Pilot Analysis of 1:1 Principle Violations in the CIMR Testbed

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What follows is an initial analysis of 1:1 Principle Violations within the 33 collections selected as part of the CIMR testbed. Of these, 25 collections with more than 20 items were subjected to a close analysis. In total these 25 collections contained 54,486 item-level OAI-PMH records.

As a formal representation of the 1:1 Principle is still in development, some basic assumptions were used to identify violations in this analysis:

- Each OAI-PMH record counted as a DCAM *Description*
  Each property-value pair counted as a DCAM *Statement*
  (e.g. <dc:format>image/jpeg</dc:format)
- "one and only one resource" cannot be both a digital and physical resources
- Digital resources cannot have a date prior to the availability of the specified format. (e.g. TIFFs did not exist before 1986). Even if the intellectual content embodied by the TIFF is associated with an earlier date, this abstract Work/Expression is a different resource that can be referred to independently.
- Physical resources may be described using measurement units such as Inches or centimeters, but not kilobytes, megabytes, etc.
  Conversely digital resources are measured in kilobytes, megabytes, etc. not in inches, centimeters.
- There exists a physical resource.
  All digital resources are surrogates of physical resources.
  Some digital resources are surrogates of other digital resources.

Method

- Each collection was characterized using the SIMILE Gadget data exploration tool. (http://brain.lis.uiuc.edu:9090/)
- DCMI Classes were assigned to the resources identified by the records. Often this was based on dc:format statements, however some sets included references to the kinds of resources described in other properties, like dc:type or dc:description.
- For each collection Gadget summaries for each Dublin Core property were reviewed for DCAM *Statements*[1] that appeared to be in conflict.

[1] DCAM *statements:* a property/value pair such as <dc:format>image/jpeg</dc:format>

e.g. if Gadget suggests that resources had <dc:format> image/jpeg AND <dc:format> Glass Plate Negative.

- When potential violations were observed in Gadget, OAI-PMH ListRecords XML documents were examined to verify that conflicting statements appeared within the same OAI-PMH record. (as opposed to different records appearing within the same collection).
- A general characterization of the kinds of resources and their relationships represented by the records was made. This was based on statements that appeared in item-level records, however collection-level records were sometimes consulted. (e.g. this is a collection of photographs, etc.)
- OAI-PMH XML, collection-level records and hosting institution websites were reviewed for contextual clues about the origins of the metadata. (e.g. was this a ContentDM site?, did the local catalog use a different metadata schema?, In a few sample cases, other available metadata formats were reviewed.

Results

Of the 25 collections selected for this pilot 17 (68%) violated the 1:1 Principle under the assumptions above. Of these 15 could be identified using the dc:format property alone (each record described both physical and digital manifestations – see Example 1: dc:format violation), 7 could be identified using the dc:date field alone, and 7 could be identified through a combination of dc:format and dc:date (e.g. dates prior to the availability of a digital format; see **Example 2: dc:date & dc:format violation**)[2]

For other violating collections, a variety of other fields were implicated often using more subtle references to the nature of the resources described. For example, several collections used dc:description to describe the physical format, size and/or condition of physical resources on which digital resources were based. In such cases the collections were counted as a violation even though the semantics of the dc:description field is "an account of the resource." In combination with other statements about digital file formats, these descriptions would suggest resources such as "brittle jpegs", "XML in good condition", or "TIFFs made with bear grass" In some cases dc:description included an explicit statement such as "digital copy of original document."

Dc:publisher proved to be an interesting, but challenging property to consider. For collections that violated on the criteria above, a collection was more likely to indicate the agent responsible for the publication of *digital resources* (76% of violating collections n(13), see Example 1: dc:format violation). However, because the values indicated are names of corporate agents, it requires outside world knowledge to make this determination. (what name indicate the publisher of printed works?, what names are Historical Societies, Libraries, that publish

[2] Violation types were counted for each collection, some collections violated using one or more properties. E.g. both dc:format and dc:date indicated violations on their own.

digitized surrogates of works?, etc.). In some cases the entity responsible for the digital work is also the entity responsible for the physical work (e.g. the collection that includes Example 2 also includes digitized texts from Wisconsin Historical Society publications).

Non-violating Violations

Perhaps the most important discovery of this pilot study was the existence of what I'm calling "non-violating-violations." For 7 of the 8 collections indicated as "non-violating" using the criteria above something else was happening. Each of the records appeared to describe one and only one resource – most often that resource was a *physical/bibliographic resource*. However each record included a URI identifier that connected the record to a digital resource. The majority of collections (n5) that fit this pattern came from collections in the 7xxxx range of IMLS DCC collectionIDs – indicating that they were derived from DLF Aquifer MODS records. These records often included MARC physical format descriptions in dc:format, suggesting the MODS records were also derived from MARC records. These records may have merely had a URL tacked on to the description of a physical resource. An analysis of the records themselves would not have produced any errors, assuming that it is possible for non-networked resources to be assigned a URI (as is the case in semantic web environments). Only after dereferencing the provided URIs do we discover that a digital resource exists. Reading "between the lines" for some dc:descriptions suggests the existence of digital resources, however these are not necessarily definitive for identifying them here. Each of the DLF Aquifer collections included here also rely on the OAI-PMH Static Repository format.

The only collection that did not follow this pattern was the Idaho Capitol Commission, which is a born-digital collection of renovations of the capitol building between 2006-2010.

Contexts

As noted above, certain context revealed patterns of 1:1 Principle violations. All but two of the DLF Aquifer collections included in the CIMR testbed were "non-violating violations." ContentDM dominated both the CIMR testbed and the number of collections that violated the 1:1 Principle. However, since all other collections also violated the principle in some way, additional analysis is required to understand whether there are identifiable patterns based on the type of underlying infrastructure.

Collections came from Academic Libraries (n8), Historical Societies (n7), Academic Archives (n4), Special Libraries (n2), Public Libraries (n2), Museums (n1) and Consortia (n1). However, several of these institutions used shared infrastructure, e.g. Calisphere, CARLI, Idaho and Utah consortia ContentDM sites, etc. Platform, metadata schema, and content standard (e.g. AACR2, CDP, etc.) appear to be more relevant to 1:1 Principle violations than type of institution.

Dumb Down?/Crosswalk?

For each of the collections here, metadata was originally expressed in some other, richer representation and crosswalked into the OAI-PMH Simple Dublin Core crosswalk. This raises the possibility that the 1:1 Principle violations observed in Simple Dublin Core records are also violations of the related "Dumb Down Principle."[3] This pilot analysis shows that this is not the case because no repositories are using just Qualified Dublin Core. Rather, other standard metadata schemas (MARC, MODS) or locally defined metadata schema are used. In the CIMR testbed all of the ContentDM sites used Dublin Core that was extended by the addition of other properties (see Han, et al. 2009). The semantics of these local properties made it clearer which described a digital resources vs. a physical resource. However, because these local schema lack a mechanism to distinguish discrete DCAM *Descriptions* about the digital/physical resources these richer local records are also not in the spirit of the Dublin Core 1:1 Principle (QDC records for a small sample of 5 collections where used here). Offering records in Qualified Dublin Core also did not prevent 1:1 Principle violations. Only a few Dublin Core properties took advantage of the richer semantics of the dcterms namespace, usually for refining dc:coverage into dcterms:spatial and dcterms:temporal. 1:1 Principle violations, then, are not a "dumb-down" failure; rather they are a crosswalk failure. In many cases local properties have been mapped to the Dublin Core property with the appropriate semantic meaning on a property-to-property basis (however, see Park, 2005). What these crosswalks fail to account for is the *subject* of the overall record.

DLF Aquifer MODS records followed the same pattern observed in Dublin Core records. Each MODS record described a physical resource that also was assigned a <MODS:location><MODS:url> property, implying a physical resource with a network location. Neither of the records used the <MODS:relatedItem> wrapper to indicate that a related digital resource was available. (Additional work is needed here, only two MODS records were observed. However DLF MODS Best Practices require the observed pattern. I've asked for advice in interpreting the rule and the MODS semantics involved in these examples. Koteles(2008) examination of Aquifer found 99% of MODS records included a location/url statement, but less than 8% of records included a description of digital formats.).

What Resources?

At present, a more systematic study that characterizes the resources described in these records is needed. Below is an initial discussion about what was observed in the current analysis.

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[3] "a client should be able to ignore any qualifier and use the value as if it were unqualified. While this may result in some loss of specificity, the remaining element value (minus the qualifier) must continue to be generally correct and useful for discovery. Qualification is therefore supposed only to refine, not extend the semantic scope of a property." Hillmann, 2005

For almost all CIMR Testbed collection (with one notable exception), digital formats served as placeholder for tangible, physical resources[4]. Using the language of the library community, in most cases digital formats served as reproductions/facsimiles with a relationship to other physical manifestations. Or to use the language from the cultural heritage community, the digital files served as surrogates for the physical resources. The difference in language may be a subtle, but important, aspect to consider in future research. The differences may also establish several axis of relationships that cannot be reflected in the simplicity of the Dublin Core metadata schema.

FRBR-like relationships

In some cases digital formats represented here, particularly text-based resources, may represent a set of FRBR like relationships. If the digital manifestation realizes the same text, albeit in a different format(s), FRBR may sufficiently characterize the relationships present. A question that the FRBR/RDA community is currently struggling with is one that has posed a challenge for cataloging codes for "most of the twentieth century," namely how to represent records of materials that are not just new manifestations of the same works, but may be new "related" works unto themselves. Under the current FRBR model, reproductions are limited to manifestion and item-level entities. (works/expressions cannot be reproductions of other works/expressions – however other kinds of work/expression relationships do exist in the current FRBR model)

The challenges of representing these kinds of relationships precede the Dublin Core metadata initiative and the 1:1 Principle itself. AACR1 concretized the core idea that there should be separate records for "original" materials and reproduction/facsimiles such as microformats, etc. Although this was reversed in AACR2, the Library of Congress and OCLC continued the earlier practice (see Library of Congress, 2010 and Knowlton, 2009). Of note in the CIMR testbed collection are many of the text/library based records based on MARC crosswalks. In some cases these records do describe the original manifestations of resources. But in other cases, the MARC records selected for crosswalking represent the reproduction record (mention of microfilm/microfiche in physical descriptions, etc.) that was already one step removed from the original.

Sources and Surrogates

While the library community has been mainly concerned with "reproductions" that often represent works in their entirety, the cultural heritage community discusses "surrogates" that stand in relationship to physical resources. Just as an image of a single page from a book cannot replace the original, digital formats of other cultural heritage objects may only be able to represent a small part of an original work. Just as an entry in a card catalog serves as a surrogate for the book on the shelf, a photograph/image of these works can provide an alternative and remote form of access (Smith, 2003). Unlike the relationship among FBRB entities, surrogates are

[4] The Idaho Capitol Commission noted above.

normally considered (FRBR)works in their own right. (Baca & Sherman, 2007). Other cultural heritage metadata standards (none of which was observed in the CIMR testbed), such as CDWA Lite, VRACore and LIDO have built the ability to express information about multiple "views" of a work into their record structure – thus making a clear distinction between the properties of works themselves and properties of surrogates. (Sometimes awkwardly, as CDWA specifically limits "surrogates" to being photographic or digital items. Engravings, etchings, lithographs etc. are considered first class works). Because surrogates are also understood to be "visual documentation" – similar to a textual document that describes a resource, CDWA and CIDOC CRM recommend modeling the relationship between physical materials and digital photographs through the "P70 documents" property (a relationship between any kind of object and anything that documents that object whether text or visual material).

At present there seems to be a gap in the literature regarding the alignment of concepts of reproductions/facsimiles and surrogates as used by the various LAM communities.

Source-Surrogate Metadata Relationships (SoSuMR)

The Collection-Item Metadata Relationships research group has been primarily concerned about the relationships between collections and the items that they contain. However, this research into 1:1 Principle violations raises question about the propagation of properties along the axis described above – namely the relationship between "original" resources and a "reproductions" and "surrogate" resource that represent the source in certain contexts. Given the assumptions that ground this analysis, it can be relatively simple to eliminate 1:1 Principle violations from records by moving descriptions of different resources into individual records. Example 4: Correcting Basic 1:1 Violations in RDF shows a re-configuration of Example 2 into discrete *descriptions* that are linked together through the dc:Relation/dc:Source relationship. However, the *description* about the digital resource includes very little information that would aid users seeking a particular resource. Aggregations may not understand that it is necessary to follow the dc:source link to gain additional information about the available resource. Park (2005) suggests that it is these kinds of limitations that have led to overloading simple Dublin Core records that result in 1:1 Violations.

If a resource is intended to serve as a surrogate for some other resource, it is plausible to assume that the surrogate will retain some of the properties of the source. An alternative approach explored in Example 5: Propagating Attributes/Values from Source to Surrogate. Which values might propagate from source to a surrogate? If the surrogate is a sufficient representative for the original resource (a "reproduction"?) we might expect properties of "aboutness" to be shared between both resources – the digital resource would retain the same dc:type, dc:subject and dc:coverage, dc:language statements. (in terms of CIMR categories, Attribute/Value Propagation).

Clearly this is early speculation that requires additional exploration. It does raise a number of other questions regarding the formalization of the 1:1 Principle.

- The 1:1 Principle may have several formalizations.
    - A "general" formalization that fits the definition provided by the Dublin Core Abstract Model.
    - A specialization of that general case would account for relationships between sources/reproductions/surrogates.
- In such relationships, what is the relationship between properties of sources and properties of surrogates?
    - Can this be represented by a general set of rules that makes the translation between Example 4 and Example 5 possible?
    - Do they resemble CIMR categories of A-V propagation, V-propagation, V-constraint?
    - Are these relationships more like "inheritance" or "propagation"?
    - Which properties propagate?

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Smith, D. (2003). The Surrogate vs. the Thing. Art Documentation, 22(2), 11-15.

Appendix A: Examples

Example 1: dc:format violation

```
<oai_dc:dc >
        <title>Paul Scarlett Hawthorn Regents Park London</title>
        <title>Paul Scarlett hawthorn in Regents Park</title>
        <creator>Cushman, Charles Weever, 1896-1972</creator>
        <subject>Trees</subject>
        <subject>Parks</subject>
        <subject>Folding chairs</subject>
        <subject>Lakes &amp;amp; ponds</subject>
        <subject>Regent's Park (London, England)</subject>
        <subject>Hawthorns</subject>
        <description>City of Westminster</description>
        <publisher>Indiana University. Digital Library Program</publisher>
        <publisher>Indiana University, Bloomington. University Archives</publisher>
        <date>1965-05-23</date>
        <type>Identification photographs</type>
        <type>Landscape photographs</type>
        <type>StillImage</type>
        <type>Image</type>
        <format>image/jpeg</format>
        <format>35mm slide</format>
        <identifier>Cushman number: 2465.25</identifier>
        <identifier>IU Archives number: P14711</identifier>
        <identifier>http://purl.dlib.indiana.edu/iudl/archives/cushman/P14711</identifier>
        <source>Indiana University, Bloomington. University Archives P14711</source>
        <relation>isPartOf http://www.dlib.indiana.edu/collections/cushman/</relation>
        <coverage>London, England, United Kingdom (Greater London county)</coverage>
        <rights>http://purl.dlib.indiana.edu/iudl/archives/cushman/rights</rights>
</oai_dc:dc>
```

Example 2: dc:date & dc:format violation

This record describes am XML resource, XML resources cannot be created in 1916. Also note the repetition of dc:publisher that includes reference to both publisher of the original resource and the digital resource.

```
<oai_dc:dc>
        <relation>http://www.americanjourneys.org/aj-017/</relation>
        <title>Itinerary of Juan Domínguez de Mendoza, 1684</title>
        <creator>Domínguez de Mendoza, Juan, born 1631</creator>
        <contributor>Bolton, Herbert Eugene, 1870-1953 (editor and
            introduction)</contributor>
        <source>Bolton, Herbert Eugene (editor). Spanish Exploration in the Southwest,
            1542-1706. (New York: Charles Scribner's Sons, 1916). Pages
            313-343.</source>
        <relation>Original Narratives of Early American History</relation>
        <publisher>Charles Scribner's Sons</publisher>
        <publisher>Wisconsin Historical Society</publisher>
        <format>xml</format>
        <date>1916</date>
        <date>2003</date>
        <description>http://www.americanjourneys.org/aj-017/summary/</description>
        <type>journal; travel narrative; translation;</type>
        <language>English</language>
        <coverage>Southwest &amp;amp; California; Mexico;</coverage>
        <coverage>Texas;</coverage>
        <coverage>1683-1684</coverage>
        <subject>Mendoza-López Expedition, 1683-1684</subject>
        <subject>Spanish; Indian;</subject>
        <subject>Apache; Jediondos; Jumano; Suma;</subject>
        <subject>Rio Grande; Salado River; Middle Concho River</subject>
        <subject>Indian-white relations;</subject>
        <subject>Indian practices;</subject>
        <subject>intertribal relations; colonization; warfare &amp;amp; battles;</subject>
        <subject>hunting;</subject>
        <subject>fires;</subject>
        <subject>mammals;</subject>
        <identifier>AJ-017</identifier>
        <rights>© Copyright 2003 by the Wisconsin Historical Society (Madison,
            Wisconsin). For further information see
            http://www.americanjourneys.org/rights/</rights>
        <identifier>http://content.wisconsinhistory.org/u?/aj,1776</identifier>
</oai_dc:dc>
```

Example 3: Non-violating violations

Note that this record does not contain any obvious violations based on formats or dates. To all indications this is a record for a photograph created in 1900 without a digital format available.

```
<oai_dc:dc>
        <dc:title >Defectives, Epileptics: United States. New York. Sonyea:
                Craig Colony: Craig Colony, Sonyea, N.Y.: Hoyt Cottage, Boys</dc:title>
        <dc:title >Social Museum Collection</dc:title>
        <dc:contributor >Unidentified Artist</dc:contributor>
        <dc:type >StillImage</dc:type>
        <dc:type >photograph</dc:type>
        <dc:date >c. 1900</dc:date>
        <dc:format >image: 14.8 x 20 cm (5 13/16 x 7 7/8 in.)</dc:format>
        <dc:description >Credit Line: On deposit from
          the Carpenter Center for the Visual Arts</dc:description>
        <dc:subject >Photographs</dc:subject>
        <dc:identifier >3.2002.1365.2</dc:identifier>
        <dc:rights >© President and Fellows of Harvard College</dc:rights>
        <dc:identifier>
          http://vc.lib.harvard.edu/vc/deliver/~immigration/HUAM19491soc</dc:identifier>
        <dc:relation >Immigration to the United States (1789-1930)</dc:relation>
        <dc:coverage >1900</dc:coverage>
</oai_dc:dc>
```

Example 4: Correcting Basic 1:1 Violations in RDF

This RDF graph created from the record in Example 2, separates information about digital resources from that about physical resources. However, it raises questions about which properties of the original resource might propagate to it's digital surrogate.

```
<rdf:RDF >

<!—Description of Physical Resource -->
   <rdf:Description
rdf:about="http://www.richardjurban.net/#oai:imlsdcc.grainger.uiuc.edu/history:oai:content.wisconsinhisto
ry.org:aj/1776" rdf:type="http://purl.org/dc/terms/PhysicalResource">
      <dc:title>Itinerary of Juan Domínguez de Mendoza, 1684</dc:title>
      <dc:creator>Domínguez de Mendoza, Juan, born 1631</dc:creator>
      <dc:contributor>Bolton, Herbert Eugene, 1870-1953 (editor and introduction)</dc:contributor>
      <dc:relation>Original Narratives of Early American History</dc:relation>
      <dc:publisher>Charles Scribner's Sons</dc:publisher>
      <dc:date>1916</dc:date>
      <dc:type>journal; travel narrative; translation;</dc:type>
      <dc:language>English</dc:language>
      <dc:coverage>Southwest &amp;amp; California; Mexico;</dc:coverage>
      <dc:coverage>1683-1684</dc:coverage>
      <dc:subject>Mendoza-López Expedition, 1683-1684</dc:subject>
      <dc:subject>Spanish; Indian;</dc:subject>
      <dc:subject>Apache; Jediondos; Jumano; Suma;</dc:subject>
      <dc:subject>Rio Grande; Salado River; Middle Concho River</dc:subject>
      <dc:subject>Indian-white relations;</dc:subject>
      <dc:subject>Indian practices;</dc:subject>
      <dc:subject>intertribal relations; colonization; warfare &amp;amp; battles;</dc:subject>
      <dc:subject>hunting;</dc:subject>
      <dc:subject>fires;</dc:subject>
      <dc:subject>mammals;</dc:subject>
      <dc:source>Bolton, Herbert Eugene (editor). Spanish Exploration in the Southwest, 1542-1706.
      (New York: Charles Scribner's Sons, 1916). Pages 313-343.</dc:source>
      <dcterms:relation rdf:resource="http://content.wisconsinhistory.org/u?/aj,1776" />
      <dc:identifier>AJ-017</dc:identifier>
   </rdf:Description>

<!—Description of the Digital Resource -->

   <rdf:Description rdf:about="http://content.wisconsinhistory.org/u?/aj,1776" >
      <dcterms:source
rdf:resource="http://www.richardjurban.net/#oai:imlsdcc.grainger.uiuc.edu/history:oai:content.wisconsinhistory.org:aj/1776" />
      <dc:publisher>Wisconsin Historical Society</dc:publisher>
      <dcterms:created>2003</dcterms:created>
      <dcterms:format>text/xml</dcterms:format>
      <dc:rights>© Copyright 2003 by the Wisconsin Historical Society (Madison, Wisconsin). For
      further information see http://www.americanjourneys.org/rights/</dc:rights>
    </rdf:Description>
</rdf:RDF>
```

Example 5: Propagating Attributes/Values from Source to Surrogate

The following RDF graph is a modification of Example 4.

```
<rdf:RDF >
<!—Description of Source -->
   <rdf:Description
rdf:about="http://www.richardjurban.net/#oai:imlsdcc.grainger.uiuc.edu/history:oai:content.wisconsinhisto
ry.org:aj/1776" rdf:type="http://purl.org/dc/terms/PhysicalResource">
      <dc:title>Itinerary of Juan Domínguez de Mendoza, 1684</dc:title>
      <dc:creator>Domínguez de Mendoza, Juan, born 1631</dc:creator>
      <dc:contributor>Bolton, Herbert Eugene, 1870-1953 (editor and introduction)</dc:contributor>
      <dc:relation>Original Narratives of Early American History</dc:relation>
      <dc:publisher>Charles Scribner's Sons</dc:publisher>
      <dc:date>1916</dc:date>
      <dc:type>journal; travel narrative; translation;</dc:type>
      <dc:language>English</dc:language>
      <dc:coverage>Southwest &amp;amp; California; Mexico;</dc:coverage>
      <dc:coverage>1683-1684</dc:coverage>
      <dc:subject>Mendoza-López Expedition, 1683-1684</dc:subject>
      <dc:subject>Spanish; Indian;</dc:subject>
      <dc:subject>Apache; Jediondos; Jumano; Suma;</dc:subject>
      <dc:subject>Rio Grande; Salado River; Middle Concho River</dc:subject>
      <dc:subject>Indian-white relations;</dc:subject>
      <dc:subject>Indian practices;</dc:subject>
      <dc:subject>intertribal relations; colonization; warfare &amp;amp; battles;</dc:subject>
      <dc:subject>hunting;</dc:subject>
      <dc:subject>fires;</dc:subject>
      <dc:subject>mammals;</dc:subject>
      <dc:source>Bolton, Herbert Eugene (editor). Spanish Exploration in the Southwest, 1542-1706.
         (New York: Charles Scribner's Sons, 1916). Pages 313-343.</dc:source>
      <dc:identifier>AJ-017</dc:identifier>
   </rdf:Description>

<!-- Description of Surrogate -->
   <rdf:Description rdf:about="http://content.wisconsinhistory.org/u?/aj,1776" >
      <dcterms:source
rdf:resource="http://www.richardjurban.net/#oai:imlsdcc.grainger.uiuc.edu/history:oai:content.wisconsinhi
story.org:aj/1776" />
      <dc:identifier rdf:resource="http://content.wisconsinhistory.org/u?/aj,1776" />
      <dc:publisher>Wisconsin Historical Society</dc:publisher>
      <dcterms:issued>1916</dcterms:issued>
      <dcterms:dateCopyrighted>2003</dcterms:dateCopyrighted>
      <dcterms:format>text/xml</dcterms:format>
      <dc:rights>© Copyright 2003 by the Wisconsin Historical Society (Madison, Wisconsin). For
      further information see http://www.americanjourneys.org/rights/</dc:rights>
      <!-- This alternative approach includes information about content which may propagate from original
to surrogate -->
      <dc:title>Itinerary of Juan Domínguez de Mendoza, 1684</dc:title>
      <dc:creator>Domínguez de Mendoza, Juan, born 1631</dc:creator>
      <dc:contributor>Bolton, Herbert Eugene, 1870-1953 (editor and introduction)</dc:contributor>
      <dc:relation>Original Narratives of Early American History</dc:relation>
      <dc:type>journal; travel narrative; translation;</dc:type>
      <dc:language>English</dc:language>
      <dc:coverage>Southwest &amp;amp; California; Mexico;</dc:coverage>
      <dc:coverage>1683-1684</dc:coverage>
```

```
    <dc:subject>Mendoza-López Expedition, 1683-1684</dc:subject>
    <dc:subject>Spanish; Indian;</dc:subject>
    <dc:subject>Apache; Jediondos; Jumano; Suma;</dc:subject>
    <dc:subject>Rio Grande; Salado River; Middle Concho River</dc:subject>
    <dc:subject>Indian-white relations;</dc:subject>
    <dc:subject>Indian practices;</dc:subject>
    <dc:subject>intertribal relations; colonization; warfare &amp;amp; battles;</dc:subject>
    <dc:subject>hunting;</dc:subject>
    <dc:subject>fires;</dc:subject>
    <dc:subject>mammals;</dc:subject>
  </rdf:Description>
</rdf:RDF>
```