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The "Wicked Problem" of Neutral Description: Toward a Documentation Approach to Metadata Standards

Kara Long [a], Santi Thompson [b], Sarah Potvin [c], and Monica Rivero [d]

aMoody Memorial Library, Baylor University, Waco Texas, USA; bUniversity Libraries, University of Houston, Houston, Texas, USA; cUniversity Libraries, Texas A&M University, College Station, Texas, USA; dFondren Library, Rice University, Houston, Texas, USA

ABSTRACT

Increasingly, metadata standards have been recognized as constructed rather than neutral. In this article, we argue for the importance of a documentation approach to metadata standards creation as a codification of this growing recognition. By making design decisions explicit, the documentation approach dispels presumptions of neutrality and, drawing on the "wicked problems" theoretical framework, acknowledges the constructed nature of standards as "clumsy solutions."

Introduction

Metadata records are produced and maintained in context, shaped by standards, tools, policies, and practices. The standards, tools, policies, and practices applied over the course of the lifecycle of an electronic resource are neither neutral nor impartial.[1] Developed by particular groups, with specific use cases, stakeholders, and goals in mind, standards may constrain and structure metadata practice. Tools used to collect or publish metadata may be influenced by divergent metadata or stewardship philosophies, and reflect design decisions made by those who commissioned, built, or guided their development. These decisions and preferences, however, are rarely made explicit.

In this article, we argue for the importance of a documentation approach to metadata standard creation and revision that serves to make design decisions explicit. The article is divided into two distinct methodological sections. The first section relies on case study methodology to chart the evolution of a community metadata standard that exemplifies the need for a documentation approach. The second section positions two essential theoretical literatures, introducing and applying Rittel and Webber's "wicked problem"[2] framework, prevalent in social policy, and discussions in the archival profession of neutrality and description.

CONTACT Kara Long kara_d_long@baylor.edu Baylor University, University Libraries, One Bear Place #97148, Waco, TX 76798-7148, USA.

These theoretical literatures provide the basis for analyzing our case study and advancing our argument for a documentation approach.

Our case study examines a community effort to standardize metadata for Electronic Theses and Dissertations (ETDs). ETDs are unique documents, representing the original research necessary to obtain an advanced degree. There are varied stakeholder interests throughout the lifecycle when examining ETDs, including student authors who create and submit their theses, faculty advisors who supervise and mentor authors, graduate schools that administer the process and grant degrees, libraries that manage and publish these resources, and, finally, potential researchers who may repurpose or reuse these resources.[3] These factors make ETDs a rich environment for illustrating concepts of documentation, archival theory, and consensus building in developing metadata practices.

Our case study focuses on the Texas Digital Library (TDL), which hosts both a community standard for ETD metadata and Vireo[4], a tool for managing ETD submission and deposit. These qualities position TDL as an apt case study for the interaction between tool and standard, and for the development and evolution of a standard. TDL's efforts to develop a shared standard for descriptive metadata for ETDs illustrate the obstacles between existing and emergent ETD metadata standards. Documentation for TDL's efforts and evolving standard elucidates and contextualizes our obstacles and rationale.

In the context of describing and arguing for a documentation approach, we selectively examine metadata standards for electronic texts, including theses and dissertations. It is beyond the scope of this article to advocate for particular solutions to electronic resource description or management, or to offer a detailed analysis of the potential of linked data, either as a theoretical or experimental approach to networked description or authority management.

Case study: Implementing and updating a community metadata standard for ETDs

Library classification and description, broadly, encompass myriad philosophical and design challenges, situated as they are in a framework of knowledge representation and organization that makes competing claims on the authority, totality, or universality of knowledge.

Electronic Thesis and Dissertation (ETD) metadata comprises a particular subset of the overarching challenges of classification and description.[5] Described in library catalogs (and occasionally held in both print and electronic form) and maintained in institutional repositories and commercial databases, ETDs have, since their introduction, been a site of emergent and overlapping practices for electronic resource description and inherited cataloging and metadata concerns specific to the genre.[6] Notably, as this section details, standards, tools, policies, and practices have been developed by ETD stakeholders to manage the specialized requirements of these unique objects over the course of their lifecycle. We will

formally introduce the "wicked problems" and "clumsy solutions" frameworks as the basis for contextualizing and understanding the provisional nature of descriptive standards. By testifying to the compromises and decisions behind the creation of both standard and tool, the documentation produced by the TDL community serves as an illustration of this provisional nature.

Origins of the Texas digital library standards creation

In 2005, the five Texas Association of Research Libraries (ARL) members—the University of Houston, the University of Texas, Texas A&M University, Texas Tech University, and Rice University—established the Texas Digital Library (TDL). A press release announced that the effort was an attempt to "assemble and provide for the benefit of society the combined resources" of the member institutions: "By leveraging the resources of these major research university systems, the Texas Digital Library will offer a cost-effective venue for the assembly and delivery of information that will benefit a variety of communities."[7] In a business case revised a year after TDL was formed, John Leggett, Mark McFarland, and Drew Racine outlined seven advantages offered by the new collaborative, leading with its role as a "center of excellence for the creation, curation, and preservation of digital scholarly information for the State in the broadest sense."[8]

The development of a shared ETD repository was the first project of the newly formed consortium. A metadata working group was tasked with "developing a common [descriptive] metadata standard that would allow members to share metadata in the TDL repository."[9] The challenge lay in unifying existing practices at the University of Texas and Texas A&M University, which both supported ETD submission, and launching the effort for member universities that did not yet collect ETDs. The University of Texas developed a process where ETDs were linked from local MARC records, while Texas A&M maintained Dublin Core (DC) records in a DSpace repository while continuing to produce and maintain MARC records in an OPAC.[10]

After analyzing TDL member institutions' needs, and considering broader implications and trends, the metadata working group decided to use the Metadata Object Description Schema (MODS) with an ETD-specific application profile.[11] While this rationale was not detailed in documentation accompanying the standard itself, Brian Surratt, chair of the working group, explained the decision in a subsequent conference paper. He argued that MARC was an inappropriate standard both because of inherent deficiencies ("It is a legacy standard and its shortcomings are magnified in the web environment") and because AACR2 and other cataloging standards failed to provide consistent guidance on the incorporation of fields integral to ETD management.[12] A cataloging standard that placed advisor names in locally-defined fields, Surratt observed, "encourages local policies and discourages establishing common standards."[13] MARC was seen as incompatible with the level of interoperability needed to build a shared repository. MARC

records were also inappropriate because they were hosted by OPACs; Surratt wrote: "Our OPACs, which are our primary systems for managing MARC records, are not designed to store content, but rather to point to the content in some other location. Our digital library systems, on the other hand, are not designed to store MARC records with our digital content."[14]

If MARC and AACR2 were deemed clunky and inadequate in their treatment of metadata specific to ETDs and inappropriate in a digital library context, DC prompted a different set of concerns. Surratt appreciated the specificity of ETD-MS, the Interoperability Metadata Standard for Electronic Theses and Dissertations maintained by the Networked Digital Library of Theses and Dissertations (NDLTD). But he saw that the expression of ETD-MS in DC inherited schema's "flaws": overly broad elements and insufficient structure, relational or hierarchical substructures, and syntax. These limitations inhibited DC's expressive capacity and its application in networked or aggregated environments.[15] The metadata working group observed that MODS "provides advantages over both MARC and Dublin Core," bringing "the best features" of MARC into an XML syntax.[16] The group decided to bring ETD-MS elements into MODS, in some cases relying on an extension element to reference ETD-MS.

Surratt's positioning of tools and systems as limiting factors in metadata application speaks to observations emerging from the University of Texas and Texas A&M and foreshadows current constraints, serving as evidence of accommodations made to manage these constraints. While this positioning falls short of exemplifying a true documentation approach—the working group published or presented their rationale apart from the standard, a separation of function that required subsequent research to recover—Surratt's explicit provision of the reasoning that shaped the standard situates the work as driven by human decision making and constrained by a particular moment in the evolution of platforms, tools, and related standards.

Given the standard's reliance on MODS, "the development of ETD systems that use MODS natively" was a clear priority; Surratt noted that "TDL will continue to investigate these issues."[17] As a 2008 conference paper explained, TDL member institutions relied on a range of practices and policies to collect ETDs: Texas A&M used a modified version of the ETD_db repository system, which provided an online interface for the submission and management of ETDs, developed by Virginia Tech and NDLTD; the University of Texas relied on ProQuest's ETD Administrator, a third-party software that addressed the submission, management, and publication of ETDs; other TDL member institutions "had no infrastructure in place to handle submission or management" or "had no engagement with ETDs whatsoever, and were still operating completely within a paper model."[18] Inconsistencies and interoperability challenges faced in the TDL ETD repository, upon its launch, prompted a desire for a more streamlined, uniform approach to gathering ETD metadata. The MODS application profile, provided without common tools and imposed on a range of institutional practice, proved inadequate to supporting

a consistent, aggregated ETD metadata repository. Beyond the need for a shared standard, TDL member institutions would benefit from a shared tool.

In 2006, TDL formed a working group to "identify the issues and policies involved with Electronic Theses and Dissertations (ETD) workflows in the member institutions, and make recommendations" around the development of a "single ingestion point" and application for ETD metadata.[19] Such an ingestion point would allow for "full control over metadata collected," in addition to flexible support for the ingestion, verification, and publication of ETDs.[20] A prototype of the resulting open source tool, known internally as the Thesis and Dissertation Submittal System, used the TDL ETD MODS Application Profile and was deployed in 2007.

With the deployment of the Thesis and Dissertation Submittal System, updated guidelines were necessary to develop a bridge between this new tool and the DSpace repositories then in use by the University of Texas and Texas A&M.[21] In 2008, the TDL Metadata Working Group, chaired by Amy Rushing, issued the Descriptive Metadata Guidelines for Electronic Theses and Dissertations.[22] The updated guidelines used MODS as the core schema, carrying forward the charge in the 2005 guidelines to develop an "interoperable standard that provided semantically rich bibliographic description."[23] In recognition of the need for aggregation and interoperability that the MODS standard alone could not meet, the updated guidelines introduced the TDL ETD DC schema, designed to provide elements to reduce potential loss of data when it was transformed from the richer MODS schema to the simpler Dublin Core schema."[24] The guidelines had larger aggregations in mind, seeking to bring TDL into alignment with the NDLTD and its ETD-MS application profile for ETD metadata, an emergent priority for TDL. When introducing the guidelines, the working group explicitly noted that the DC schema mappings "… are provided only to assist participants in meeting DSpace requirements, and are not a recommendation to provide qualified Dublin Core as the primary descriptive metadata schema."[25]

With more than $800,000 in underwriting from an Institute of Museum and Library Services (IMLS) National Leadership Grant, TDL continued to develop its submission tool. METS figured heavily in the project's goals: an overarching goal was the creation of a common submission system with "organic METS support."[26] An ambitious grant narrative promised that a Metadata Working Group, working 2007–2008, "will have primary responsibilities for developing metadata standards for rights management, preservation, and compound objects, based upon accepted and emerging metadata standards such as MODS, PREMIS, and CopyrightMD, with METS as the base standard for administrative and structural metadata."[27]

The submission tool, renamed Vireo and launched in 2009, has enjoyed broad adoption and support from TDL member institutions, a group that has expanded to 22 members as of September 2016, 10 years since it was founded. Institutions outside of TDL (including Harvard University, University of Illinois at Urbana-Champaign, and Johns Hopkins University) have also adopted Vireo. Shifts in how working groups were maintained and persisted meant that Vireo development

proceeded without coordination or oversight from a metadata working group. As Pargman and Palme observe, "The standards specified in standards document (formal standards) and the standards used in real practice (de facto standards) are two different things."[28] The gap between formal and de facto standards widened considerably with the growth of Vireo. In 2014, attentive to the fact that metadata exported from Vireo no longer complied with either earlier guidelines (2005 or 2008) and that qualified DC had become the de facto descriptive schema for Vireo users, TDL formed a working group dedicated to analyzing this divergence and updating the guidelines, in cooperation with the Vireo User Group.[29]

As members of TDL's ETD metadata working group, our charge was to reexamine and update a community standard for ETD metadata. The following section delves more deeply into the idea of the wicked problem and how ETD description conforms to this framework. When we conceive of ETD management in general, and description specifically, as a wicked problem, we position descriptive standards as "clumsy solutions."[30] A clumsy solution addresses some of the problems, but will not resolve all of the complexities found in describing ETDs. A clumsy solution is not consensus—in fact, it is an acknowledgement that no meaningful consensus can be reached due to the nature of the problem. It is an attempt to incorporate dissonance and disorder.[31] We argue that, by taking a wicked problems approach, practitioners who work with ETDs can conceive of the descriptive standard as a "clumsy solution," that leaves room for reiterative decision making, recognizing bias, and acknowledging that the standard only manages the problem of description with the expectation of ongoing revision. In short, it is dynamic and responsive to changes in the technologies and processes used to describe ETDs. As we will detail in a subsequent section, our working group developed a process of investigation and research to better understand both the existing and emergent needs of ETD stakeholders. This process also looked at the rationale behind previous iterations of the standard. The working group issued a report accompanying the updated standard that clearly presented our decision-making process and rationale. This aligns with the documentation approach that forefronted the "why" of the standard alongside the "what."

ETD description as a wicked problem

The wicked problems framework, which has been used to discuss issues such as climate change, offers a robust approach.[32] Wicked problems are perhaps best known and most widely used in social policy planning. The concept was introduced in 1973 by Horst Rittel and Martin Webber in their seminal article, "Dilemmas in a general theory of planning."[33] The framework gave Rittel and Webber a way to describe complex social problems that were difficult to define and seemingly intractable.

Wicked problems stand in contrast to "tame" problems, for which there is a well-understood or easily identifiable solution. Richard Buchanan situates the

formulation of the wicked problems framework in the context of 1960s-era debates over design methodology,[34] arguing that Rittel's approach forged, "an alternative to the linear, step-by-step model of the design process being explored by many designers and design theorists," which presented two distinct phases of problem definition and problem solution.

> *Problem definition* is an *analytic* sequence in which the designer determines all of the elements of the problem and specifies all of the requirements that a successful design solution must have. *Problem solution* is a *synthetic* sequence in which the various requirements are combined and balanced against each other, yielding a final plan to be carried into production.[35]

This model, Buchanan argues, is "based on *determinate* problems which have definite conditions. The designer's task is to identify those conditions precisely and then calculate a solution. In contrast, the *wicked-problems* approach suggests… a fundamental *indeterminacy*."[36]

Librarians and information professionals have adopted this model for thinking about some of the formidable challenges that surround the maintenance, description, and preservation of digital objects, thus setting a precedent for applying the wicked problems framework in libraries. This research suggests *additional* and *other* "wicked" problems in the profession (apart from ETD description) and reinforces the utility of the framework. Researchers at the University of Sheffield collected and analyzed interview data to measure how effective it is for librarians to conceive of research data management as a wicked problem. Their findings confirmed that this was a useful way of understanding the challenges of managing research data.[37] Also working in the UK, Julie McLeod and Sue Childs published an article that describes electronic records management (ERM) in libraries as a wicked problem and developed practical examples for information management professionals to better understand and tackle ERM issues.[38] McLeod and Childs do not limit their discussion of ERM to library use-cases; however, libraries have become custodians to a growing number and variety of digital objects and their care is "…complex, contextualised, and contingent."[39] ETDs *could* be classified as electronic records, broadly defined; but, they do posit some unique challenges, particularly in that ETDs act as a record of a student's matriculation and fulfillment of degree requirements as well as an original research product.

Ten characteristics of wicked problems

Rittel and Webber outline ten characteristics of wicked problems.[40]
1. There is no clear definition of the "problem."
2. There is no "stopping rule," meaning there is no conceivable end-point to the problem.
3. There is no right or wrong answer, only better or worse solutions.
4. There is no way to test the solution to the problem—once a solution is implemented, the problem significantly changes.

5. Because each solution attempted changes the problem, there is no trial-and-error.
6. There are endless possible solutions.
7. Every wicked problem is unique.
8. The problem is a symptom of a larger set of problems or issues.
9. The problem can be viewed from different perspectives, which, in turn, change the problem and our approach to it.
10. Wicked problems affect real people and have real consequences.

Wicked problems arise when there are tensions between individual and collective interests.[41] Colleges and universities customize ETD tools and standards for their particular use. This results in non-standard ETD metadata across various institutions. Yet, an aggregation or the creation of a union catalog of ETDs depends on a certain level of standardization or normalization of ETD metadata in order to be meaningful.[42] The following examples demonstrate how ETD description expresses the above characteristics of wicked problems.

(1) There is no clear definition of the "problem" and (9) The problem can be viewed from different perspectives, which, in turn, change the problem and our approach to it

Drafting a standard for ETD description quickly brings up overlapping needs and concerns regarding ETD management. For example, a recommendation concerning access and availability metadata has bearing on what policies and procedures are in place for limiting the availability of ETDs and managing embargoes. Likewise, the variability of college and university structures also has a bearing on a standard way to describe academic colleges, schools, departments, and institutes nested within or independent of each other on a given campus. The scope of the descriptive standard and what is needed to suitably represent the complexity of different organizational structures and policies is unclear; thus, the scope of the "problem" is unclear.

(2) There is no "stopping rule," meaning there is no conceivable end-point to the problem

There is no clearly defined end to the number or variety of ETDs to describe. Digital file formats, storage requirements, software, and hardware requirements are in a constant state of change. There is no conceivable "final" or "stable" ETD format. Additionally, as long as universities and colleges require theses and dissertations, these collections will continue to grow. Given both the likely growth and shifting format of ETDs, the terms and vocabularies used to describe these items can never be final or stable. This problem is not exclusive to ETDs and applies to other types of electronic content as well. E-books and other e-resources licensed or purchased by the library are generally accessible through a publisher-provided e-book platform or website. This is generally not the case for ETDs. Unique or proprietary file

formats will need to be supported by the library. This is as much a challenge of infrastructure and technology as it is policy.

Reporting on large-scale ETD repositories in 2009, Adam Mikeal et al. stated, "Unfortunately, it is all too likely that even with a reasonable amount of preparation and foresight, there will be decisions and assumptions that must be revisited later."[43] We can manage the problem through periodic review and updates to our standards and practices. In the same presentation, Mikeal et al. acknowledged the cost of a reiterative approach to ETDs, noting "Careful planning may at best limit, but not prevent, those costs, so one must provide for metadata migration from the outset."[44] Preparing and planning for metadata migration can help anticipate several possible scenarios: the move from or upgrade to a new submission system, the move from, or upgrade to, a new institutional repository, or the transformation of metadata from one schema to another—either for exchange or enhancement of an existing collection. This demonstrates the need for on-going management of ETDs, not a final or end solution.

(3) There is no right or wrong answer, only better or worse solutions and (6) There are endless possible solutions

ETD processing and description are increasingly handled outside of cataloging units in library workflows.[45] ETD metadata is created through a combined effort of authors; graduate school office personnel; library personnel; and the systems that process, deposit, and store ETD metadata. Many institutions no longer represent ETD records in their OPACs; instead records are stored and displayed through an institutional repository, or similar digital collections platform. Other institutions continue to display ETD records in the catalog, and even convert records from the repository into MARC format.[46] The data transformation goes both ways—other institutions re-purpose data from ProQuest or even from legacy MARC records, and transform these records for ingest in their repository.[47] Institutions may handle all of their ETD processing through locally developed systems; others rely on consortia, services from commercial firms, or any combination of these methods.[48] The means and methods each institution uses to disseminate and store ETDs vary tremendously. A descriptive standard for ETDs must be flexible enough to implement under existing workflows among a diverse group of users both within and outside of the library. Any descriptive standard can only ever be a better or worse solution, depending on these varied perspectives. This presents the possibility for innumerable solutions.

(8) The problem is a symptom of a larger set of problems or issues

Historically, subjects are considered important access points in the discovery of relevant materials by users. With the emergence of digital libraries and electronic formats, significant improvements in system indexing and the capability to search the full-text of documents directly have led to discussions around the continued usefulness of the labor-intensive practice of supplying subject terms. The practice of using author-supplied metadata in combination with system-directed user interfaces has led to declines

in the practice of assigning Library of Congress Subject Headings (LCSH) to ETDs. Research in this area has shown that student-generated metadata "is able to deliver about 90% of the record content, most of which is both accurate and findable."[49] Another study found a "… strong reliance placed on titles by indexers," identifying a high correlation between indexer-applied Index Medicus subject categories and terms—or near synonyms—found in articles' titles.[50] And though early studies "from 1980 and 1960 support formal Subject terms, this is before improvements in full search searching and indexing was available."[51] These findings suggest that authors are more likely to select meaningful terms to describe their own research and these along with full-text searching will provide end-users with greater discoverability and thereby reduce the need for traditional subject analysis of ETDs. However, there are still many use cases where formalized subject headings continue to provide enhanced access: for example, applying Medical Subject Headings (MeSH) in the health and biomedical information fields, or using a controlled vocabulary such as the Proquest Subject Guides, where terms are selected by authors, provide consistency when browsing content on a collection level.[52]

Local needs and practices vary greatly when it comes to assigning subjects. In developing community-level metadata guidelines, the Texas Digital Library (TDL) working group aimed to provide options that were flexible enough to meet local goals while maintaining a general consistency. Therefore, the TDL ETD guidelines stated that subjects are optional, but when used recommend that the "form of the heading may be taken from a standard or local thesaurus."[53] These guidelines are necessarily flexible when it comes to the question of if or how subject metadata are supplied, but provide a standard encoding method for the metadata element when in use.

Linked data has massive, even radical, implications for the description and management of electronic texts, including electronic theses and dissertations. And the wide adoption of linked data technologies would reframe many of the challenges these objects present to catalogers and metadata specialists, particularly in the areas of subject assignment and name disambiguation. Linked data promises to make library collections more findable on the web by structuring bibliographic data in a way that allows it to be linked. In brief, this would allow for web scale interoperability of library data and would make some of the maintenance of local databases unnecessary. In 2008, when the first TDL Metadata Working Group convened, many libraries were in the process of transitioning from AACR2 as a content standard for descriptive records and into RDA, which is more web-friendly. When the group reconstituted in 2015, libraries were still in a state of transition. Most institutions now have transitioned fully to RDA; and a few institutions have begun transitioning away from MARC towards linked data technologies. In the 2016 Library Technology Report, *Library Linked Data: Early Adoption and Development*, Erik T. Mitchell writes, "It appears that despite the transition to Linked Data for large-scale and core services such as the transformation of library MARC platforms and the migration of EAD finding aids, the community has not yet distilled a set of activities or systems into an 'easy-to-implement' platform or adoption approach.

Indeed, LD efforts might still be categorized as existing in the startup phase…"[54] While these technologies are still in the early stages of adoption, there remained too many unknown variables for the TDL Metadata Working Group to recommend a process of implementation for ETD metadata from existing repositories to linked data-capable platforms. Some of these variables include the tools and standards available or unavailable to institutions as well as variables regarding staffing, institutional organization, and the willingness to invest in both the tools and skills needed to successfully transition ETD records to a linked data environment.[55] The matter of when and how to implement linked data in libraries is not specific to ETD collections but encompasses a much broader set of concerns about the visibility of bibliographic data on the web and its utility in a networked environment. ETD collections will certainly be impacted by the adoption of linked data, but the question of how to create linked data using ETD records can also be seen as a subset of the much larger issue.

(7) Every wicked problem is unique

ETD collections aggregate unique content, making their description and management unique to each holding institution. Materials held in common by several or many libraries can share a set of descriptive practices or record; and, that record can be reproduced or copied for local uses. Conversely, ETD data must be created, held, and maintained locally. This is one aspect in which ETDs differ significantly from other digital library materials. E-books, to take one example, are often described with shared or publisher-provided records, and maintained on publisher-provided platforms. The hyper-local nature of ETD collections has given rise to equally localized practices that govern their description and management, making the problem of ETD description a unique problem, both to genre and to each individual collection.

A descriptive standard for ETD metadata must be functional in order to be useful to stakeholders. The stakeholders are a varied group with different needs. Additionally, every university providing access to ETD collections may do so in a slightly different way. So, not only are the key stakeholders tremendously varied but the means by which ETD records are stored, displayed, and indexed also vary. A descriptive standard for ETDs must be platform-agnostic in order to be effective. Fineman outlined some of the different methods of access for ETD collections, including institutional repositories, union catalogs of OAI-harvested records, proprietary databases like UMI, and through the open web.[56] We can add to this list the emergence of library discovery layers, systems that aggregate library content from the library catalog, digital collections, and subscription databases. These products have helped to reduce the "silo effect," which cordons off portions of the library collection in databases that are not searchable through the library catalog. The challenge lies in creating a sufficiently detailed descriptive standard that translates well across these different platforms. A solution that works well in a union catalog may be a worse solution in a proprietary database.

The "clumsy solution"

If ETD description is indeed a wicked problem, we can develop a "clumsy solution." According to Andrew Cox, Stephen Pinfield, and Jennifer Smith, a clumsy solution "partly satisfies different stakeholders. No consensus is possible. Organisations should correspondingly be loosely coupled so that the inherent contradictions between such viewpoints can be accommodated and aligned."[57] This loose coupling leaves room for individual institutions to diverge from the standard in ways that fulfill their needs without jeopardizing relationships with the regional, national, or international organizations that produce descriptive standards. These tensions have always existed in libraries, but have not always been *written into* prevailing descriptive standards. For example, the TDL ETD Metadata Working Group discovered many variations in how institutions were handling date-related metadata. There are multiple dates that are or can be associated with an individual thesis. The date a thesis is submitted, the date of defense, and date of graduation are a few examples. Institutions each had a local understanding of what the individual "date" element meant to their campus, but there was little to no consensus or even documentation that clarified the many uses and meanings of the date field.

Writing a descriptive standard that acknowledges the decision-making process, identifies its limitations, and shows its construction leaves room for this kind of loose coupling. The emphasis of such a standard is not on strict compliance but thoughtful divergence. When presented with a series of arguments and evidence of decision making, institutions can make informed decisions about when to deviate from the standard, why, and what the impact might be—solidifying the non-neutral role that the descriptive standard plays as a clumsy solution.

The TDL ETD descriptive standard as a "clumsy solution"

The Texas Digital Library (TDL) Electronic Theses and Dissertations (ETD) Descriptive Metadata Standard, Version 2.0, acknowledges important decisions made during the construction of the standard and admits new limitations that we imposed on the standard as a result of its revision.[58] The working group communicated these new developments through a final report that accompanied the release of version 2.0 of the standard.[59] This report, organized around five case studies that comprised the bulk of the standard's revision, and additional case studies for future areas of focus, documented a series of issues identified, discussed, debated, and finally situated as recommendations by the group.

Throughout the report, the group acknowledged the unattainable goal of developing a balanced standard that conformed to larger, more ideal descriptive metadata standards while, at the same time, promoted ease of implementation among TDL member institutions. For the most part, the former prevailed: version 2.0 privileged decisions that aligned with our group's negotiated, and, at times, renegotiated, conception of "high semantic interoperability."[60] Our changes aimed to align ETD metadata (for example, better articulating author rights information)

and cross-walking protocols to prevailing standards focused on describing ETDs (ETD-MS) and digital objects (Dublin Core) across various platforms and systems.

Ease of implementation did not go unaddressed by the group. As written in the report, "we also acknowledge an imperative to be practical, to produce guidelines that might be applied without introducing too great a gap between new and legacy metadata."[61] One such example was our decision to discontinue the inclusion of MODS metadata as part of the metadata standard. MODS was at the heart of the original 2005 standard and remained in place in 2008, when the standard was revised. Thanks to publications by those 2005 and 2008 working groups, we were able to reconstruct the decisions and compromises that enshrined MODS in the standard, despite its incompatibility with existing tools. In the years since the publication of version 1.0 of the standard, those incompatibilities deepened rather than, as had been the hope of previous working groups, resolved. Numerous TDL members had either stopped generating MODS ETD metadata or never elected to do so at all. Stakeholders expressed their confusion and, at times, annoyance with the level of MODS details included in the standard since it was little used, due in part to key systems not generating or supporting the metadata schema. Although the Vireo ETD Dissertation Submission System, used by many TDL members to acquire and curate ETDs, included the option of generating MODS metadata, DSpace, used to archive and make the ETDs accessible, required Dublin Core metadata and was unable to natively support MODS files except as appended bit-streams, rendering any MODS-exported metadata supplemental at best. Understanding the barriers identified by stakeholder feedback and system functionality allowed the group to re-focus version 2.0 of the standard around the practicalities of implementing Dublin Core at the expense of spending resources on updating or including information about MODS.

Thomas Bruce and Diane Hillmann have argued that "… some intellectual barriers [to understanding metadata elements] can be lowered by careful consideration of potentially diverse audiences when designing and documenting metadata implementations." They recommend "practice guides and other similarly rich forms of documentation" as the basis for "proper intellectual access."[62] Our working group's documentation approach incorporated the perspectives and feedback of a range of ETD stakeholders, including representatives from thesis and graduate offices. We presented work-in-progress at the Texas ETD Association annual meeting and the Texas Conference on Digital Libraries before introducing the final report at the United States ETD Association annual meeting, all in 2015. While working group members were all librarians engaged with ETD metadata or personnel from the Texas Digital Library, a Task and Review group was formed that provided targeted feedback on draft recommendations; this group included technologists, thesis office personnel, and librarians. Additionally, feedback was solicited from the diversely populated Vireo Users Group.[63]

The working group's report also acknowledges the limitations of the updated standard. Some of these decisions reveal preferences that the group had to agree

upon in order to generate a succinct and cohesive recommendation. For example, to make a recommendation on the complex and, at times, unwieldy ETD date metadata collected throughout the lifecycle of the document, the group privileged some dates as "more important" than others. Relying on stakeholder feedback to guide our decision-making process, the group emphasized the value in documenting two dates (graduation date and date made public) above all others because of their importance in understanding the provenance of a document and in facilitating its discoverability. While our recommendations still allow room for acknowledging other date metadata, we openly stress, through both the final report and the Dictionary that communicates the updated standard, that graduation date and date made public should be prioritized.[64]

Engaging with a lack of neutrality: Deploying the clumsy solution

A documentation approach to metadata standards acknowledges the decision-making process as seamful and constructed. This awareness prompts our profession to reflect on the ways that our decisions affect the work we do and the users we serve. Documenting and describing our actions helps our colleagues, users, and other observers to understand the choices we make during such a revision process and how these choices are rooted in a specific time, space, and place. Recognizing the context in which information professionals operate bears our agency and confronts the long-held view of the neutral librarian, archivist, and information professional. Confronting neutrality requires us, as a profession, to challenge our assumptions, push for diverse perspectives on an issue, and admit the limitations of our decisions. A growing number of scholars and practitioners have espoused the benefits of transparent documentation, particularly vis-à-vis its relationship with the ideal of the neutral librarian, archivist, or standard. The pervasive non-neutrality and built-in bias in bibliographic records has been discussed extensively in both library and archives literature.[65] As Hope Olson writes, "Naming information is the special business of librarians and information professionals. Applied in our role as 'neutral' intermediaries between users and information, our theories, models, and descriptions are as presumptuous and controlling as scientists' construction and containment of nature." Olson documents a "pervasive belief among information scientists" in the role of standardization to impose "an overriding unity in language" … "Librarians call such a constructed universal language a *controlled vocabulary*."[66] Olson, and others, have examined non-neutrality in bibliographic and archival records with a focus on broad frameworks for bibliographic description, without attention to specific formats or media.

A closer analysis of one subset of this growing literature, from the archival community, offers rich examples of how transparent documentation contests neutrality and provides a mechanism for a clumsy solution to wicked descriptive problems. Focusing on archival literature at this juncture in our conversation may seem tangential at first glance. However, as unique, locally-held resources, ETDs share

common attributes with archival principles and workflows. Contemporary ETD scholarship increasingly addresses the art and science of acquiring, describing, curating, and preserving documents, metadata, and supplemental files associated with submissions—all core archival functions that easily align with lifecycle approaches to rare and unique archival objects, including corporate records and personal manuscripts.

Equally significant, the archival literature has a longstanding fascination with the benefits and limitations of neutrality. The goal of "neutrality" has been rooted in archival theory and practice for generations. While the beginnings of neutrality and archives can be traced to a variety of sources in European archival training and manuals, several contemporary scholars attribute the idea of the "neutral archivist" partially to the writings and theories of English archivist Hilary Jenkinson. In his 1922 *Manual of Archive Administration*,[67] Jenkinson helped to popularize the role of archivist as "impartial custodian" in relationship to the records they acquire, describe, and preserve. Grounded in the pursuit of service and "truth," the archivist's career, according to Jenkinson:

> Exists in order to make other people's work possible … His Creed, the Sanctity of Evidence in his Task, the Conservation of every scrap of Evidence attaching to the Documents committed to his charge; his aim to provide, without prejudice or after-though, for all who wish to know the Means of Knowledge … The good Archivist is perhaps the most selfless devotee of Truth the modern world produces."[68]

Jenkinson's "impartial custodian" identity dissuaded archivists from imposing their interpretation of the records on core archival functions, particularly archival appraisal.

In the years since Jenkinson's writings, archivists and scholars have contested the idea of the "neutral archivist." In the 1970s, propelled by the emerging trend of social and cultural history, scholars encouraged archivists to shake the "myth" of neutrality. The archival literature cites historian Howard Zinn, author of *A People's History of the United States*, as one such critic. During an address at the annual meeting of the Society of American Archivists, Zinn proclaimed the neutral stance of archivists to be "fake" and warned that the profession's adoption of such neutrality was creating a historical record "biased towards the important and powerful people of society, tending to ignore the impotent and obscure."[69]

Later scholars, influenced by postmodern theory, continued to critique the identity of the "neutral archivist." Central to the postmodern theory on archival practice, according to Terry Cook and Joan Schwartz, is acknowledging the "central role of the archivist as mediator and interpreter, as an important shaper of the documentary past."[70] For Cook and Schwartz, the archivist "is an actor, not a guardian; a performer, not a custodian."[71] By closely analyzing this archival performance, observers begin to identify ways that archivists mediate the materials entrusted to them. Archival educators Wendy Duff and Verne Harris focus their analysis on the decisions made related to the description of objects in collections.

Duff and Harris write, "in describing records, archivists are working with context, continually locating it, constructing it, figuring and refiguring it … The describer selects certain layers for inclusion, and decides which of those to foreground."[72] These decisions and actions—sometimes described as the "power of the archivist,"—change the ways users interact and understand objects in archival collections. They write, "the power to describe is the power to make and remake records and determine how they will be used and remade in the future. Each story we tell about our records, each description we compile, changes the meaning of the records and re-creates them."[73] For Duff and Harris, and others who apply postmodern theory to archival work, the power held by the archivist to make decisions on description, representation, and other archival functions directly challenges the "neutral archivist" identity.

For some writers, acknowledging the inherent power of archivists is a positive step forward in overcoming the "myth of neutrality." However, this awareness, in itself, is not enough. Because "there is no one answer, no right answer" to archival description (or any other archival function), Cook and Schwartz advocate that archivists should go beyond identifying power: they should "accept the responsibility to be self-consciously accountable for documenting their practice with open transparency."[74] For Cook and Schwartz, archivists achieve transparency by "explain[ing] in writing why choices were made as they were, using what criteria, based on what concepts of value or significance, employing what methodologies, and reflecting what personal values of the archivist."[75] Arnold argues that archivists "… are complicit in erasing [their] work—often in the same of 'impartiality' or 'professionalism'—by failing to expose it through publicly documented appraisal decisions or robust processing notes."[76] It is through these actions that users understand how records were "shaped" by archivists—including the decisions made on archival issues like description.

Library and archival literature and practice provide several ways for information professionals to "document the practice of open transparency." Archivists Michelle Light and Tom Hyry offer one approach through using colophons, which are "statements regarding the creation of a work, written or printed after the main text has concluded" as a means for providing information on "editorial contributions" and other decisions made by archivists during the descriptive process.[77] This colophon would inform a user of archival materials on the methodologies used by archivists to acquire, process, describe, and make accessible materials. Light and Hyry note that "while some of this information may seem obvious, routine, and even unimportant to archivists, it does give researchers potentially important information that has been obscured by the intervention of the archival processes."[78] By writing a final report, which explained the group's methods and technical processes, decisions, and limitations, members of the TDL ETD Metadata Working Group developed such a colophon. But developing supplemental reports are not the only way to take advantage of colophons. Light and Hyry also note that "existing standards already have containers for the kinds of information the

colophon proposes."[79] They write that an encoded archival description (EAD) tag could be used to include contextual information. Other metadata schema and standards, including Dublin Core, MODS, and the Preservation Metadata: Implementation Strategies (PREMIS) all contain metadata elements that trace the provenance of objects and record actions and decisions that shape how records are described, preserved, and made accessible. By documenting these actions, metadata elements help to un-obscure the actions of information professionals and, in the process, combat the "myth of neutrality."

Conclusion

As we discovered when embarking on a metadata standard update, no coherent professional literature guides the creation and evolution of community-supported metadata standards and acknowledges the tradeoffs inherent to this process.[80] In this article, we have detailed the evolution of a community-supported metadata standard and tool for ETDs. By introducing a wicked problems framework for the creation and revision of metadata standards, we advocate for a documentation approach to metadata standard creation and revision as the basis for a critical assertion of non-neutrality in information practice. This approach is needed as standards, and the technology that supports them, continue to evolve over time, introducing more complexity into the wicked problem of describing ETDs.

Along the way, we sought to fill a gap between theoretical literatures on design thinking and neutrality and the practical work of standards creation, updating, and communication. While our analysis drew upon version 2.0 of the TDL ETD Descriptive Metadata Standard, it is not an investigation or critique on the merits of the standard itself or the confines it bears on describing ETDs at member institutions. Instead, documenting our revision process has allowed us to highlight the areas we prioritized and privileged while also acknowledging the limitations of our revised standard. Future work on the intersections of the wicked problems of ETD description and the clumsy solution of a documentation approach could explore how decisions on metadata standards influence specific software development and workflows used to make ETDs discoverable. Understanding the motivations behind our policies and standards will help our profession shed the myth of the neutral standard (and librarian) while advancing iterative, clumsy solutions for the most complex of problems.

Acknowledgments

ORCID

Kara Long 🔘 http://orcid.org/0000-0001-9225-5067
Santi Thompson 🔘 http://orcid.org/0000-0002-0337-6439
Sarah Potvin 🔘 http://orcid.org/0000-0001-6025-5054
Monica Rivero 🔘 http://orcid.org/0000-0002-4580-4710

Notes

1. A growing literature, incorporating books, articles, and texts adapted from professional presentations, examines the fallacy of neutrality in library and archival work and theory. See, for example, Hope A. Olson, "The Power to Name: Representation in Library Catalogs," *Signs* 26, no. 3 (Spring 2001): 639–68; Josh Honn, "Never Neutral: Critical Approaches to Digital Tools & Culture in the Humanities," 2013, http://sites.northwestern.edu/jch629/39; nina de jesus, "Locating the Library in Institutional Oppression," *In the Library with the Lead Pipe*, September 24, 2014, http://www.inthelibrarywiththeleadpipe.org/2014/locating-the-library-in-institutional-oppression/; Chris Bourg, "Never Neutral: Libraries, Technology, and Inclusion," *Feral Librarian*, January 28, 2015, https://chrisbourg.wordpress.com/2015/01/28/never-neutral-libraries-technology-and-inclusion/; Mark A. Matienzo, "To Hell With Good Intentions: Linked Data, Community and the Power to Name," February 11, 2016, http://matienzo.org/2016/to-hell-with-good-intentions/. An adjacent literature has situated information work in the context of maintenance theory, acknowledging the potential invisibility of library and archival efforts. See, for example, the program from "The Maintainers: A Conference" (Hoboken, NJ, 2016), http://themaintainers.org/, in particular the work of Nathan Ensmenger; Hillel Arnold, "Critical Work: Archivists as Maintainers," *Hillelarnold.com*, September 2, 2016, http://hillelarnold.com/blog/2016/08/critical-work/.

2. Horst W. J. Rittel and Melvin M. Webber, "Dilemmas in a General Theory of Planning," *Policy Sciences* 4, no. 2 (1973): 155–69, http://dx.doi.org/10.1007/BF01405730

3. Daniel Alemneh, Bill Donovan, Martin Halbert, Yan Han, Geneva Henry, Patricia Hswe, Gail McMillan, and Xiaocan (Lucy) Wang, "Guidance Documents for Lifecycle Management of ETDs" (Atlanta: Educopia Institute, 2014), https://educopia.org/publications/gdlmetd.

4. "Vireo ETD Management," *Texas Digital Library*, accessed September 2, 2016, https://tdl.org/etds/.

5. Notably, the literature on ETD metadata continues to grow. See, for a recent example, Margaret Beecher Maurer and Shadi Shakeri, "Disciplinary Differences: LCSH and Keyword Assignment for ETDs from Different Disciplines," *Cataloging & Classification Quarterly* 54, no. 4 (2016): 213–43, http://dx.doi.org/10.1080/01639374.2016.1141133; Tom Steele and Nicole Sump-crethar, "Metadata for Electronic Theses and Dissertations: A Survey of Institutional Repositories," *Journal of Library Metadata* 16, no. 1 (2016): 53–68, http://dx.doi.org/10.1080/19386389.2016.1161462.

6. For a detailed description of the special issues represented by ETD metadata, see Sarah Potvin and Santi Thompson, "An Analysis of Evolving Metadata Influences, Standards, and Practices in Electronic Theses and Dissertations," *Library Resources & Technical Services* 60, no. 2 (2016), http://dx.doi.org/10.5860/lrts.60n2.99.

7. "Texas Digital Library Established," *UT News Press Release, The University of Texas at Austin*, July 12, 2005, http://news.utexas.edu/2005/07/12/texas-digital-library-established.

8. John Leggett, Mark McFarland, and Drew Racine, "The Texas Digital Library: A Business Case," March 2, 2010, http://sites.tdl.org/sandbox/files/2013/06/TDL-Briefing-Book-0303102.pdf.

9. Brian E. Surratt, "MODS Meets Manakin: Innovations in the Texas Digital Library's Thesis and Dissertation Collection" (9th International Symposium on Electronic Theses and Dissertations, Quebec City, Canada, 2006), https://www.researchgate.net/publication/228358861_MODS_meets_Manakin_Innovations_in_the_Texas_Digital_Library's_thesis_and_dissertation_collection.

10. Ibid., 1.

11. Texas Digital Library Metadata Working Group, "MODS Application Profile for Electronic Theses and Dissertations, Version 1," December 2005, http://www.tdl.org/wp-content/uploads/2009/04/etd_mods_profile.pdf. Alisha Little (University of Texas), Anne Mitchell (University of Houston), and Jason Thomale (Texas Tech University) were members of the 2005 working group, and Brian E. Surratt (Texas A&M University) chaired the working group.

12. Surratt, "MODS Meets Manakin", 2.

13. Ibid. Gail McMillan observed that "Currently, even the full MARC record for a dissertation is not very robust and often has a local twist, presenting valuable information in a unique format that can be seen only at the originating institution because it is masked to users of OCLC or other centralized cataloging repository" (p. 110). Gail McMillan, "Electronic Theses and Dissertations: Merging Perspectives," *Cataloging & Classification Quarterly* 22, no. 3/4 (1996): 105–25, http://dx.doi.org/10.1300/J104v22n03_09 and co-published simultaneously in Ling Yuh W. Pattie and Bonnie Cox, *Electronic Resources: Selection and Bibliographic Control* (Boca Raton, FL: CRC Press, 1996).

14. Ibid.

15. Ibid.

16. Ibid, 3.

17. Ibid., 5.

18. Adam Mikeal, "ETD Management in the Texas Digital Library: Lessons Learned from a Demonstrator" (11th International Symposium on Electronic Theses and Dissertations, Aberdeen, Scotland, 2008), http://oaktrust.library.tamu.edu/handle/1969.1/85724.

19. Adam Mikeal et al., "Developing a Common Submission System for ETDs in the Texas Digital Library," July 12, 2007, http://oaktrust.library.tamu.edu/handle/1969.1/5679.

20. Ibid.

21. The new submission system was specifically built to be compatible with DSpace, used by both the University of Texas and Texas A&M at that time. But while the system generated MODS XML, in compliance with the original ETD MODS application profile, DSpace was only able to natively support and display flat schema like DC. In DSpace's architecture, the MODS XML file was stored as a largely inaccessible and static file, a bitstream accompanying the record; separate DC metadata were generated as the basis for actually managing and discovering item records. Given the basic incompatibility of DSpace and MODS, it may come as no surprise that the submission system was the only mechanism available to TDL members for ingesting MODS XML into DSpace.

22. Amy Rushing et al., "Texas Digital Library Descriptive Metadata Guidelines for Electronic Theses and Dissertations Version 1.0," June 2008, http://www.tdl.org/wp-content/uploads/2009/04/tdl-descriptive-metadata-guidelines-for-etd-v1.pdf.

23. Ibid., "Introduction," 3.

24. Ibid., 4.

25. Ibid.

26. Texas Digital Library, "IMLS Grant: Design," accessed April 28, 2015, http://www.tdl.org/grants/imls/design.

27. Texas Digital Library, "The Texas ETD Repository: Promoting Our Scholarship and Preserving Our Legacy, Narrative Proposal for IMLS National Leadership Grant," February 2007, 6.

28. Daniel Pargman and Jacob Palme, "ASCII Imperialism," in *Standards and Their Stories: How Quantifying, Classifying, and Formalizing Practices Shape Everyday Life* (Ithaca, NY: Cornell University Press, 2009), 191.

29. Sarah Potvin et al., "Texas Digital Library Descriptive Metadata Guidelines for Electronic Theses and Dissertations, Version 2.0," Report, and Standard (September 2015), https://tdl-ir.tdl.org/tdl-ir/handle/2249.1/68437.

30. Marco Verweij et al., "Clumsy Solutions for a Complex World: The Case of Climate Change," *Public Administration* 84, no. 4 (December 2006): 817–43, http://dx.doi.org/10.1111/j.1540-8159.2005.09566.x-i1.

31. Ibid.

32. Ibid.

33. Rittel and Webber, "Dilemmas in a General Theory of Planning."

34. Buchanan traces "the first published report of Rittel's concept of wicked problems" to a 1967 guest editorial by C. West Churchman, "Wicked Problems," *Management Science* 14, no. 4 (December 1, 1967): B-141, http://dx.doi.org/10.1287/mnsc.14.4.B141.

35. Richard Buchanan, "Wicked Problems in Design Thinking," *Design Issues* 8, no. 2 (1992): 5–21, http://dx.doi.org/10.2307/1511637, note 37.

36. Ibid., 15.

37. Andrew M. Cox, Stephen Pinfield, and Jennifer Smith, "Moving a Brick Building: UK Libraries Coping with Research Data Management as a 'Wicked' Problem," *Journal of Librarianship and Information Science* 48, no. 1 (2016): 3–17, http://dx.doi.org/10.1177/0961000614533717.

38. Julie McLeod and Sue Childs, "A Strategic Approach to Making Sense of the 'wicked' Problem of ERM," *Records Management Journal* 23, no. 2 (2013): 104–35, http://dx.doi.org/10.1108/RMJ-04-2013-0009. Also see: Sue Childs and Julie McLeod, "Tackling the Wicked Problem of ERM: Using the Cynefin Framework as a Lens," *Records Management Journal* 23, no. 3 (2013): 191–227, http://dx.doi.org/10.1108/RMJ-07-2013-0016.

39. McLeod and Childs, "A Strategic Approach to Making Sense of the 'wicked' Problem of ERM."

40. Rittel and Webber, "Dilemmas in a General Theory of Planning."

41. Moira Zellner and Scott D. Campbell, "Planning for Deep-Rooted Problems: What Can We Learn from Aligning Complex Systems and Wicked Problems?" *Planning Theory & Practice* 16, no. 4 (2015): 457–78, http://dx.doi.org/10.1080/14649357.2015.1084360.

42. Rebecca L. Lubas, "Defining Best Practices in Electronic Thesis and Dissertation Metadata," *Journal of Library Metadata* 9, no. 3–4 (2009): 252–63, http://dx.doi.org/10.1080/19386380903405165.

43. Adam Mikeal et al., "Large-Scale ETD Repositories: A Case Study of a Digital Library Application," in *Proceedings of the 9th Annual ACM/IEEE-CS Joint Conference on Digital Libraries* (New York: ACM, 2009), 135–44, http://dx.doi.org/10.1145/1555400.1555423.

44. Mikeal et al., "Large-Scale ETD Repositories: A Case Study of a Digital Library Application."

45. For history of ETDs see: Yale Fineman, "Electronic Theses and Dissertations," *Portal: Libraries and the Academy* 3, no. 2 (2003): 219–27.

46. Sai Deng and Terry Reese, "Customized Mapping and Metadata Transfer from DSpace to OCLC to Improve ETD Work Flow," *New Library World* 110, no. 5/6 (2009): 249–64, http://dx.doi.org/10.1108/03074800910954271.

47. Shawn Averkamp and Joanna Lee, "Repurposing ProQuest Metadata for Batch Ingesting ETDs into an Institutional Repository," *Code4Lib Journal*, no. 7 (June 26, 2009), http://journal.code4lib.org/articles/1647.

48. Margaret Beecher Maurer, Sevim McCutcheon, and Theda Schwing, "Who's Doing What? Findability and Author-Supplied ETD Metadata in the Library Catalog," *Cataloging & Classification Quarterly* 49, no. 4 (2011): 277–310, http://dx.doi.org/10.1080/01639374.2011.573440.

49. Maurer, McCutcheon, and Schwing, "Who's Doing What?"

50. Christine Montgomery and Don R. Swanson, "Machinelike Indexing by People," *American Documentation* 13, no. 4 (October 1962): 363.

51. Theda Schwing, Sevim McCutcheon, and Margaret Beecher Maurer, "Uniqueness Matters: Author-Supplied Keywords and LCSH in the Library Catalog," *Cataloging & Classification Quarterly* 50, no. 8 (2012): 903–28, http://dx.doi.org/10.1080/01639374.2012.703164.

52. See 2015–2016 Subject Guides found at "Dissertations - Submitting Your Dissertation or Thesis to ProQuest," http://www.proquest.com/products-services/dissertations/submitting-dissertation-proquest.html (accessed September 1, 2016).

53. Potvin et al., "Texas Digital Library Descriptive Metadata Guidelines for Electronic Theses and Dissertations, Version 2.0." While research has shown the effectiveness of discovering resources with subjects attributed to them, the working group chose to leave this element as an optional metadata field for several reasons, including: (1) authors have a better understanding of the content and, consequently, may be best suited to apply the appropriate descriptive keywords; (2) Vireo developers continue to refine the user-ingest process, which has a simple interface that allows students to select from a pre-determined list; and (3) user discoverability is enhanced through the repository's full-text search capabilities.

54. Erik T. Mitchell, "Library Linked Data: Early Activity and Development," *Library Technology Reports* 52, no. 1 (2016).

55. See Dean Seeman and Lisa Goddard, "Preparing the Way: Creating Future Compatible Cataloging Data in a Transitional Environment," *Cataloging & Classification Quarterly* 53, no. 3–4 (2015): 331–340, for a discussion of the gaps between the development of linked data in libraries and current catalogers' practice.

56. Fineman, "Electronic Theses and Dissertations."

57. Cox, Pinfield, and Smith, "Moving a Brick Building."

58. Potvin et al., "Texas Digital Library Descriptive Metadata Guidelines for Electronic Theses and Dissertations, Version 2.0."

59. Ibid.

60. Ibid., 4.

61. Ibid., 4.

62. Thomas R. Bruce and Diane I. Hillmann, *The Continuum of Metadata Quality: Defining, Expressing, Exploiting* (Chicago: ALA Editions, 2004), http://ecommons.cornell.edu/handle/1813/7895.

63. One might argue that the Report and Dictionary created by the TDL working group function as boundary objects among the network of practice comprised of ETD managers. Star defines boundary objects as "objects that are both plastic enough to adapt to the local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites." See S. L. Star, "Cooperation Without Consensus in Scientific Problem Solving: Dynamics of Closure in Open Systems," in *CSCW: Cooperation or Conflict*?, ed. Steve Easterbrook (London: Springer London, 1993), 93–106, http://link.springer.com/10.1007/978-1-4471-1981-4_3, 103. Brown and Duguid originated the concept of "network of practice" to signal "extended epistemic networks," suggesting "that relations among network members are significantly looser than those within a community of

practice." See John Seely Brown and Paul Duguid, "Knowledge and Organization: A Social-Practice Perspective," *Organization Science* 12, no. 2 (March-April 2001): 198–213, http://dx.doi.org/10.1287/orsc.12.2.198.10116.

64. Potvin et al., "Texas Digital Library Descriptive Metadata Guidelines for Electronic Theses and Dissertations, Version 2.0.", 9–12.

65. Terry Cook and Joan M. Schwartz, "Archives, Records, and Power: From (Postmodern) Theory to (Archival) Performance," *Archival Science* 2, no. 3 (2002): 171–185; Michelle Light and Tom Hyry, "Colophons and Annotations: New Directions for the Finding Aid," *The American Archivist* 65, no. 2 (2002): 216–30, http://dx.doi.org/10.17723/aarc.65.2.l3h27j5x8716586q.

66. Hope A. Olson, "The Power to Name: Representation in Library Catalogs," *Signs* 26, no. 3 (2001): 639–68. http://www.jstor.org/stable/3175535, 640.

67. Hilary Jenkinson, *A Manual of Archive Administration Including the Problems of War Archives and Archive Making* (Oxford: The Clarendon Press; London, New York [etc.] H. Milford, 1922), http://archive.org/details/manualofarchivea00jenk.

68. Hilary Jenkinson, Quoted in Jimerson, *Archives Power*, 134.

69. Howard Zinn, Quoted in Jimerson, *Archives Power*, 134.

70. Cook and Schwartz, "Archives, Records, and Power," 183.

71. Ibid.

72. Duff and Harris, "Stories and Names", 276.

73. Duff and Harris, "Stories and Names", 271–272.

74. Cook and Schwartz, "Archives, Records, and Power," 183.

75. Ibid.

76. Arnold, "Critical Work."

77. Light and Hyry, "Colophons and Annotations," 223–224.

78. Ibid.

79. Ibid., 225.

80. In August 2016, the ALCTS/LITA Metadata Standards Committee released "Principles for Evaluating Metadata Standards", intended "to inform and support the development, maintenance, selection, and assessment of metadata standards." see ALCTS/LITA Metadata Standards Committee, "Principles for Evaluating Metadata Standards," *Metaware.buzz*, August 4, 2016, http://metaware.buzz/2016/08/04/principles-for-evaluating-metadata-standards/.These nine "aspirational" principles include a requirement that standards be documented (#8) as well as an assertion of standards development as "not neutral" (#9). In a presentation at a DCMI preconference in 2014, Michael Rush spoke to some of the trade-offs and challenges that accompanied the effort to update an archival description standard; this presentation was not subsequently published. While the work of standards creation and development may be considered in conference presentations or discussions, and occasionally makes an appearance on Twitter, it appears to have evaded the formal professional literature.