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Two kinds of evidence: how information systems form rhetorical arguments

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Two kinds of
evidence

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Abstract

Purpose – This paper aims to examine how systems for organizing information construct rhetorical arguments for a particular interpretation of their subject matter.

Design/methodology/approach – The paper synthesizes a conceptual framework from the field of rhetoric and uses that framework to analyze how existing organizational schemes present evidence in support of arguments regarding the material being organized.

Findings – Organizational schemes can present logical arguments as posed in rhetoric, using two forms of evidence for their claims: relationship evidence from the category structure and resource evidence from the ways that items are assigned to categories.

Research limitations/implications – This study does not attempt to identify all types of evidence that organizational schemes might use in argumentation. Further research may describe additional forms of evidence and argumentative structures.

Practical implications – When creating organizational schemes, designers might develop a strategy to facilitate persuasive argumentation. Moreover, because arguments may be either strengthened or undermined through the assignment of resources to categories, both indexing and collection development may be seen as contributing to the overall design of an organizational scheme.

Originality/value – While many researchers have asserted that organizational schemes form arguments, and while various studies have described what information systems might be said to communicate, this study focuses on how such communication may take place more or less effectively. This analysis foregrounds the potential for organizational schemes to be systematically and purposefully designed as rhetorical communication, to express particular ideas.

Keywords Knowledge organizations, Classification, Information systems, Design

Paper type Research paper

1. Introduction

While it was once assumed that classification schemes should attempt to objectively represent the natural order of the world, or at the least to accurately and comprehensively document the bibliographic universe (as in, for example, Bliss, 1929; Richardson, 1930; Sayers, 1915) it has now become common to assert that classifications (the term classification is used loosely throughout this paper to mean any system for organizing information) constitute a form of argument that advocates for a particular interpretation of the subject matter that the classification organizes, and that no classification presents a neutral picture of its domain (as in Hjørland, 1998; Beghtol, 2001; Mai, 2004; Feinberg, 2007). Beghtol, for example, contends that “every classification is a theoretical construct imposed on ‘reality’”, while Mai suggests that “classifying bibliographic material has much more to do with interpretation and



judgments than with logic". While such claims have been widely accepted, it is not yet clear how these contentions translate to the design context. If there is no such thing as an objective information system, then what are we designing, and how should we be going about it?

This paper suggests that, if information systems cannot achieve neutrality or objectivity, it is more responsible to systematically and purposefully adopt and defend a specific interpretation of the subject being described and organized. It then becomes a design goal for an information system to express a persuasive case for the interpretation that it depicts, just as any more traditional form of document is required to do. Every document genre, from scientific journal articles to historical narratives, has its own set of communicative mechanisms that serve to legitimize an argument for the intended audience (Bazerman, 1988; Nelson *et al.*, 1987). This study identifies some of the communicative mechanisms available to information systems to express their arguments.

How is it, this paper asks, that information systems are able to communicate subject interpretations, and what design elements enable an information system to communicate effectively, that is, to be persuasive? Most research in this area (such as Berman, 1971; Olson, 1998; Bowker and Star, 1999; Olson and Schlegl, 2001) has involved what information systems might communicate and the social effects produced when these subjective messages are taken for objective representations, and not how systems that make no claims to neutrality are able to express arguments more or less effectively. In order to adopt this design approach and take advantage of the expressive potential of information systems, it becomes necessary to examine the communicative mechanisms possible for different forms of structured document collections. Once these rhetorical properties are identified and described, we can then examine how to incorporate them into the design process.

This study demonstrates how classifications implement one aspect of rhetorical communication: argumentation, which involves the presentation of evidence to support conclusions. Evidence, in this case, refers to the means by which a classification might persuade its readers to support its assertions. The basis, by which a classificationist includes or excludes concepts from an organizational scheme, or the semantic warrant, also involves a form of evidence (various forms of warrant are described by Beghtol, 1986; the domain-analytic approach of Hjørland and Albrechtsen, 1995; may also be considered as a type of warrant). These two forms of evidence are employed in different situations, however. The warrant defines the potential sources and rationale by which a classification designer determines the content of the classification. For example, if a classificationist includes a category for the subject of ecofeminism because documents have been written about that subject, the classificationist has made use of publication evidence in accordance with literary warrant. In contrast, this paper examines the evidence displayed by the classification itself to its audience, or the support that a classification might use to prove an argument regarding its particular interpretation of ecofeminism. In other words, I am not concerned in this study with how a classificationist determines what argument to espouse; instead, I am interested in how classifications, as a document form, can present the chosen argument more or less persuasively to its audience. (While a classification that aims to advocate for a specific point of view on its subject matter might indeed require its own form of

warrant, a detailed examination of that question is beyond the scope of the current study.)

The paper is organized as follows: in the first section, I provide a brief overview of argumentation in the context of rhetoric, describing the ways in which rhetorical argumentation differs from strict logical argument. In the following sections, I show how a classification can approximate a logical argument of the type employed in rhetorical discourse by using two forms of evidence, that of the structure of the classification itself and that of the resources categorized with the classification. I then discuss the goals of classificatory arguments and the corresponding level of proof necessary to achieve those goals. Throughout these sections, I refer to examples from two existing systems for organizing information, *The Women's Thesaurus* and the Prelinger Library. The professionally created *Women's Thesaurus* was developed to index material by and about women, in the thought that previous general vocabularies, such as the Library of Congress Subject Headings, were not sufficient for this task. San Francisco's Prelinger Library, an independent institution of about 50,000 items, features a collection centered on the curatorial sensibilities of its owners and caretakers, Rick and Megan Prelinger, as well as a unique organizational scheme that highlights themes of particular interest to the Prelingers. Both these examples explicitly articulate a point of view on their material. The article concludes by considering several design implications associated with the employment of such argumentation strategies in the context of information systems.

2. Rhetorical argumentation

On the surface, rhetorical argumentation seems similar to formal logic, and rhetorical argument does use the familiar processes of deduction and induction. However, as described by Aristotle, the reasoning used in rhetoric is looser than the forms required by dialectic, or philosophical disputation. For example, the premises on which rhetorical arguments are based may be probably true most of the time, as opposed to always true, a requirement in dialectic. To show that, for example, an Athenian alliance with Sparta is not advisable, we do not need to show that all alliances are perilous, merely that this particular alliance with Sparta has a reasonable possibility of producing ill consequences. It may be helpful to take up the general perfidiousness of Spartans, but even so, given the contingency of the situation, it is not necessary to actually prove that all Spartans are treacherous, merely to show that some are, or have been so, or for whatever reason are likely to be so in this instance. Likewise, premises in rhetorical argument are typically based in the beliefs and values of the audience, which are both variable and impermanent, rather than a proven truth. "We all know that politicians are shifty" may be a perfectly acceptable premise for rhetorical argument in the United States, where this is a commonly held belief, whereas in dialectical disputation, that premise might be questioned and further proof required. Moreover, because of this reliance on shared knowledge and values for argument construction, premises in rhetorical arguments are often left implicit, to be inferred by the audience. In dialectic, it is important to specify all the steps involved in progressing from one premise to another, to verify a conclusion's logical integrity. In rhetoric, however, we rely on common assumptions and do not question them as a logician might.

As an example of rhetorical argumentation, suppose that you are accused of stealing. If you merely claim innocence, then you have made an assertion but offered no evidence. You have not, strictly speaking, made an argument. If, however, you were to say, "Of course I didn't do it; I'm a millionaire", then you have indeed made a logical argument in a form commonly used in rhetorical situations. You left implicit the major premise of your argument, that people who are wealthy are unlikely to steal, a step that you could not omit in dialectic. In the context of your defense, though, leaving this premise to be inferred makes it clear that it is supposed to be obvious (Would a millionaire steal a purse? Well, of course not!). To lay out your entire line of reasoning here would not only be redundant and perhaps irritating for the audience that you are trying to persuade (because no one likes it when told in great detail notions that are common sense and that everybody knows), it might even undermine your case, which is based in a sense of the accusation being ridiculous. Moreover, the premise that you left unexpressed is based on a probability, not a inevitability. Lack of motive makes it less likely that someone is guilty of a crime, but it does not entail innocence. A logician would not be satisfied with this argument: it does not make all of its premises apparent, let alone prove that its premises are necessarily true. However, as a rhetorical argument, lack of motive works perfectly well. Such an argument could certainly persuade a jury of reasonable doubt, especially if the prosecutor's case is equally circumstantial.

As the following sections show, arguments expressed via classification rely particularly strongly on inference to both provide intermediate premises and to generate conclusions from premises. Yet while classificatory structures may be limited, in comparison to other textual forms, in their ability to express complex arguments unambiguously, they nonetheless do seem capable of representing a form of argumentation in the rhetorical mode.

3. Support for classificatory arguments: structural evidence

The first way that a classification can make an argument in the rhetorical sense involves the use of structural evidence, which arises from the way that a classification includes, arranges, and relates categories. Here is a simple example to demonstrate the basic idea of structural evidence. Say we have a category, history, which appears in two different classifications, like so:

- (1) Social science:
 - economics;
 - history;
 - political science; and
 - psychology.
- (2) Humanities:
 - art history;
 - history;
 - literature; and
 - music.

Through the inclusion and arrangement of categories, each of these classifications is making an argument for a particular interpretation of the category History. (Note that my goal here is not to discuss how a classificationist might decide which argument to make regarding the status of history as a subject, merely to show the potential tools with which the classificationist might make a case – any case – to an audience.)

Some of the substance of each argument is explicitly expressed by the classification; other parts of the argument are implicit, including, notably, the conclusion. As previously noted, however, it is not unusual for elements of rhetorical arguments to be left unexpressed. If the conclusion seems to follow naturally enough from the assertions, then this is not problematic in terms of conveying the argument.

For the first classification, based merely on the example snippet, we can infer the following argument:

- P1.* History is a social science.
- P2.* Social sciences share certain characteristics, such as goals, methods, and data.
- C1.* History shares goals, methods, and data with economics, political science, and psychology.

While it is convenient to use the notation of premises (*P1*, etc.) and conclusion (*C1*) to illustrate argument structure, I reiterate that we are not dealing with actual syllogisms here (and thus questions of valid argument forms, and so on). We are in the realm of rhetoric, and the logic employed is more informal.

The first premise, that history is a social science, is explicitly expressed by the classification's structure. The category history is related to the category social science via a hierarchical, or IS A, relationship. The second premise, that the social sciences share characteristics, is partially explicit: the sharing of characteristics is explicitly asserted, as the individual social sciences are all part of the same hierarchical array. However, the hierarchical structure does not indicate what the shared characteristics are, so the reader must infer this based on previous knowledge.

For the second classification, we can construct an argument with the same form, but different structural evidence, content-wise, and this a different conclusion:

- P1.* History is one of the humanities.
- P2.* The humanities share certain characteristics, such as goals, methods, and data.
- C1.* History shares goals, methods, and data with art history, literature, and music.

At this point, one might note with consternation that the conclusions from our example arguments appear contradictory. The initial premises (“history is a social science”), while explicitly “stated” in the classification, are not themselves provided with evidence. Indeed, one's acceptance of either of these arguments relies on whether or not the initial premise seems reasonably plausible given what we, the audience, believe about the humanities and social sciences, just like one's acceptance of the argument that a millionaire is unlikely to steal someone's wallet is only plausible based on what

we believe about millionaires. While it may seem unsettling that two contradictory premises – that history is part of the humanities or that history is part of the social sciences – may be equally acceptable bases for argument, this is actually common. Everyday situations often take advantage of antithetical lines of argument; the introductory premises emanate from different, but equally acceptable, values. An observer of the 2008 presidential primaries in the USA may have noted several competing, opposite arguments: “Change is good for government. I’m the candidate of change, vote for me!” and its inverse, “Stability is good for government. I’m the candidate of experience, vote for me!” In the typology of *loci*, or argumentative strategies (analogous to Aristotle’s *topoi*, or “common places” in which arguments are generated) presented by Perelman and Olbrechts-Tyteca (1969), “change is good” uses the *locus* of quality, which emphasizes the good of the unique and its precarious existence (if Americans do not change, we will lose those unique characteristics that we prize: the high standard of living of the middle class, for example). On the other hand, “stability is good” uses the *locus* of quantity, which prefers the probable and durable over the improbable and uncertain. As Perelman and Olbrechts-Tyteca remark, “it is amazing that even where very general *loci* are concerned, each *locus* can be confronted by one that is contrary to it” (Perelman and Olbrechts-Tyteca, 1969, p. 85). Either of these arguments, for change or stability, or for history as part of the humanities or part of the social sciences, with their corresponding starting points and strategies, may find an audience, and indeed, we might find ourselves believing in either or both, given the rhetorical situation that is prompting the argument. (In the 2008 US elections, as “change is good” began to seem like the more powerful argument, it was then pounced on by both eventual opponents.)

However, while it is possible to take advantage of acceptable values in many ways, it is difficult to contradict currently held values in an argument. Attempting to classify history as one of the sciences, as in the following example, will probably not persuade many people without significant additional evidence:

- (1) Science:
 - biology;
 - chemistry;
 - history; and
 - physics.

It might be difficult to provide such evidence for describing history as a science, of the same order as biology and chemistry. But in the humanities and social science cases, one might envision other types of structural evidence to bolster the conclusion, if it seemed necessary for the audience. For example, in addition to the hierarchical relationship linking history, economics, political science, and so on as social sciences, we could form associative relationships linking each of these to similar methods, such as statistical modeling, as shown in the following example:

- (1) Social science:
 - economics related term: statistical modeling;
 - history related term: statistical modeling;

- political science; and
- psychology.

In other words, we can exploit classificatory structure in a certain way to better make a particular case. This type of structural manipulation can be considered a form of logical argument.

3.1 *Structural evidence and the Toulmin model of argument*

It is possible to map an argument constructed out of structural evidence in a classification onto the Toulmin model of functional, or practical, argumentation (Toulmin, 1958). For Toulmin, while the arguments created in different disciplines might vary according to formality, precision, and criteria for evaluation, any argument from any field should follow a similar layout. The Toulmin model is a worthwhile analytical tool for the design and analysis of classificatory arguments, because the line of reasoning, or the way that premises are connected to form the conclusion, is made explicit. Using the Toulmin model, we can see more precisely how the classificatory structure works to both produce assertions and generate conclusions from those assertions.

In the Toulmin model, a claim is the conclusion of the argument, the grounds are the evidence, and the warrant represents the means by which the grounds might be connected to the claim. The primary structure of the argument involves the movement from the evidence (grounds) to the claim (endpoint or conclusion) based on the reasoning provided by the warrant. Additional concepts may clarify the move from grounds to conclusion: a backing may reinforce the warrant, and a rebuttal shows objections to the claim.

A basic example of the Toulmin model might be:

Claim: My sister has brown eyes.

Grounds: I have brown eyes.

Warrant: We are twins.

Backing: Twins share physical characteristics.

Rebuttal: It's not certain that we are identical twins; thus, her eyes might not be brown.

The warrant and backing concepts make the line of reasoning explicit. As discussed in the previous section on rhetorical argumentation, in many actual rhetorical situations, these clarifications might remain unexpressed, perhaps because they are obvious to the audience, perhaps because the arguer had not really thought the argument through, perhaps as a conscious deceit to propose a weak argument to the unsuspecting. Applying the Toulmin model to classifications can clarify the argumentative structure by making sure that implied premises, left for the audience to infer, are made apparent. To show how a classificatory argument based on structural evidence works with the Toulmin model, I use an entry from the *Women's Thesaurus* and first present its argument in the notation of premises followed by a conclusion. Then I explicate that argument further using the Toulmin model.

The following is the entry for the Angel in the House thesaurus term. Because neither this term nor most of the related terms are commonly known, I provide definitions for the terms in parentheses. Definitions provided by *The Women's Thesaurus* are given in quotation marks; other definitions are my own.

Angel in the house

Definition: "Image of woman as self-sacrificing, always putting others' wishes and needs above her own".

Subject group: Language, literature, religion, and philosophy, social sciences, and culture.

Broader term: Images of women.

Related terms:

Cult of true womanhood (definition: an idealized view of women's nature, popular in the nineteenth century in the USA, that stressed motherhood, purity, homemaking, and piety).

Domestic code (definition: "Statement of household ethics and management, found in biblical and classical writings, wherein wives are expected to be subject to their husbands, slaves to their masters, and children to their parents").

Domesticity (definition: the state of being involved in household or family activities. The cult of true womanhood was also called the cult of domesticity).

Homemaking (definition: an encompassing term for domestic duties, such as cooking, cleaning, and child rearing).

Momism (definition: "Idealizing mother's role, defining her as central to the family, although often without according her social or financial recognition in the 'outside' world").

Mother syndrome (definition: "Stereotyped need to be the 'perfect' mother: self-sacrificing, always cheerful nurturer who instinctively puts everyone else's demands first").

Purity (definition: the state of being free from contaminants. In regards to women, often used to emphasize innate morality, and also to describe sexual innocence).

Self-denial (definition: the state of rejecting temptation. Often attributed to women and mothers, in particular).

Superwoman syndrome (definition: the idea that women should be equally proficient in professional and homemaking activities and should manage both roles simultaneously).

In expressing an argument, this term entry relies on associative relationships (related terms), and not hierarchical relationships, as the entry includes just a single broader term, Images of Women, and no narrower terms (The subject group in *The Women's Thesaurus* is roughly equivalent to a top term. Although the thesaurus is not actually faceted, it groups terms into broad subject areas and commences hierarchical relationships among the terms in that area.)

Because the nature of associative relationships in *The Women's Thesaurus* is not specified (thesauri seldom do so), the classificatory argument relies on the audience to infer more specific details about these relationships. The partially implicit nature of

such premises is similar to the history example, where the hierarchical relationship mandated shared characteristics among categories in the same array but did not specify the nature of those shared characteristics. The use of associative relationships, however, requires even more inference on the part of the audience than hierarchical ones; all we know is that a relationship is asserted, and nothing about the nature of that relationship. In this particular case, though, the use of so many (nine) related terms results in a hefty accumulation of evidence and some sense of assurance that our inferences are probably correct.

Incidentally, this extensive use of associative relationships and relative paucity of hierarchical relationships characterizes the overall structure of *The Women's Thesaurus*. This might be viewed as a design flaw according to current standards and guidelines for thesaurus construction, because the nature of associative relationships is so vague and undetermined; users looking for specific information might be better served by more precise clarification of concepts through more extensive use of hierarchy. As an argumentative approach, though, such a strategy is interesting. One could suggest that this structural approach is itself an argument based on structural evidence, using a strategy based on analogy: that just as hierarchy was not necessary to create an effective thesaurus, so is hierarchy unnecessary in other types of structures, such as social structures, and so on. I will certainly not, within the confines of this article, be able to enumerate all possible uses of structural evidence in classification; my goal is merely to show how the mechanism works in general and to work out a few specific cases to give a sense of the argumentative possibilities.

Using the form of premises followed by a conclusion, the following argument may be constructed from the Angel in the House thesaurus term entry. Again, as with many rhetorical arguments, most of these premises rely, either partially or completely, on inference for their construction. The first six premises incorporate both the explicit linking of concepts provided by the thesaurus entry (that is, the direct connection specified by a related term relationship between the Angel in the House entry and another concept) and implicit specification of the nature of those relationships. The last three premises are implied by definitions of the terms:

- P1. Purity, self-denial, and domesticity are states of being associated with an angel in the house.
- P2. Homemaking is the primary activity of an angel in the house.
- P3. The Angel in the House concept is a manifestation of the cult of true womanhood.
- P4. The domestic code enforces the role of angel in the house for wives.
- P5. Momism and mother syndrome idealize the mother role in a manner similar to the way that the Angel in the House concept idealizes the homemaker role; a homemaker is also (or should be also) a mother.
- P6. The superwoman syndrome is a modern manifestation of the Angel in the House concept.
- P7. Some of the related terms are historical.

- P8. Some of the related terms are contemporary.
- P9. The related terms all apply to women, but none apply to men.
- C1. The Angel in the House concept is part of a system of concepts about the role of women in society, linking women to the home and family in a way that men are not so linked. This system has a long history and persists into the present day.

While the argument seems complex, it is only so in amount of information, not in structure or logical maneuvering. The thesaurus entry mandates links between many concepts, forming the initial basis for this cluster of assertions. Each of the first six premises takes one or more related concepts and specifies a more precise nature to each link. The more specific information comes directly from term definitions, some of which are actually provided by *The Women's Thesaurus* in the associated entries. The remaining three premises lay out additional information culled from basic inferences about the provided data, as that all the related concepts are used to describe women exclusively, not a particularly deep or contestable bit of knowledge. The conclusion merely rolls up the accumulated assertions, summarizing the existence and effects of this concept cluster.

Using the Toulmin model to clarify the line of reasoning further, we can examine more concretely the ways in which the classificatory structure adds weight to this interpretation of the entry's argument:

Claim: The Angel in the House concept is part of a system of concepts about the role of women in society, linking women to the home and family in a way that men are not so linked. This system has a long history and persists into the present day.

Grounds: Premises 1 through 9 constitute the grounds.

Warrant: A cluster of related concepts on a single topic may form a system that reinforces selected values while excluding other values. Here, this cluster constitutes an interpretation or explanation of the Angel in the House concept and its role within the Women's Thesaurus.

Backing: Each association between the thesaurus entry and a related term increases the coherence and consistency of the cluster and adds to the force of the argument.

Rebuttal: The classification itself doesn't enable the incorporation of a rebuttal or the ability to address one. However, as an analytical tool, we can add a rebuttal: that because the precise nature of associative relationships isn't specified explicitly by the classification, an audience may misinterpret, or just miss, the evidence.

The warrant and backing, the elements of the Toulmin argument model that clarify the line of reasoning from the evidence to the conclusion, depend on the type of structural evidence being offered. Here, the evidence arises from associative relationships. Further, while the specific nature of these relationships differs for each related term, in this case, each relationship illuminates a different facet of the Angel in the House concept; indeed, we might say that the focus of this argument is to propose a particular description of this concept (a more extended discussion about the goals of classificatory arguments appears in a later section of this article).

As for the rebuttal, this will apply to any argument based on unspecified relationships. For such an argument to be persuasive, the classification designer must correctly intuit how the targeted audience might interpret such linkages (as with any rhetorical argument, the need to begin from accepted values makes it difficult to form an argument that will be accepted by everyone).

This argument about the concept Angel in the House is, of course, specific to *The Women's Thesaurus*. Other constructions of evidence, leading to the same or different claims, are certainly possible. For example, related terms might include concepts that contrast the role of men in society with that of women (such as the term “public sphere”) or terms that present an alternate view of women’s roles (such as the terms “working woman” or “working mother”). Such moves might alter the composition of the Toulmin model. Imagine a different entry for Angel in the House with the following related terms:

- cult of true womanhood;
- purity;
- domesticity;
- homemaking;
- working woman;
- working mother;
- glass ceiling; and
- mommy track.

Here, instead of one cluster that we can define coherently, we have two clusters, one that seems to describe an older way of looking at women’s roles, more directly associated with Angel in the House (with the terms Cult of True Womanhood, Purity, Domesticity, and Homemaking), and one that describes more current ideas of women’s roles, where women have a presence in the workplace as well as the home (with the terms Working Woman, Working Mother, Glass Ceiling, and Mommy Track). Still, barriers towards women’s full participation in the working world continue to exist (represented by the concepts Glass Ceiling and Mommy Track), and the roots of these barriers can perhaps be traced back to concepts such as Angel in the House and the associated concepts from the first cluster (Cult of True Womanhood, Purity, Domesticity, Homemaking). Part of the Toulmin model for this second argument might look like this:

Claim: The Angel in the House concept is part of a system of concepts about the role of women in society, linking women to the home and family in a way that men are not so linked. While to some degree this conceptual system has evolved, as women have entered the workplace in greater numbers, ideas connected to the Angel in the House concept form barriers that restrict women’s equal success in the working world.

Grounds: The idea that women are specially suited for activities of homemaking and childcare, and are thus not suited for public activities, such as paid employment, particularly in areas requiring significant responsibilities, has a lengthy history, as represented by the concept of Angel in the House and other concepts that reflect this perspective, such as Cult of True Womanhood, Purity, Domesticity, and Homemaking. While it is more typical in the

current day for women to enter the workplace (as represented through the concepts of Working Woman and Working Mother), the values associated with the Angel in the House cluster persist in contributing to barriers against women's full participation in the workplace (as represented by the concepts of Glass Ceiling and Mommy Track).

Warrant: Selecting related terms that seem to clearly fall in two distinct conceptual clusters leads the reader to examine differences and similarities between the different clusters.

Backing: Through ordering of concepts, it is possible to indicate how one system of concepts changes into another over time.

This example shows how different structural evidence may not only lead to different conclusions but may take advantage of different argumentative techniques to do so.

3.2 Structural evidence from multiple categories

The arguments created from structural evidence become more interesting when we consider how multiple categories in a classification may work together. Here are two related entries from *The Women's Thesaurus*:

Collaboration

Subject group: history and social change

Related terms: administration
feminist methods
group process
leadership
leadership skills
management styles
management theory
social skills
social values
women's organizations

Leadership skills

Subject group: economics and employment

Broader term: skills

Related terms: authority
charisma
collaboration
consensus building
influence
power.

As with the previous example of the Angel in the House entry, the classification provides only structural evidence, which implies, but does not directly state conclusions, and the bulk of the evidence comes from unspecified associative relationships. Therefore, the argument relies on the audience to partly construct its premises; the majority of premises are partly explicit (that there is a relationship between two terms) and partly implicit (the details of that relationship are unexpressed).

Using the Toulmin model to clarify the line of reasoning and means of using structural evidence to generate a conclusion, we might express an argument for the Collaboration entry as follows:

Claim: Collaboration, as a component of leadership, should be valued in traditional organizations as well as women's organizations.

Grounds: Through a combination of explicitly stated and implicitly generated information, we obtain the following evidence:

Collaboration is valued in women's organizations as a social and leadership skill to facilitate group process.

This premise is constructed by combining several associative relationships and specifying the details of the relationships.

Traditional organizations value leadership but not collaboration.

This is suggested by the omission of "organizations" from the list of related terms, with the corresponding inclusion of the more specific "women's organizations." This impression is reinforced through shared cultural understanding in the audience; in cultures where leadership was not a common value in organizations, this premise would not have as firm of a foundation.

Warrant: We can aggregate related terms and their implied relationships to construct more complex premises. Premises may be generated based on the omission, as well as the inclusion, of terms.

Backing: Additional structural evidence increases the likelihood that an argument will be accepted. For example, four relationships between the thesaurus entry and terms associated with leadership (leadership, leadership skills, management styles, management theory) strengthen the contention that collaboration is a component of leadership.

The warrant and backing for the claim are similar to, but not the same as, the warrant and backing for the Angel in the House argument. This argument aggregates related terms to generate premises, while the Angel in the House entry does not; this argument also uses the absence, as well as the presence, of relationships. However, both arguments rely on the accumulation of evidence via mutually reinforcing relationships (or the lack of such relationships).

The argument presented through the Collaboration entry is complemented by the Leadership Skills entry.

Claim: Collaboration and consensus building, in addition to authority and charisma, may lead to influence and power.

Grounds: By combining several associative relationships and specifying the details of the relationships, we obtain the following evidence:

Authority and charisma are traditional leadership skills.

Leadership skills enable influence and power.

Collaboration and consensus building are not traditional leadership skills, but are valued as such by women's organization.

Part of the structure of this premise is similar to the previous ones; it aggregates and fleshes out associative relationships. but here, we can incorporate additional information about collaboration (that it is valued by some organizations) by reference back to evidence from the collaboration entry, where the relationships posit the connection between collaboration and women's organizations.

Warrant: We can aggregate related terms and their implied relationships to construct more complex premises.

Backing: We can accumulate evidence by reference to other locations in the classificatory structure to increase the strength of an argument.

Through the way that categories are instantiated and related in both these entries, a case is made for a particular interpretation of leadership, that it should encompass collaboration and consensus-building; if one seeks influence and power, it may pay to collaborate and achieve consensus. While the warrant for Leadership Skills is similar to that for the Collaboration entry, the backing is different. This argument appropriates evidence by reference to a related entry (the Angel in the House argument also did this in a minor way, as its assertions were based on term definitions, and some of the related entries had definitions provided by the Women's Thesaurus). This ability to accumulate evidence by synthesizing information from multiple related concepts, forms, I think, an important element of persuasive arguments for classifications. The resulting cohesiveness makes it possible for a classification to both offer stronger arguments and to present an integrated standpoint on the subject matter in general.

It may not be traditional to speak of a web of associations like these related thesaurus entries as a form of argument, but there are precedents. Walker (1994), for example, discusses how presenting a concept as a member of a variety of categories can result in an overall argument that is more powerful than the sum of its parts, with a conclusion that goes beyond the mere fact that concept A is a member of categories B, C, and D. Walker's example here is an essay on the semiotics of wrestling by the French author Roland Barthes. Barthes sets up wrestling as being a member of the individual categories Spectacle, Theater, and Religion, and then extrapolates from those relationships that wrestling is a sign system that represents Suffering, Defeat, and Justice. As designers, we can do this in a classification if we pay attention to the set of relationships that we are aggregating. While we might not, within the constraints of classificatory form, be able to explicitly state a conclusion, we can, if the relationships work together cohesively, and if we amass enough evidence, provide the audience with so many clues that they can derive the conclusion themselves in a reliable way.

One could also see an argument of this type as a variation of argument from sign. In an argument from sign, the evidence is a kind of clue that leads to the claim. For example, if I am in Austin, Texas in May and look outside my window to see people wearing coats, mittens, and scarves, I may conclude that it is unseasonably chilly outside, based on previous observations that in order for people to wear coats and mittens, it must be cold. Such fashion choices indicate, but do not cause, the weather, and, importantly, one clue may not be enough to lead to the overall claim. One person wearing a parka and long pants, when everyone else was wearing shorts and T-shirts, would not lead me to think that I also needed to don my winter coat. Similarly, one of the individual relationships regarding Collaboration or Leadership Skills does not

determine the interpretation, but together, they provide clues to it. If a classification designer thinks of an organizational scheme's set of concepts and relationships as working together to provide a coherent set of clues for a set of linked conclusions, then it should be possible to devise a structure that delivers a reasonably clear set of messages with demonstrable support. All of the classification's concepts, in a sense, will then be wearing their coats and mittens. But if some are dressed for Austin summer, others for Seattle spring, and still others for Chicago winter, then there will be too much conflicting information. The audience will not be able to read the clues predictably, and the overall message will not be persuasive.

It might be possible to object, at this point, that some of these example arguments are in essence houses of cards, built on shaky foundational premises. I am not sure I accept that history can be a social science, one might say, and collaboration might conflict with leadership, not complement it. Let us take another look, however, at the initial example of stealing: one could make the same objection that personal wealth hardly makes it less likely that someone would steal (although one could also assert that despite this, such an argument often works). However, does not the lack of motive argument become more believable when combined with other arguments, even if these are just as circumstantial and, on their own, seemingly inconclusive? For example, one might argue that the accused thief has an excellent character and years of community service, that the accuser is an unstable person with psychological issues, and so on. So where one instance might not be sufficient, even more thesaurus terms, making similar arguments, creating a tighter and more cohesive web, can constitute an additive force. Even if we don't agree with an argument for a particular category, we might still agree that a cumulative argument, extended to the entire scheme, is more convincing.

4. Another form of support for classificatory arguments: resource evidence

In addition, another form of evidence is available within the possibilities of a classification: the resources assigned to a category. It is perhaps not typical to view either the selection of resources in a collection or their categorization with a developed scheme as part of classification design. However, any group of objects instantiates a type of category, even when that category lacks a label or enclosing relationship structure. Sauperl (2002) indirectly emphasizes this point as she reports how library catalogers may use the way that a similar item's subject has been expressed through headings and class number in determining the subject headings and class assignment for a new item. Moreover, users interact with collections that are organized in particular ways; they do not, in general, experience a classification in isolation, separate from the resources that it organizes. The characteristics that distinguish a group of resources therefore can be seen as providing evidence for conclusions regarding both a category and its role in an overall scheme. This evidence can supplement the classification's structural evidence to strengthen the overall argument (or it can contradict the structural evidence and detract from the overall argument).

One could imagine for the example of history as part of the humanities or as part of the social sciences, that a quite different selection of materials might be involved in each History category. History books that seem more like the humanities might not be included in the collection organized by the History as Social Science classification, or, if they were, these books might be placed in a totally different category. Or if, going back

to the *Women's Thesaurus*, the term Collaboration is indeed used to index management-related books, and those books provide certain discussions of management, such as the title *Adaptive Co-management: Collaboration, Learning, and Multi-level Governance*, that might provide additional support for the premises advanced via the classificatory structure, that there is a verifiable relationship between collaboration and management.

The conscious selection of data as an argumentative strategy is discussed by Perelman and Olbrechts-Tyteca as follows:

By the very fact of selecting certain elements and presenting them to the audience, their importance and pertinence to the discussion are implied. Indeed, such a choice endows these elements with a presence, which is an essential factor in argumentation and one that is far too much neglected in rationalistic conceptions of reasoning (Perelman and Olbrechts-Tyteca, 1969, p. 116).

While resources may supplement arguments made from structural evidence, categorized resources may also constitute arguments in themselves. For example, in the Prelinger Library, which is specific to a particular collection, structural evidence is sparse. Named categories exist and are arranged in a linear order, but additional relationships between the categories have not been defined. However, the composition of resources in the Prelinger Library's categories can itself express arguments. For example, the category Domestic Environments includes both materials about home economics (the processes that are involved in creating and maintaining domestic environments) and materials about the physical characteristics of those environments (such as brochures for remodeling kitchens to make them more efficient, and advertisements for labor-saving domestic appliances). The associated resources provide evidence for a contention that domestic environments are in fact workplaces for those performing these activities. The argument can be expressed as follows according to the Toulmin model:

Claim: Domestic environments are workplaces.

Grounds: Through a combination of explicitly stated and implicitly generated information, we obtain the following evidence:

Domestic environments are sites of specialized, significant activities.

An identifiable, if unnamed, subset of resources in the category of domestic environments provides evidence for this premise.

Domestic environments are associated with a variety of layouts and specialized tools to facilitate this work.

A second identifiable subset of resources in the category domestic environments provides evidence for this premise.

Workplaces involve both specialized activities and associated tools.

This premise is implicit, based on the audience's understanding of workplaces.

Warrant: Shared characteristics of resources within a category provide evidence for an assertion regarding that category, but all resources in the category need not share the same characteristics.

Backing: Wittgenstein's (1968) notion of family resemblances illustrates how items may be identified with a single category and yet not all share the same attributes as category markers. This case is interesting because we can identify two clearly delineated subsets in the category, but it is not difficult to think of other examples. For Wittgenstein's classic example of a game, one could easily mark two subsets as games with rules and games without rules (as the games that children make up spontaneously). In the present case, however, the resource subsets have a critical, argumentative force that shapes the category definition.

As the warrant shows, the argument here is based on the idea that even without an explicit category designation, two distinct subsets of resources can be identified within a single defined class in a collection, and the different, yet complementary characteristics of resources in those subsets can combine to generate a conclusion about the category that both subsets inhabit. One subset of resources asserts that activities that can be described as work are performed within domestic environments. Another subset of resources asserts that domestic environments are in fact optimized, in both their architectural structure and in the tools associated with them, to perform these activities. Based on shared social knowledge of workplace characteristics, the audience is then led to conclude that domestic environments, as locations of work configured specifically to facilitate labor processes, are types of workplaces, like factories.

This perhaps radical contention that domestic environments are workplaces is generated in the context of the Prelinger collection, where it fits into a larger set of ideas about infrastructure and processes of labor and production. As an argument, then, this conclusion forms part of an explanation of the category Domestic Environments and its role in the Prelinger Library. Note, however, that this evidence does not show that work activities are necessarily and always a component of the category Domestic Environments, especially as this category might be employed in a different context. One could imagine a quite different category of Domestic Environments that included primarily resources that emphasize the style and aesthetics of such environments, concentrating on leisure instead of work, with runs of *Architectural Digest*, and so on; this second category of Domestic Environments might contribute to an overall perspective that one needs to focus on the fleeting pleasures of life.

Each of the arguments for these different category interpretations might be persuasive (even to the same audience), and each plays a different role in a larger argument about a particular subject area or other domain covered by a classification. So instead of saying that the Prelinger Library's argument defines or provides some integral truth about domestic environments, we might say more accurately that the Prelinger Library has a specific, interesting, and plausible interpretation of domestic environments that it is suggesting to us in a particular context, but that other interpretations may be equally possible.

This section has described how the resources that make up a collection can also be considered as evidence for classificatory arguments. As with looking at concept definition and relationships with the higher purpose of forming a consistent set of clues toward an overall standpoint on the subject area, the designer must similarly look at resource selection in terms of constructing a persuasive data presence that focuses the argument. In the next section, these ideas are explored further to delimit the possible

scope of classificatory arguments and the level of proof that such arguments might need to be persuasive.

5. Goals of classificatory arguments and corresponding level of proof

The idea that the set of a classification's claims makes up an interpretation, as opposed to a truth or even a hypothesis, has implications for the level of proof necessary to constitute a convincing argument. If we are going to convict someone of stealing a purse and send that person to prison, for example, our standard of proof is "beyond a reasonable doubt". We might require many different kinds of evidence – eyewitness accounts, fingerprints, motives, and so on – to achieve that standard. A classification's evidence, structure and resources, seems weaker in comparison. However, the goal is correspondingly less serious. The ultimate goal of a classificatory argument, I would say, is to show a plausible and perhaps illuminating theory or standpoint that explains some aspect of a subject area, a particular collection, whatever the domain of the classification may be. This explanation attempts to provide a persuasive interpretation that aligns with currently accepted facts and values, but its goal is to be critical: revealing, interesting, and thought-provoking, more than it is to obviate all other possible interpretations.

The art historian Michael Baxandall (1985) characterizes the description of pictures in a way similar to what I see a classification as doing in this context. For Baxandall, a descriptive term, such as feathery brushwork or delicate hand, when applied to a particular picture, functions as an explanation of the critic's interest in the picture. One could apply limitless descriptive terms to any painting; choosing one indicates the way in which the picture is interesting to the describer more than it reveals some necessary element of the picture. A term such as feathery brushwork functions as an application of a way of thinking: thinking about the painting as the product of a specific painterly technique as opposed to its use of color or its iconography, for example. This critical intent focuses one's attention not only on the picture in a particular way, as one descriptive term is used instead of another, but also on the descriptive term itself. For example, the descriptive term firm design, according to Baxandall, has a different meaning when applied to a painting by the Italian Renaissance artist Piero della Francesca than the meaning of firm design as applied to a painting by Picasso. It is through the conjunction of the descriptive term and the particular picture that we achieve an interpretation, both of the picture and of the descriptive term.

It is similar for a category term and the domain of a classification scheme. In the context of *The Women's Thesaurus*, using Collaboration in a way that relates it to Leadership applies a particular way of thinking to both collaboration and leadership and also to the area of women's studies. The important point here is that, if our goal is to highlight a classification's interpretive function, then the level of proof we require is to be accurate (to fit with the existing facts), internally consistent, and hopefully illuminating; we are not required to vanquish all possible opponents in a rhetorical war. Multiple interpretations of the concept of domestic environments might exist, make sense, and be persuasive in a variety of contexts, illuminating a different array of overall perspectives on different subjects.

This overall line of thinking suggests that an organizational scheme's persuasiveness lies not so much in convincing the audience that the scheme is

correct but in enticing the audience to explore the ways in which the scheme and its associated resources might be illuminating, how it might contribute to the reader's own evolving interpretation of the domain of the scheme. Such an alternate view of rhetoric is articulated by Foss and Griffin (1995) as "invitational". In contrast to traditional rhetoric, which Foss and Griffin describe as "the conscious intent to change others", and which is often characterized as a competitive exercise, where one attempts to bend an audience to one's will, invitational rhetoric's goal is "a greater understanding of the issue in its subtlety, richness, and complexity", as well as a greater understanding of different perspectives on the issue (Foss and Griffin, 1995; p. 5). One still needs to make a decent case, of course; you cannot just go around sticking History in with Science without showing how that might make sense. However, neither does one need to actively eliminate the competition. We might find a reasonable case presented for History as either as social science or part of the humanities, for example.

6. Discussion

Design implications that emerge from this characterization of classification, argumentation, and possible forms of evidence include:

- Design consistency and the goal to create a persuasive theory of a subject.
- Resource selection and category assignment as elements of the classification design process.
- The role of the user audience in realizing a successful design.

6.1 Consistency and formation of a theory of the subject

Such an understanding of possible claims and evidence implies that the designer should consider, if attempting to create a classification that displays a persuasive interpretation of a particular domain, how each assertion about concepts supports (or does not support) an overall standpoint or theory of the subject area. While all rhetorical arguments rely on shared social values and knowledge as the base for making a persuasive case, and thus incorporate a high level of inference on the part of the audience, classificatory structures, due to the lack of narrative complexity possible with their inherent form, rely on inference to a particularly large degree. Consistency thus seems especially important. A classification that reinforces its case via multiple relationships set in place throughout the structure would seem to be more persuasive, for example, than a classification that is not able to show such connections between concepts, or that displays connections that seem contradictory. This seems to indicate that a classification purposefully designed to persuade its audience of a specific argument must use that argument as its semantic warrant; future research might explore this possibility in more depth.

6.2 Resource selection and category assignment as classification design elements

Another implication concerns the relationship between classificationist (the designer of a scheme), classifier (the person who assigns resources to classes) and the person who selects resources for a collection. According to this study's conception of claims and evidence, classifiers, in a sense, are continually building on the skeleton created by the classificationist, and the selection of resources, in addition to their category

assignment, is a key factor in supporting or undermining a classification's theory of the subject. If we want a classification to communicate persuasively, it seems, we need to consider the activities of resource selection and category assignment as part of classification design, remembering that users more often experience a collection as organized and not the organizational scheme in isolation. To the extent that selection, indexing, and creation of the organizational scheme itself are performed by different people over time, this implies that classification design may be seen as a distributed, dynamic process, rather than a discrete, static one.

6.3 Role of the user audience in "implementation" of the design experience

The role of the user audience in constructing a successful classification has a dual quality. On the one hand, to develop persuasive argumentation, a designer needs to target an audience and identify its shared beliefs and values. On the other hand, the designer also needs the audience to recognize that the classification is not attempting to faithfully mirror the way each user sees the world but is attempting to bring the user to a new understanding of the subject, an understanding toward which the audience should also bring a critical intent similar to that of the designer. In a traditional retrieval situation, a classification's utility lies in its ability to match the way the user thinks about a query with a set of resources that the user in some way expects (will answer a question, help accomplish some identified goal, and so on). In contrast, a classification that asserts a standpoint is itself is something to read and interpret; its interest may lie in being different from the user's current view of a subject, as opposed to its being similar. A classification in this mode should be interrogated by its users, not merely deemed right or wrong, correct or incorrect.

7. Conclusion

This study has demonstrated that information systems can use rhetorical argumentation as a persuasive mechanism to communicate a specific interpretation of the subject matter that they collect and organize. Two forms of evidence for supporting conclusions were identified: structural evidence from the inclusion and arrangement of categories in an organizational system, and resource evidence from the selection of documents and their assignment to categories in the organizational scheme. These forms of evidence provide a sufficient level of proof for constructing subject interpretations.

The study begins to translate recent work in classification theory into design practice. If we acknowledge that information systems work as forms of documents, communicating a point of view about the materials that they aggregate, arrange, and make accessible to users, then it becomes imperative to understand these communicative functions and to learn how to design systems that exploit the potential of the classificatory form most effectively. While such knowledge may be useful to a variety of information professionals, such as classificationists, thesaurus developers, information architects, and metadata specialists, it is also potentially important as a form of overall information literacy and writing skill. With the pervasiveness of the Web and especially the popularity of social media and its emphasis on user participation, the collection, organization, and arrangement of resources is becoming a more significant form of expression in general. A blogroll, for

example, which is in essence a form of bibliography, may work as a community manifesto, marking both a set of publications (or people) and their common concerns. How do such forms of expression work to communicate and persuade? How might they work more effectively or differently? Such questions form significant possibilities for further research.

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