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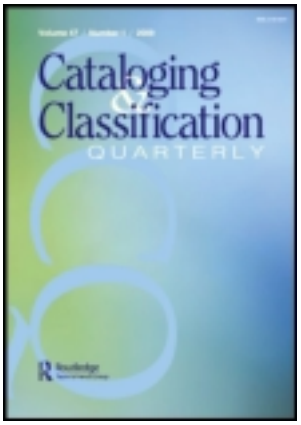

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Testing *Resource Description and Access* (RDA) with Non-MARC Metadata Standards

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Testing *Resource Description and Access* (RDA) with Non-MARC Metadata Standards

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Columbia University, the University of Chicago, and the University of Illinois at Urbana-Champaign participated in the 2010 U.S. National Libraries Test of Resource Description & Access *(RDA). As devised, the new cataloging code is format and schema independent. Because creating descriptive metadata records in non–MARC (Machine Readable Cataloging) metadata standards is now a part of regular cataloging practice, the three institutions chose to test RDA with the standards, Metadata Object Description Standard (MODS), Encoded Archival Description (EAD), and Dublin Core. This article describes the set-ups and workflows of each institution, the issues encountered with record creation, and the conclusions drawn from the test.*

KEYWORDS RDA, MODS, EAD, Dublin Core, metadata, schema, U.S. National Libraries RDA Test

INTRODUCTION

Resource Description and Access (RDA) is a new cataloging code developed by the Joint Steering Committee for Development of RDA (JSC) to replace the *Anglo-American Cataloguing Rules*, Second Edition (AACR2).[1] RDA grew out of the guidelines set forth by AACR2, and is grounded on the conceptual

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models of the Functional Requirements for Bibliographic Records (FRBR), the Functional Requirements for Authority Data (FRAD), as well as the International Cataloguing Principles (ICP).[2]

In late 2010, the Library of Congress (LC), the National Library of Medicine (NLM), and the National Agricultural Library (NAL) conducted a test with twenty-three libraries, vendors, and teaching institutions participating as testing partners. In June 2011 after an assessment of results, the three national libraries endorsed the recommendation of the RDA Test Coordinating Committee to "adopt RDA with certain conditions and that implementation will not occur before January 1, 2013."[3]

Although the RDA test focused principally on the data structure standard Machine Readable Cataloging (MARC21), the Joint Steering Committee had stated that, "users will be able to use RDA content with many encoding schemas (e.g., Metadata Object Description Standard (MODS), MARC21, or Dublin Core)."[4] Thus, several test partners, among them Columbia University Libraries (CUL), the University of Chicago Library (UCL), and the University of Illinois at Urbana-Champaign (UIUC), chose to apply RDA to several non–MARC metadata standards. This article describes that experience from the perspective of testers at these three institutions. The discussion centers on how each library dealt with the issues it encountered, such as the development of workflows, and, in the wake of RDA/non-MARC record creation, conclusions that were drawn.

LITERATURE REVIEW

To date, the authors have found few articles or presentations that address issues concerned with RDA in non-MARC metadata standards. Rather, those published most recently, such as *Introducing RDA*, focus on the general development of the standard, its relationship to FRBR, and to RDA in MARC.[5] Some important publications do foresee the potential of RDA and the Semantic Web; among these are *RDA Vocabularies for a 21st Century Data Environment*,[6] and *RDA Vocabularies: Process, Outcome, Use*.[7]

TEST SET-UPS

In the role of RDA testing partners, CUL and UCL participated as libraries, the UIUC contributed as a teaching institution. The choice of non-MARC metadata standards to be evaluated with RDA, and the types of material for which records were devised were left to each institution. Every descriptive non-MARC metadata standard record was created in eXtensible Markup Language (XML) format utilizing the XML editing tool oXygen.

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TABLE 1 Metadata Standard(s), Format, and Tool Used in Each Institution

Institution	Metadata Standard(s)	Format	Tool
Columbia	MODS EAD Dublin Core	XML	oXygen
University of Chicago	Dublin Core	XML	oXygen
University of Illinois	Dublin Core	XML	oXygen

All three institutions tested Dublin Core, and CUL assessed MODS and Encoded Archival Description (EAD) as part of its testing process. Each had decided it was necessary to evaluate Dublin Core, because it is the most widely used non-MARC metadata standard in the library domain (see Table 1).[8]

Columbia University

The metadata coordinator was part of CUL's professional cataloging staff who volunteered to test RDA. Assembled by the director of the Original and Special Materials Cataloging Division in early 2010, this initial group had expertise in continuing resource cataloging (serials and integrating resources), rare books, non-roman scripts, authority work, and non-MARC metadata standards.

The coordinator took part in all RDA meeting and training opportunities, which included an RDA session at the American Library Association's Annual Conference (2010), and Webinars. While in training, the coordinator and other CUL testers met almost weekly, and as needed during the official test period. Many who took part signed up for the listserv RDA-L, an electronic discussion forum.[9] They reviewed the *RDA Toolkit*, and practiced creating local workflows, which could be shared with *Toolkit* users, or limited to the use of a specific creator. MARC21 test records (bibliographic and authority), were studied, as was a variety of documentation and publications, which with few exceptions were MARC based. The coordinator, therefore, asked CUL's Metadata Group to offer its support during the test period. The four members who contributed made comments and suggestions throughout the process, and provided much needed technical support.

As a content standard, RDA "provides a comprehensive set of guidelines and instructions covering all types of content and media."[10] The coordinator chose the resources from a variety of digital projects, rather than from a single current project, because it was thought more practical to describe a number of formats displaying a range of issues as a way to test as many areas of RDA as possible.

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MODS was the primary non-MARC metadata standard tested because it is normally used to create the descriptive records for CUL's digital collections. Encoding in XML, the coordinator created eleven MODS 3.4 RDA records and two records in Qualified Dublin Core. Although CUL rarely uses the latter standard, the coordinator produced several test records to compare them with those composed in MODS. In addition, the archival finding aids of CUL's Rare Book and Manuscript Library are created in EAD format, and it was deemed worthwhile to test this standard with RDA. All records when completed were submitted as part of the extra set, which consisted of "at least 25 additional records using RDA rules, for the material they normally catalog on a day-to-day basis."[11]

University of Chicago

During the national test of RDA, the UCL incorporated a non-MARC metadata standard assessment. The director of Metadata and Cataloging Services asked the digitization manager of the Special Collections Research Center to take part as a tester because of the manager's experience in descriptive record creation with a variety of non-MARC metadata standards.[12]

Prior to the official test period, the manager, who was the single non-MARC record provider, attended all RDA training and Webinar sessions offered at the Library. As a group, the manager and the participating cataloging staff met bi-weekly to review sample records and discuss concerns about RDA, for example, the use of core elements and vocabularies, the *Toolkit*'s navigation, and its workflows. In the main, training and discussions were centered on the use of RDA with MARC21.

Cultural pieces, both source objects and digital surrogates, were chosen by the manager as the type of material to be described. Distinct formats were selected as a means to compare the difference in descriptions of physical objects and their reproductions in RDA records. The non-MARC portion of RDA testing, the director and manager agreed, would be carried out using Dublin Core. This particular data structure standard was preferred because it is used regularly in record creation for the digital collections of the UCL. By the test's conclusion, twenty extra-set Qualified Dublin Core records were produced.

University of Illinois at Urbana-Champaign

The UIUC's participation in RDA testing differed from the other two institutions. In the test with its Graduate School of Library and Information Science, the UIUC library partnered as a teaching institution. A Practicum program requiring 100 hours of work was set up for students who volunteered to take part in the test.

Students were divided into two groups, those with prior cataloging and class experience and those without that knowledge. From the latter

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group, one student was recruited to create records in Dublin Core. The student learned to apply the elements of Dublin Core, and RDA as a content standard and element set, how to formulate basic XML, and to use the tool oXygen. During the test period, the student created ten Dublin Core RDA records. Five records were produced from LC's common copy set, and three were generated from the common original set. Two additional Dublin Core records were composed from UIUC's digital collections as extra set records; one described a digitized image, the other a collection.

RDA TESTING WITH MODS

Published in June 2010, MODS 3.4 includes a number of changes, which accommodate the encoding of RDA in the schema.[13] For example, the value "Family" is now a valid type attribute under the name element. This new addition aligns MODS practice with RDA, which defines a creator as a "person, family, or corporate body responsible for the creation of a work."[14] Moreover, MODS 3.4 incorporates some RDA value vocabularies. For instance, RDA's Mode of Issuance element, which indicates how a resource is issued, maps to <issuance> a sub-element of <originInfo> in MODS.[15] A second example of MODS' adaptation is seen with its attribute <supplied> whose use is permitted with several elements to indicate that a cataloger supplies the data. This is a valuable feature when attempting to accommodate RDA core elements such as Place of publication.

The CUL MODS application profile is closely aligned with the *Digital Library Federation/Aquifer Implementation Guidelines for Shareable MODS Records*.[16] Access points are generally selected from a controlled vocabulary or a name authority file, and content standards are currently applied only at the element level. For example, a decision could be made to follow AACR2 for formulating the titles, but the description as a whole would not necessarily be constructed according to AACR2.

MODS Record Creation

To produce MODS records using RDA, CUL's coordinator and non-MARC testers consulted the RDA to MODS mapping table[17] and the text of RDA via the *Toolkit*, as well as MODS User Guidelines.[18] The coordinator selected resources that the CUL metadata staff regularly catalogs, digital reproductions (images, printed ephemera, and objects) and digital collection Web sites. The text of RDA was searched beforehand for all guidelines pertaining to reproductions, since it was deemed unproductive to repeat the task when creating records. For as Corey Nimer noted recently in an article about RDA and Archives, "Unlike AACR2, which had separate chapters for each material

type and featured a linear set of rules for creating records, the RDA rules are not meant to be read in order when cataloging."[19]

The testers immediately noticed a major difference between the RDA guidelines and current CUL metadata practice. According to the RDA rule, which appears modeled on AACR2 1.11A, the description of a reproduction should be based on the reproduction rather than the original piece. It is required that, "When describing a facsimile or reproduction, record the data relating to the facsimile or reproduction in the appropriate element. Record any data relating to the original manifestation as an element pertaining to a related work or manifestation, as applicable."[20] Yet, CUL's MODS records as currently constructed are based on the DLF Aquifer guidelines, which aim to provide as simple a structure as possible for presenting metadata, while at all times keeping the needs of end users and aggregators in mind.[21] Herein, it is recommended that a main record should describe the content of the resource in both its original and digital forms.

Each CUL non-MARC tester felt that describing an original object in terms of its digital surrogate in a record unnecessarily limits what can be said, and that users seeking access are not well served. They wholeheartedly agreed with Gregory Most who addressed the subject in an article on slide library image cataloging: "As in many other visual collections utilizing the MARC format, the object described in the record is not the object in hand (the slide) but rather the work of art it represents. The information about the surrogate is not of primary interest to the user, but rather the work of art itself."[22]

In a MODS record, separate but associated things, a letter and its digital surrogate for example, can be defined with the use of <relatedItem>. This element permits the nesting of a related item's description in the main record as a way to resolve problems arising from a strict adherence to the 1:1 principle. A record so configured, however, may be overlong and complicated.

The relationship between a digital surrogate and the original resource is expressed using the <relatedItem> element and the type attribute "original." Other relationships may need to be communicated as well. The digital item, for example, may be part of a digital collection published online, and its relationship is conveyed utilizing the <relatedItem> element and the type attribute "host." The original item's description potentially may include a relationship with a "host" as well, to specify the physical archival collection in which it is contained (see Figure 1).

MODS records constructed for the test needed to contain all RDA core elements, title proper, statement of responsibility, and carrier type to name just three. In MODS, it is possible to encode all of those required. Nonetheless, some elements did not function adequately in the descriptions of digitized archival resources. For instance, several resources described included a name or phrase that could be considered a statement of responsibility. Yet, it seemed problematic to apply this element to anything other than digitized reproductions of published works.

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```
<mods:relatedItem type="host">
      <mods:titleInfo>
            <mods:title>Jewels in her crown</mods:title>
      </mods:titleInfo>
      <mods:location>
            <mods:url usage="primarydisplay">
       http://www.columbia.edu/cu/lweb/eresources/exhibitions/treasures/</mods:url>
      </mods:location>
</mods:relatedItem>
<mods:relatedItem displayLabel="electronic reproduction of (item)" type="original">
      <mods:titleInfo>
            <mods:title>Portrait of Fredrick A. P. Barnard</mods:title>
      </mods:titleInfo>
      <mods:titleInfo type="alternative">
            <mods:title>Portrait of Frederick A. P. Barnard</mods:title>
      </mods:titleInfo>
      <mods:note type="title">Title from caption of digitized version</mods:note>
      <mods:originInfo>
            <mods:place supplied="yes">
                <mods:placeTerm>United States?</mods:placeTerm>
            </mods:place>
            <mods:dateCreated encoding="marc" keyDate="yes">1886</mods:dateCreated>
            <mods:issuance>single unit</mods:issuance>
      </mods:originInfo>
      <mods:name type="personal">
            <mods:namePart>Johnson, Eastman</mods:namePart>
            <mods:namePart type="date">1824-1906</mods:namePart>
            <mods:role>
                <mods:roleTerm type="text" authority="rdaroles">artist</mods:roleTerm>
            </mods:role>
      </mods:name>
      <mods:note type="statement of responsibility">E.J.</mods:note>
      <mods:note>Artists' initials on drawing</mods:note>
      <mods:genre authority="rdacontent">still image</mods:genre>
      <mods:physicalDescription>
            <mods:extent>1 drawing ; 61 x 45.1 cm</mods:extent>
            <mods:form authority="rdamedia" type="media">unmediated</mods:form>
            <mods:form authority="rdacarrier" type="carrier">sheet</mods:form>
            <mods:form type="basematerial">paper</mods:form>
            <mods:form type="appliedmaterial">chalk</mods:form>
            <mods:form type="mount">textile</mods:form>
            <mods:note>Black and white chalk on prepared gray paper, mounted on
linen</mods:note>
      </mods:physicalDescription>
      <mods:location>
            <mods:physicalLocation>Columbia University, Office of Art
                Properties</mods:physicalLocation>
      </mods:location>
</mods:relatedItem>
```

FIGURE 1 Two <mods:relatedItem> Elements Can Have <host> and <original> Information.

A digital reproduction of an envelope was one of the resources selected for MODS RDA cataloging. This provided a challenge to the non-MARC testers who had to agree on the object's content type. Because an image of the Allyn House in Hartford, Connecticut was displayed on the front, they settled on the type still image. Deciding which elements would be included in which records was another task faced when following the 1:1 principle. At a minimum, the main record for the digital item would need to contain all required RDA core elements, subject access, and important name access points. It was also difficult to decide on elements needed in the nested <relatedItem> description for the original piece. Repeating a large amount of information documented in the main record would add too much

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to workloads, and to record lengths. Yet, this portion would hold the only available item level description of the original resource. At CUL, MODS is used mostly to catalog archival materials which lack item-level descriptions that could be linked to.

At a minimum, it was thought records should contain enough information to support resource discovery and retrieval. Data could be captured in the elements <name>, <title>, and all others different from those in the descriptions of digital surrogates. Thus, the record describing the original object would include <date>, <physicalDescription>, and <location>. Rather than that of the digital surrogate, the creation or issuing date of the original item, recorded in the <keyDate> attribute of the <relatedItem> description, was considered primary.

In MODS 3.4, it is possible to include Uniform Resource Identifiers (URIs) in all elements that allow for the use of the authority attributes <authorityURI> and the <valueURI>.[23] CUL testers, therefore, added URIs to their MODS RDA records from the *Library of Congress Subject Headings* (LCSH) authority file, and included value URIs in the subject elements of some test records.[24] Furthermore, they did the same with the RDA value vocabularies role terms, content type, media type, and carrier type found in the Open Metadata Registry (http://metadataregistry.org/rdabrowse.htm).[25]

The resultant MODS descriptions were based on a sample record that was modified and adjusted for each resource; however, these were not all the same. Some records were full and contained URIs for controlled vocabularies, while others did not (see Figure 2). The objective of the coordinator and CUL testers was to use the test to experiment with a new set of cataloging guidelines, rather than to deliver a finished product upon completion.

RDA TESTING WITH EAD

EAD (version 2002) is a schema commonly used at CUL to describe archival finding aids, and *Describing Archives (DACS)* is applied as a content standard.[26] During the test period, the archivist of CUL's non-MARC tester group wanted to compare RDA and DACS, to determine if the new standard would work well with EAD. As a first step, the metadata coordinator used the workflow feature of the *Toolkit* to combine all RDA guidelines referring to archival materials. The subsequent workflow was shared openly in the *Toolkit*, though labeled a draft, because it was project-specific.

The archivist and coordinator worked as a team to produce EAD test records because the former did not participate in RDA training, and the latter had no working knowledge of EAD. Together, they applied RDA guidelines and value vocabularies to an existing finding aid, at the same time regularly updating the *Toolkit* workflow. They were unable to find an RDA/EAD crosswalk in the *Toolkit* or on the EAD Web site (http://www.loc.gov/ead) to aid in their assessment. Consequently, they recorded all findings, tracking

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```
<mods:relatedItem displayLabel="electronic reproduction of (item)" type="original">
      <mods:titleInfo>
            <mods:title>Allyn House, Hartford, Conn., envelope, recto,
1863</mods:title>
      </mods:titleInfo>
      <mods:note type="title">Title devised by cataloger</mods:note>
      <mods:originInfo>
            <mods:place supplied="yes">
                <mods:placeTerm>United States?</mods:placeTerm>
            </mods:place>
            <mods:dateCreated encoding="marc" keyDate="yes">1863</mods:dateCreated>
            <mods:issuance>single unit</mods:issuance>
      </mods:originInfo>
      <mods:genre authority="rdacontent"
            authorityURI="http://RDVocab.info/termList/RDAContentType"
            valueURI="http://rdvocab.info/termList/RDAContentType/1014">still
image</mods:genre>
      <mods:physicalDescription>
            <mods:extent>1 envelope</mods:extent>
            <mods:form authority="rdamedia"
authorityURI="http://RDVocab.info/termLIst/RDAMediaType"
                type="media" valueURI="
                http://RDVocab.info/termLIst/RDAMediaType/1007 "
                >unmediated</mods:form>
            <mods:form authority="rdacarrier"
                authorityURI="http://RDVocab.info/termList/RDACarrierType"
type="carrier"
valueURI="http://RDVocab.info/termList/RDACarrierType/1059">object</mods:form>
      </mods:physicalDescription>
      <mods:location>
            <mods:physicalLocation>Avery Architectural and Fine Arts
Library</mods:physicalLocation>
      </mods:location>
</mods:relatedItem>
```

FIGURE 2 MODS Record Includes <keyDate> in <mods:relatedItem> and URIs as Values.

whether an RDA element was core and mapping each guideline to the appropriate EAD element. Local notes concerning the issues encountered and justifications of decisions were added.

Use of the RDA element Carrier type, which among other things indicates format or resource container, required a local decision. An archival collection is likely to consist of many carrier types, rather than a single form, such as an assembly of photographic prints. The element is repeatable and may be applied to, (a) the predominant part of the resource, or to, (b) the most substantial parts of the resource. RDA allows a cataloger to use the term "other" if none of the other terms listed in the rule 3.3.1.3 apply, or "unspecified" if the carrier type cannot easily be determined.

The archivist mapped Carrier type to <physdesc><genreform source="rdacarrier">. In EAD, this element can be applied at either a file (folder) level or collection level, and the testers debated over where it would prove most useful. At the more granular file level it could be paired with one of RDA's specific values, but at the collection level "unspecified" or "other" might be noted. Even so, the archivist selected the latter option because only collection level descriptions of finding aids are incorporated in the local catalog and exported to OCLC. Figure 3 shows an example of a collection consisting chiefly of photographs, thus a specific value could

```
<archdesc level="collection" relatedencoding="MARC21">
        <did>
            <origination>
                <persname encodinganalog="100" role="photographer"
source="rdarole">Bourke-White,
                    Margaret, 1904-1971.</persname>
            </origination>
            <unittitle encodinganalog="245$a" altrender="Margaret Bourke-White
Photographs">Margaret
                Bourke-White Photographs</unittitle>
            <unitdate encodinganalog="245$f" normal="1931"
type="inclusive">1931</unitdate>
            <physdesc>
                <extent encodinganalog="300">0.5 linear feet (1 20.5x16.5 print
box).</extent>
                <genreform source="rdacarrier">sheet</genreform>
                <genreform source="rdamedia">unmediated</genreform>
            </physdesc>
      …

        <dsc>
            <c level="series">
                <did>
                    <unittitle> Margaret Bourke-White Photographs </unittitle>
                </did>
                <c level="file">
                    <did>
                        <container type="Box" label="Box"> 1 </container>
                        <container type="Folder" label="Folder"> 1 </container>
                        <unittitle>Avery Hall (4 images) </unittitle>
                    </did>
                </c>
      …
      </dsc>
 </archdesc>
```

FIGURE 3 A Snippet of Sample EAD Record Created in RDA.

be applied. Whether to add a label containing the RDA relationship designator to the EAD element <unittitle> was also discussed. The testers, however, decided that this element sufficiently expresses the relationship between the file and collection level. Adding an RDA relationship designator, they believed, would duplicate information already contained in the EAD element.

During the official test period, the archivist and coordinator adapted two EAD encoded finding aids, replacing content based on DACS with that of RDA, all the while timing the process. They chose to modify existing finding aids rather than create new RDA/EAD origin records due to the effort involved and the time constraints of the test.

RDA TESTING WITH DUBLIN CORE

University of Chicago

Typically, Dublin Core descriptive metadata records at UCL are created in Microsoft database tables, rather than in XML format; the records, therefore, are not validated against a schema or document type definition (DTD). For the test (and upcoming record creation), the digitization manager asked the staff of the UCL's Digital Library Development Center (DLDC) to provide a

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schema so that valid Dublin Core RDA records could be composed.[27] When completed, the schema was used to produce all of UCL's non-MARC records, the pre-trial instances, as well as the examples for the extra set.

Focused on becoming proficient with new methods of practice, the manager began to study the RDA guidelines, and devised a template in oXygen to streamline record production. An official mapping of RDA and Dublin Core, it was announced, had not been published with the first release of the *Toolkit* because questions and issues about the standards' correspondence remained unaddressed. Thus, when building the template, the documents *Draft mapping RDA to Dublin Core* and *Notes on the mapping* were consulted. Posted to the DC-RDA ListServ in early 2010,[28] the summaries served as rough guides to the correlation of the standards throughout the test. When using these documents, however, it was essential to keep in mind the caution from Alan Danskin of the Joint Steering Committee for Development of RDA. "This was a working draft," he said, ". . . not . . . subsequently developed, and . . . based on a draft of RDA which differs from the final text."[29]

During the evaluation period of pre-testing, and as an aid to record building with the new template, a Microsoft Excel spreadsheet was used to track Qualified Dublin Core elements, applicable RDA rules, and notes concerning sample record content.

Columbia University

The Web archiving project (http://library.columbia.edu/indiv/humanrights/hrwa.html) is one area in which the Dublin Core element set is currently applied at CUL. The Libraries use the Internet Archive's Archive-It (http://www.archive-it.org/) service, which makes Simple Dublin Core available for the description of archived Internet resources.

The creation of the Human Rights Web Archive was the focus of CUL's Web archiving project at the time RDA was tested. The metadata coordinator chose two homepages of human rights organizations for the test. There is little variation in the descriptions of the human rights Web sites, so a small sample was deemed sufficient. Since RDA could not reasonably be expressed in Simple Dublin Core, the coordinator employed Qualified Dublin Core instead. CUL's Digital Program Division created a local schema that accommodated RDA. The same RDA/Dublin Core draft mapping employed by the UCL and UIUC was also consulted by the CUL testers.

University of Illinois at Urbana-Champaign

Since the UIUC participated in the RDA test with its Graduate School of Library and Information Science, the focus was on how students would learn and then use the new standard and tools to create metadata in formats

other than MARC. The student recruited for the non-MARC test participated in all RDA course work designed by Practicum course instructors, viewed LC Webinars, used locally crafted workflows for creating RDA–MARC records, and learned XML and Dublin Core. The resources employed to produce Dublin Core RDA records were same as those used by other students who took part, that is, the set of records provided by the LC in addition to a local digital collection.

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FINDINGS

RDA in MODS

The metadata coordinator presented the MODS records to the full CUL Metadata Group before submitting them to LC. All non-MARC testers felt they were successful in creating valid RDA records in MODS, and that these were comparable to the ones composed by the testers of MARC. The non-MARC testers discovered that the process of applying RDA to the types of resources they cataloged was not always trouble-free. Neither the FRBR model nor the RDA core elements worked well when cultural objects were described, even though it was not necessary to utilize the elements across all possible format types.[30]

It was proposed that a more FRBR-like structure of the MODS records would alleviate some of the issues encountered, such as the difficulties faced when deciding what elements to apply to which manifestation. The MODS records created during the CUL RDA test are essentially composite records, like those of MARC, which combine the FRBR Group 1 entities work, expression, and manifestation. While it was recognized that strictly following the 1:1 principle has advantages in a FRBRized environment, adherence would, at a minimum, add to existing workloads.

The coordinator considered testing the Metadata Authority Description Schema (MADS) in addition to MODS. If attempted, that approach might have allowed the CUL testers to create authorized work level records in MADS and separate MODS records for expressions and manifestations.[31] The cultural objects selected for the test, however, did not seem to fit neatly into the FRBR structure.[32]

It was felt that the strength of RDA, for their purposes, lay primarily in its elements and value vocabularies, and that it seems more likely that these aspects will be integrated in non-MARC metadata creation. An example of the usefulness of RDA's value vocabularies is illustrated in Figure 4. Herein, the coordinator created a detailed description of a painting's digital reproduction and one of the original object in <relatedItem>. For the comprehensive account of the latter, only controlled terms were employed.

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```
<mods:relatedItem displayLabel="electronic reproduction of (item)" type="original">
        <mods:titleInfo>
            <mods:title>New York from Long Island</mods:title>
        </mods:titleInfo>
        <mods:note type="title">Title from caption of digitized version</mods:note>
        <mods:originInfo>
            <mods:place supplied="yes">
                <mods:placeTerm>United States?</mods:placeTerm>
            </mods:place>
            <mods:dateCreated qualifier="approximate" encoding="marc" keyDate="yes"
                >1795</mods:dateCreated>
            <mods:issuance>single unit</mods:issuance>
        </mods:originInfo>
        <mods:name type="personal">
            <mods:namePart>Robertson, Archibald</mods:namePart>
            <mods:namePart type="date">1765-1835</mods:namePart>
            <mods:role>
                <mods:roleTerm type="text" authority="rdaroles">artist</mods:roleTerm>
            </mods:role>
        </mods:name>
        <mods:note type="statement of responsibility">Archibald Robertson</mods:note>
        <mods:note>Statement of responsibility from caption of digitized
version</mods:note>
        <mods:genre authority="rdacontent">still image</mods:genre>
        <mods:physicalDescription>
            <mods:extent>1 painting ; 43.8 x 62.2 cm</mods:extent>
            <mods:form authority="rdamedia" type="media">unmediated</mods:form>
            <mods:form authority="rdacarrier" type="carrier">sheet</mods:form>
            <mods:form type="basematerial">paper</mods:form>
            <mods:form type="appliedmaterial">ink</mods:form>
            <mods:form type="appliedmaterial">watercolour</mods:form>
            <mods:note>Ink and color wash on paper.</mods:note>
        </mods:physicalDescription>
        <mods:location>
            <mods:physicalLocation>Columbia University, Office of Art
                Properties</mods:physicalLocation>
        </mods:location>
</mods:relatedItem>
```

FIGURE 4 <mods:relatedItem> Includes Information about a Digital Reproduction of a Painting.

RDA in EAD

CUL's archivist felt that most of the RDA guidelines regarding archival materials are in accord with current archival practice. The inclusion of family names as a type of creator and the added granularity of RDA name authority records was greeted as a great improvement over AACR2. Both the metadata coordinator and the archivist reached conclusions similar to those of Cory Nimer, who has observed, "For archives, the impact of these changes in practice will be fairly minimal as many of the principles, such as output neutrality, not including square brackets for supplied information, or not using abbreviations, were included in DACS."[33]

The archivist also concurred with Nimer's findings that the biggest changes were caused by the need to accommodate the RDA core elements in archival descriptions,[34] particularly content type, and carrier type. Though adding these elements was considered a plus, the archivist thought the value vocabularies currently used within them do not reference archival materials as well as they should. And while CUL's archival tester was pleased with

several features of RDA, she did not feel strongly enough about the standard to consider a move away from DACS.

According to the final report of the U.S. Test Coordinating Committee, only two RDA/EAD records were submitted following the test.[35]

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RDA in Dublin Core

Physical Object versus Digital Reproduction

The materials chosen for the UCL's non-MARC RDA test were drawn from the Goodspeed Papyri Collection. Among other things, these manuscripts contain poems, hymns, grain receipts, and land transactions, which were written around the second century in parts of Egypt colonized by former Greek soldiers.

The digitized archival and manuscript pieces of the Library's digital collection displays are paired with composite metadata records, which chiefly describe the characteristics of the original counterparts. This practice has been driven by the needs of users, who access the collections both online and in-house;[36] moreover, it follows the method locally devised and documented in *Guidelines for use of Dublin Core in University of Chicago Digital Library Projects*. In contrast, nearly all of the RDA records created by the digitization manager during the non-MARC test describe characteristics of the reproduction, that is, those of the Web site's digital surrogates.[37]

The examples below demonstrate the two previously cited approaches to record content selection, reproduction versus original. The Alexandrian hexameter fragments record of Figure 5 was created based on the RDA rule regarding reproductions and facsimiles.[38] While the record of John Chrysostom's Homily 53 on Matthew in Figure 6 describes the original piece, a digital copy of the single leaf is pointed to in <dc:identifier>.

At the UCL, the manager sought responses from a small group of users about the usefulness of the two types of descriptions. They were asked to focus on the elements, <dc:creator>, <dcterms:created>, <dc:description>, and <dc:format>, between the two records. The findings, briefly stated, are as follows. It concerned each user questioned that data about the digital surrogate of the hexameter fragments were the primary focus of its record, unlike that of the record of Chrysostom's Homily. With descriptive records in general, each noted, original creator name, creation date, and format are elements fundamental to user search strategies. All were of the opinion, moreover, that <dc:description> in Figure 5 appears to function as a catch-all, in which wanted information could not be easily found, or perhaps even extracted, and indexed. The RDA reproduction description thus configured, the group concluded, was neither unambiguous in form, nor did it contain data specific to their needs.[39]

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```
<dc:identifier>http://www.lib.uchicago.edu/e/jej/rda/gpy-1061-101-
1r.jpg</dc:identifier>
<dc:title>University of Chicago Library, Goodspeed Papyri Collection, Ms.
1061</dc:title>
<dcterms:alternative>Alexandrian hexameter fragments</dcterms:alternative>
<dcterms:alternative>P.Kar.Goodsp. 101</dcterms:alternative>
<dc:creator>University of Chicago Library</dc:creator>
<dc:publisher>University of Chicago Library, Special Collections Research
Center</dc:publisher>
<dcterms:created xsi:type="dcterms:W3CDTF">2010-12-01</dcterms:created>
<dc:language xsi:type="dcterms:ISO639-3">grc</dc:language>
<dcterms:spatial xsi:type="dcterms:TGN">Al-Ashmūnayn, Egypt</dcterms:spatial>
<dc:description>Digital facsimile of the Alexandrian hexameter fragments in
Greek. Contains a collection of hymns to Greek deities (verso). The goddess
Aphrodite, the topic of marriage, Apollo, and Artemis-Hecate are the focus of a
number of lines. Dionysus may also be the subject of one hymn. Arsinoë
Ptolemaeus, a name found on one of the fragments, is thought to refer to either
one of four Ptolemaic queens, or to one of the Egyptian or Cypriot towns of the
same name. A register of names and lands unrelated to the poetry is on the
recto. Dated to the 2nd century (see, Edgar J. Goodspeed, "Alexandrian
Hexameter fragments," Journal of Hellenic Studies, 23 (1903): 237-
247).</dc:description>
<dc:description>Papyrus. Fragments (J) 90 x 50 mm; (A, B) 540 x 210 mm; (C) 220
x 144 mm; (D) 142 x 35 mm; (E) 162 x 90 mm; (F) 108 x 51 mm; (G) 178 x 67 mm;
(H) 93 x 70 mm; (I) 32 x 29 mm. Written in black ink.</dc:description>
<dc:format>online resource</dc:format>
<dc:format>computer</dc:format>
<dc:format>image file</dc:format>
<dc:format xsi:type="dcterms:IMT">jpeg</dc:format>
```

FIGURE 5 Dublin Core Record Describing Alexandrian Hexameter Fragments, Goodspeed Papyri Collection.

```
<dc:identifier>
http://goodspeed.lib.uchicago.edu/view/index.php?doc=0862&obj=001
</dc:identifier>
<dc:creator xsi:type="dcterms:LCSH">John Chrysostom, Saint, d. 407</dc:creator>
<dc:title>Homily 53 on Matthew</dc:title>
<dcterms:created>Between 1001and 1200</dcterms:created>
<dc:language xsi:type="dcterms:ISO639-3">grc</dc:language>
<dc:description>Leaf from a copy of John Chrysostom's Homily 53 on Matthew
(from 15:32 to 16:12) in Greek. The text of the present leaf collated with,
John Chrysostom, Saint, d. 407, Homiliae in Matthaeum, ed., Frederick Field,
vols. 1, 3 (Cambridge, 1839) reads with manuscripts G (Cambridge, Trinity
College, cant. B.9.12); H (Paris, Bibliothèque Mazarine Ms. 687); K (Paris,
Bibliothèque Mazarine Ms. 695); L (Paris, Bibliothèque Mazarine Ms. 685); and,
M (Cambridge, Emmanuel College, cantab. I.1.14 and 15).</dc:description>
<dc:description>Written in cursive script in dark brown ink.</dc:description>
<dc:description>The place of origin of the manuscript to which the present leaf
belonged is unknown. Written in either the 11th or 12th
century to judge from the paleography,  and because the manuscripts with which
its readings were collated fall within that date range.</dc:description>
<dc:format>Sheet</dc:format>
<dc:format>Leaves (Gathered matter components)</dc:format>
<dc:format>403 x 250 mm.</dc:format>
<dcterms:medium>Parchment.</dcterms:medium>
<dcterms:extent>1 leaf, unnumbered. Written space 300 x 170 mm (fol.
[1r]).</dcterms:extent>
<dc:format>2 columns, 35 lines. Ruling with hard point.</dc:format>
<dc:format>Unmediated</dc:format>
```

FIGURE 6 Dublin Core Record Describing John Chrysostom, Saint, d. 407, Homily 53 on Matthew, Goodspeed Manuscript Collection.

TABLE 2 Corresponding Elements between RDA and <dc:format>

RDA Element	DC Element
3.2 Media type	<format>
3.3 Carrier type	
3.5 Dimensions	
3.5.2 Dimensions of map, etc.;	
3.5.3 Dimensions of still image	
3.11 Layout	
3.11.2 Layout of cartographic images;	
3.11.3 Layout of tactile music;	
3.11.4 Layout of tactile text	
3.12 Book format	
3.13 Font size	
3.14 Polarity	
3.15 Reduction ratio	
3.16 Sound characteristics	
3.16.2 Type of recording;	
3.16.3 Recording medium;	
3.16.4 Playing speed;	
3.16.5 Groove characteristic;	
3.16.6 Track configuration	

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Semantic Interoperability

The testers encountered a semantic interoperability issue with Dublin Core and RDA while working with the standards. Early in training, they realized the elements of RDA are as complex as those of MARC. In the draft mapping that served as the model for the testers' XML templates, eleven RDA elements are seen to map to <dc:title> and <dcterms:alternative>, title, title proper, and variant title, to name just three. Four elements correspond to both <dc:creator> and to <dc:contributor>; whereas nineteen can be mapped to <dc:format> (see Table 2). Further, there is no simple way in Dublin Core to demonstrate the differences between RDA's <title> and <parallel title>. Therefore, between Dublin Core and RDA, the semantic disjunction appears comparable to that which exists between Dublin Core and MARC.

When integrating the RDA elements carrier type, media type, and content type into their records, the testers encountered another challenge. The value vocabularies used to record this information, computer, and online resource, to name just two, lose meaning in a Dublin Core RDA record due to the many-to-one relationship of the element sets. For the MARC standard, the Library of Congress addressed this issue by introducing three new fields, 336 (content type); the 337 (media type); and, 338 (carrier type). So that the source of the vocabulary is not lost, the data can be captured in subfield 2 of each field (see Figure 7).

In attempting to provide contextual information within portions of their records, the testers varied their approaches. The methods included: placing

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010			2009655201
040			DLC ǂb eng ǂc DLC ǂe rda ǂd DLC ǂd PHA
019			689054056
037			Only US RDA Test participants should add institution records to this master record; no changes should be made to the master record.
092			ǂb
049			UIUU
100	1		Bellefontaine, Antoine, ǂe novelist.
245	1	0	US RDA TEST COPY RECORD EE Above the coffee shop : ǂb a novel / ǂc by Antoine Bellefontaine ; neighborhood sketches by Teri Bellefontaine.
246	1	3	Coffee shop
250			1st edition.
260			Paris : ǂb Imagination House Press ; ǂa Ottawa : ǂb Steward Publishing Ltd, ǂc [2010?], ©2010.
300			iv, 210 pages : ǂb illustrations ; ǂc 25 cm
336			text ǂ2 rdacontent
337			unmediated ǂ2 rdamedia
338			volume ǂ2 rdacarrier
380			Fiction ǂ2 lcsh
700	1		Bellefontaine, Teri, ǂe illustrator.
710	2		Imagination House Press, ǂe publisher.
710	2		Steward Publishing Ltd, ǂe publisher.

FIGURE 7 MARC Record Created in RDA.

type names as qualifiers; linking controlled vocabulary terms and element names together with a colon; or simply putting in the single term (see Figure 8). It has been pointed out in earlier research, however, that using qualifiers with parenthesis is not typically recommended as good practice.[40]

The Qualified Dublin Core schema allows the use of encoding schemes with the 'xsi:type' attribute. For instance, in the above record, the elements <dc:date> and <dc:language>, respectively, contain the

```
<?xml version="1.0" encoding="UTF-8"?>
<qualifieddc xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:dcterms="http://purl.org/dc/terms/"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="http://imlsdcc.grainger.uiuc.edu/registry/qualif
ieddc.xsd">
<dc:title>Above the coffee shop</dc:title>
<dcterms:alternative>Coffee shop</dcterms:alternative>
<dc:creator>Bellefontiane, Antoine</dc:creator>
<dc:publisher>Paris, Imagine House Press</dc:publisher>
<dc:publisher>Ottawa, Steward Publishing Ltd</dc:publisher>
<dc:contributor>Bellefontaine, Teri (illustrator)</dc:contributor>
<dc:date>2010</dc:date>
<dcterms:dateCopyrighted
xsi:type="dcterms:W3CDTF">2010</dcterms:dateCopyrighted>
<dcterms:extent>25 cm.</dcterms:extent>
<dcterms:extent>i-iv, 1-210</dcterms:extent>
<dc:type>text (content type)</dc:type>
<dc:format>unmediated (media type)</dc:format>
<dc:format>volume (carrier type)</dc:format>
<dc:description>1st edition</dc:description>
<dc:description>with illustrations</dc:description>
<dc:language xsi:type="dcterms:ISO639-2">eng</dc:language>
</qualifieddc>
```

FIGURE 8 Dublin Core Record Created in RDA.

values from the encoding schemes W3CDTF and ISO639-2. The schema currently available, however, supports only a limited number of encoding schemes and qualifiers (refinements). For example, it does not support the means to document roles, like one is able to do by employing the designated subfield e in the personal and corporate name fields (100, 110, 600, 610, 700, 710) of a MARC record. The Dublin Core user community is aware that adding role information to records would be extremely useful, and recommends incorporating MARC relator terms as "refinements of Dublin Core elements."[41] Doing so, nonetheless, would require borrowing namespaces from MARC or modifications to a Qualified Dublin Core schema. In a number of cases, catalogers add roles parenthetically, but content configured in that way can be difficult for machines to process.

Local Qualified Dublin Core Schemas

For the RDA test, each institution used a Qualified Dublin Core schema to carry out record validation. These were constructed based on local practice, such as the need for different namespaces and encodings schemes. A new schema was composed for the UCL before testing began. The UIUC utilized a schema that was developed for previous digital projects, and which permits the use of encoding schemes with a variety of Dublin Core elements.

Based on test results and experience, both the UCL and the CUL restructured their schemas. It was recognized at the UCL, that a broader range of vocabulary encoding schemes was needed, such as those of the Getty Art and Architecture Thesaurus. By integrating "ucdcterms," with the result, <dc:subject xsi:type="ucdcterms:AAT">subliterary papyri</dc:subject>, the means to deliver expanded and enriched descriptive records was provided.

The RDA value vocabularies are not among the encoding schemes currently supported by the official Qualified Dublin Core schema, but the testers of CUL looked for ways to include <rdamedia> and <rdacarrier> which map to <dc:format> in their records. And although they mocked up several to illustrate what the addition might look like, the official test examples submitted did not contain this encoding change.

A new local Qualified Dublin Core schema has now been produced by CUL's Digital Program Division. It not only enables metadata practitioners who employ it to specify the source of the value vocabularies used in <dc:format>, but it also has improved the machine processing of records. When formulating this new XML schema, three locally defined attributes, including "vocabURI" and "resourceURI," were added. The attributes facilitate the use of stable URIs, which the DCMI/RDA Task Group made available through the Open Metadata Registry. With this change, the values of the Dublin Core elements and of the vocabularies in which the URIs are defined

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```
<?xml version="1.0" encoding="UTF-8"?>
<?oxygen NVDLSchema="cul_qdc.nvdl"?>
<cqdc:qualifieddc xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
      xmlns:dc="http://purl.org/dc/elements/1.1/"
      xmlns:cqdc="http://libraries.cul.columbia.edu/qualifieddc/"
      xmlns:dcterms="http://purl.org/dc/terms/"
      xmlns:cul="http://libraries.cul.columbia.edu/URIattrs">
<dc:creator
      xsi:type="dcterms:LCSH"
      cul:vocabURI=http://viaf.org/authorityScheme/LC
      cul:resourceURI="http://viaf.org/viaf/149354604/">
      Anti Caste Discrimination Alliance
</dc:creator>
<dc:title>Anti Caste Discrimination Alliance</dc:title>
<dcterms:alternative>ACDA</dcterms:alternative>
<dc:language
      cul:vocab="ISO 639-2"
      cul:vocabURI=http://id.loc.gov/vocabulary/iso639-2
      cul:resourceURI="http://id.loc.gov/vocabulary/iso639-2/eng">eng
</dc:language>
<dc:publisher>Anti Caste Discrimination Alliance</dc:publisher>
<dcterms:issued>[2008-]</dcterms:issued>
<dcterms:extent>1 online resource</dcterms:extent>
<dc:type>text</dc:type>
<dc:format
      cul:vocab="RDA Media Type"
      cul:vocabURI=http://RDVocab.info/termLIst/RDAMediaType
      cul:resourceURI="http://RDVocab.info/termLIst/RDAMediaType/1003">computer
</dc:format>
<dc:format
      cul:vocab="RDA Carrier Type"
      cul:vocabURI=http://RDVocab.info/termList/RDACarrierType
      cul:resourceURI=http://RDVocab.info/termList/RDACarrierType/1018
      online resource
</dc:format>
<dc:description>ACDA is an umbrella body for a number groups and organisations who are
working to eliminate Caste Discrimination in the UK and more widely</dc:description>
<dcterms:spatial xsi:type="dcterms:LCSH">Great Britain</dcterms:spatial>
<dc:subject xsi:type="dcterms:LCSH">Caste-based discrimination</dc:subject>
<dc:subject xsi:type="dcterms:LCSH">Caste</dc:subject>
<dc:subject xsi:type="dcterms:LCSH">East Indians</dc:subject>
<dc:subject xsi:type="dcterms:LCSH">Human rights</dc:subject>
<dc:identifier>http://www.acdauk.org.uk/</dc:identifier>
<dcterms:isPartOf
      xsi:type="dcterms:URI">http://www.columbia.edu/cu/lweb/indiv/humanrights/hrwa/
      ndex.html</dcterms:isPartOf>
</cqdc:qualifieddc>
```

FIGURE 9 Dublin Core Record Created with Schema Developed in Columbia University Libraries.

can be expressed. Figure 9 shows an example of how the attributes can be applied in a record.[42]

CONCLUSION

The authors of this article served as testers in the 2010 U.S. National Libraries Test of RDA. Their experiences detailed herein, delineate the challenges facing those who provide users access to cultural objects by creating descriptive metadata, and who wish to apply RDA guidelines as a part of that process.

The official test focused primarily on the MARC format, and procedures for testing non-MARC metadata standards had to be developed, planned, and performed independently by each participating institution. This lack of available guidance at the national level may be the primary reason why so

few institutions submitted non-MARC records. The official count as recorded shows thirty-three for Dublin Core, twenty-eight in MODS, and two with EAD.[43]

After using RDA as a content standard when creating their MODS, EAD, and Dublin Core records, the authors concluded that its benefits were not fully realized or applied during the national test. Ultimately, it was difficult to evaluate the standard completely without an application available to aptly manage and display the data. The URIs created for each RDA element, the value vocabularies, and the conceptual models FRBR and FRAD on which RDA is based, are designed to work within a system that has not been fully amplified and implemented.

The authors concur with the U.S. RDA Test Coordinating Committee that training and better guidelines for the use of RDA with non-MARC metadata standards will need to be developed. The enhancements should include, but not be limited to: RDA record examples in non-MARC metadata standards; and mappings of RDA elements to other metadata standards.[44] Once the above recommendations are in place, the authors hope that extensive testing will be conducted.

NOTES

1. Chris Oliver, *Introducing RDA, a Guide to the Basics* (Chicago: American Library Association, 2010), 1.

2. Joint Steering Committee for the Development of RDA, "RDA, Resource Description & Access: The Cataloguing Standard for the 21st Century," http://www.rda-jsc.org/docs/rdabrochure January2010.pdf (accessed May 11, 2011).

3. U.S. RDA Test Coordinating Committee, *Report and Recommendations of the U.S. RDA Test Coordinating Committee* (2011), 10, 179–182, http://www.loc.gov/bibliographic-future/rda/rdatesting-finalreport-20june2011.pdf (accessed July 25, 2011).

4. Ibid.

5. Oliver, *Introducing RDA*.

6. Karen Coyle, "RDA Vocabularies for a Twenty-First-Century Data Environment," *Library Technology Reports* 46, no. 2 (Chicago, IL: ALATechSource, 2010).

7. Diane Hillmann, Karen Coyle, Jon Phipps, and Gordon Dunsire, "RDA Vocabularies: Process, Outcome, Use," *D-Lib Magazine* 16, no.1/2 (Jan./Feb. 2010), http://www.dlib.org/dlib/january10/hillmann/01hillmann.html (accessed July 28, 2011).

8. Jin Ma, *Metadata*, in SPEC kit, 298 (Washington, DC: Association of Research Libraries, 2007), 7.

9. RDA-L, http://www.rda-jsc.org/rdadiscuss.html

10. "Joint Steering Committee for the Development of RDA," http://www.rda-jsc.org/ (last modified December 9, 2010).

11. North Carolina State University Libraries Intranet, "RDA Test," (2010), https://staff.lib.ncsu.edu/confluence/display/MNC/RDA+Test (last modified April 15, 2011).

12. A variety of data structure and content standards are used to describe the cultural materials of the University of Chicago Library digital collections. These include, but are not limited to: Dublin Core; Visual Resource Association Core (VRA); Text Encoding Initiative (TEI); Cataloging of Cultural Objects (CCO); and Describing Archives: a content standard (DACS).

13. "Description of MODS 3.4 Changes," http://www.loc.gov/standards/mods/mods-changes-3-4.html (last modified April 21, 2011).

14. American Library Association, Canadian Library Association, and CILIP, "Resource Description and Access, Section 19.2.11," http://www.rdatoolkit.org/ (accessed May 12, 2011).

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15. Ibid., Section 2.13.

16. "Digital Library Federation/Aquifer Implementation Guidelines for Shareable Metadata Records (Version 1.1)," https://wiki.dlib.indiana.edu/confluence/download/attachments/24288/DLFMODS_ImplementationGuidelines.pdf (accessed April 3, 2011).

17. MODS/MADS Editorial Committee, "RDA to MODS mapping (revised October 2010)," http://www.loc.gov/standards/mods/rdaMODSmapping.xls (accessed April 22, 2011).

18. "MODS User Guidelines (version 3)," http://www.loc.gov/standards/mods/userguide/ (last modified October 27, 2010).

19. Cory Nimer, "RDA and Archives," *Journal of Archival Organization* 8 (2010): 233.

20. "Resource Description and Access, Section 1.11."

21. "Digital Library Federation/Aquifer Implementation."

22. Gregory P. J. Most, "National Gallery of Art Slide Library, Washington, D.C.," in *ArtMARC Sourcebook: Cataloging Art, Architecture and their Visual Images*, ed. Linda McRae and Lynda S. White (Chicago: American Library Association, 1998), 103.

23. "Description of MODS 3.4 Changes," http://www.loc.gov/standards/mods/mods-changes-3-4.html (last modified April 21, 2011).

24. Library of Congress, "Authorities and Vocabularies," http://id.loc.gov/ (accessed April 3, 2011).

25. "Open Metadata Registry," http://metadataregistry.org/rdabrowse.htm (accessed April 3, 2011).

26. Steven L. Hensen, *Describing Archives: A Content Standard* (Chicago: Society of American Archivists, 2004).

27. Dublin Core Metadata Initiative, http://dublincore.org/schemas/xmls/ (last modified 2011).

28. Alan Danskin, e-mail message (with attachments) to Chris Beer, February 22, 2010; Diane Hillmann, e-mail message (with attachments) to Chris Beer, February 23, 2010.

29. Danskin, e-mail message, 22 February 2010.

30. "Resource Description and Access, Section 0.6."

31. This approach was employed in the Perseus Digital Library; however, this project was limited to textual resources. See David Mimno, Gregory Crane, and Alison Jones, "Hierarchical Catalog Records: Implementing a FRBR Catalog," *in D-Lib Magazine* 11, no. 10 (Oct. 2005). http://www.dlib.org/dlib/october05/crane/10crane.html (accessed July 29, 2011).

32. See Murtha Baca and Sherman Clarke, "FRBR and Works of Art, Architecture, and Material Culture," in *Understanding FRBR: What it is and How It Will Affect Our Retrieval Tools*, ed. Arlene G. Taylor (Westport, CT: Libraries Unlimited, 2007): 103–110.

33. Nimer, "RDA and Archives," 235–236.

34. Ibid., 236.

35. U.S. RDA Test Coordinating Committee, 151.

36. Survey results, both formal and informal, concerning two of the Library's online collections, the Goodspeed Manuscript Collection, and the Archival Photographic Files have prompted an increase to the amounts of data indexed for searching, as well as changes to the amount and types of data displayed.

37. "Reconsidering the Cataloging Treatment of Reproductions," http://www.loc.gov/-acq/conser/reproductions.pdf (accessed May 13, 2011).

38. "Resource Description and Access, Section 1.11." The rule states: When describing a facsimile or reproduction, record the data relating to the facsimile or reproduction in the appropriate element. Record any data relating to the original manifestation as an element pertaining to a related work or manifestation, as applicable.

39. The user group was asked if the RDA records did fulfill the primary objective of the test, and they responded that these did not. Their comments touch on the record elements with which they were most concerned. For the purpose of this discussion only one example of a digital surrogate, the Alexandrian Hexameter Fragments record is shown.

40. Awen Hutt and Jenn Riley, "Semantics and Syntax of Dublin Core Usage in Open Archives Initiative Data Providers of Cultural Heritage Materials," *Proceedings of the ACM/IEEE Joint Conference on Digital Libraries* (2005): 262–270.

41. "Appendix, Roles," n.d., http://dublincore.org/documents/usageguide/appendix_roles.shtml (accessed May 20, 2011).

42. For a detailed analysis of the issues surrounding Dublin Core and RDA, see Myung-Ja Han, Melanie Wacker, and Judith Dartt, "Testing Resource Description and Access (RDA) with Dublin Core," available at http://dcevents.dublincore.org/index.php/IntConf/dc-2011/paper/viewFile/45/21.

43. U.S. RDA Test Coordinating Committee, 151.

44. Ibid., 13, 16, 158.