accrual notes, separated material notes, and bibliographic citations, which have different meanings depending on their location they are recorded in the finding aid hierarchy.

The project team then conducted a series of user tests on the prototype to determine whether the inherited metadata made component-level descriptions more understandable. Participants completed a series of research tasks, locating materials from multiple collections using both search and browse functions to identify relevant items. Test users also were asked to complete a known-item search within the finding aids.

## Research Results

Although usability test participants did not agree in their review of other aspects of the site, all responded positively to the information found in the item-level displays.<sup>18</sup> At the collection and series level, the resulting descriptions are fairly robust, while files and items have adequate descriptive metadata for discovery. The subjects were able to complete the required tasks, using the inherited metadata to quickly identify materials based on the information provided.

The screenshot displays the 'Manuscript Collection Descriptions (beta)' page for the 'Athletic Media Relations records and awards' series. The page is part of the 'BYU Harold B. Lee Library' and is located under 'Home » UA 5427 » Series III'. The main heading is 'Athletic Media Relations records and awards' with dates '1937-1987'. A description states: 'The series contains NCAA record books and awards. The NCAA records are from baseball, track, football, swimming, wrestling, and track. The awards come from the final four basketball yearbooks.' Metadata includes: Extent: 1 carton; Creator: Brigham Young University. Athletic Media Relations; Call Number: UA 5427 Series III; Repository: L. Tom Perry Special Collections; University Archives; 1130 Harold B. Lee Library; Brigham Young University; Provo, Utah 84606; http://sc.lib.byu.edu/; Access Restrictions: Restricted. Closed for 25 years (until 2021) after the creation of the records and thereafter open to the public after consultation with the University Archivist and in accordance with the General Restriction Statement of the L. Tom Perry Special Collections. A 'Conditions of Use' section states: 'It is the responsibility of the researcher to obtain any necessary copyright clearances. Permission to publish material from Athletic Media Relations records must be obtained from the Supervisor of Reference Services and/or the L. Tom Perry Special Collections Board of Curators.' A 'Preferred Citation' section provides: 'Athletic Media Relations records and awards; UA 5427; Athletic Media Relations records; L. Tom Perry Special Collections; University Archives; 1130 Harold B. Lee Library; Brigham Young University; Provo, Utah 84606; http://sc.lib.byu.edu/'. A 'Subject Terms' section lists: 'National Collegiate Athletic Association; Athletics; Social Life and Customs; Sports and Recreation; Travel'. A 'Genre / Form' section lists: 'Awards; Records'. On the right side, there is a 'Site Navigation' menu with links for Search, Browse, About, Help, and Admin. Below that is a 'Search this Collection' search box with a 'SEARCH' button. Further down is a 'Collection Arrangement' section with a note: 'Yellow highlight indicates current location in collection description'. A list of series is shown, with 'Series III Athletic Media Relations records and awards' highlighted in yellow. Other series include Series I (Athletic Media Relations media guides and publications, 1963-1996), Series II (Athletic Media Relations photographs, 1970-1996), and Series IV (Athletic Media Relations travel and statistics, 1948-1979). At the bottom right, there is a 'Help with this Collection' section with a link to 'Ask us a Question' and contact information for Gordon Daines, University Archivist - University Archives, gordon\_daines@byu.edu.

Figure 1. Single-level display of series in Brigham Young University finding aid database

Based on the response to the system's use of inheritance for display, the project team then applied these component-level descriptions to creating shareable Dublin Core records. As in the

<sup>18</sup> Nimer and Daines, 228-229.

University of Illinois and Ionian University projects, rather than outputting a single collection-level record our database responds to OAI requests with individual records for each component of the finding aid. Each of these records includes the descriptive elements inherited from higher levels of the description, and points back to its originating component level within the finding aid interface. Internally we have also been able to add a “Get Metadata” feature, which exports the metadata in a tab-delimited format for reuse by our university’s digital library program staff.

## Findings

While planning and developing our new finding aid system, the project team found that applying inheritance improved access to our materials, both in internal display interfaces and in the reuse of archival metadata. The robust, single-level descriptions enabled by inheritance down to the components of archival collections were preferred by our primary users in our own usability testing. Using automated transformations, a well-designed EAD document may be quickly transformed and repurposed, either for internal or external users.

In order for inheritance function correctly, however, we also found that it is important that archivists consider display and potential reuse as they create finding aids. Jenn Riley and Kelcy Shepherd have suggest six main areas that archivists should consider in developing shareable metadata. These include providing adequate content, consistency, coherence, context, communication, and conformance to standards.<sup>19</sup> Many of these areas were addressed through our institution's strict implementation of DACS and EAD standards, which included rule interpretations that simplified inheritance and reuse. Data in archival descriptions must be provided explicitly to enable inheritance, either for single-level displays or for the creation of derivative records. Following descriptive practices that enable the creation of such records will result in clearer description and greater opportunities for the creative reuse of finding aid metadata. One element of these practices for our institution has been avoiding the use of formatting and other document-based structures in EAD in order to improve reuse.

However, the project team also found that inheritance was not always a straightforward process. In some cases inherited values can distort the meaning of the description, as the information in some elements is specific to the component in which it is recorded. In other cases, inherited information may be inaccurate when applied to lower levels of description. Systems designers involved in projects using inheritance rules for generating displays or derivative records should be cautious when applying these rules to finding aid metadata.

Despite these challenges, the project team feels that our encoding practices and finding aid display have been successful in meeting the access needs of our users. Based on our experience, applying inheritance can also provide a useful tool for archivists to leverage their metadata for sharing and reuse outside of the archival community, further expanding access to our materials.

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<sup>19</sup> Riley and Shepherd, 96-97.



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