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Toward a Value-Analytic Approach to Information Standards

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ABSTRACT

While developments in information technology enable exciting new potentials, they may, in the process, inadvertently violate important values such as autonomy or privacy. Responsible, ethical approaches to technology warrant the use of critical perspectives in evaluating our technological practices and artifacts. Key among such artifacts are information standards, influential documents that represent and perpetuate community agreements on ideal practice. In critically examining standards, values represent a promising conceptual lens. This paper advances the use of value analysis on information standards, particularly those devoted to knowledge organization. Value analysis is a methodological approach that guides the elicitation of values from artifacts. Two case studies demonstrate the application of value analysis to knowledge organization standards and their resulting data, and show how values and their implications can be discerned from these information artifacts. Value analysis must next be extended beyond standards as documents to examine the fuller ecosystem within which information standards are situated and enacted in order to fully understand their implications, uphold important community values, and maintain ethical information practices.

KEYWORDS

Values, information standards, knowledge organization, ethics.

INTRODUCTION

While developments in information technology enable exciting new potentials, they may, in the process, inadvertently violate our values. The creation, collection, and use of data is increasingly complex and opaque in all domains, and represents a growing threat to user autonomy and privacy. In order to sustain responsible, ethical approaches to information technologies, new, critical examinations of an array of technological practices and artifacts are warranted. Key among such artifacts are information standards, documents that represent and perpetuate community agreements on ideal practice and govern the creation and presentation of data. Standards are seemingly neutral pieces of infrastructure, but play a key part in embodying and perpetuating community perspectives (Bowker & Star, 2000). In further examining the role standards play in supporting or subverting ethical information practice, value analysis represents a promising evaluative lens.

Value theory conceptualizes values as deeply held beliefs in the preferability of certain ways of being or doing (Orsi, 2015). Put simply, values are any things that people or organizations consider to be important (Cheng & Fleischmann, 2010), though they are typically construed as abstract concepts such as efficiency or respect. Value theory and the study of values have been applied across domains, particularly in the social sciences. Within information science, values are already prominent in several streams of research, including professional ethics (Gorman, 2015; Koehler, 2015), and design (Friedman, Kahn, & Borning, 2002; Shilton, Koepfler, & Fleischmann, 2013). Though surveys and interviews are powerful methodological tools in examining values in all settings, eliciting values from written documents and other communicative artifacts has given rise to a distinct methodological tradition known as value analysis. In information science, value analysis has been applied to artifacts such as algorithms (Friedman & Nissenbaum, 1996) and tweets (Fleischmann et al., 2012), though at present, it has not been applied to information standards.

Standards are documents that codify and set forth specifications or protocols, and are agreed upon and distributed within a community (IEEE Standards Association, 2017). They serve to enable collective human activity but are often taken for granted in the process, leading to difficulties in discerning their role and effects (Busch, 2000; Bowker et al., 2009). Like all societal products, however, standards are shaped by the perspectives of those who produce them. Information standards oversee the creation and management of data and information systems, facilitating information access and sharing. In establishing ideal practice, information standards must espouse certain points of view at the expense of others (Lampland & Star, 2009), and may thus be seen as values-laden artifacts. What values these standards express, and whether they uphold or betray intended community values, is an open question.

In this paper, I advance a value-analytic approach to examining information standards as key technological artifacts. After reviewing relevant background concerning values in information science and the study of standards, I present two brief case studies. In these cases, I employ value analysis to demonstrate how values can be read from information standards and the data they are used to generate, and how standards and data embody and enforce systems of values. Following this, I then dis-

cuss the inherently values-laden and ethical nature of standards, and the implications of standards as value-bearing artifacts that are enacted through practice. I conclude that values are a useful evaluative tool for analyzing and designing information standards to support ethical technological practice, and outline an agenda for continued research in this area.

BACKGROUND AND APPROACH

The study of values has its origins in philosophy where it is known as value theory, referring not to a singular, formal theory, but rather, a discipline of inquiry (Orsi, 2015). Under value theory, values may take many forms but are usually depicted as abstract concepts such as happiness or efficiency; the values of rightness and goodness in particular are closely tied to ethics (Rescher, 1969). Inquiry into values has since flourished in other domains, especially the social sciences where it has been used to address motivation (McGuire, 1974), behavior (Rokeach, 1973), and social organization (Hofstede, 2003). Values have long been an important concept in information science, with much attention focusing on key values associated with the field and its practitioners, for example, access, intellectual freedom, and privacy (Bates, 1999; Gorman, 2015; Koehler, 2015). Beyond this reflexive emphasis on values, research in information science has also explored the interaction between values and technological design. One approach to understanding this relationship is value sensitive design (VSD), initially advanced by Friedman (1996) as a means of assessing how a set of heuristic values such as usability, autonomy, and freedom from bias are involved in the design of systems. A separate but similar area of study, known as values in design (ViD) focuses on a wider range of values beyond the heuristic, moral values of VSD and attempts to depart from such *post hoc* analyses (Knobel & Bowker, 2011). Recently, values and design (VaD) has been advanced as a general term to refer to both VSD and ViD research (Shilton, Koepfler, & Fleischmann, 2013).

In all domains, the content-analytic tradition of studying values associated with artifacts is referred to as value analysis (White, 1951). Early proponents of value analysis utilized pre-determined frameworks of values in the coding of textual data in order to reveal important, embedded values; approaches were typically quantitative (White, 1951; Rokeach, 1968). Later approaches to value analysis incorporated more inductive and qualitative methods, and moved beyond textual documents to examine other kinds of artifacts (Clawson & Vinson, 1978). Within the social sciences, value analysis has been applied to a range of materials including textbooks (Dhand, 1967), novels (Lester, 1982), and comic strips (Spiggle, 1986). Regardless of the specific content type analyzed, value analysis is designed to highlight the preferences and priorities embedded in a set of materials, and distill these into a system of values. In information science, value analysis has been used to analyze organizational codes of ethics, including those of library associations (Shachaf, 2005) and archival institutions (da Silva, Chaves Guimarães, & Bolfarini Tognoli, 2015). Most recently, automated and crowdsourced approaches to value analysis have been applied to social media to uncover user values (Fleischmann et al., 2012). Though VaD research has applied value analysis to technological artifacts such as algorithms (Friedman & Nissenbaum, 1996), so far, research in information science has not applied this approach to a key type of technological artifact in this area: standards.

Information standards serve as technological infrastructure, establishing guidelines for procedures and products and enabling collective work. There has been a particularly strong emphasis on standardization within the information domain (Delsey, 1989), especially concerning knowledge organization, the representation of knowledge or information in various forms of organizing systems (Andersen & Skouvig, 2006). Such standards are used extensively and serve to guide the creation and use of technologies such as classifications, ontologies, and databases, as well as associated data. Though widely adopted information standards tend to take on the appearance of neutrality (Olson, 2001), they have in fact been shown to embody specific perspectives at the expense of others (Bowker & Star, 2000; Lampland & Star, 2009). Critical analyses of terminological information standards in particular have revealed a range of embedded biases (Knowlton, 2005; Diao & Cao, 2016; Adler, Huber, & Nix, 2017). Though this body of research holds strong implications for values in information standards, values and value analysis in relation to these artifacts has not yet been formally addressed (Dobreski, 2017). While attention to the values in all information standards is critical, standards for knowledge organization present a particularly worthwhile site of investigation due to their ability to generate data that may further perpetuate embedded values.

Below, I present two case studies intended to illustrate the potentials of value analysis as an evaluative approach to knowledge organization standards and data. The first case study examines the text of several cultural heritage standards, focusing on passages concerning variations in a person's name and then following this element of data out into representations on the web. The second case study examines a bibliographic record produced under the library standard *Resource Description and Access* (RDA), placing it in the context of this standard's asserted goals and contrasting it with data from Google Books. Together, these cases show the utility of value analysis in examining important commitments embedded within knowledge organization standards and data. Further implications are explored following the case studies.

VARIANT NAMES FOR PERSONS

Cultural heritage is the study, preservation, and curation of cultural practices and artifacts passed down through societal groups (UNESCO, 2017). Given the complex and distributed nature of cultural heritage work, standards play an important

role in coordinating activities in this domain, with knowledge organization standards holding special importance. Libraries, archives, and museums have devoted a great deal of energy to the creation, implementation, and maintenance of knowledge organizing systems. A major focus of standards in cultural heritage is resource description, the process of creating representations of artifacts and agents (Hider, 2012). Traditionally, libraries, archives, and museums have maintained their own distinct standards for resource description. Within the area of archives, *Describing Archives: A Content Standard* (DACS) (Society of American Archivists, 2013) serves as the *de facto* descriptive standard, emphasizing the structural and relational particulars of archival materials and their creators. For museums, *Cataloging Cultural Objects* (CCO) (Baca & Visual Resources Association, 2006) is a major content standard for describing works of art and other artifacts, and is often implemented in conjunction with structural standards including *Categories for the Description of Works of Art* (CDWA) and VRA Core. Within libraries, descriptive standards, commonly referred to as bibliographic standards, have guided the creation of catalog records for library resources and the persons and organizations associated with them. Over the past 40 years, a significant number of English-speaking libraries utilized the *Anglo-American Cataloging Rules, 2nd Ed.* (AACR2) as a descriptive standard. While many still do, 2010 saw the publication of AACR2’s successor, the internationally focused *Resource Description and Access* (RDA), which is now being implemented by more and more libraries worldwide.

Despite the diversity of their intended settings and applications, descriptive standards in the cultural heritage domain prescribe and define a number of similar data elements, particularly for persons (Dobreski & Kwaśnik, 2017). For example, personal names, titles, and dates are common across cultural heritage standards. Each of these standards also differentiates between a preferred personal name and variant personal names. While the preferred name represents the “official” name to be used in a finding aid or catalog record, variant names represent any other name forms of significance. For example, while “George Eliot” may be the preferred name, “Marian Evans Cross” may be recorded as a key variant name for this author.

Given the similarities in concept and scope, the variant name instructions in AACR2, CCO, DACS, and RDA offer an opportunity to probe for differences in underlying value systems. While these four standards express the analogous concept of variant name, do they do so while expressing the same or different values? A brief value analysis of the initial instructions of the corresponding passages (Table 1) offers insight.

Standard	Passage	Instruction
AACR2	26.2A1	“Refer from a name used by a person, or found in reference sources, that is different from the name used in the heading for that person.”
CCO	A.1.2.1.2.2	“Include alternate and variant names that appear in published sources and represent significant differences in form or spelling.”
DACS	10.3	“Make a see reference from a form of the name of a person or corporate body or title of a work that might reasonably be sought to the form that has been chosen as the name or uniform title heading or as a title entry.”
RDA	9.2.3.3	“Record a variant name for person that is considered important for identification or access by applying the general guidelines on recording names at 8.5.”

Table 1. Corresponding passages concerning variant names.

At first glance, each of the standards appears to be placing value on the concept of use: use makes a particular variant name significant and justifies its inclusion in a record describing a person. Usage can be seen as a common value. However, a closer inspection of these instructions reveals important variations, particularly in determining whose usage is of value. For CCO, usage is limited to formally published sources. AACR2 refers somewhat similarly to usage in reference sources, but also includes usage by the actual person being described. DACS shifts the focus to usage by an implicit user, with variant names capturing any reasonable alternatives they may search under. Finally, RDA places value on two specific user tasks: identifying a person and accessing data about a person. Variant names that, to the cataloger’s judgment, support these use cases are to be recorded.

We can see that while the concept of a variant name is similar, the associated values among the four standards are not. Different kinds of use are valued and thus justify a name as being significant or not. Value is given to formally published

sources, to potential users, or to the person being described, and thus the resulting variant names recorded for one person may differ significantly among the four standards. Valuing or devaluing a person’s own usage regarding their name has further implications for autonomy and self-identification as well. Even within the relatively narrow area of cultural heritage resource description, similar concepts carry differing values across different standards with immediate implications for data.

When expanded beyond the cultural heritage domain into the wider setting of the general web, we can see even greater variations among standardized naming practices. For example, the Wikipedia Manual of Style (MoS) prescribes guidelines for biographical articles with the goal of supporting consistency and ease of use, which we can interpret as an ostensible set of values (“Wikipedia: Manual of Style/Biographies,” 2018). Functionally, MoS sets a standard for information to be included in articles representing persons. Specific rules are given concerning personal names, with the most commonly known form of a name serving as the article’s title. Beyond this, the types of variant names and the order in which they are recorded are specified, including the fullest form of name, the birth name if different, other prior names of note, and any pseudonyms or nicknames.

Under these rules, consistency is clearly an important value, and may be seen as instrumental in supporting ease of use. Variant names are divided into common types and prescribed common treatments in all articles concerning persons. Usage, specifically the most “common,” is most important in determining the article title, analogous to a preferred name in cultural heritage descriptions. Beyond this, variant names are implied to be derived from usage, though again, the question of whose usage is of value here is critical.

The Wikipedia article for Jake Zyrus lists the birth name and earlier stage names for the singer prior to his gender transition (Figure 1). The citations for the variant names in the Zyrus article are for recent online news articles. In justifying variant names on Wikipedia, all sources on the web thus constitute the realm of usage. However, in consulting the Library of Congress name authority file, we see that an RDA compliant authority record still lists the singer with a preferred name of Charice, and variant names given for his birth names, with no mention of Jake Zyrus (Figure 2). While this arrangement may be impeding the identification and access valued by RDA, it also reflects the differing conception of usage. Usage here reflects the library domain, and as the singer has only issued published recordings prior to adopting the Zyrus name, this name currently falls outside the range of materials relevant to usage. Beyond this, both the Wikipedia and RDA representations of Zyrus could potentially be seen as violating key human values such as privacy and self-identification.

Jake Zyrus	
Background information	
Birth name	Charmaine Clarice Relucio Pempengco
Also known as	Charice Pempengco · Charice

Figure 1. Wikipedia infobox for Jake Zyrus.

LC control no.:	no2009052666
LCCN Permalink:	https://lccn.loc.gov/no2009052666
Personal name heading:	Charice, 1992-
Variant(s):	Pempengco, Charice, 1992- Relucio Pempengco, Charmaine Clarice, 1992-
Found in:	Hit man [SR] p2008: container (Charice) Charice Pempengco WWW site, Apr. 3, 2009 (Charice Pempengco; Charice; b. Charmaine Clarice Relucio Pempengco, May 10, 1992, San Pedro, Laguna province, Philippines)

Figure 2. RDA record for Charice.

Though both cultural heritage and the wider web environment predicate variant names on usage, differing conceptions of whose usage is of value can lead to drastic differences in the ways in which people are named. The differences may hold other value implications and can significantly impact user understanding and access.

BIBLIOGRAPHIC REPRESENTATION

Like all standards, knowledge organization standards serve to bring practice into conformity (Svenonius, 2000). Within libraries, bibliographic standards have been designed to guide practices surrounding the creation of catalog data. The aforementioned standards AACR2 and RDA are the latest in a fairly linear succession of bibliographic standards that have brought increasing uniformity among catalog records over the past century. As the current *de facto* descriptive standard for libraries, RDA guides the creation of data for library catalogs, data that is also increasingly being shared outside the confines of the traditional catalog. RDA sets the current standard for a “good” bibliographic representation.

While the values of specific knowledge organization standards have yet to be fully explored, RDA offers evidence of its asserted values through the inclusion of an explicit statement on objectives and principles. Key objectives include fulfilling user needs, cost efficiency, and flexibility, while principles highlight differentiation, sufficiency, accurate representation, uniformity, and relationships (Canadian Library Association et al., 2010). Taken together, these objectives and principles can serve as an asserted value system, though how well the text of RDA upholds and expresses these values has not yet been assessed. However, another piece of critical evidence here is the resulting RDA bibliographic records. Each record compiles data prescribed by RDA for a specific resource, and may be seen as an enactment of the standard. Value analysis of bibliographic records can be used to gauge if the products of knowledge organization standards express values, and if so, how these values relate to those of the guiding standard.

Again, a brief value analysis of a specific case can offer further insight. Figure 3 presents a bibliographic record for the 2016 epistolary novel *The Pharos Gate: Griffin & Sabine's Lost Correspondence*, by Nick Bantock. This novel is the latest in a series of works documenting the correspondence of two fictional lovers through various art styles, post cards, and inserted letters. A bibliographic record was created for this resource by catalogers at the Library of Congress using the RDA standard; it has subsequently been revised and updated by a number of other institutions. Subject headings for the resource, which are dictated by separate knowledge organizing standards, have been omitted from this figure.

Personal name:	Bantock, Nick, author, illustrator.
Main title:	The pharos gate : Griffin & Sabine's lost correspondence / written and illustrated by Nick Bantock.
Published/Produced:	San Francisco : Chronicle Books, [2016]
Copyright:	©2016
LCCN:	2015020211
ISBN:	9781452151250 (alk. paper)
Description:	1 volume (unpaged) ; 21 cm + 5 folded letters
Type of material:	Book
Content type:	text
Media type:	unmediated
Carrier type:	volume
Summary:	Shares the fate of lovers Griffin and Sabine, in a volume published simultaneously with the twenty-fifth-anniversary edition of "Griffin & Sabine."

Figure 3. RDA bibliographic record for *The Pharos Gate*.

Typical of bibliographic representations, the RDA record offers many expected descriptive elements, including author, title, publisher, and date. However, several specific features of this record are worth noting. First, the author's name ("Personal name") is qualified with two relationship designators, specifying his role as author and illustrator of this work. The inclusion of this data echoes RDA's emphasis on relationships, while also supporting clarity on behalf of the user. The physical description represents the book as lacking page numbers and containing five letters. While the information on the accompanying letters may be seen as helpful to users in identifying and understanding the resource, the choice to note the work as un-paged may seem curious. While the RDA cataloger could have counted the number of pages, recording this resource as "un-paged" more accurately reflects how the resource presents itself. Though this supports accurate representation, it may leave the user unclear as to the scope of the resource, thus failing to fulfill user needs. Finally, the summary offers an oblique reference to this work's membership in a series with other works about Griffin and Sabine. More concrete information on relationships to other works is not presented, showing the valuation of relationships has not been fully realized.

While libraries may be considered the chief purveyor of bibliographic representations, catalogs are compiled in other settings as well. Again, we can turn to the general web environment for a revealing contrast. Google Books is an online catalog of books with full-text (where possible) and basic metadata designed to support web searching, browsing, and acquisition ("About Google Books," n.d.). A Google Books bibliographic representation of *The Pharos Gate* is given in Figure 4.

Title:	The Pharos Gate: Griffin & Sabine's Lost Correspondence
Author:	Nick Bantock
Edition:	illustrated
Publisher:	Chronicle Books, 2016
ISBN:	1452151253, 9781452151250
Length:	60 pages
Subjects:	Fiction › General

Figure 4. Google Books record for *The Pharos Gate*.

The Google Books bibliographic record is decidedly brief, although lengthier descriptions and reviews of this resource are included in the system's search and display in order to support the valued uses of search, browse, and acquire. Though this record seems less complete than its RDA counterpart, note that it does contain a count of 60 pages. A user might be puzzled here as to why a relatively brief record contains a page count while the fuller looking record seems to have overlooked this detail. This is not a matter of completeness, however, but can be explained by differences in values. RDA's value of accurate representation leads to a completely different conception of the extent of this book, as opposed to Google Book's more common sense, and arguably more user-friendly, approach.

This brief analysis shows that the RDA record for *The Pharos Gate* places value on relationships and user needs, albeit with varying success. Accuracy of representation is also valued, though it may come at the expense of clarity. In pursuing accurate depiction, this bibliographic representation may be failing to uphold the needs of users. Though the text of RDA acknowledges there may be tradeoffs among specific objectives and principles (Canadian Library Association et al., 2010), this could still be seen as a conflict between asserted and functional values. Expected values such as relationships and user needs may be compromised or even absent when standards are enacted. Overall, this case demonstrates that even seemingly neutral information artifacts embody values closely tied to the standards used to generate them, and may also be the site of important value conflicts and omissions.

DISCUSSION

The preceding cases show how value analysis can be applied to information standards and the data they produce, that standards and data do express discernible values, and that these values vary even among standards of similar scope. Even from such relatively low stakes examples there are major implications concerning values and information. In the case of variant names usage is clearly an important value, but whose usage is valued varies among different standards, leading to differences in which names are considered to be relevant. At the same time, important human values such as autonomy and self-identification are of lesser importance, or of no consideration at all. In the case of Jake Zyus, differences in how usage and self-identification are valued among different standards can lead to completely different names and depictions of the same person among different knowledge organizing systems, with conflicting and confusing results for users. Though Zyus's gender is not specified in the current library authority record, under RDA, gender and gender history may also be recorded. The inclusion of gender in RDA data has been criticized for removing an individual's choice for disclosure, compromising autonomy, and violating privacy (Billey, Drabinski, & Roberto, 2014), showing the potential for further value violations here.

In the case of *The Pharos Gate*, differences in values yet again play a role in differing depictions of the same resource. More importantly, the current RDA record for this book was shown to fall short of upholding an asserted value of relationships. The relationship of the present volume to previous works in a series concerning the same characters falls within the realm of bibliographic relationships of interest to RDA and its underlying conceptual model, *The Functional Requirements for Bibliographic Records* (FRBR). Why then is this relationship not further highlighted in the current bibliographic record? The answer may lie in the current technological environment in which RDA data is being produced. RDA describes an idealized bibliographic representation based on entity-relationship modeling, though current catalog systems rely on the MARC encoding format, which has been criticized for its inability to easily and accurately express relationships (Boehr, Reynolds, & Shrader, 2012). The realization of RDA's valued relationships is prevented by current technological limitations, thus demonstrating that values in standards can be threatened by other aspects of technological infrastructure. This suggests that standards as expressions of community value commitments should be further accounted for in VaD research.

As a genre of document, standards have been shown to communicate in specific ways, leading especially to their capacity to persuade potential users (Young, 2003; Feinberg, 2009). Similarly, the purpose and form of standards may be seen as contributing to their ability to bear values. In the strictest sense, standards are intended to communicate and regulate an ideal or optimal reality, and in the process, set benchmarks for correct practices or products. Standards attempt to define what is right or preferred in the eyes of a given community, and must value some things at the expense of others. These documents are thus inherently values-laden, and furthermore, carry ethical connotations. Ethics are seen as closely tied to the specific values of goodness and rightness (Rescher, 1969). In being designed to establish what is "right," all standards have ethical implications as well. Examinations of technology and ethics must consider standards and the role they play in establishing what a community values and considers correct.

While standards as written documents are one thing, standards in practice are another. Standards depict an ideal, but they must be enacted by actors in real working environments (Palme & Pargman, 2009). Information standards are technological artifacts, but they are also technological performances. In enacting a standard such as RDA, practitioners may be guided by the values they perceive from these documents, but must reconcile these with the values of their professional community, their individual institutions, and perhaps even their own personal values. As we have seen with the case of *The Pharos Gate*, they may also need to compromise important values in accordance with technological realities. While the resulting data provides us evidence of information standard enactment, to fully understand the role values play in the use of standards we must

explore the perspectives and actions of practitioners. Understanding the decisions of those who interpret and enact a standard is critical in more fully revealing its value implications.

Value analysis offers a useful lens in evaluating technological artifacts and practices, and can serve effectively in revealing important value commitments and ethical implications. Traditional value analysis, as applied to the textual content of standards as documents, is warranted in further understanding and comparing specific standards. However, our conception of value analysis must be expanded beyond the text, not only to the enactment by practitioners, but also to the wider value ecosystems in which standards are situated. Any domain can be viewed as a collision of multiple value systems, with values from individuals, institutions, and artifacts interacting in specific ways. The resulting congruencies and conflicts bear meaningful influence on the role standards truly play, and whether their innate values are supported or subverted. Thus applications of value analysis to texts, practitioners, institutions, communities, domains, systems, and data all hold promise. Though all information standards are of interest here, it may be particularly useful to focus on knowledge organization standards, which guide the depiction of information and generate data that is being widely shared and reused. RDA in particular has seen a growing international implementation and sets an influential standard for bibliographic data in catalogs and the wider web environment (Marden et al., 2013). Value analysis of cultural heritage standards such as RDA also stand to benefit from the presence of strongly asserted community values that have already been actively explored (Gorman, 2015; Koehler, 2015; Vecco, 2010).

CONCLUSION

Information standards are not neutral, nor are the data they produce. Like all information artifacts, they have the capacity to both uphold and violate important community values. Value analysis represents an effective approach in uncovering key value commitments. As a methodological tradition, it deserves a place in the repertoire of critical approaches to technologies and technological practices. Information standards represent a particularly meaningful area of application for value analysis, as these documents formalize important community ideals. As the preceding case studies have demonstrated, the values found in standards and standard-driven data have implications for a potentially wide base of users on the web. While attention to these artifacts is critical, so too are the implications of their enactments by practitioners in real working environments. Beyond this, attention to an even wider range of information artifacts, persons, groups, and practices can place standards in the context of a larger ecosystem of values and offer a more complete image of their role and effects. Within information science, value analysis is a useful approach to understanding and upholding important values such as autonomy and privacy, and maintaining ethical information practices.

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