

Introduction: Knowledge Organization Innovation: Design and Frameworks

by Jane Greenberg, Guest Editor

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EDITOR'S SUMMARY

The collection of articles in this issue of the *Bulletin of the American Society for Information Science and Technology* reflects the association between knowledge and the methods we use to represent a knowledge domain – knowledge organization systems (KOS). Though necessary and beneficial, our efforts to capture and represent knowledge impose a structure and inevitably reflect our perceptions and established notions. We must be aware of limits created in the process and be open to innovative approaches that facilitate access and serve all users without operational or cultural barriers. These collected articles explore new ideas in developing KOS designs and in their structural frameworks. They describe real world projects that illustrate innovations and challenge conventional approaches to knowledge organization systems.

KEYWORDS

knowledge organization systems
knowledge representation
organization of information
domain information
innovation
design

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Introduction: Knowledge and Knowledge Organization

Most readers of this issue of the *Bulletin of the American Society for Information Science* have witnessed or engaged in spirited dialog exploring relationships among data, information, knowledge, understanding and wisdom. Exploring the relationship among these concepts exposes a healthy intellectual tension framing our information ecology. Less common, although increasingly important, are discussions exploring the relationship between *knowledge* and *knowledge organization systems* (KOS). Targeted exploration of this topic makes sense given the growth in semantic, classificatory and ontological knowledge structuring projects.

Discourse on knowledge in nearly any discipline draws upon fundamental, epistemological ideas proposed by ancient philosophers. Concepts such as perception, phenomenal subjectivism, causation, sensory experience and observation inform our discussions. Knowledge structures further embody our conception of knowledge, building on this historical foundation. Knowledge structuring efforts can also reveal a disconnect between such systems and our conception of knowledge. Classification systems used for organizing intellectual output reflect artificial and practical considerations – a message simply and eloquently presented in Langrider's classic *Classification: Its Kinds, Elements, Systems, and Applications* [1, pp. 2-23]. Despite their artifice and known limitations, knowledge structures are imbedded in information systems. In fact, when knowledge structures are absent, the information system is generally considered sub-standard.

KOS are a necessity: they inform and promote discovery, use and re-use of information. Benefits aside, we must also acknowledge that schemes may

reinforce erroneous views, false perceptions and limit new discoveries. Scholar Hope Olson stands out as having produced perhaps the most extensive and thoughtful body of work in this area. Her work documents a wide range of limitations. It also inspires and obligates us to responsibly consider and act upon a unified approach toward knowledge organization. This grand knowledge organization challenge was made vivid in Olson's keynote address to the 18th Workshop of the American Society for Information Science and Technology Special Interest Group/Classification Research (SIG/CR) in Milwaukee, Wisconsin, in 2007. In it she emphasized a need to examine "nascent alternatives," and concluded her presentation by stating, "Classification is, after all, our epistemic infrastructure." [2]

Today, slightly over a decade into the 21st century, technology can be used to break down traditional knowledge organization barriers. In this realm, there are many projects exploring means for sharing, manipulating, extending and advancing our theoretical understanding of, and the use of, knowledge organization. As we progress and innovate, we also need to be cognizant of new barriers that may emerge – knowing that not all the world is networked. In other words, knowledge organization advancements must consider a global and balanced approach.

This issue of the *Bulletin* presents eight articles considering present-day knowledge organization challenges, advancements and global approaches. Contributors include information and library science researchers, information professionals and domain scientists. The work presented, reflecting recent innovations, is loosely grouped under the topics of *design* and *frameworks*. These two clusters consider thematic content and emphases and help present the larger scope of this body of work.

Design

The articles in this cluster report on new design approaches to knowledge organization systems. Although all eight articles in this *Bulletin* present novel ideas, the four contributions in this cluster place an emphasis on design and structure in operational systems. The themes include semantics for archaeological research, digital access to diverse KOS, automatic metadata generation and tagging.

- **Archaeological research.** The first contribution by Tudhope, Binding, Jeffrey, May and Vlachidis reports on STAR (Semantic Technologies for Archaeological Resources) and STELLAR (Semantic Technologies Enhancing Links and Linked data for Archaeological Resources). Pursued via a partnership involving researchers at the Hypermedia Research Unit at the University of Glamorgan and the English Heritage commission, the projects explore semantic technological advancements to support of archaeological excavation and the long-term use of research datasets.
- **Digital access to diverse KOS.** Hlava's work, the next contribution, reports on an eclectic terminology registry – more formally the TaxoBank Terminology Registry. This registry serves as a gateway to a wide array of vocabularies ranging from scholarly undertakings (maintained by major research and governmental organizations) to those created by students and subject enthusiasts, covering recreational and entertaining topics, such as bellydancing.
- **Automatic metadata generation.** The third contribution is about the HIVE (Helping Interdisciplinary Engineering Vocabulary) project, co-authored by myself, along with Losee, Pérez Agüera, Scherle, White and Willis. HIVE is a demonstration project supporting dynamic integration of SKOS (Simple Knowledge Organization System)-encoded vocabularies and automatic metadata-term assignment. The piece reports on rationale, development and ongoing activities.
- **Tagging.** The last article in this cluster is Spiteri's piece exploring how social discovery systems can leverage user-generated metadata. This work examines how tagging can make library catalogs "more user friendly, intuitive and interactive."

Frameworks

The articles in the second cluster emphasize innovative knowledge organization structures and ideas. Although they reveal aspects of design innovation, these contributions address higher-level, conceptual designs that have implications across a broad spectrum of KOS. These contributions can be further grouped by infrastructures and conceptual frameworks.

- **Infrastructure.** The first three pieces in this group emphasize infrastructure and report on work promoting interoperability and sharing of KOS.
 - First, Zeng and Hodge report on the DCMI/NKOS (Dublin Core Metadata Initiative/Networked Knowledge Organization Systems) Task Group. As the task force charter indicates, there is no standard protocol for describing KOS resources. The article reviews significant work preceding the task group's formal launch and the current effort developing a Dublin Core Application Profile for KOS resources.
 - Second, Phipps and Hillmann report on the Open Metadata Registry, supporting services for developers and consumers of controlled vocabularies. The registry hosts RDF-based Simple Knowledge Organization System (SKOS) vocabularies and many of the Resource Description and Access (RDA) vocabularies. Developing this profile is a leading effort toward making vocabularies compatible for Semantic Web deployment and production.
 - Third, Lapp, Morris, Catapano, Hobern and Morrison review knowledge organization infrastructure challenges and developments in the biodiversity community. This work highlights several ways in which digital knowledge organization offers new opportunities for advancing biodiversity research. In their conclusion, the authors underscore the importance of cost and the need to invest in resources now in order to move science forward. The issues discussed in the realm of biodiversity echo knowledge organization challenges and opportunities in many disciplines.
- **A conceptual framework.** The final contribution in this special issue, by Smiraglia and van den Heuvel, stands as a capstone, in terms of pushing our thinking forward. The title is quite descriptive, "Idea Collider: From a Theory of Knowledge Organization to a Theory of Knowledge Interaction." They present a theory of knowledge interaction inspired by the Large Hadron Collider at the European Organization for Nuclear Research (CERN). Their theoretical model draws upon social and bibliographic classification, ontology, taxonomy, semiotics

and research on instantiation. It also targets how knowledge may be harmonized in our universes and via interactions among different constellations. This work gives us all a new and insightful vantage point for considering knowledge, knowledge organization and ultimately knowledge organization theory.

Conclusion

Exploring the relationship between knowledge and KOS is of increasing importance, given the growth in semantic, classificatory and ontological knowledge structuring projects. The eight pieces in this *Bulletin* special section document innovative designs and frameworks that are informing and advancing knowledge organization activities. Knowledge organization is both fundamental and vital to information and library science, and the importance of this work cannot be underestimated. Although these selected reports cannot represent the full range of innovative undertakings in knowledge organization, each piece represents an important development, and collectively they form a useful record of advanced research and development in this area at this time.

Pulling together eight contributions in a single *Bulletin* requires time and the usual author-pestering regarding deadlines. This demand was minimal, however, compared to the diligence, attention and enthusiasm expressed and made evident by the contributors. In closing, thank you to the authors for their contributions and to *Bulletin* editor Irene Travis for suggesting this timely topic and for her patience and editorial suggestions that helped unify this special section. ■

Resources Mentioned in the Article

- [1] Langridge, D.W. (1992). *Classification: Its kinds, elements, systems, and applications*. London: Bowker Saur.
- [2] Olson, H. (2007). Cultural infrastructure: The story of how classification came to shape our lives. In J. Lussky (Ed.). *Proceedings 18th Workshop of the American Society for Information Science and Technology Special Interest Group in Classification Research, Milwaukee, Wisconsin*. Extended abstract retrieved March 22, 2011, from <http://arizona.openrepository.com/arizona/handle/10150/105521>.