How Metadata Contextualizes Records: An Overview of Metadata in Electronic Records Management

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Introduction

Metadata, often referred to as "data about data," is an essential component of electronic recordkeeping and management. Although "data about data" is a helpful shorthand description, the National Information Standards Organization (NISO) offers a more instructive definition: "Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource" (2004). While it can be argued that metadata exists in non-digital records, this paper will focus on metadata's role in electronic records management. US National Archives proposes that in the context of electronic records management, metadata is "the factual information related to records," describing the "content, context, and structure of records" (2016). The creation and maintenance of the factual information describing digital records as metadata is not only essential to how records are used and managed, but also to their long-term preservation.

This paper will detail different categories of metadata (administrative, descriptive, preservation, technical, and use), the uses of metadata in recordkeeping, and metadata quality standards. This content will be used to explore how metadata provides context regarding the organizational processes of records management. The insight that metadata provides about organizational dynamics can provide crucial insight into the context of the creation and ensuring lifecycle of records. Before digging into these topics, detailing a few practical applications of metadata may underscore why metadata is useful—why metadata matters.

The controlled vocabularies utilized and developed to support metadata schemas allow search tools to query databases, which in turn aids in the Functional Requirement for Bibliographic Records (FRBR) of under users to *find*, *identify*, *select*, and *obtain* materials in online catalogues and databases (Tillett, 2003). In records management, metadata can be used to

improve record retrieval, to aid record authorization, and as part of system migrations (University of Waterloo, n.d.). The National Archives and Records Administration (NARA) uses metadata to "provide contextual information that explains how electronic records were created, used, managed, and maintained prior to their transfer to NARA" (2015). NARA considers the contextual information metadata provides essential to the management, preservation, and accessibility of electronic records. An overview of the five primary categories of metadata will provide a more detailed exploration of the applications of metadata in libraries and records management.

Categories of Metadata

There have been many categorization systems proposed to differentiate the different types of metadata. In 1998, the Library of Congress (2005) proposed three types of metadata: descriptive, administrative, and structural. This categorization system is still commonly used. This paper, however, will use the metadata schema described by Anne J. Gilliland (2016). This classification system outlines five categories of metadata: administrative, descriptive, preservation, technical, and use. Gilliland's categorization was chosen for its increased specificity and its conformance with the US National Archives classification system (2016). In addition to this metadata classification system, Gilliland outlines six primary functions of metadata: creation, multiversioning, reuse, and recontextualizion of information objects; organization and description; validation; search and retrieval; utilization and preservation; and disposition. These functions will be referred to throughout the following sections.

A point of clarification before the analysis: metadata can describe the content and context of records; however, as the National Information Standards Organization notes, "Good metadata records are objects themselves" (2008). Not only can metadata describe records, metadata are

records. This aligns with what Yakel calls the "fundamental theoretical principle" of "documenting documentation" (1996, p. 463). Metadata records "document the document" and are documents themselves. In some examples of metadata records, like bibliographic records, the record is a surrogate for the original document. Other metadata is embedded directly into a record, like its file type and encoding language.

Administrative Metadata

There are two types of metadata that occur in nearly every categorization system surveyed: administrative and descriptive. Administrative metadata is "metadata used in managing and administering collections and information resources" (Gilliland, 2016). Some of the examples of administrative metadata given by Gilliland (2016) include acquisition and appraisal information, access requirements and protocols, and selection criteria for digitization. Administrative metadata is essential for library professionals to organize materials and for users to access materials. High quality administrative metadata can help users with the FRBR *obtain* user task (Tillett, 2003). Users can refer to administrative metadata— like an object's loan status or its location— to aid in obtaining the item.

US National Archives notes the value of administrative metadata in managing collections of records, offering examples of administrative metadata fields like "Transfer Request (TR) Number, the Record Group, and the name of the person authorized to transfer custody" (US National Archives, 2016). As highlighted by these examples, the uses of administrative metadata in the context of recordkeeping primarily for organizing and administering in-house records. Administrative metadata can serve as access points for records managers, making records more searchable and accessible.

Descriptive Metadata

Like administrative metadata, descriptive metadata is included in most metadata classification systems. Broadly speaking, descriptive metadata is any metadata that describes a digital object. Much of the data common to bibliographic records can be understood as descriptive metadata; this includes standard bibliographic fields like title, author, and date published. The data populating these fields are the metadata that comprise digital bibliographic records, which are the surrogates for the actual objects in a collection, whether physical or digital. As evidenced by this example, descriptive metadata is a necessary tool for discovering and accessing content in online catalogs and databases.

Gilliland defines descriptive metadata thusly: "Metadata used to identify, authenticate, and describe collections and related trusted information resources" (2016). Some of the examples provided by Gilliland include cataloging records, linked relationships between different resources, and metadata generated by a digital object's original creator or system (Gilliland, 2016). This is the metadata that is most often used as an access point for users querying a catalog or database. Gilliland acknowledges this, writing "Good descriptive metadata is essential to users' ability to find and retrieve relevant metadata and information objects" (2016). Unlike some of the other categories of metadata discussed here, the US National Archives (2016) definition for descriptive metadata is essentially the same, but it focuses on records specifically instead of information resources in general.

Not only does descriptive metadata serve as an access point for record retrieval, it can also be used to collocate other relevant records and information objects. NISO writes: "Good metadata uses authority control and content standards to describe objects and collocate related objects" (2008). This principle emphasizes the importance of applying standards, in the form of

controlled languages, to descriptive metadata to aid users in information retrieval. Indeed, it is essential that library professionals provide accurate descriptive metadata so users can perform FRBR user tasks: *find*, *identify*, and *select* (Tillett, 2003).

For example, when a user queries the "Author" field of a database search engine with a search term, the results page will be populated with snippets that represent the records with descriptive metadata—in this case, the author's name—that matches the term. This allows users to *find* relevant objects. Other bibliographic metadata like publication date will help users *identify* that the object is the right one. Format metadata describing the object—whether it is a physical book or an eBook for instance—will help users *select* the appropriate version of the object.

Descriptive metadata points to the history of metadata in libraries and records management. Bibliographic records existed long before the term "metadata" was ever used; in the past, metadata creation was "the responsibility of information professionals engaged in cataloging, classification, and indexing" (Gilliland, 2016), but now, thanks to advances in technologically, metadata can be produced by automatically by software or even by the general public. Users generating "title, description, and keyword tags" (Gilliland, 2016) for web pages may not even know they are participating in the act of creating descriptive metadata. Descriptive metadata is essential to finding materials online; however, there is another type of metadata that works to ensure their long term access and retention—preservation metadata.

Preservation Metadata

Preservation metadata is metadata that is created with an explicit intent to aid in preservation. Gilliland defines preservation metadata as "Metadata related to the preservation

management of collections and information resources" (2016). Examples given by Gilliland (2016) include documentation of a resource's physical condition, documentation of preservation actions taken, and documentation of any changes that occurred during the digitization process. These examples highlight the usefulness of metadata in the context of archives and special collections, where metadata aids in the management of physical objects in a collection and their digitized surrogates.

US National Archives offers a definition of preservation metadata that is more specific to records management: "Preservation Metadata is a specialized set of information required to preserve and provide access to electronic records" (2016). Preservation metadata can be the format used to encode a file, the required software to view a file, or the actions taken to maintain a file (US National Archives, 2016). Compared to the previous categories of metadata discussed, preservation metadata is generally more relevant to information professionals than the average patron or user. Preservation metadata may be useful to users of open access digital libraries that want their materials to be accessed and used by the general public, but more specialized information organizations may utilize proprietary systems that people outside of the institution would have no way of accessing. Additionally, the organization may have reasons for keeping the preserved materials private as part of their access policies.

Gilliland's definition of preservation metadata explained how metadata can be used to understand the relationship between physical objects in a collection and their digital surrogates. In contrast, the US National Archives definition highlights the processes and technologies utilized to preserve digital records. This shows how preservation metadata can overlap with another category of metadata called technical metadata.
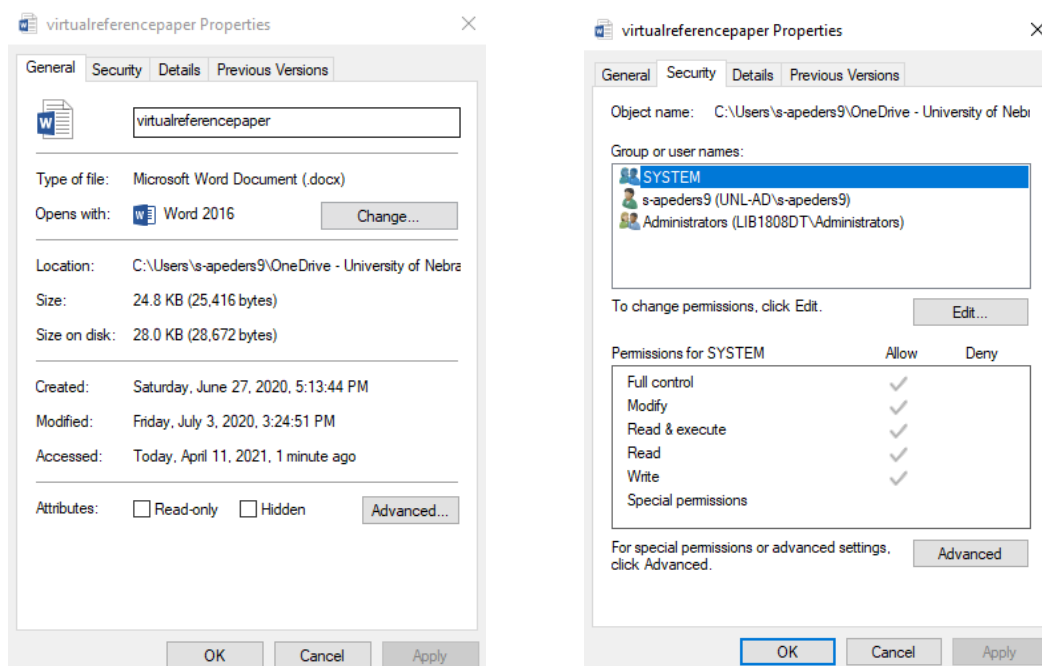
Technical Metadata

The examples of preservation metadata listed in the previous paragraph included some examples of metadata that involves technological processes. That metadata could also reasonably be described as technical metadata. Technical metadata is "metadata related to how a system functions or behaves" (Gilliland, 2016). Some of the examples of technical metadata Gilliland provides are "hardware and software documentation," "event metadata," "technical digitization information," and "authentication and security data" (Gilliland, 2016). All of this metadata is crucial to the long-term maintenance and preservation of digital objects, despite not being produced explicitly for that purpose. This statement comports with the US National Archives description of technical metadata; they write "Technical metadata is frequently included as Preservation metadata as it is necessary for the maintenance of electronic records" (2016).

Authentication and security data are particularly significant to ensuring record authenticity—an essential aspect of records management that noted as a requirement for "creating and preserving records which modern society relies" (Rogers, 2015). Metadata can aid in record authentication, but since metadata also function as records, a system must be put in place to rigorously administer metadata authenticity and security as well. Hirtle (n.d.) argues that records in an electronic system can only be considered trustworthy if methods to guarantee "recordness" and "evidentiality" are built into the system. Evidentiality, or evidential value, is the term used to describe "the ability of records to document the functions of an organization," while recordness is "the quality of being a record" (Dictionary of Archives Terminology, n.d.).

Technical metadata is unique compared to other categories of metadata because much of it "can be collected automatically by a computer" (Gilliland, 2016). This is not to say that other types of metadata cannot be generated automatically, but that it is the most common method for producing technical metadata.

Consider the "Properties" window of a file in the Microsoft Windows Operating System. The two images below illustrate the "General" and "Security" tabs of the "Properties" window of a Microsoft Word 2016 document.

All of the data, other than the file name "virtualreferencepaper" were generated automatically by a computer. Not all of the data shown in these two images is necessarily technical metadata; the file name and date created are descriptive metadata, and the file location is administrative metadata. Examples of technical metadata on display in the first image include "Type of File," "Opens With," "Size" and "Size on Disk," and the "Read-only" and "Hidden" attributes. The "Type of File" shows the format of the file type (.docx), while "Opens With" indicates the software the computer will use to open the file. Note that while this data is automatically generated, this data can be manipulated by the owner of the file by changing file settings. The file owner could save the file as an alternative format and set the computer to open the file with another program in place of Word 2016, like Open Office, for instance. Contrast this with "Size"

and "Size of disk;" these fields are automatically generated based on properties intrinsic to the file, like its content and file type. Although data in this field reflects changes made to the content by the file owner, the field itself cannot be changed by hand; this an example of metadata that can only be generated automatically.

Use Metadata

Use metadata is all metadata related to a digital object's usage and copyright status. The term "use metadata" is sometimes used interchangeably with "rights metadata;" however, this paper will acknowledge rights metadata is a distinct subcategory of use metadata. Use metadata broadly refers to metadata regarding usage, while rights metadata is specifically related to an item's rights data.

Gilliland defines use metadata as "Metadata related to the level and types of use of collections and information resources" (2016). Use metadata provides many practical purposes as part of recordkeeping. Examples of use metadata include "circulation records," "physical and digital exhibition records," "use and user tracking," "content reuse and multiversioning information," "search logs," and "rights metadata" (Gilliland, 2016). Note that Gilliland also categorizes rights metadata as an example of use metadata. In the context of records management, the definition of use metadata is functionally the same, it "describes how records can be assessed or circulated" (US National Archives, 2016).

Accurate use and rights metadata fulfills the National Information Standards Organization's Metadata Principle 4: "Good metadata includes a clear statement of the conditions and terms of use for the digital object" (2008). This principle suggests that all digital objects and records should have metadata indicating copyright status, publishing status, and

ownership. The metadata should inform the user "how to obtain permission for restricted uses and how to cite the material for allowed uses" (National Information Standards Organization, 2008). This is a legal matter for both the publishing institution and the user looking to reference the digital object; accordingly, rights metadata is the only type of metadata that can be legally enforced, with the National Information Standards Organization pointing to the WIP Copyright Treaty and WIPO Performances and Phonograms Treaty as examples of treaties that serve as "legal remedies against any party that knowingly removes or alters rights management information" (2008).

The benefits of rights metadata are not strictly legal. Accurate use and rights metadata is beneficial to the publishing institution in that it allows them to prove copyright and ownership status of items in their collection and improves the likelihood their materials are referenced properly. This metadata can improve access and usability of materials for users, as it lets them know how to cite it properly and whether or not it can be included in their research. This process is called rights workflow, and is expressed through "rights expression languages" which are used to detail transactions between the rights holder and the user (National Information Standards Organization, 2008). In a physical work, rights metadata is perhaps most commonly identifiable as part of the copyright page in a book. Rights metadata may also be embedded directly into a digital object like a copyrighted image.

NISO (2008) offers additional information about the technical expressions of rights metadata: rights metadata is often encoded as XML (eXtensible Markup Language) data as part of file headers for XMP (eXtensible Metadata Platform) documents. These XMP documents may also utilize RDF (Resource Description Framework) syntax in an XML graph structure to

serialize the data (Wikipedia, 2021). These extensible data standards allow for rights metadata to be repurposable and machine readable and are an essential element of metadata production.

Recordkeeping Metadata

To be clear, recordkeeping metadata is *not* one of the six categories of metadata outlined by Gilliland; instead, recordkeeping metadata is an umbrella term that can encompass any of those metadata categories as long as they relate to records in a recordkeeping organization. Writes, "Recordkeeping metadata assists agencies to identify, authenticate, describe and manage digital records in a systematic and consistent way through system migrations or government administrative change" (Latham, 2015). Latham offers other examples of what recordkeeping metadata does; recordkeeping metadata: "Ensures contextual information about business transactions is captured and linked to the relevant records," "Reduces the risk of unauthorized access to records;" and "Supports the identification and management of vital records" (Latham, 2015). Common recordkeeping metadata fields include "Identifiers," "Dates (such as date registered or date destroyed," and "Relationships and linkages from the record to other data about business transactions that the record relates to" (Latham, 2015). While recordkeeping agencies have their own uses and needs for metadata, ultimately the applications of recordkeeping metadata align with everything that has been described in this paper thus far. Remember that metadata *are* records and that "Good metadata records are objects themselves" (National Information Standards Organization, 2016). To be considered good metadata, metadata must conform to standards. This is what ensures its interoperability and what allows users to utilize it to find, identify, select, and acquire information resources. The following section will explain what those data standards are and what good metadata looks like.

Metadata: Standards and Quality

The definition of metadata given by NISO in this paper's introduction emphasized that metadata is "structured information" (2004). Metadata must be structured for it to be useable in the context of libraries and record management. Metadata standards are developed by information organization to produce structured metadata that is interoperable and machine readable, which in turn improves the accessibility of digital objects.

Gilliland's Typology of Data Standards delineates four kind of data standards: data structure standards, data value standards, data content standards, and data format/technical interchange standards (2016). To summarize, data structure standards are data categories or containers; data value standards are the controlled vocabularies that are used to populate "data structure standards or metadata sets;" data content standards are format guidelines; and data format/technical interchange standards are when metadata standards are "expressed in machine readable form" through the application of text encoding markup languages like XML (Gilliland, 2016). Each standard type in the typology has its own long list of associated frameworks, schema, and standards with unique formats and syntaxes.

The vast number of types of data standards that exists means that organizations must research which standards fit their own institutional needs. This process require input of professionals across an entire library organization—metadata librarians, research data librarians, archivists, collection managers, digital humanists, records managers—all of these different professions have unique data and metadata standard needs. Although departmental needs may be unique, developing a set of standards at an organizational level can improve cross departmental collaboration and the interoperability of their data.

Metadata standards are only valuable when an organization ensures that they are being applied accurately. Thus, the information institutions that produce metadata must have policies in

place to assess and assure metadata quality. Bruce & Hillman write, "Like pornography, metadata quality is difficult to define. We know it when we see it, but conveying the full bundle of assumption experience that allow us to identify it is a different matter" (2004, p. 1). Despite the challenge of defining quality metadata, Bruce & Hillman suggest that high quality metadata should assist with FRBR user tasks and recognize the following characteristics as components of high quality metadata: completeness, accuracy, provenance, conformance to expectations, logical consistency and coherence, timeliness, and accessibility (2004). Information organizations must utilize metadata quality metrics to assess whether their metadata meets these characteristics, with Bruce & Hillman defining the "first tier" of metadata quality as: the ability to validate a schema (in an encoding language like XML); the use of an appropriate namespace declaration for each data element; and "the presence of an administrative 'wrapper'" containing basic provenance data (2004, p. 10). As important as metadata quality is to information organizations and recordkeeping, it comes at a cost. NISO writes:

> There is usually a direct relationship between the cost of metadata creation and the benefit to the user: describing each item is more expensive than describing collections or groups of items; using a rich, complex metadata scheme is more expensive than using a simple metadata scheme; applying standard subject vocabularies and classification schemes is more expensive than assigning a few uncontrolled keywords; and so on. (National Information Standards Organization, 2008)

This statement is important because it underlines how important policies—in this case, budgetary ones—at an organizational level have a causal relationship that impacts the creation of digital objects and records. Metadata is "not created in a vacuum" (Jaffe, 2020)—its value and quality

hinges on the organizational culture that produces it. The information that can be gleaned from metadata standards and quality metrics utilized by an organization can give insight into the organization itself—not just its budget and policies, but its values.

Metadata Records and Organizational Context

In *The Way Things Work: Procedures, Processes, and Institutional Records,* Elizabeth Yakel describes a "shift in focus" of how archivists conceptualize their recordkeeping practices and the processes that lead to a document's creation—or its *genèse*, or "the genesis of documents" (1996). Yakel argues that archivists may need to expand the traditional notion of context from focusing on administrative history to a broader view of organizational processes, writing "Using a primacy of process approach signifies a fundamentally different strategy and shifts the focus from content to context" (1996, p. 455). This concept urges a dynamic interpretation of a record's context within the institutional and bureaucratic processes that produced it, as opposed to a static interpretation of a record based on its content description. Yakel poses the question: "Is it not time to provide a much broader interpretative context for users which acknowledges the organization dynamics in which the records were created" (1996, p. 462)? With that rhetorical question, Yakel argues that more emphasis should be placed on the evidentiality of metadata records.

Metadata existed in 1996 when Yakel posed this question—the meeting that would spawn the Dublin Core Metadata Initiative was in March 1995 (Dublin Core Metadata Initiative, n.d.)—but metadata and digital document culture had yet to reach the level of proliferation, that is now the norm. Metadata, and the processes that lead shape its production, can be interpreted evidentially to understand the context of records.

Administrative metadata may provide context for a digital objects creation. This context can give a great amount of insight into the object's history. For instance, metadata regarding the "selection criteria for digitization" (Gilliland, 2016) establishes that the digital object is a surrogate for the physical instance of a collection item, meaning that the creator institution has an organizational structure that supports digitization. Not only that, the selection criteria for digitization will signal what value the institution that digitized it saw in the first place.

Preservation metadata may provide insight into the values of culture of institution that produced it. Preservation metadata may be used to discern an institution's organizational processes, preferred technologies, and archival practices. In turn, knowledge of these institutional practices can be used to illustrate the broader organizational dynamics. For instance, metadata that details the quality and frequency of integrity checks for a digital objects could be used to interpret how an institution manages their schedule for digital object preservation and their fixity practices. Similarly, technical metadata—and associated organizational format/technical interchange standards—can provide context to the technological processes and software/hardware resources that serve as evidential proof of an organization's larger digital recordkeeping culture.

Use and rights metadata can provide invaluable data regarding organizational context and record evidentiality, giving direct information about day-to-day activities of an organization and its recordkeeping habits and culture. Consider circulation records, a type of use metadata, for example. Circulation records can provide knowledge of how often materials are used and the patron or staff member that used it. In aggregate, circulation records can give some context to amount of traffic an organization sees. Exhibition records can relay how archives use and display materials. An exhibition record could show that the material was displayed as part of an

archive's curated physical exhibition or the digitized version in a digital exhibition. The information that can be extracted from this metadata could to approximate the physical and digital footprint of a collection and to portray the practices of an organization's working archivists.

This gets to the heart of Yakel's plea for "broader interpretative context for users which acknowledges the organization dynamics in which the records were created" (1996, p. 462). The metadata standards utilized by an organization gives context to the organizational dynamics that produce records. NISO states:

> The decisions about which metadata standard(s) to adopt and what levels of description to apply must be made within the context of the organization's purpose for creating the collection, the available human and technical resources, the users and intended usage, and approaches adopted within the particular field of inquiry or knowledge domain. (National Information Standards Organization, 2016)

As evidenced by this quote, metadata standards reflect the organization's dynamics. NISO stresses that institutions may need to utilize more than one metadata schema. In fact, institutions may need to combine metadata schema to suit the needs of their collections and materials; NISO offers the example of using Encoded Archival Description (EAD) metadata schema at the collection level "for archival collections with a provenance," while utilizing a metadata schema like VRA Core 4.0 at the item level (2016).

In addition to these data structure and format standards, institutions must select and apply controlled vocabularies to populate the metadata fields of the items in their collections. All of

these data standards can reveal aspects of the organizational dynamics that produce the resulting metadata records. Principe & Schirrwagen offer guidelines for adapting metadata schemas based "different classes of content providers;" suggesting Dublin Core for "textual publications in institutional repositories and thematic repositories;" DataCite Metadata Kernel for "research data repositories;" and CERIF-XML for "Current Research Information Systems" (2015). Information professionals choose these standards to serve institutional needs. Under this assumption, professionals outside of the institutions can look at metadata standards to reverse engineer the organizational needs fulfilled by these standards.

Recommendations

In *Rethinking Metadata's Value and How It Is Evaluated,* Rachel Jaffe (2020) proposes that since metadata reflects the organizational culture that produces it, it also reflects the biases and marginalizations of that culture. This means that metadata can perpetuate racist, colonialist, homophobic, sexist, ableist, or other modes of discrimination of the organization that it is produced by. Jaffe stresses that metadata embody relationships not just between different types of data, but between data and humans, and human and humans. Jaffe argues that metadata quality should not only emphasize adherence to standards and technical specifications, but ethical values as well; Jaffe writes:

> And metadata values (e.g., title, creator, description) have a value beyond their utility as interoperable, searchable units; they are being recognized as having creative value in that they contribute to a story we are telling about ourselves as individuals, as organizations, and as a community. (Jaffe, 2020)

Information professionals and records managers must be aware of how metadata reflects organizational dynamics, including institutional bigotry. Information organization must consider how racism, sexism, and other forms of bigotry exist in their organization and is reflected in their work, including the metadata they produce. Policies must be developed to ensure that staff are trained to understand the ethical implications of their work and how to incorporate anti-racism into metadata practices. Metadata should not be assessed only by its accuracy, but also by the ethics of its production.

Conclusion

The five categories of metadata—administrative, descriptive, preservation, technical, and use—are utilized by every type of information organization. Metadata is exceptionally important in electronic records management because it can provide the context of record creation. Indeed, context is what separates documents and records: "The key difference between the document and the record is the specification of the context of action in which the record was involved" (Thibodeau, 2000). The dynamics of information organizations are reflected in the metadata they produce, which in turn informs the context of their records. Information organizations must develop and implement metadata quality standards to ensure the accuracy, usefulness, and ethics of their metadata.

References

Dictionary of Archives Terminology. (n.d.). *Evidential value*.

https://dictionary.archivists.org/entry/evidential-value.html

Dictionary of Archives Terminology. (n.d.). *Recordness*.

https://dictionary.archivists.org/entry/recordness.html

Dublin Core Metadata Initiative. (n.d.). *DCMI history*. https://www.dublincore.org/about/history/

US National Archives. (2016, November 21). *Metadata in electronic records management*.

National Archives Records Express. https://records-

express.blogs.archives.gov/2016/11/21/metadata-in-electronic-records-management/

Library of Congress. (2005, September 8). *Library of Congress repository development: Core*

metadata elements. https://www.loc.gov/standards/metadata.html

Gilliland, A. (2016). Setting the stage. In M. Baca (Ed.), *Introduction to Metadata* (3rd ed.). The

Getty Research Institute. http://www.getty.edu/publications/intrometadata/setting-the-

stage/

Bruce, T. & Hillmann, D. (2004). The continuum of metadata quality: Defining, expressing,

exploiting. In D. Hillmann & E. Westbrooks (Eds.), *Metadata in Practice*. ALA Editions.

https://ecommons.cornell.edu/handle/1813/789

Hirtle, P. (n.d.) *Archival authenticity in a digital age.* Council on Library & Information

Resources. https://www.clir.org/pubs/reports/pub92/hirtle/

Jaffe, R. (2020, November 10). Rethinking metadata's value and how it is evaluated. *Technical*

    Services Quarterly, 37(4), 432-443. https://doi-

    org.proxy.mul.missouri.edu/10.1080/07317131.2020.1810443

Latham, R. (2015, July). *Information management advice 14 the value of recordkeeping*

    metadata. Tasmanian Archive and Heritage Office.

    https://www.informationstrategy.tas.gov.au/Records-Management-

    Principles/Document%20Library%20%20Tools/Advice%2014%20The%20Value%20of

    %20Recordkeeping%20Metadata.pdf

University of Waterloo. (n.d.). *Recordkeeping metadata*. https://uwaterloo.ca/records-

    management/help-advice/recordkeeping-metadata

Rogers, C. (2015, January). Record authenticity as a measure of trust: A view across records

    professions, sectors, and legal systems. *INFuture2015: e-Institutions – Openness,*

    Accessibility, and Preservation. doi: 10.17234/INFUTURE.2015.13

National Archives and Records Administration. (2015, September 15). *Bullet 2015-04*. National

    Archives. https://www.archives.gov/records-mgmt/bulletins/2015/2015-04.html

National Information Standards Organization. (2008, April 17). *Metadata*.

    http://framework.niso.org/24.html

National Information Standards Organization. (2008, April 17). *Metadata principle 3*.

    http://framework.niso.org/26.html

National Information Standards Organization. (2008, April 17). *Metadata principle 4*.

    http://framework.niso.org/26.html

National Information Standards Organization (2004). *Understanding metadata*. NISO Press.

    https://www.lter.uaf.edu/metadata_files/UnderstandingMetadata.pdf

Principe, P. & Schirrwagen, J. (2015, July 1). *OpenAIRE guidelines: Promoting repositories*

    interoperability and supporting open access funder mandates. Text Encoding Initiative.

    https://tei-c.org/2015/06/22/dcmi-webinar-openaire-guidelines-promoting-repositories-

    interoperability-and-supporting-open-access-funder-mandates/

Thibodeau, K. (2001). Advances in preserving electronic records at the National Archives and

    Records Administration. D-Lib Magazin, 7(2).

    http://www.dlib.org/dlib/february01/thibodeau/02thibodeau.html

Tillet, B. (2003). What is FRBR? A conceptual model for the bibliographic universe.

    Technicalities, 25(5). Library of Congress.

    https://www.loc.gov/cds/downloads/FRBR.PDF

Wikipedia. (2021, March 28). *Extensible metadata platform*.

    https://en.wikipedia.org/wiki/Extensible_Metadata_Platform

Yakel, E. (1996). The way things work: Procedures, processes, and institutional records.

    American Archivist, 59(4), 454-464.

    https://doi.org/10.17723/aarc.59.4.c1545152u4218314