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Metadata Survey: EAD Schema Usage Review

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Term Paper:

Metadata Survey: EAD Schema Usage Review

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Abstract:
This research paper will review and summarize the major concepts, issues, and related literature on the topic of EAD usage as it relates to XML encoded library finding aids. This paper will first present a brief background on EAD, followed by a brief definition of the schema. This report will review two aspects of the EAD schema: the method of user website access and the percentage of EAD schema usage. To accomplish this, a short review and finding aid survey will be conducted on three library websites: the University of Vermont Library, the Duke University Library, and the University of Chicago Library. A sampling of the EAD schema will be reviewed from each library. The percentage of eadheader usage will be calculated. An interview will be conducted with a staff member from each library. This paper will review the data derived from this limited survey, and the results from the calculated EAD element usage. Survey findings in regard to metadata consistency will be briefly discussed. Barriers to access related to EAD functionality and accessibility will be briefly addressed. The paper will conclude with suggestions as to how libraries can improve usage and implementation of the EAD schema to maximize functionality, usability, and accessibility of EAD finding aids for user access.
**Introduction:** Functionality, usability, and accessibility are essential elements for effective library operations. One such function of archives and libraries is to create and provide access to digital files and digital collections for patrons.

Librarians and archivists use finding aids to help identify the materials held within collections. Finding aids are “…descriptive inventories, indexes, or guides that are created by archival and manuscript repositories to describe and provide access to the contents of archival records and manuscript collections” (UW, 2013). Within the finding aid, the description of collections is based on “hierarchical description” (Dow, 2005, p. 46).

Pitti & Duff referred to the finding aid as “describing material collectively and hierarchically” (2001, p. 208). While finding aids may vary in style, their purpose is to provide detailed description of the content and intellectual organization of collection materials.

**Need for EAD finding aid:**

With the growth and development of the internet, online access of collections by patrons and researchers has made remote searches feasible. And, with the sharp increase in use of the internet for information access, archivists and librarians have realized that there is a need to provide greater patron access to online finding aids.

In many cases, due to geographic distance or health limitations, online access of a library’s finding aid may be the preferred or only option available to patrons. A need which has been largely addressed with the EAD schema, is the ability for patrons to remotely access the descriptive information available in the finding aids (Thurman, 2005, p. 186).
Proper encoding of the finding aid is essential as it enables the researcher to locate important information such as information about a collection’s scope and content, or the difference between a personal and corporate name. Such distinctions are critical for searching, retrieval, and indexing.

A finding aid encoded in html is only retrievable via keyword searching, which is very inefficient. For these reasons, EAD was developed to help researchers locate digitized online collection finding aids.

**EAD Defined:** EAD stands for Encoded Archival Description, and is a non-proprietary de facto standard for the encoding of finding aids for use in an online networked environment (LC, 2012). EAD grew out of work done by Daniel Pitti at UC Berkeley in the mid 1990’s and was influenced by the TEI schema and ISAD (JISC, 2013; Pitti & Duff, 2001, pp. 34-37).

EAD was established as an international standard to meet the needs of archives and libraries for the encoding of finding aid data (Combs et al., 2010). The EAD standard is supported by both the Society of American Archivists, and the Library of Congress (Florida Virtual, 2012, n.p.).

EAD allows for the standardization of collection information in finding aids within and across repositories. The Encoded Archival Description (EAD) standard is used by digital libraries to create an xml protocol for encoding archival finding aids (Dow, 2005, p. 134).

EAD documents are encoded in XML, “Extensible Mark-up Language,” a simplified derivative of SGML (UT, n.d.; Pitti & Duff, 2001, p. 22-23). XML is a data format that ensures data longevity when migrated between software environments (Combs, et al., 2010, n.p.). The EAD schema elements are taken from the Dublin Core element of 15 simplified metadata fields which may be applied across many formats and domains (DC, 2013).
The advantage of the EAD schema is that it can be produced from, or mapped to, a variety of formats, such as MARC, Dublin Core, and html, which makes it a useful format for data mapping to a variety of formats (Combs, et al., 2010, n.p.; Pitti & Duff, 2001, p. 222).

Libraries are an important resource of the global information environment and library catalogs are one of the systems which can be used to describe and organize digital information resources. In this environment standards are absolutely essential. They provide the framework for linking diverse sources of information to form broad-based collections that can be searched and retrieved by users from anywhere on the Internet.

The EAD schema was developed with the express objective of standardization. EAD enables the standardization of collection information in finding aids within and across repositories (Society of American Archivists, 2010, n.p.). The EAD schema is designed to have interoperability with Dublin Core. The attached chart shows the metadata crosswalk mapping of Dublin Core to EAD (See Table F, Appendix).

**Literature Review of EAD:** For this paper, a literature search was conducted on the subjects of the EAD schema, EAD encoded archival finding aids, and EAD implementation. While a number of articles on the EAD schema were located, it appears that limited research has been published comparing utilization of the EAD meta-tag <eadheader> by institutions.

Carpenter and Park made a useful suggestion for schema standardization and interoperability. They noted that there is a need to,”…build a common data model that is interoperable across EAD repositories” (Carpenter & Park, 2009, p. 149). And, an article by Redding addressed archival descriptive practices and how it has benefited from the implementation of the EAD schema (Redding, 2002, p. 35).
Regarding standardization and interoperability, Shaw noted the importance of the EAD schema having structured data as it would conform to the Open Archives Initiative (Shaw, 2001, p.122).

Prom, in his 2002 article, mirrored some of Shaw’s comments as Prom, like Shaw, both discussed the usefulness of searching and retrieving EAD using the OAI Protocols (Prom, 2002, p. 51). Prom discussed findings from a research survey conducted for the University of Illinois Open Archives Initiative Metadata Harvesting Project (Prom, 2002, p. 52). The project developed a mapping of data tags from EAD to the OAI/Dublin Core (Prom, 2002, p. 54).

Prom & Habing wrote of the advantages of mapping the EAD schema to the OAI protocol (2002, n.p.). Prom and Habing noted that searching the online finding aids which are encoded in EAD, would yield rich results if, “…search mechanisms for EAD ever become more robust than those currently available” (Prom & Habing, 2002, n.p.)

Artlsche & O’Brien referenced the “The Open Archives Initiative Protocol for Metadata Harvesting” as being a common standard for sharing metadata by Libraries (Arlitsch & O’Brien, 2011, p. 77). Promotion of this initiative was a common theme in the literature, as Prom & Habing noted,“ Promotion of this initiative, presents a promising opportunity to make metadata about archives, manuscript collections, and cultural heritage resources easier to locate and search” (2002, n.p.).

**Literature review of EAD finding aids:** A literature review on finding aids was conducted as related to EAD usage. An article by Elizabeth Yakel, discussed the need for standardized finding aids (Yakel, 2004, p. 75). Yakel noted the importance of having standardized finding aids, and cited the problems arising from, “…non-standardized finding aids, with different EAD interface designs” which were unique to individual repositories (Yakel, 2004, p.75).
Gilliland-Swetland (1998) explored various kinds of data elements contained in displays of online finding aids (Kim, 2008, p. 43). She suggested user testing and user ratings, according to the perceived utility of the finding aids (Kim, 2008, p. 43; also Gilliland-Swetland, 1998, n.p.).

Dow, quoting a 1999 report by the Council on Library and Information Resources, stated, “...the most significant impediment to greater access...is the lack of adequate finding aids” (Dow, 2005, xiii). Dow also stressed the importance of ensuring “consistency in the content and format of finding aids” (Dow 2005, p. xiv).

Gilliland-Swetland, noted that the finding aid acts as an, “…information discovery and retrieval tool” (Gilliland in Pitti & Duff, 2001, p. 207). Gilliland also said that the finding aid, “facilitates information discovery and retrieval by diverse user groups” (Ibid, p. 210).

**EAD and standardization:** The articles reviewed on the EAD schema indicate that the standardization of the finding aid was an important step forward for archival institutions. For instance, Pitti contended that an important reason for standardizing the encoding of finding aids, was that, “...standardization will support the long-cherished dream of providing archivists and both professional and public researchers universal, union access to primary resources” (Pitti, 1999, n.p.).

And, Pitti also noted that, ”Standardization will make it possible to build union access, through union databases, but more ideally through union indexes, to archival description originating in repositories throughout the world, which will enable users to discover or locate archival materials at any time and from any place” (Pitti, 1999, n.p.).
Dow concurred with Pitti by commenting that creating digitized EAD compatible finding aids, and using the EAD standards, will ensure researcher access (Dow, 2005, p. xiv). Dow stated that EAD reflects the “descriptive standards” developed by the international archival community (Dow, 2005, p. xiv).

And, Henson stated that the function of providing access to information is, “…a key element and is directly related to the role of standards in archival description, EAD’s consistency with traditional archival theory, and with the descriptive standards that have emerged for archives during the past twenty years” (Henson, 1999, p. 60).

In my literature review, I also encountered articles by some authors whom pointed out the shortcomings of the EAD schema. They objected to using the collection inventory as an access tool. Specifically, two authors, Yakel (2003), and MacNeil (2008), were both critical of the EAD encoding of archival arrangement and description. They both argued that using standard archival arrangements or a standardized description does a disservice to the historical understanding of the records (Daines & Nimer, 2011, p. 6; also Yakel, 2003, n.p.; and McNeil, 2008, n.p.).

**EAD implementation:** Back in 2002, Marshall noted that, “…little research has been conducted in the area [EAD implementation] to date” (Marshall, 2002, p. 41). But, I was fortunate to locate a more recent article, by Carpenter and Park (2009), whom engaged in a comprehensive review of the EAD headers at three library and archival institutions. They based their study on the best practices guidelines from RLG, LC, and OAC (Carpenter & Park, 2009, p.143). They focused their review on the <eadheader> element, which contains 19 elements (Ibid, p.145).
Metadata Focus: For the purposes of expediency, this review limited its focus to those metadata elements contained within the EAD header element. The reader should be aware that additional meta-tags, located in the <archdesc> section of the xml code, also contain information relevant to collections.

But, due to limitations of time and report length, I chose to limit my focus to the EAD header elements, identified based on their respective XML or source code, as accessed from each repository’s online website. I relied on each repository’s online catalog for access to the pertinent xml files (see “Figure 2” right; source: LC, 1998, n.p.).

The <eadheader>, the focus of this review, is modeled on the header element in the Text Encoding Initiative (TEI), an international, humanities-based effort to develop a suite of DTDs for encoding literary texts (JISC, 2013, n.p.).

To encourage uniformity in the provision of metadata across document types, EAD uses a TEI-like header to capture information about the creation, revision, publication, and distribution of finding aids (JISC, 2013, n.p.).

Metadata consistency and archival description

Metadata consistency in archival records can be difficult to measure as an archive may use its own judgment in regard to the level of descriptive collection information displayed in a record. Not all collections are processed at 100%, and those which are fully processed may vary in terms of the level of descriptive information available. In other words, limited staff may make it...
difficult for archives to fully process and/or describe all materials in a particular collection.

Finding aids are typically created to give at least a basic overview of the collection’s contents. Basic description will usually include elements at the <eadheader> level as well as at the <archdesc> level. Some collections may rate a more detailed description at the file or item level.

This inevitably results in a degree of inconsistency in regard to collection descriptive data. In reviewing metadata schemes, one must be cognizant for the need to identify those elements whose usage is consistent with established metadata schemes and enhances interoperability.

**EAD Guidelines**

The basic guideline used for this study is the Dublin Core to EAD Crosswalk, referred to as the *EAD Application Guidelines for Version 1.0*, published by the Society of American Archivists (Society of American Archivists, 1999b), listed at: [www.loc.gov/ead/ag/agappb.html](http://www.loc.gov/ead/ag/agappb.html).

The EAD application guidelines, version 1.0 (EAD crosswalk) are available from the Library of Congress (LC, 1999). They are based on the 15 elements in the Dublin Core (DC).

The Library of Congress has available a list of meta-tags (LC, 2007). This list is available as the “EAD Tag Library,” and lists all valid EAD meta-tags (LC, 2007). For logistical reasons, I have opted to limit my review to the EAD meta-tag header.

**Libraries surveyed:** For this research paper, the following three libraries were selected:

Library #1: University of Vermont, Bailey/Howe Library, Special Collections, [http://library.uvm.edu/sc/](http://library.uvm.edu/sc/)

Library #2: Duke University, Rubenstein Rare Book & Manuscript Library, [http://library.duke.edu/rubenstein/](http://library.duke.edu/rubenstein/)

Library #3: The University of Chicago Library, Special Collection Research Center, [http://www.lib.uchicago.edu/e/scrc/](http://www.lib.uchicago.edu/e/scrc/)
**Repository selection criteria:** For this institutional review of the EAD schema, I selectively chose three archival repositories, based on each containing a digital library or archive. The three digital libraries were chosen based on their each contained viewable digitized EAD metadata structures. This search proved to be somewhat challenging as a large number of digitized libraries had EAD data, but most contained data which were not viewable as a separate xml source file. I made my EAD repository selection based on two useful lists of EAD repositories, (Carpenter and Park, 2009, p. 152), and (Huffman, 2008, pp. 49-50).

**Research method:** I calculated the percentage of meta-tag implementation of digitized finding aids at the above three archival libraries. I then used the data derived from this limited study to calculate the percentage of actual EAD meta-tag header usage at each institution. During my research, I encountered a number of repositories containing EAD encoded XML finding aids, but they were not viewable by the public. While this is not a barrier for patron access, it may be a barrier for future research surveys.

All three archival library collections were examined for their EAD metadata quality and consistency as identified thru records from each archive. None of the three libraries had an accessible online local metadata creation guide.

In my research, I found that the three reviewed libraries all offered access to their digitized finding aids and collections through their collection catalogs. All three libraries had a select number of finding aids examined for their EAD metadata quality and consistency as identified thru records from each archive. None of the three libraries reviewed had an accessible online local metadata creation guide.
The collections from the three libraries primarily dealt with subject matter pertaining to their respective geographic regions. A total of sixty records were selected, twenty from each digital repository. XML entry mappings from EAD encoded finding aids were utilized.

**Repository assessment method:** For my assessment of the three digitized library finding aid collections, I reviewed 20 metadata XML records from each archive’s online website catalog. Each record had its `<eadheader>` section examined for its level of conformance with the EAD schema. I examined the XML records for their systematic usage of the `<eadheader>` tags.

In reviewing the xml records, I examined the meta-tags for issues of consistency as well as areas of non-conformity. For the purposes of this paper, I limited my review to those meta-tags at the `<eadheader>` level, and did not review meta-tags at the `<archdesc>` level. This level of review is consistent with the methodology used in an EAD institutional survey conducted by Carpenter and Park (2009, p. 143).

In terms of online collection access, I observed that access to each institution’s online catalog entries was primarily accessible via the “title” element. Two of the three institutions, Duke University Library, and the University of Chicago Library, had readily accessible XML data.

I ran into a barrier to access as the University of Vermont, Special Collections Library, had no accessible XML data. This limitation was finally overcome after I examined the html source code for each XML record and then googled the XML file name.

None of the three libraries reviewed had a listed local metadata creation guide, although the Duke University library, in its Strategic Plan 2006-2010, listed “support for metadata creation and maintenance projects” (Duke, 2010, n.p.). And in its 2011 Librarian Report, the Duke University library included the priority of “recommending metadata fields for digital
collections” as one of its priorities (Duke, 2011, n.p.).

The University of Vermont Special Collections Library had excellent usage of the EAD headers. For my sample selection, all the EAD encoded finding aids dated after 2008 indicated usage of the Archivist Toolkit software (see Chart 10).

The Duke University Library also had good usage of the EAD headers. Duke listed DACS for its file creation (see Chart 11). According to Dow, DACS is a “content standard” for use within EAD (Dow, 2005, p. 133). An advantage of DACS is that it enables one to “group similar information together under appropriate headings” (Santamaria, 2007, n.p.).

In my review of the University of Chicago Library, Special Collection Research Center, I was unable to locate a specific processing method (see Chart 12). But, on the positive side, this library had viewable XML files.

**Website Access:** *Library #1, University of Vermont, Bailey/Howe Library, Special Collections* (see Figures 1-3, Appendix)

The University of Vermont Library houses a number of libraries and departments. From the main library webpage [http://library.uvm.edu/](http://library.uvm.edu/) one chooses from the list of “Libraries and Collections” on the right column, and then clicks the link to “Special Collections.”

The “Special Collections” webpage has links under the headings of “Quick Links” and “Research Links” on the right column. Within “Research Links,” the user clicks “Finding Aids.” Within the “Finding Aids” webpage, on the right side, there is a column entitled, “Browse the Finding Aids” with links to search by repository, topic, place or genre (see Figure 2, Appendix). If the user clicks, “View all finding aids,” on the left column, it brings up an alphabetical list “Browse All Finding Aids” (see Figure 3, Appendix).
My challenge with this repository was that they had no provision to view the raw XML files. I tried a number of approaches, and was eventually able to right-click each finding aid and locate the name of the actual XML file. One such file name, “hoag.ead.xml,” is pictured below (see XML examples, Figure 11, Appendix). I identified the pertinent XML file name, and then googled the name. This method worked and I was able to retrieve all of the necessary XML files.

**Review of Metadata Quality, Library #1, University of Vermont, Bailey/Howe Library, Special Collections** (Table C, Appendix)

A sample EAD header is attached (Figure 10, Appendix). This archive does not have published local guidelines for its metadata scheme. This institution identifies their collection goals on their main homepage. I examined 20 records from their online digitized finding aid collection (Tables A & B, Appendix).

Their EAD metadata maps to two distinct levels: <eadheader> and <archdesc>. I limited my review to meta-tags at the <eadheader> level. In regard to tag usage, tag uniformity was quite good, and all EAD tags were used (Tables A & B, Appendix).

**Chart 1**
(EAD Header)
University of Vermont, Bailey/Howe Library, Special Collections:

<table>
<thead>
<tr>
<th>Element</th>
<th>XML location</th>
<th>Repository review</th>
<th>% usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eadid</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Filedesc</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Titlestmnt</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Titleproper</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Date</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Creation</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Language</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
</tbody>
</table>
Meta-tag usage at the <eadheader> level appeared to be very consistent. Important tags such as <title>, <date>, <publisher>, and <eadid> were used at 100% (Tables A & B, Appendix).

There were some variations in the data placed within the tags of <address> and <publicationstmt> (Tables A & B, Appendix). The address tag is used to identify the address of the repository. I found that older XML pages, created prior to 2008, lacked complete url’s and part of the library’s address.

Chart 2
(EAD Header)
University of Vermont, Bailey/Howe Library, Special Collections:

Partial list of least frequently occurring metadata elements: (see Table B, Appendix)

<table>
<thead>
<tr>
<th>Element</th>
<th>XML location</th>
<th>Repository review</th>
<th>% usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>Eadheader</td>
<td>1 out of 20 records</td>
<td>5%</td>
</tr>
<tr>
<td>Publicationdate</td>
<td>Eadheader</td>
<td>18 out of 20 records</td>
<td>90%</td>
</tr>
</tbody>
</table>

Per Chart 2, (above), this library did not identify the <author> of the finding aids. Based on my survey date, the <publicationdate> was missing in 10% of the records (Table B, Appendix).

Of note, at the <eadheader> level, the University of Vermont Library had a slight variance in meta-tags which I found were based on the date of the file creation. In my sampling of 20 records, 15 of the 20 XML files, which had creation dates of 2008 or newer, contained 3 additional or variances in the meta-tags (Table B, Appendix). These additional tags included: a url link located within the <eadid> section, a <num> tag, located within the <titlestmnt> section, and the <extref> tag, representing a jpg image link.

As part of my research, I conducted a brief telephone interview with University of Vermont Library, Archivist Chris Burns. In one of his prior projects, Mr. Burns authored some of the XML style sheets which I reviewed for this paper. Mr. Burns explained to me that their archive
instituted usage of the Archivist Toolkit, which simplified XML code creation (Burns, 2013). This made sense to me as I found that all the University of Vermont XML records which listed the Archival Toolkit were consistent in their data field usage.

**Website Access:** Library #2, *Duke University, Rubenstein Rare Book & Manuscript Library* (Figures 5-7; Appendix)  
http://library.duke.edu/rubensteinfindingaids/Creator/A/

The Duke University, Rubenstein Rare Book & Manuscript Library, is one of nine libraries listed on bottom of the Duke University Library main webpage (Figure 5, Appendix). In accessing this library’s website, I ran into a barrier to access as there was no obvious link from the main library homepage, (Figure 5, Appendix) to the Rubenstein Library.

There was a small boxed index with links at the bottom of the main library webpage (Figure 5, Appendix), but I found no summary or label of information about each library. In my opinion, this is a weakness of the website layout. Once the user clicks the link to the Rubenstein Library, there is a menu choice of “Catalog” or “Finding Aids” (Figure 6, Appendix). Users click the “Finding Aids” button and then click the “Browse All Finding Aids” button (Figure 7, Appendix).

A very nice feature of this library is that it appears all of the digitized finding aids have an embedded clickable XML link. According to Librarian Noah Huffman, this is a standard feature of all Rubenstein Library finding aids (Huffman, 2013).
Review of Metadata Quality, Library #2
Duke University, Rubenstein Rare Book & Manuscript Library (Table D, Appendix)

A sample EAD header is attached (Figure 13, Appendix). This archive lacked published guidelines for its metadata scheme. But, the Duke University Library website included some published materials which made a general reference to metadata.

Duke University has a “Strategic Plan 2006-2010,” which listed “support for metadata creation and maintenance projects” (Duke, 2010). And, in a 2011 Duke University Librarian Report, the priority of “recommending metadata fields for digital collections” was listed (Duke, 2011).

At the <eadheader> level, the Duke University, Rubenstein Library, appeared to use most of the EAD tags (Tables A & B, Appendix). Specific usage was noted in regard to elements <titleproper> and <publisher>. These tags were at 100% (Table A, Appendix). The <creator> tag was also at 100% (Tables A & B, Appendix).

Chart 3:
(EAD Header)
Duke University, Rubenstein Rare Book & Manuscript Library

<table>
<thead>
<tr>
<th>Element</th>
<th>XML location</th>
<th>Repository review</th>
<th>% usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eadid</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Titlestmnt</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Titleproper</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Creation date</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Creation</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Language</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
</tbody>
</table>

Overall tag usage, while not as complete as the University of Vermont, was still very respectable.

The Duke University usage of the <titlestmnt> tag was at 100% (Tables A & B, Appendix).
Partial List of least frequently occurring metadata elements: (see Table B, Appendix)

<table>
<thead>
<tr>
<th>Element</th>
<th>XML location</th>
<th>Repository review</th>
<th>% usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publisher</td>
<td>Eadheader</td>
<td>15 out of 20 records</td>
<td>75%</td>
</tr>
<tr>
<td>Publisher date</td>
<td>Eadheader</td>
<td>16 out of 20 records</td>
<td>80%</td>
</tr>
<tr>
<td>Descrules</td>
<td>Eadheader</td>
<td>17 out of 20 records</td>
<td>85%</td>
</tr>
</tbody>
</table>

Per Chart 4, above, the four tags which were not at complete usage were <Publisher> at 75%, <Publisher address> at 25%, the <publisher date> at 80%, and <Descrules> at 85%, (see Tables A & B, Appendix).

As part of my research survey, I conducted a brief telephone interview with Noah Huffman, Archivist for Meta-data and Encoding, Duke University, Rubenstein Library (Huffman, 2013). Mr. Huffman explained to me that his department previously used the digitizing software NoteTab, they are currently using “Archivist Toolkit,” and plan to transition to “ArchivesSpace” (Huffman, 2013).

Website Access: Library #3, University of Chicago Library, Special Collections Research Center (Figures 8-10, Appendix).

In my review of the University of Chicago Library, http://www.lib.uchicago.edu/e/index.html, I found it to have a well-planned website layout, using columns for its menu system (Figure 8, Appendix). In the middle column, under the heading of “Libraries and Collections,” is the link button for the “Special Collections Research Center” (Figure 8, Appendix).

I was impressed with this website layout and felt it was more patron friendly than the Duke University website layout. After clicking the “Special Collections Research Center” button, the patron is brought to the Special Collections Research Center webpage (Figure 9, Appendix). The
Special Collections Research Center website contains clearly marked columns with links. On the left side, at the top, is a section entitled, “Search.” Within this section is a button marked, “Finding Aids.”

Clicking this button takes one to the “Finding Aids” webpage (Figure 10, Appendix). One can use the “Search Finding Aids” search box, or the “Browse all Finding Aids” list (Figure 10, Appendix). As in the case of the Duke University library, this library has its digitized finding aids formatted whereby all of their digitized finding aids have an embedded XML link.

**Review of Metadata Quality, Library #3**  
*University of Chicago Library, Special Collections Research Center (Table E, appendix)*

A sample EAD header is attached (Figure 14, Appendix). This archive has general collections guidelines, but lacked published guidelines for its metadata scheme, although after conducting a site search, I located a brief page which was entitled,” EAD 2002: Finding Aid Delivery using Native XML Technologies”(UC, 2004, n.d.).

**Chart 5:**

*(EAD Header)*  
*University of Chicago Library, Special Collections Research Center*

Partial List of most frequently occurring metadata elements:  
(see Table B, Appendix)

<table>
<thead>
<tr>
<th>Element</th>
<th>XML location</th>
<th>Repository review</th>
<th>% usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eadid</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Titlestmnt</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>titleproper</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Author</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Language</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>100%</td>
</tr>
<tr>
<td>Creation</td>
<td>Eadheader</td>
<td>20 out of 20 records</td>
<td>80%</td>
</tr>
</tbody>
</table>

Overall meta-tag usage, though less than the University of Vermont, was still very good. The Duke University usage of the <titlestmnt> tag was at 100% (Tables A & B, Appendix).
Chart 6:

(EAD Header)

*University of Chicago Library, Special Collections Research Center*

Partial List of least frequently occurring metadata elements: (see Table B, Appendix)

<table>
<thead>
<tr>
<th>Element</th>
<th>XML location</th>
<th>Repository review</th>
<th>% usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publisher</td>
<td>Eadheader</td>
<td>0 out of 20 records</td>
<td>0%</td>
</tr>
<tr>
<td>pubaddress</td>
<td>Eadheader</td>
<td>0 out of 20 records</td>
<td>0%</td>
</tr>
<tr>
<td>pubdate</td>
<td>Eadheader</td>
<td>0 out of 20 records</td>
<td>0%</td>
</tr>
<tr>
<td>Creation date</td>
<td>Eadheader</td>
<td>0 out of 20 records</td>
<td>0%</td>
</tr>
<tr>
<td>descrules</td>
<td>Eadheader</td>
<td>0 out of 20 records</td>
<td>0%</td>
</tr>
</tbody>
</table>

The five tags which were not used included `<Publisher>` at 0%, `<publisher address>` at 0%, `<pubdate>` at 0%, `<creationdate>` at 0%, and `<Descrules>` at 0%. (Table A & B, Appendix).

As part of my research review, I conducted a brief telephone interview with Ms. Feeney, Head of Archives Processing and Digital Access at the University of Chicago Library, Special Collections Research Center. I discussed aspects of the digitized finding aid creation with Ms. Feeney (Feeney, 2013).

Ms. Feeney explained to me that the Chicago Library is using locally created finding aids in word, and then pasting them into pre-set forms or scripts (Feeney, 2013). Ms. Feeney advised me that their process is quite expedient and that they have created approximately 600 digitally encoded finding aids and have no backlog (Feeney, 2013). Ms Feeney told me that they previously reviewed Archivist Toolkit, and they may decide to migrate to ArchiveSpace in the future (Feeney, 2013).

**Survey data consistency: <eadid>**

EAD best practices states that, “the `<eadid>` element is a required subelement of `<eadheader>` that contains a unique identifier for a given EAD document” (Neimmer, 2002, p. 4). See Chart 7, below, for the `<Eadid>` comparison data.
Based on the data and percentages presented in Chart 7 (above), it would appear that all three libraries are at 100% usage for this element. But, based on my survey data, I found that while all three repositories were at 100% usage of this element, the usage of this, or any data elements, did not guarantee full data usage of sub-elements.

Specifically, in my review, the xml records which I examined from the University of Chicago Library, all had some data missing from the <Eadid> field. I found that this repository was missing the following <Eadid> sub-elements: countrycoding, countrycode, datencoding, langencoding, Repositoryencoding, and mainagencycode (see Figure 11, Appendix).

**Data consistency: <titleproper>**

Based on my research, I identified the “title” as being the primary searchable element within the online catalog as accessible by all three libraries. There are other searchable elements including subject fields. But, the title element is extremely important as it identifies the collection.

I reviewed my sample list (n=20) of digitized finding aid titles from the University of Vermont Library, Special Collections, Duke University, Rubenstein Library, and the University of Chicago, Special Collections Research Center.
In my survey, I observed that the collection titles from all three libraries appeared to be uniform in nature, with a minimum of extraneous wording (Chart 8, below).

**Chart 8: Comparison of title element <titleproper>** (see Tables C, D, E, Appendix)

<table>
<thead>
<tr>
<th>Library #1: University of Vermont (see Table C)</th>
<th>Library #2: Duke University (see Table D)</th>
<th>Library #3: University of Chicago Library (see Table E)</th>
</tr>
</thead>
</table>

**Data consistency <publicationstmt>**

EAD best practices states that, “the name and address of the repository are required” (Neimmer, 2002, p. 6). Within this field, the meta-tag <publisher> is the name of the party responsible for issuing or distributing the encoded finding aid. EAD best practices notes that,”…a publisher's name and address is expected within the <publicationstmt> element. One could insert tags for the publisher's name and address, but if the publisher's address changes, the XML document will include out-of-date information” (Neimmer, 2002, n.p.).

In my review of the usage of the <publisher> meta-tag, it appears that the University of Vermont Library is in perfect conformance at 100%, with EAD Best practices. In contrast, the Duke University library has partial compliance at 75%, while the University of Chicago Library has zero compliance (Chart 9, below).

**Chart 9: Comparison of sub-title element <publisher>** (see Tables C, D, E, Appendix)

<table>
<thead>
<tr>
<th>Element:</th>
<th>Library #1 University of Vermont Library (see Table C)</th>
<th>Library #2 Duke University Library (see Table D)</th>
<th>Library #3 University of Chicago Library (see Table E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;publisher&gt;</td>
<td>20/20=100%</td>
<td>15/20=75%</td>
<td>0%</td>
</tr>
<tr>
<td>&lt;publisher address&gt;</td>
<td>20/20=100%</td>
<td>5/20=25%</td>
<td>0%</td>
</tr>
<tr>
<td>&lt;publisherdate&gt;</td>
<td>18/20=90%</td>
<td>16/20=80%</td>
<td>0%</td>
</tr>
</tbody>
</table>
**Data consistency:** <creation>

This is useful element as it indicates the type or format used in the encoding process. As Dow stated, “All archival description follows rules, standards, conventions, and protocols. This element indicates which format, such as DACS, ISAD, EAD, or RLG was used” (Dow, 2005, p.75). The University of Vermont, is making excellent usage of this meta-tag (see Chart 10, below).

**Chart 10:**
Library #1: University of Vermont Library

<table>
<thead>
<tr>
<th>Encoding Format</th>
<th>Library #1: University of Vermont Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used “Archivist Toolkit”</td>
<td>15/20=75%</td>
</tr>
<tr>
<td>Used “EAD encoding”</td>
<td>5/20=25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

In Chart 11, (see below), one can see the mixture of encoding formats used by the Duke University Library.

**Chart 11:**
Library #2: Duke University Library

<table>
<thead>
<tr>
<th>Encoding Format</th>
<th>Library #2: Duke University Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used “xml authoring program”</td>
<td>10/20=50%</td>
</tr>
<tr>
<td>Used “automated markup system”</td>
<td>5/20=25%</td>
</tr>
<tr>
<td>Automated markup system and XMetal software</td>
<td>1/20=5%</td>
</tr>
<tr>
<td>Scanning, OCR and MS Word</td>
<td>4/20=20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
And, in Chart 12 (see below), one can see that there is no defined encoding format in use by the University of Chicago Library.

Chart 12:

<table>
<thead>
<tr>
<th>Encoding Format</th>
<th>Library #3: University of Chicago Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>No method listed</td>
<td>20/20=100%</td>
</tr>
</tbody>
</table>

Survey results: Consistency of metadata usage
The XML code from EAD encoded finding aids, 20 per library, were reviewed from three libraries. In my review, I identified the <titleproper> element as the most important tag due to its usage for identification and retrieval of the pertinent collection catalog record (Chart 8). Samples (n=20) from all three library collection finding aids were at 100% and appeared to be uniform and consistent (Tables A & B, Appendix).

Consistency of <Eadid> usage: Based on my findings, (Chart 7; Tables A & B, Appendix), it appeared that all three libraries were at 100% usage. But, in my review, the XML records which I examined from the University of Chicago Library, had data missing from this field (Chart 7).

Consistency of <publisher> usage: In my review, I found that the University of Vermont Library was in almost perfect conformance with EAD Best practices (see Chart 9). In contrast, the Duke University library had partial compliance while the University of Chicago Library had zero compliance (Tables A & C, Appendix).

Consistency of <creation> usage: This is element was used by this library to identify the type or form of encoding used. In my review, I found that the University of Vermont had a 75% usage of “Archivist Toolkit” (Chart 10). This library also had the highest usage of meta-tags (Tables A & C, Appendix).
The Duke University Library used a mixture of four types of encoding formats (Chart 11). This reflected their percentage of meta-tag usage which was less than the University of Vermont Library. And, the University of Chicago did not list a software format (Chart 12). They had the lowest percentage of usable meta-tags (Tables A & C, Appendix).

**EAD Interoperability**
Interoperability of digital library systems is essential to the flow and access of information. Digital library systems provide essential functions to ensure the flow of information. Without interoperability of the library system, it would be difficult to provide access to patrons. Metadata schemas are standardized formats, such as EAD, which provide authoritative data about data elements. This formalized data enables the institution’s catalog to share collection information in a standardized format. This results in semantic interoperability of metadata across domains.

**Barriers to EAD interoperability:** In my metadata review, I encountered no major barriers to interoperability at any of the three libraries while accessing the sampled (n=20) finding aids. All three libraries had their online catalog organized by title entry, with viewable finding aids. And, all three libraries contained catalog information which was viewable online. Review of subject categories, another important aspect of finding aid access, was outside the scope of my review.

**EAD functionality:** A properly-encoded metadata schema is essential as it provides users with data fields containing pertinent information regarding a resource. This schema, when properly supplied with resource data elements, permits the user to use search syntax in order to browse and locate the relevant catalog entry. The catalog entry contains finding aid information pertaining to a particular collection. Consistency of data and proper input of this data is essential.

I believe that further studies of EAD meta-tag functionality would be helpful. As Huffman
noted, “To date, most studies of EAD have considered issues surrounding its development as a standard or its implementation at specific repositories. Few studies have examined the …functionality of EAD retrieval systems” (2008, n.p.).

As a metadata scheme, EAD is designed to provide interoperability within archival collections. In my review, I encountered no barrier to using the search catalog from each library to access their respective finding aids.

**Survey results: EAD Usability and accessibility** In my metadata survey, although each of the three libraries had varying degrees of EAD usage, I found that none of these variants affected retrieval or access to the relevant EAD finding aid. My review did find that website usability and accessibility differed at each of the three libraries reviewed.

Specifically, I found website access to be seamless at both the University of Vermont Library as well as the University of Chicago Library. But, I encountered difficulty in access at the Duke University Library. I found that the main impediment at the Duke University Library was due to a poorly designed main website portal. I attribute this issue to the fact that the Duke University hosts nine separate libraries. A revision of this webpage would probably assist patron access.

In my review, I found another interesting pattern: one of the issues to impede EAD meta-tag usage appeared to be the lack of uniform usage of EAD software tools, such as Archivist Toolkit. During the course of my review, I found that there was a pattern between software used, and the percentage of meta-tag elements reported.

I found that those libraries which listed software usage in their EAD schema, such as Archival Toolkit, appeared to have better uniformity and a higher percentage of usage of their meta-tags. Also, based on the data from my survey, both the Duke University library and the Chicago
Library appeared to omit some EAD elements (Tables A & B, Appendix). In my opinion, if these libraries would choose to adopt local metadata creation guidelines, and use Archival Toolkit, their usage of the meta-tag elements might improve.

As mentioned at the beginning of this paper, none of the three libraries reviewed had a published local metadata schema, although the Duke University library, listed “support for metadata creation and maintenance projects” (Duke, 2010). And the Duke University library included the priority of “recommending metadata fields for digital collections” as one of its priorities (Duke, 2011).

Comparative survey findings: Issues in EAD implementation My findings from the 3 institutional survey appear to be comparable to those findings from some other implementers. Dow, cited earlier in this paper, said that her biggest problem in implementing EAD at the University of Vermont in 1996 was her insistence on working alone (Dow, 1997, p. 452). It was not until she involved her IT staff that her project progressed (Dow, 1997, p. 452).

Marshall, who surveyed early implementers, reported that EAD implementation case studies show that, "it is especially important for archivists working with EAD to be able to articulate their goals and requirements to non-archivists, particularly administrative and systems personnel” (Marshall, 2002, p.30). My survey noted the absence of any published EAD documentation or guidelines on the websites of the three surveyed libraries.

EAD Consistency and uniformity: The primary goal of the EAD schema is to enable the access and retrieval of descriptive information for a finding aid. Consistency and uniformity of data elements are essential for EAD to be effective. to achieve this goal. In order for a researcher to
access a collection, the XML data must be accurate in 2 important aspects: 1) accuracy in the element data, especially the title field, 2) properly encoded EAD encoded xml to enable online access and retrieval.

**Recommendations for EAD implementation:**

Based on my review, it appears that the following would be helpful for more effective EAD implementation and interoperability: [1.] library workshops to educate library staff in the use of standardized software packages such as Archivist Toolkit, [2.] library-level creation and usage of a well-defined metadata development policy,

[3.] inter-library collaboration to assist library staff in the usage of EAD encoding software [4.] standardizing meta-data encoding procedures, [5.] further study to explore the usage of the OAI crosswalk, [6.] inclusion of specific meta-tags to ensure support for element-specific indexing and retrieval.

Based on my survey data, it appears that adherence to the EAD schema can directly affect usage of key meta-tag elements. It also appears, based on my research and survey that libraries are making efforts to ensure adherence to the EAD schema as they digitize their finding aids. In my opinion, this is essential for interoperability, consistency, as well as uniformity of encoded data.

In closing, advances in technology and the developments of new software are aiding librarian staff efforts to collaborate and improve access to digitized finding aids and collections. Libraries and archives, while operating under budgetary pressure, are working towards meeting the information needs of the online user and their desire for access of digitized information from library and archival collections.
In my opinion, it is essential for implementers to be cognizant of the need for interoperability of authority data between libraries, to work towards standardizing the appearance and encoding of digitized finding aids, as well as the need to ensure that the XML encoded data files can be accessed for element-specific indexing and retrieval by search engines.

These points would help to ensure standardization and usability of the EAD schema. After all, the goal of the library and archive is, “…to facilitate [greater] information discovery and retrieval [of digitized materials] by diverse user groups” (Pitti & Duff, 2001, p. 210). As I see it, libraries should continue their efforts to ensure the functionality, usability, and accessibility of digitized EAD finding aids. These efforts will help information-seeking users locate and retrieve EAD finding aids online.
Appendix

Table A

Comparison of:
(Library #1) University of Vermont Library, Special Collections;
(Library #2) Duke University’s Rubenstein Rare Book & Manuscript Library;
(Library #3) The University of Chicago Library, Special Collections Research Center;


<table>
<thead>
<tr>
<th>Element Name*</th>
<th>Element Description</th>
<th>RLG Status</th>
<th>Library #1 University of Vermont Library</th>
<th>Library #2 Duke University Library</th>
<th>Library #3 University of Chicago Library</th>
<th>Percentage across collections</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;eadheader&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eadid (1.)</td>
<td></td>
<td>Required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Filedesc (2.)</td>
<td></td>
<td>Required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Titlestmt (3.)</td>
<td>The name given to the resource &lt;titleproper&gt;</td>
<td>Required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Titleproper (4.)</td>
<td></td>
<td>required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Author (5.)</td>
<td></td>
<td>If needed</td>
<td>5%</td>
<td>100%</td>
<td>100%</td>
<td>68%</td>
</tr>
<tr>
<td>Publicationstmt (6.)</td>
<td></td>
<td>required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Publisher (7.)</td>
<td></td>
<td>required</td>
<td>100%</td>
<td>75%</td>
<td>0%</td>
<td>58%</td>
</tr>
<tr>
<td>Publisher address (8.)</td>
<td>wrapper element within the &lt;filedesc&gt; portion of &lt;eadheader&gt;. Address of publisher.</td>
<td>required</td>
<td>100%</td>
<td>25%</td>
<td>0%</td>
<td>42%</td>
</tr>
<tr>
<td>Publication Date (9.)</td>
<td></td>
<td>required</td>
<td>90%</td>
<td>86%</td>
<td>0%</td>
<td>56%</td>
</tr>
<tr>
<td>Field</td>
<td>Type</td>
<td>Required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------</td>
<td>----------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Profiledesc (10.)</td>
<td></td>
<td>required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Creation (11.)</td>
<td>Subelement of the &lt;profiledesc&gt; portion of &lt;eadheader&gt;.</td>
<td>required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Creation date (12.)</td>
<td></td>
<td>required</td>
<td>100%</td>
<td>100%</td>
<td>0%</td>
<td>66%</td>
</tr>
<tr>
<td>Language (14.)</td>
<td></td>
<td>required</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Descrules (15.)</td>
<td>Optional sub-element of &lt;eadheader&gt;.</td>
<td>optional</td>
<td>100%</td>
<td>100%</td>
<td>0%</td>
<td>66%</td>
</tr>
<tr>
<td>Revision desc (16.)</td>
<td>Recommended</td>
<td></td>
<td>100%</td>
<td>40%</td>
<td>0%</td>
<td>46%</td>
</tr>
<tr>
<td>Change (17.)</td>
<td></td>
<td></td>
<td>100%</td>
<td>40%</td>
<td>0%</td>
<td>46%</td>
</tr>
<tr>
<td>Change date (18.)</td>
<td></td>
<td></td>
<td>100%</td>
<td>40%</td>
<td>0%</td>
<td>46%</td>
</tr>
<tr>
<td>Change item (19.)</td>
<td></td>
<td></td>
<td>100%</td>
<td>40%</td>
<td>0%</td>
<td>46%</td>
</tr>
</tbody>
</table>
Table B

Usage of the EAD Header  <eadheader> Elements

Library #1: University of Vermont, Bailey/Howe Library, Special Collections
http://library.uvm.edu/sc/

Library #2: Duke University, Rubenstein Library,
http://library.duke.edu/rubenstein/findingaids/Creator/A/

Library #3: The University of Chicago Library, Special Collection Research Center,
http://www.lib.uchicago.edu/e/scrc/findingaids/browse.php?alpha=A

<table>
<thead>
<tr>
<th>#</th>
<th>EAD element</th>
<th>Library #1 Vermont (n=20)</th>
<th>Library #2 Duke (n=20)</th>
<th>Library #3 Chicago (n=20)</th>
<th>% of total element usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Eadid</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20 [a]</td>
<td>100%</td>
</tr>
<tr>
<td>2.</td>
<td>Filedesc</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20</td>
<td>100%</td>
</tr>
<tr>
<td>3.</td>
<td>Titlestmnt</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20</td>
<td>100%</td>
</tr>
<tr>
<td>4.</td>
<td>Titleproper</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20</td>
<td>100%</td>
</tr>
<tr>
<td>5.</td>
<td>Author</td>
<td>1/20</td>
<td>20/20</td>
<td>20/20</td>
<td>68%</td>
</tr>
<tr>
<td>6.</td>
<td>Pubstmt</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20</td>
<td>100%</td>
</tr>
<tr>
<td>7.</td>
<td>Publisher</td>
<td>20/20</td>
<td>15/20</td>
<td>0/20</td>
<td>58%</td>
</tr>
<tr>
<td>8.</td>
<td>Address</td>
<td>20/20</td>
<td>5/20</td>
<td>0/20</td>
<td>42%</td>
</tr>
<tr>
<td>9.</td>
<td>Date</td>
<td>18/20</td>
<td>16/20</td>
<td>0/20</td>
<td>56%</td>
</tr>
<tr>
<td>10.</td>
<td>Profiledesc</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20</td>
<td>100%</td>
</tr>
<tr>
<td>11.</td>
<td>Creation</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20</td>
<td>100%</td>
</tr>
<tr>
<td>12.</td>
<td>Date</td>
<td>20/20</td>
<td>20/20</td>
<td>0/20</td>
<td>66%</td>
</tr>
<tr>
<td>13.</td>
<td>Langusage</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20</td>
<td>100%</td>
</tr>
<tr>
<td>14.</td>
<td>Langusage</td>
<td>20/20</td>
<td>20/20</td>
<td>20/20</td>
<td>100%</td>
</tr>
<tr>
<td>15.</td>
<td>Descrules</td>
<td>20/20</td>
<td>20/20</td>
<td>0/20</td>
<td>66%</td>
</tr>
<tr>
<td>16.</td>
<td>Revisiondesc</td>
<td>20/20</td>
<td>8/20</td>
<td>0/20</td>
<td>46%</td>
</tr>
<tr>
<td>17.</td>
<td>Change</td>
<td>20/20</td>
<td>8/20</td>
<td>0/20</td>
<td>46%</td>
</tr>
<tr>
<td>18.</td>
<td>Date</td>
<td>20/20</td>
<td>8/20</td>
<td>0/20</td>
<td>46%</td>
</tr>
<tr>
<td>19.</td>
<td>Item</td>
<td>20/20</td>
<td>8/20</td>
<td>0/20</td>
<td>46%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>359</td>
<td>292</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

Key: numbers refer to instances of tag usage. (n=20).
[a]: Key information missing from field
### Table C

Library #1: University of Vermont, Bailey/Howe Library, Special Collections

<table>
<thead>
<tr>
<th>Collection</th>
<th>Reference URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Guide to the i. Tarin Chaplin Papers</td>
<td><a href="http://cdi.uvm.edu/findingaids/collection/chaplinitarin.ead.xml">http://cdi.uvm.edu/findingaids/collection/chaplinitarin.ead.xml</a></td>
</tr>
<tr>
<td>12. Inventory of the Lucias Chittenden Papers</td>
<td><a href="http://cdi.uvm.edu/findingaids/collection/chittendenle.ead.xml">http://cdi.uvm.edu/findingaids/collection/chittendenle.ead.xml</a></td>
</tr>
<tr>
<td>13. Inventory of the James Hulme Canfiend Collection</td>
<td><a href="http://cdi.uvm.edu/findingaids/collection/canfieldjh.ead.xml">http://cdi.uvm.edu/findingaids/collection/canfieldjh.ead.xml</a></td>
</tr>
<tr>
<td>15. Inventory of the Thomas Hawley Canfield Collection</td>
<td><a href="http://cdi.uvm.edu/findingaids/collection/canfieldt.ead.xml">http://cdi.uvm.edu/findingaids/collection/canfieldt.ead.xml</a></td>
</tr>
<tr>
<td>16. Inventory of the Champlain Transportation Company Records</td>
<td><a href="http://cdi.uvm.edu/findingaids/collection/ctc.ead.xml">http://cdi.uvm.edu/findingaids/collection/ctc.ead.xml</a></td>
</tr>
<tr>
<td>17. Inventory of the Carruth Papers</td>
<td><a href="http://cdi.uvm.edu/findingaids/collection/carruth.ead.xml">http://cdi.uvm.edu/findingaids/collection/carruth.ead.xml</a></td>
</tr>
<tr>
<td>19. Inventory of the Author Wells papers</td>
<td><a href="http://cdi.uvm.edu/findingaids/collection/wellsarthur.ead.xml">http://cdi.uvm.edu/findingaids/collection/wellsarthur.ead.xml</a></td>
</tr>
<tr>
<td>20. Inventory of the Lyman Allen Papers</td>
<td><a href="http://cdi.uvm.edu/findingaids/collection/allenyman.ead.xml">http://cdi.uvm.edu/findingaids/collection/allenyman.ead.xml</a></td>
</tr>
</tbody>
</table>
Table D

Library #2: Duke University, Rubenstein Library

<table>
<thead>
<tr>
<th>Collection</th>
<th>Reference URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Guide to the Alvin Achenbaum papers</td>
<td><a href="http://library.duke.edu/rubenstein/findingaids/achenbaumalvin/">http://library.duke.edu/rubenstein/findingaids/achenbaumalvin/</a></td>
</tr>
</tbody>
</table>
### University of Chicago Library, Special Collection Research Center: Collection List

<table>
<thead>
<tr>
<th>Collection</th>
<th>Reference URL</th>
</tr>
</thead>
</table>
Table F

Source: “Table 1” below; NISO, 2004, p. 12).

The below chart shows the metadata crosswalk mapping of Dublin Core to EAD.

<table>
<thead>
<tr>
<th>Element Type</th>
<th>Dublin Core</th>
<th>EAD</th>
<th>MARC 21</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title Element</strong></td>
<td>Title</td>
<td>&lt;titleproper&gt;</td>
<td>245 00$a (Title Statement/Title proper)</td>
</tr>
<tr>
<td><strong>Author Element</strong></td>
<td>Creator</td>
<td>&lt;author&gt;</td>
<td>700 1#$a (Added Entry--Personal Name) (with $e=author)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>720$a (Added Entry--Uncontrolled Name/Name) (with $e=author)</td>
</tr>
<tr>
<td><strong>Date Created Element</strong></td>
<td>Date.Created</td>
<td>&lt;unildate&gt;</td>
<td>260 ##$c (Date of publication, distribution, etc.)</td>
</tr>
</tbody>
</table>
Figures

Figure 1

Library #1: University of Vermont, Bailey/Howe Library, Special Collections, http://library.uvm.edu/sc/

Bailey/Howe Library, Main webpage (below)
Library #1: University of Vermont, Bailey/Howe Library, Special Collections, http://cdi.uvm.edu/findingaids/

Special Collections, Main webpage

The Special Collections Department of the Bailey/Howe Library houses the Wilbur Collection of Vermontiana (published books and periodicals, manuscript collections, maps, photographs, etc.), the Rare Book Collection, and the University Archives. The Special Collections reading room and offices are located on the ground floor of the Bailey/Howe Library.
Figure 3

Library #1: University of Vermont, Bailey/Howe Library, Special Collections, http://cdi.uvm.edu/findingaids/

Finding Aids Webpage

Electronic access is available to selected finding aids from the University of Vermont Special Collections, the University of Vermont Archives, and from the St. Johnsbury Archives Collaborative. Finding aids provide detailed descriptions of the content of the collection as well as the context in which the collection was created.

© View all finding aids

UVM Special Collections

Special Collections holdings document Vermont and Vermonters and are especially strong in the following areas: politics, literature, architecture, social history, religion, education, photography, publishing and printing history, theatre and music, and business and labor. Collections include manuscripts, photographs, maps, ephemera, clippings, and printed material, and total more than 10,000 linear feet.

© View UVM Manuscripts finding aid

UVM Archives

Browse the Finding Aids

By Repository
- UVM Manuscripts
- UVM Archives
- St. Johnsbury Archives Collaborative

Topics
- University of Vermont -- Administration
- University of Vermont -- History
- Religion -- Vermont
- Vermont -- History -- Civil War, 1861-1865
- Politics -- Vermont

Places
- United States -- History -- Civil War, 1861-1865
- Vermont -- Politics and government
- Burlington (Vt.)
- Chittenden, Lake
- Vermont Politics and government

Genre
- Correspondence
- Photographs
- Clippings
- Financial records
- Diaries
**Figure 4**

**Library #1:**  
University of Vermont, Bailey/Howe Library, Special Collections,  
http://cdi.uvm.edu/findingaids/browseEAD.xql

"Browse All Finding Aids" Webpage  
(Note: Webpage is represented by two images, upper and lower)

---

A. W. Hoag and Associates Records  
*Creator:* A. W. Hoag and Associates.  
*Dates:* Bulk, 1945-1961  
*Extent:* 64.5 linear feet  
*Abstract:* Collection contains survey maps, job tickets, field notes, notebooks, and sketches, photographs, correspondence, title abstracts, and other materials documenting the survey business activities of A. W. Hoag and Associates.

Collamer Abbott Collection  
*Creator:* Abbott, Collamer M., b. 1910  
*Dates:* 1790-1978  
*Extent:* 11 cartons, 8 boxes  
*Abstract:* The Abbott Collection is composed of papers, maps, and photographs on mining and minerals, particularly in Vermont and the Eastern United States.

Fortis Abbott Papers  
*Creator:* Abbott, Fortis  
*Dates:* circa 1900-1975  
*Extent:* 23.0 linear feet or 3 cartons  
*Abstract:* Property appraisals, mainly Chittenden County.
Figure 5

**Website Access: Library #2**

*Duke University, Rubenstein Rare Book & Manuscript Library*

http://library.duke.edu/

(Image 1: Main Library webpage)
Figure 6

Website Access: Library #2
Duke University, Rubenstein Rare Book & Manuscript Library
http://library.duke.edu/rubenstein/

(Image 1: Main webpage)
Figure 7

Website Access: Library #2

*Duke University, Rubenstein Rare Book & Manuscript Library*

“Finding Aids” webpage:

http://library.duke.edu/rubenstein/findingaids/Creator/A/

Image 2: Finding Aids webpage (below)
Figure 8

Website Access: Library #3.
The University of Chicago Library, Special Collection Research Center, http://www.lib.uchicago.edu/e/scrc/collections/

Image: Main library webpage
Figure 9

**Website Access:** Library #3,
The University of Chicago Library, Special Collection Research Center,
http://www.lib.uchicago.edu/e/scrc/collections/

Image: Main website of Special Collections Research Center
Figure 10

**Website Access:** Library #3, The University of Chicago Library, Special Collection Research Center, [http://www.lib.uchicago.edu/e/scrc/collections/digital/](http://www.lib.uchicago.edu/e/scrc/collections/digital/)

Website: Special Collections Research Center, Finding Aids
Figure 11

Comparison of <Eadid> headers:

Library #1:
University of Vermont, Bailey/Howe Library, Special Collection

Source: 1. Guide to the Rolf Haugen papers

http://cdi.uvm.edu/exist/cocoon/xmldb/db/ead/haugenpapers/haugenpapers.ead.xml

```
<xml version="1.0" encoding="UTF-8" ?>
<ead xmlns="urn:isbn:1-931666-22-9" xmlns:ns2="http://www.w3.org/1999/xlink"
    http://www.loc.gov/ead/ead.xsd">
    <eadheader findaidstatus="In_process" repositoryencoding="iso15511" countryencoding="iso3166-1" dateencoding="iso8601"
        langencoding="iso639-2b">
        <eadid countrycode="US" managencycode="US-US-VIU"
            url="http://cdi.uvm.edu/findingaids/collection/haugenpapers.ead.xml">haugenpapers.ead.xml</eadid>
    </eadheader>
</ead>
```

Library #2:
Duke University, Rubenstein Library

Source: 1. Guide to the Abbot Family papers

http://library.duke.edu/rubenstein/findingaids/abbot/ (xml file link is on webpage)

```
<ead>
  <eadscript id="2935704321500000007"/>
  <eadheader audience="internal" findaidstatus="unverified-full-draft" langencoding="ISO639-2b" scriptencoding="ISO15924"
    dateencoding="ISO8601" countryencoding="ISO3166-1" repositoryencoding="ISO15511">
    <eadid countrycode="us" managencycode="rub" publicid="//rubenstein.humanities.duke.edu/findingaids/findingaids/abbot/Abbot%20Family%20Papers" xml:lang="en" url="http://library.duke.edu/rubenstein/findingaids/abbot/">Abbot</eadid>
  </eadheader>
</ead>
```

Library #3:
University of Chicago Library, Special Collection Research Center


```
<ead>
  <eadscript id="9648001564200968"/>
  <eadheader audience="internal">
    <eadid>ICU.SPCL.EGABBOTT</eadid>
  </eadheader>
</ead>
```
Figure 12

Library #1: University of Vermont Library, Complete <eadheader>

Source: 1. Guide to the Rolf Haugen Papers (haugenpapers.ead.xml)
Figure 12 (Cont.)

</change>
</revisiondesc>
</eadheader>

===end of Figure 12.
Figure 13

Library #2: Duke University, Rubenstein Library, Complete <eadheader>
Source: 1. Guide to the Abbot Family papers (abbot.xml)

<ead>
<script id="8160058143548667"/>
<eadheader audience="internal" findaidstatus="unverified-full-draft" langencoding="ISO639-2b" scriptencoding="iso15924" dateencoding="iso8601" countryencoding="iso3166-1" repositoryencoding="iso15511">
<eadid countrycode="us" mainagencycode="ndd" publicid="-/David M. Rubenstein Rare Book & Manuscript Library//TEXT (us::ndd:::Abbot Family Papers)//EN" url="http://library.duke.edu/rubenstein/findingaids/abbot/">abbot</eadid>
</eadheader>
<filedesc>
<titlestmt>
<titleproper>
Guide to the Abbot Family Papers,
<date normal="1733/1999" type="inclusive" era="ce" calendar="gregorian">1733-1999 and undated</date>
<date normal="1860/1910" type="bulk" era="ce" calendar="gregorian">(bulk 1860-1910)</date>
</titleproper>
<author>
Processed by: Tania Roy; machine-readable finding aid created by: Ruth E. Bryan
</author>
</titlestmt>
<publicationstmt>
<p>
<date era="ce" calendar="gregorian">2002</date>
Duke University. All Rights Reserved.
</p>
</publicationstmt>
<notestmt>
<note>
Aleph Number:
<num type="aleph">002878457</num>
</note>
</notestmt>
</filedesc>
<profiledesc>
<creation>
Machine-readable finding aid derived from automated markup system and XMetaL software.
</creation>
<Date of source: December 13, 2000>
</profiledesc>
Figure 13 (Cont.)

Processed by Tania Roy December 13, 2000; Finding Aid encoded by Ruth E. Bryan, David M. Rubenstein Rare Book & Manuscript Library, Duke University, <date era="ce" calendar="gregorian">February 20, 2002</date>
</creation>
</langusage>
Description is in
</language>English.</language>
</langusage>
</profiledesc>
</revisiondesc>
<change>
<date normal="20050627" era="ce" calendar="gregorian">06-27-2005</date>
</item>
PUBLIC "-/David M. Rubenstein Rare Book & Manuscript Library//TEXT
(US::NDD:::Abbot Family Papers)//EN" "abbotfamily.xml" converted from EAD
1.0 to 2002 by v1to02.xsl (sy2003-10-15).
</item>
</change>
</revisiondesc>
</eadheader>

====end of Figure 13.
Figure 14

Library #3:
University of Chicago Library, Special Collection Research Center

http://www.lib.uchicago.edu/e/scrc=findingaids/view.php?eadid=ICU.SPCL.EDGABBOTT&xml

<ead>
  <eadheader audience="internal">
    <eadid>ICU.SPCL.EDGABBOTT</eadid>
  </eadheader>
  <filedesc>
    <titlestmt>
      <titleproper>Guide to the Edith and Grace Abbott Papers</titleproper>
      <date>1870-1967</date>
    </titlestmt>
    <author>Finding aid prepared by FGB, 1963; 1981; EAI, 2000</author>
    <publisher>University of Chicago Library</publisher>
  </filedesc>
  <notestmt>
    <note>
      <p>© The contents of this finding aid are the copyright of the University of Chicago Library</p>
    </note>
    <note>
      <p><subject>Sociology and Social Welfare</subject></p>
    </note>
    <note>
      <p><subject>Chicago and Illinois</subject></p>
    </note>
    <note>
      <p><subject>Labor and Socialism</subject></p>
    </note>
    <note>
      <p><subject>Gender Studies and Sexuality</subject></p>
    </note>
  </notestmt>
</ead>
Figure 14 (Cont.)

- <profiledesc>
  - <creation>Finding aid encoded by KEF, 2006</creation>
  - <langusage>
    - Finding aid written in
      <language langcode="eng">English</language>
  </langusage>
</profiledesc>
</eadheader>

====end of Figure 14.
References:


Feeney, K. (2013). Telephone Interview with Librarian Kathleen Feeney, Head of Archives Processing and Digital Access, University of Chicago Library, Special Collection Research Center, conducted 12/5/2013 by James Gross.

Florida Virtual Campus Center (2012). Opening Archives Program, Florida Virtual Campus, State University Library Services, retrieved 10/11/2013 from: http://fclaweb.fcla.edu/Opening_Archives


Note: This paper contains a very useful list of institutions with EAD encoded collections. See pp. 49-50, Appendix A, Sample of 33 EAD Interfaces Examined, Taken from a list of 86 EAD implementers at http://www.archivists.org/saagroups/ead/implementors.html


Drexel Honesty Statement

At the beginning of each term, students must submit the following statement with their signature:
I certify that:
- I will submit only my own original work, created without unauthorized collaboration.
- I will not quote the words of any other person from a printed or audio source or a website without indicating what has been quoted and providing an appropriate attribution/citation.
- I will not submit work in this course that has been used to satisfy the requirements of any other course or created to meet other, non-academic requirements.

Signature       ________james gross____________
Date            ______12/8/2013_____________