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# Epistemic warrant for categorizational activities and the development of controlled vocabularies

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## Abstract

**Purpose** – The purpose of this paper is to update and review the concept of warrant in Library and Information Science (LIS) and to introduce the concept of epistemic warrant from philosophy. Epistemic warrant can be used to assess the content of a work; and therefore, it can be a complement to existing warrants, such as literary warrant, in the development of controlled vocabularies. In this proposal, the authors aim to activate a theoretical discussion on warrant in order to revise and improve the validity of the concept of warrant from the user and classifier context to the classificationist context.

**Design/methodology/approach** – The authors have conducted an extensive literary review and close reading of the concept of warrant in LIS and knowledge organization in order to detect the different stances and gaps in which the concept of epistemic warrant might apply. The authors adopted an epistemological approach, in the vein of some of the previous commenters on warrant, such as Hope Olson and Birger Hjørland, and built upon the theoretical framework of different authors working with the concept of warrant outside knowledge organization, such as Alvin Plantinga and Alvin Goldman.

**Findings** – There are some authors and critics in the literature that have voiced for a more epistemological approach to warrant (in opposition to a predominantly ontological approach). In this sense, epistemic warrant would be an epistemological warrant and also a step forward toward pragmatism in a prominently empiricist context such as the justification of the inclusion of terms in a controlled vocabulary. Epistemic warrant can be used to complement literary warrant in the development of controlled vocabularies as well as in the classification of works.

**Originality/value** – This paper presents an exhaustive update and revision of the concept of warrant, analyzing, systematizing, and reviewing the different warrants discussed in the LIS literary warrant in a critical way. The concept of epistemic warrant for categorizational activities is introduced to the LIS field for the first time. This paper, and the proposal of epistemic warrant, has the potential to contribute to the theoretical and practical discussions on the development of controlled vocabularies and assessment of the content of works.

**Keywords** Knowledge organization, Categorization, Epistemology, Warrant, Epistemic warrant, Literary warrant

**Paper type** Research paper

## Introduction

The classification of works is, of course, a complicated matter. Many systems exist, and many ideas have been propounded over the years. The present proposal suggests that assessing the warrant of a work is a means to categorize content. To be more specific, we propose epistemic warrant as a sound combination to existing warrants, such as literary warrant, to develop

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controlled vocabularies and classification mechanisms. As the concept of warrant can also be used to categorize and represent the content of a work by classifiers and end-users, we believe epistemic warrant is a good option to consider the purposes and insight of the users without falling into the traps of the user-based and cognitivist approaches.

### Warrant and literary warrant

The concept of “warrant,” in knowledge organization, can be understood as “the rational justification for the introduction of a term or concept into a controlled vocabulary [...] Warrant provides the limits a classificationist sets on source of concepts and terminology, and as a result on the inclusion or exclusion of concepts and terminology” (Tennis, 2005, p. 86). The warrant of a classification system is “the authority a classificationist invokes first to justify and subsequently to verify decisions about what classes/concepts to include in the system, in what order classes/concepts should appear in the schedules, what units classes/concepts are divided into, how far subdivision should proceed, how much and where synthesis is available, whether citation orders are static or variable and similar questions” (Beghtol, 1986, p. 110).

In a broader sense, warrant is “the justification for using a specific term to represent a particular concept” (Smiraglia, 2016, p. 351). The “ANSI/NISO Z39.19-2005 Guidelines for the construction, format, and management of monolingual controlled vocabularies” prescribes “using warrant to select terms” for the construction of classifications and other knowledge organization systems, stating that “The process of selecting terms for inclusion in controlled vocabularies involves consulting various sources of words and phrases as well as criteria based on: -the natural language used to describe content objects (literary warrant), -the language of users (user warrant), and -the needs and priorities of the organization (organizational warrant)” (p. 16). The previous National Information Standards Organisation (1993) “ANSI/NISO Z39.19-1993 Guidelines for the construction, format and management of monolingual thesauri” also considered literary warrant and user warrant but omitted the organizational warrant.

The concept of literary warrant was introduced in 1911 by E. Wyndham Hulme, and as Mario Barité (2009, p. 13) pointed out “Since then, it has evolved slowly but steadily to become one of the basic and unquestionable foundations of knowledge organization for information retrieval.” Hulme (1950, cited in Chan *et al.*, 1985, p. 48; Barité *et al.*, 2010, p. 124) explained literary warrant as: “meaning that the basis for classification is to be found in the actual published literature rather than abstract philosophical ideas or concepts in the universe of knowledge or the order of nature and system of the sciences.” Hulme was an empiricist, and as such, opposed his work to the rationalism of philosophical classifications exemplified by the periodic table. In time, the empiricist legacy of Hulme would be opposed to historicist and pragmatist views too. In this regard, Hulme failed to identify in his approach that, for instance, the number and positions of elements in the periodic table is not always aprioristic and speculative, but continuously updated and refined according to new findings and paradigms in Chemistry, and that even different criteria and purposes might lead to different arrangements and “periodic systems” (see Hjørland *et al.*, 2011).

Similarly to the inclusion and arrangement of elements in the periodic table, literary warrant determines the classes and the hierarchical structure of those classes in the system. However, instead of basing the decision in aprioristic knowledge, Hulme linked the organization of classes in the system to the concepts that are used in the publications (i.e. the properties of the books, in the most objective and theory-independent way possible), assuming that the published literature is the only raw material for the systematization of contents and forgetting the theories and discourses these publications are based on. As a consequence, in those cases in which there are not publications showing certain properties of a topic, then the topic and its relationships are not be recognized in the classification system, influencing the study, promotion, and number of publications on the topic in a

circular way. This principle has been proved problematic and refuted, for instance, in emergent fields or fields with fluid terminology and structures such as queer theory, in which it has been shown that, in spite of existing concepts and terms that are discussed and used among scholars, these terms are not included in the Library of Congress standards (see de la tierra, 2008).

On the other hand, the sole opposition in Hulme's words of the published literature to ideas or concepts in the universe of knowledge recognizes the existence of something else outside the published literature (a context) that is being unprivileged. This omission well might be done for the sake of objectivity, and, as Bullard (2017, p. 78) points out, citing Mai (2005) and Fidel (1994) and what might be called the "document-centered approach," where literary warrant is applied alone, the work itself is examined without context. However, Hjørland (2015) also shows that relationships in thesauri and other knowledge organization systems are never context free. Relationships in classifications must be based on empirical knowledge as well as scientific theories and paradigms. As Hulme was also the father of "statistical bibliography" (today termed bibliometrics), a "metascience," it must be emphasized that, in words of Hjørland (2016a, p. 22): "A lack of subject knowledge on the part of meta-scientists may provide problematic interpretations of the empirical patterns observed." In this vein, even today's bibliometrics and its algorithms (including related applications for information retrieval such as page rankings algorithms in web search engines) are not neutral activities corresponding to the ideals of classical empiricism that Hulme advocated. There are always some underlying assumptions and bias in the process of selecting concepts, prioritizing criteria, etc. and only because this bias remains unstated it does not make the system error-free, it is just harder to detect the errors whatever the approach is being followed.

In addition, the disregard and omission of contextual and subject knowledge in the construction of the systems that following empiricist claims as in literary warrant alone, brings further problems, such as theoretical inconsistencies, and uncertainty about the usefulness and stance of the system. Hjørland (2016b, p. 479) points out that when it has been said that systems lack a theoretical foundation, it is likely that the implicit principles of the system are based on literary warrant (he cites Vanda Broughton's, 2004 perception of the Library of Congress Classification (LCC): "It is quite hard to discern any strong theoretical principles underlying LCC," p. 143). The accumulation of classes without the consideration of their context and the scientific implications for theories that their location in the structure imply, makes systems that follow literary warrant alone insufficient for the organization of documents. As classes were inserted into the system without context (and therefore losing meaning), it is unclear whether these classes might represent the whole meaning of the documents (especially in relation to others). Users of the system should be aware of this too.

In order to overcome these problems, some authors have proposed different warrants, or, better yet, the combination of different warrants. In 1995, Claire Beghtol discussed the possibility of applying a type of domain analysis of fiction studies considering two concepts, "literary warrant" (Hulme, 1950) and "consensus" (Bliss, 1939). For the purpose of the project, she characterized literary warrant "as the topics around which a literature has become established" (p. 31). Regarding "consensus" (consensus/scientific warrant is a concept that will be explained in more detail in the next section), Bullard (2017) has pointed out that it is a ubiquitous warrant, same as literary warrant, even when it is not invoked by named. However, according to Hjørland's categories of epistemological basis of classification (e.g. Hjørland, 2013b, that includes empiricism, rationalism, historicism, and pragmatism as the main schools), it can be stated that while literary warrant is related to empiricism, and consensus warrant is originally linked to rationalism, in the "post-Kuhnian" (Kuhn, 1962) world also to pragmatism (and therefore to Hjørland and Albrechtsen's, 1995 domain analysis), making Beghtol's statement for her project as a type of domain analysis consistent.

On the other hand, although today the concept of literary warrant is common among classificationists, Beghtol (1986, p. 112) also pointed out that, historically, some authors have argued uses of the term that differ from Hulme's original conception. For instance, some authors do not distinguish book classifications from scientific or philosophical classifications of knowledge as Hulme does. Indeed, the British Classification Research Group (CRG) played a great role in the shaping of literary warrant while omitting, borrowing, and transforming the concept within the classification discourse during the twentieth century. As Beghtol (1986, p. 113) reported, the CRG narrowed Hulme's original idea from "literary" to what might be called "terminological" warrant. In this form, the system would not be based on the subjects of books but on the terminology of a subject field (i.e. the terms that the authors in the literature of the subject use). The context of this move can be pinned in the efforts of the CRG on facet analysis and search for terms in the foci and subdivisions of systems. This might be perhaps related, in context, to Hjørland's (2007) observation of Mooers' (1972) arguable criticism of the principle of literary warrant: "Mooers does not directly say that the ideas are not to be found in the literature, but rather that the specific expressions found there should not be used." Today, the definition of literary warrant by the ANSI/NISO Z39.19-2005 (more concerned with "words and phrases" than ideas) seems to be in the CRG "terminological" line too.

In a prescriptive way, the ANSI/NISO Z39.19-2005 defines literary warrant in this vein as the "Justification for the representation of a concept in an indexing language or for the selection of a preferred term because of its frequent occurrence in the literature" (pp. 6, 162). Regarding its usage, i.e., selecting the preferred form, the standard mandates the use of "neutral" terms (such as "developing nations" instead of "underdeveloped countries"), and adds some principles based on frequency and sources too:

Words and phrases drawn from the literature of the field *should* determine the formulation of terms. When two or more variants have literary warrant, the most frequently used term *should* be selected as the term. Guidance in the selection of terms *may* be found in reference works of the domain, such as dictionaries, glossaries, encyclopedias, and authoritative treatises of the field. Other controlled vocabularies, abstracting and indexing services, and subject heading lists *may* be useful as sources for selection of preferred forms. Opinions of subject experts regarding the preferred form of terms may be sought (p. 30, emphasis on original).

Most modern library classification and controlled vocabularies follow the principle of literary warrant. LCC and Library of Congress Subject Headings (LCSH) explicitly acknowledge their use. Although the Dewey Decimal Classification originally drew on earlier philosophically based schemes such as W.T. Harris's (Olson, 2004, p. 3), newer versions seem to be implicitly or explicitly based in literary warrant (Olson, 2004; Hjørland, 2007; Barité, 2009, 2011). However, as Barité (p. 17) noted, both the DDC and the Universal Decimal Classification, in spite of claiming literary warrant as their basis, do not explicitly state the methodological criteria for their use of the warrant, so it is assumed that it is considered just as a general guiding principle.

### Other warrants in the literature

As for other warrants that have been proposed or used in the literature, Beghtol (1986) identified and discussed three other warrants related to literary warrant, namely scientific/philosophical warrant, education warrant, and cultural warrant, and also mentioned an academic warrant (p. 117, probably just as a synonym of education warrant) (concrete) institutional warrant (pp. 118-119, that "produces classes that are mostly discipline-based, but also others, phenomenon- or mission-based, that can accommodate institutions oriented toward a certain phenomenon or guided by a certain mission." This is the warrant that was coined and used by Coates for the development of the Broad System of Ordering,

Coates, 1978), and enquiry warrant (p. 121). Over time, several other warrants have also been proposed or studied in the literature, including market warrant (Martínez-Ávila, 2012), ethical warrant (Beghtol, 2002b), use warrant (Svenonius, 2000), structural warrant (Svenonius, 2000; Kent *et al.*, 1975; Mitchell, 2007 cited in Barité 2011), phenomenological warrant (Ward, 2000), autopoietic warrant (Mai, 2011), logical warrant (Fraser, 1978), gender warrant (Olson and Ward, 1998; Olson, 2003, 2007 cited in Barité, 2011), as well as the aforementioned user and organizational warrants (NISO). These warrants are chronologically presented in Table I and some of them will be briefly reviewed below.

The scientific/philosophical warrant is attributed to Henry Evelyn Bliss (1939), who stated that “bibliographic classifications should be *organized in consistency* with the *scientific and educational consensus*, which is *relatively stable* and tends to become more so as theory and system become more definitely and permanently established in general and increasingly in detail” (pp. 42-43, italics in original). This warrant was the basis of his own Bibliographic Classification (BC). Although Beghtol in her analysis split the scientific and education warrants into two, it should be noted, as she also did, that Bliss enunciated both concepts together. In words of Beghtol (p. 126), “For Bliss, then, part of the authoritative semantic warrant of a library classification rested on its conformity to the practical needs of educational institutions and this practical utility rendered a library classification relatively permanent by responding to the best consensual thinking of the scientific and educational communities.” Key aspects introduced here are not only the idea of the warrant as a source for the classification system, but also of the targeted audience (in terms of practical needs and practical utility) that the warrant should consider. As pointed out before, although this warrant was originally linked to rationalism, it could be linked to pragmatist and domain analytic approaches too.

The term Cultural Warrant was brought into light in the 1970s in a discussion between Joel M. Lee (1976) and Derek Austin (1976). However, as Beghtol (1986, p. 119) also pointed out, the concept might be well rooted in a series of lectures between 1921 and 1922 that Hulme himself (1923) delivered at the University of Cambridge. According to Beghtol (2002a, p. 45):

The concept of cultural warrant posits that every classification system is based on the assumptions and preoccupations of a certain culture, whether the culture is that of a country, or of some smaller

Warrant	Reference(s)
Literary warrant	Hulme (1950)
Scientific/philosophical/ consensus warrant	Bliss (1939)
Structural warrant	Kent <i>et al.</i> (1975)
Cultural warrant	Lee (1976) and Austin (1976); according to Beghtol (1986), cultural warrant might be rooted in a series of lectures between 1921 and 1922 by Hulme (1923)
Concrete institutional warrant	Coates (1978)
Logical warrant	Fraser (1978)
User warrant	Fraser (1978); according to some authors (e.g. Barité, 2011) an early reference to user warrant was used by Lancaster (1977), labeled by Greenberg (2001) as “end-user warrant”
Enquiry warrant	CRG (1984, cited in Beghtol, 1986)
Education/Academic warrant	Beghtol (1986)
Gender warrant	Olson and Ward (1998)
Phenomenological warrant	Ward (2000)
Use warrant	Svenonius (2000)
Ethical warrant	Beghtol (2002b)
Organizational warrant	National Information Standards Organisation (2005)
Autopoietic warrant	Mai (2011)
Market warrant	Martínez-Ávila (2012)

**Table I.**  
Warrants referred  
in the literature

or larger social unit (e.g. ethnic group, academic discipline, arts domain, political party, religion, and/or language) [...] The concept of cultural warrant implies that a knowledge organization system is more likely to be useful and appropriate for those who are members of a culture and that it is less likely to be useful and appropriate for those who belong to some different culture, at whatever level of society that culture or domain may reside. Thus, a knowledge organization system that is appropriate for the elements of one culture may not recognize elements that are highly important for some other culture, and such exclusions pose problems because we need to integrate knowledge across cultural, geographic, and linguistic boundaries.

Richard Smiraglia (2009, pp. 674-675) called cultural warrant “the personal and professional milieu of information seekers,” and also stated that “The importance of cultural warrant in the ethics of knowledge representation follows closely on Hjørland’s emphasis on activity-theoretic and domain-specificity” (p. 671). Hjørland’s (1997) activity-theoretical analysis, as highlighted by Smiraglia, is the one that approaches individual resources according to their uses, either intended or actual. In this vein, while, as Hjørland (2007) pointed out elsewhere, “the principle of literary warrant (or other kinds of warrant) introduces an empirical principle in knowledge organization,” this interpretation by Smiraglia and the concept cultural warrant might also suppose a step toward pragmatism, with consequences for information retrieval. As Beghtol (2005, p. 904) also wrote, “A system that has not been established on an appropriate cultural warrant will not be adopted for information search and retrieval because information seekers will find that it does not match their accepted view of how the world works.” Indeed, this might be a consequence of the limitations of literary warrant alone, or as Hjørland (2007) put it “The important implication is that classification systems based on literary warrant are not well-suited to classify other kinds of documents (or other samples of documents) than those they are based on such as journal articles or literatures from other cultures.” This idea reinforces the thesis that the choice of the warrant for the basis of system is also an ethical issue.

Also in 2002b, Beghtol proposed the concept of “Ethical Warrant,” using the concept of “cultural hospitality” as a theoretical framework. In that paper, the term “cultural warrant” is taken to include the concept of “user warrant” (Fraser, 1978; Albrechtsen and Jacob, 1998) assuming that individuals are members of a certain culture(s), and they act as representatives of one or another culture(s) when participating in the development and use of information systems (p. 511). As for the concept of “User Warrant,” Beghtol refers to the definition of Patterson *et al.* (2000): “the collaboration of potential users, either directly or indirectly, in the development and use of any knowledge management system, including knowledge representation and organization systems.” Although Beghtol’s paper was published after the ANSI/NISO Z39.19-1993, the choice of Patterson *et al.*’s definition over the NISO one (“justification for the representation of a concept in a [thesaurus] or for the selection of a preferred term because of frequent requests for information on the concept.”) might be deliberate or might be due to the title of the standard referencing thesauri, since it was not until the 2005 version that the title was changed from “thesauri” to “controlled vocabularies” (that also includes library classifications, subject headings and more). On the other hand, some other authors (e.g. Barité, 2011, p. 4) have identified an early reference to user warrant (Lancaster, 1977, p. 140, labeled by Greenberg, 2001, as “end-user warrant” and also citing Rodriguez, 1984) that might be missed or omitted by Beghtol. As for the prescriptive ANSI/NISO Z39.19-2005 definition of “user warrant,” this is the “Justification for the representation of a concept in an indexing language or for the selection of a preferred term because of frequent requests for information on the concept or free-text searches on the term by users of an information storage and retrieval system” (pp. 10, 167), also adding for the usage that “Users should be asked to review drafts of the vocabulary to add missing terms, identify terms that are incorrect or obsolete, create more useful term forms, and validate relationships among terms” (p. 30). The ANSI/NISO definition could be

considered a shift from an arguably pragmatist potential of earlier definitions to a clear user-based empiricist view.

A similar concept to “user warrant” is the “use warrant,” proposed by Svenonius (2000) and also listed in Mai (2011), that considers the vocabulary of those who search for the literature and not only the vocabulary of those who create the literature as in literary warrant. Use warrant draws on Charles Cutter’s principles of the convenience of the public and empirical research on the common terms that are used by users (common usage). This kind of warrant would correspond to a user-based and cognitive approach to knowledge organization (see Hjørland, 2013a). Although the user-based approach and literary warrant seem to be opposed concepts, in appearance, both seem to be based on the same empiricist principles with the only difference being the shift from the focus on the documents alone to the focus on the user alone. Notwithstanding, Hjørland (2017) regards Cutter’s view on subjects “wiser than most of the later understandings that dominated the 20th century.”

Another kind of warrant mentioned by Beghtol in 1986, also related to the user-based and cognitive approaches in Library and Information Science, is the Enquiry Warrant (p. 121). This kind of warrant was discussed at the CRG’s 250th meeting in December 1984, and mentioned in the *International Classification Journal* (currently *Knowledge Organization Journal*) number 12-1 of 1985, pp. 31-32. Enquiry warrant was defined by Beghtol as “the semantic rationale behind the creation of such systems as the Detroit Public Library Reader Interest Arrangement and Pejtersen and Austin’s Analysis and Mediation of Publications multiple-entry classification scheme for fiction.” Recent analyses of these reader-interest arrangements in relation to current bookstore-like classifications such as BISAC include Martínez-Ávila (2012), Martínez-Ávila and San Segundo (2013), and Martínez-Ávila *et al.* (2014). In relation to BISAC, Martínez-Ávila also proposed the concept of “Market Warrant” (Martínez-Ávila, 2012, 2016 Martínez-Ávila *et al.*, 2013; Martínez-Ávila and Kipp, 2014). According to Martínez-Ávila (2016), “market warrant” would be “the justification for the inclusion of terms in a controlled vocabulary based on publishing activities and current market demands” (p. 658).

In the context of folksonomies, Jens-Erik Mai (2011, p. 119) also proposed the concept of “Autopoietic Warrant,” in which the authority is created within the system and the users of the system, in a self-referential manner, would establish the terms and classes to be included. In this case, the authority of the system would emerge from its use. The matter of authority in the warrant, as discussed by Mai, and classification is another important point that will be also addressed below.

As for the organizational warrant listed by the ANSI/NISO Z39.19-2005, it is defined as “Justification for the representation of a concept in an indexing language or for the selection of a preferred term due to characteristics and context of the organization” (pp. 7, 163), adding that “Determining organizational warrant requires identifying the form or forms of terms that are preferred by the organization or organizations that will use the controlled vocabulary” (p. 16). Although the NISO’s “organizational warrant” and Beghtol’s “institutional warrant” seem to have points in common, it seems that the difference is that the NISO’s definition expands the target group (the organization) to a wider range of institutions, as Beghtol spoke on the institutional warrant just in the context of academic institutions.

### **Ontological and epistemological warrants**

Historically, warrants have been used as mechanisms for justification of the classification systems. The inclusion and exclusion of terms are implicitly or explicitly based on the different warrants related to the semantic purpose of the systems, which of course should consider the utility of the system. Beyond the syntactic aspects of classifications, these decisions and warrants shape the way meanings are created in the organization and retrieval of documents. Warrant can be treated as a meaningful design choice related to the epistemological



foundations of the system (Bullard, 2017). In this vein, the choice (and even development) of the warrant for the construction of the system would relate to the ontological commitment of the classificationist. Birger Hjørland (2013b, p. 171) stated that “any ontological theory commits us to identifying and classifying a number of phenomena in a specific way-and vice versa; a listing and classification of a number of phenomena may reveal the theoretical outlook of its creator (‘show me your classification and I’ll tell you what theory you subscribe to’).” Similarly, for the context of warrants, Beghtol (1986) also wrote:

One such underlying semantic rationale for a classification system may be identified in the concept of the warrant upon which the system is based. [...] Warrant covers conscious or unconscious assumptions and decisions about what kinds and what units of analysis are appropriate to embody and to carry the meaning or use of a class to the classifier, who must interpret both the document and the classification system in order to classify the document by means of available syntactic devices. The semantic warrant of a system thus provides the principal authorization for supposing that some class or concept or notational device will be helpful and meaningful to classifiers and ultimately to the users of documents (pp. 110-111).

This authorization of terms, however, can only be sanctioned by the authority in charge of the system. Hope Olson (2002, p. 387) addressed the question “Who does the work of classification?” posited by Bowker and Star (1999) in the context of the cultural considerations of classification, with two possibilities that led to a common point: “Either the people who apply classification or the people who create classification. Obviously, those who apply a classification have major responsibilities for its effect. [...] However, in each of these instances, the classification itself is a tool of authority and is mandated by somebody.” This means that the authorization provided by the warrant, which will influence the location and retrieval of documents, is ultimately driven by the ontological, epistemological, methodological and ethical decisions of the people and institution in charge of the system. Using a specific example of the LCSH as a controlled vocabulary, Hope Olson (2000, p. 55) states that the LCSH operates as a device of cultural authority through three discourses: LCSH’s historical link with Charles Cutter’s Rules for a Dictionary Catalog; the concept of literary warrant, “which puts the literature of disciplines or knowledge domains in charge of the standard”; and the authority of the Library of Congress as the institution governing LCSH, mediating between the knowledge domains and the public, and, at least de facto, governing application through documented policies and procedures and through copy cataloging.” In other words, the basis of a specific warrant, in addition to the application of the system, will benefit (and harm) a specific group of users over another. In this vein, what ethical decisions are being considered by the institution? Are the ethical, cultural and even technical consequences of the chosen warrant being consciously considered as part of the methodology of construction of the system in a pragmatist way? Are different warrants considered?

Today, warrants can also be considered methodological components of the development of classification and other knowledge organization systems (as evidenced by the inclusion of the concept in the NISO guidelines for the construction of controlled vocabularies). While, for instance, Jens-Erik Mai (2008) spoke on “actors, domains, and constraints in the design and construction of controlled vocabularies,” W.J. Fraser (1978, cited in Beghtol, 1995, p. 41) also suggested that “literary warrant,” “user warrant,” and “logical warrant” may be regarded as constraints on categories that should be established in a subject access system.” On the other hand, as Barité *et al.* (2010, p. 134) pointed out (and it is one of the main points of our paper), literary warrant alone might be insufficient as an only basis for the construction of conceptual structures. What other warrants are being or should be considered in addition? Hope Olson (2004, pp. 3-4) made the distinction between ontological warrants and epistemological warrants for bibliographic classifications, while drawing on Francis Bacon’s identification of gaps in human knowledge. For Olson, the key point is the question of whether or not bibliographic classification is linked to the classification of knowledge.

In this way, she sees two options: “If we accept that bibliographic classification is unrelated to classification of knowledge, then literary warrant alone is justified. On the other hand, if we consider that what is recorded and then classified bears some relation to knowledge, then classification of knowledge is, indeed, linked to bibliographic classification. In that case, some more fundamental type of warrant instead of or along with literary warrant is necessary.” For this specific use, Olson states that literary and other similar warrants would be of no use. Olson concludes that an ontological warrant is aimed at reflecting states of being rather than achieving knowledge (something that seems to be unacceptable in information institutions of today), while epistemological warrant would be a better choice for devising a classification that can contribute to the discovery of knowledge. In this vein, we are proposing epistemic warrant as a complement to serve this specific use and group of users.

### Epistemic warrant

What follows is a proposal that states that epistemic warrant is a means that can assist information seekers in locating content that closely matches the desired purpose of searches. This can be helpful for both assigning categories to a work and incorporate those categories into the knowledge organization system. It is known that new subject headings are proposed and established using literary warrant when a cataloger is cataloging an item and is not satisfied with the available system, such as the LCSH (Strader, 2012, p. 238). Categorization and classification of information carries the explicit implication that terms assigned to works are indicative of the content of the works. As Rodriguez (1984, p. 17) and Mario Barité (2016, p. 148) pointed out, literary warrant “is one of the most fundamental principles of subject analysis.” Means by which the contents of works may be classified are guided by the purpose of helping information seekers locate content which matches the ideational implicature of the works in question. The effort to classify content is a direct application of the purpose of location. Knowledge organization is (and should be) concerned with accomplishing the purpose of classification and it is suggested here that epistemic, as well as literary, warrant can be employed in categorizational activities.

Epistemic warrant has a substantial pedigree in a couple of ways, including argumentation and the theory of knowledge. Stephen Toulmin (1958) has developed a well-defined schema for assigning warrant within argumentation. In argumentation, data proceed toward claims, with reason(s) being the linking element. Warrant – logical reasons for believing and accepting premises – is necessary if a claim is to be articulated. Working backward, warrant is necessary for the evaluation of a claim. Anyone stating an argument, according to Toulmin, must integrate warrant into the formulation of all components. Without reasoned warrant, a claim stands upon shaky ground, and it is doubtful whether it can (or should) be accepted. The “reason” element of warrant is the foundation for the epistemic aspect of argument. Warrant, therefore, is in a very real sense, constitutive of acceptable argument. Toulmin, though, was not primarily concerned with the formal logic of argumentation; his principal point was that reason is the *sine qua non* of the process of argument. Toulmin (2001) emphasized the necessary character of reason in a later work; Toulmin’s (1958) work was the beginning of a trajectory of a rationalist mode of thinking about relationships, of which the connection of data to claims was but one. In his (Toulmin, 2001) later writing he states, “For now [...] the spotlight remains on the intellectual validity of Rationality itself: the human values of Reasonableness are expected to justify themselves in the court of Rationality” (p. 2). It has been recognized (see Keith and Beard, 2008) that Toulmin’s model is not merely about objects and properties, but is more about agents and actions. That realization of warrant and the functions it can serve are extremely important to the present suggestion regarding the place of epistemic warrant in categorization.

Argument is by no means the only locus for epistemic warrant. Alvin Goldman (1999) claims, “the root, or “Ur” criterion of warrant is reliability of belief-formation. (Notice that the criterion appealed to is reliability, not judged-reliability or believed-reliability. Actual reliability is the criterion the community tries to apply, though it may fail to apply the criterion correctly)” (p. 11). One of the most prominent proponents of epistemic warrant is Alvin Plantinga. Plantinga (1993a) sums up his conceptualization succinctly; warrant is “that which distinguishes knowledge from mere true belief” (p. 3). Plantinga (1993b) elaborates:

[...] a belief *B* has warrant for you if and only if (1) the cognitive faculties involved in the production of *B* are functioning properly (and this is to include the relevant defeater systems as well as those systems, if any, that provide *propositional* inputs to the system in question); (2) your cognitive environment is sufficiently similar to the one for which your cognitive faculties are designed; (3) the triple of the design plan governing the production of the belief in question involves, as purpose or function, the production of true beliefs (and the same goes for elements of the design plan governing the production of input beliefs to the system in question); and (4) the design plan is a good one: that is, there is a high statistical or objective probability that a belief produced in accordance with the relevant segment of the design plan in that sort of environment is true (p. 194).

Plantinga eschews naturalism on narrow grounds: he refuses to accept an evolutionary grounding for epistemology. That said, if he were to view naturalism broadly, as several commentators suggest he should, he might be more sympathetic to the naturalist cause. He may even agree with Alvin Goldman (1985), who says, “Epistemics would not cover all the territory epistemology has covered in the past. It would not, for example, deal with the analysis of knowledge, or with the attempt to answer skepticism” (p. 228). This definition of epistemics is compatible with the proposal articulated here.

Plantinga does draw from other thinkers to bolster his position regarding warrant. Among these is John Locke, whose philosophy leads Plantinga (1993a) to write, “there is a clear affirmation that we have an epistemic or doxastic duty: a duty, for example, not to afford a firm assent of the mind ‘to anything, but upon good reason’” (p. 13). He also cites Hilary Kornblith (1983), who states, “[E]pistemically responsible action is guided by a desire to have true beliefs. The epistemically responsible agent will thus desire to have true beliefs and thus desire to have his beliefs produced by reliable processes” (p. 48). These sources affirm Plantinga’s commitment to, not just belief, but also opinion. They also emphasize the necessity of truth-bearing accounts that knowing agents should hold if there is to be warrant for their beliefs.

Commentators other than Plantinga address epistemic warrant, sometimes with a direct connection to what knowledge can be conceived of. For example, Joel Pust (2000) suggests, “Knowledge, it seems intuitively obvious, is an all or nothing affair. We do not attribute more or less knowledge that *p* to a person. If knowledge is an all or nothing concept, and warrant is *defined* as that which separates knowledge from mere true belief, then it would seem that warrant must also be all or nothing” (p. 54, italics in original). Pust’s assertion of warrant being all or nothing fits in with the usage for classification proposed here. If a work is about a certain topic or theme, then there is clear warrant to incorporate that topic into categorization. That action constitutes a necessary function of classification. This element of the proposal is affirmed by Trenton Merricks (1995), who says:

- (A) Necessarily, every warranted false belief is barely warranted.
- (B) Necessarily, there is a decrease in warrant with every inference from a warranted belief to some other belief.
- (C) Contingently false beliefs cannot be warranted, but (at least some) necessarily false beliefs can be warranted (p. 853).

Merricks (1995) adds that (A), (B), and (C) are implausible, in keeping with Pust. What is necessary is a commitment to warrant representing knowledge. While there are criticisms of Plantinga, such as Peter Markie's (1996) assertion that warrant is not all or nothing but is subject in application to degrees of knowledge claims, Plantinga's conception of warrant, in combination with Toulmin's, provides necessary and sufficient background for expert classification of information content.

### Aboutness

Some theorists apply the action of aboutness description to sentences and use logic and semantics narrowly to describe what the sentence means. Aboutness here is a broader concept; it is applied not to individual sentences, but to extended utterances (usually on a common theme or set of themes). The utterances are claims or observations about something that putatively exists in the world or the mind. Therefore, aboutness embodies a realism about the description of the claims or thoughts. This does not necessarily endorse the truth of the statements or the thoughts; rather, aboutness attempts to represent the knowledge claims inherent in the observations or thoughts. As such, epistemic warrant – as aboutness – is a description of the utterance and its epistemic claims, not necessarily the world as it is. This said, warrant is an epistemic description of what is said or written and reflects what utterances assert. Herein lies the epistemic enterprise of discerning and stating warrant in the knowledge organization framework.

Bas van Fraassen argues in many of his works that we should not/do not appeal to a specific vocabulary when we apply knowledge organization via epistemic warrant. Instead, we examine observational subject matter. An utterance (including a theory) does not assert anything about all reality, but it asserts something about part of reality – usually the observational or thought-based part that is asserted in the utterance. The responsibility of epistemic warrant is to discern what is said about the part of reality. Epistemic warrant has to do with the actuality of what is said, which is not necessarily the same as the actuality of what is. In addition to assessing knowledge claims, epistemic warrant limits itself to the ontic claims of utterances. The presentation here should be taken to exist within these stated boundaries.

Stephen Yablo (2014) provides summaries of the inclusion of subject matter as a way of wholes subsuming parts.

*B* is part of *A* just if the argument *A*, so *B* is:

- (1) truth-preserving – *A* implies *B*; *A*'s information value includes the information value of *B*; and
- (2) aboutness-preserving – *A*'s subject matter [...] includes the subject matter of *B* (p. 45).

This notation introduces a mereological (parts and wholes) element. Without putting too fine a point on this element, the classificatory action that entails warrant necessitates recognizing that the action is a matter of preserving truth and aboutness, as Yablo indicates. The classification, or *B*, is a component of the whole utterance, or *A*. What Yablo proposes is firmly in keeping with the epistemic warrant described in our paper. The truth of classification is directly related to fidelity to the assertion(s) that form the utterances classified. Yablo expresses this as a kind of fidelity of information value (taken here to mean the discernible meaning of the utterances). Further, the classification is faithful to the subject matter of the utterance (and contains nothing that is not faithful to that subject matter). So, the classification can be considered to be part of the whole that is the utterance. And it is connected to that whole by means of epistemic warrant.

### Examples of epistemic warrant

One example that can be used to illustrate epistemic warrant is Plantinga's own work, warrant and proper function. LCSH assigned to the work are: "Knowledge, Theory of;" "Belief and Doubt;" "Cognition." The subject headings are not inaccurate, but it is questionable whether all are necessary and sufficient. Since the work is primarily about epistemic warrant, a subject heading such as "Epistemology, Warrant" would be useful to anyone seeking information about the topic. Moreover, other subject headings that would be useful to connecting an information seeker to the work's content could include "probability, epistemic," "induction," "naturalism," and "testimony." Furthermore, Plantinga draws heavily from the thought of Thomas Reid, so "Reid, Thomas" would be helpful. The headings are warranted, according to the proposal articulated above, by the substantive, manifest, and apparent inclusion of the topics within the work.

Another example takes its cue from an article by Jen Pecoskie and Heather Hill (2015). The article, "Beyond traditional publishing models," addresses alternative modes of publishing and non-traditional subjects for publication. A warrant-based reading of the paper reveals that some topics that could be assigned to it would include "Publishing, Non-traditional," "Fanfiction," "Self-publishing," "Readership," "Authorship," and (because his model is employed) "Darnton, Robert." The article delves into knowledge-based claims that are connected to these topical elements. There is thus warrant to assign such topics to the article.

### Conclusion

The concept of warrant should not be limited just to the selection of terms to use in the development of a knowledge organization systems. Epistemic warrant can also be used to categorize and represent the content of a work by classifiers and end-users and then to propose and warrant new terms for the development of controlled vocabularies. As epistemic warrant can be used to assess the content of a work, it is also a sound and useful complement to some existing warrants, such as literary warrant, that are proven to be problematic when used alone. Unlike user warrant, use warrant, and other warrants, the epistemic warrant is not based on the empiricist claim of "information requests," "common usage," and "free text searchers," but on more pragmatist and epistemological grounds regarding the way users would search for information.

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