Epistemic communities, domain analysis, and Kuhn: dialogs and intersections in Knowledge Organization

Abstract
We study the concept of epistemic communities within the domain analytic approach in knowledge organization and we relate these concepts to Kuhn’s views on paradigms and other concepts of the sociology of science that are inherent to the foundations of library and information science.

Introduction
One of the core aspects of knowledge organization as a field is the organization of knowledge in classification systems and concept systems (Hjørland 2016). The social aspects of the production and consumption of knowledge are also inherent aspects to knowledge organization as these systems are a reflection of the social conditions and epistemology of its time, what Jesse Shera (1951, 82) called a “dependency of classification theory upon the state of the sociology of knowledge.” In the domain analytic approach to knowledge organization, which can be considered a solid continuation of the social epistemological approach established by Shera, disagreement is common and “the picture is really not one of agreement, but of conflicting schools, and the closer the neighbours the sharper the conflict” (Broadfield 1946, 69, cited in Hjørland 2016, 477). Within this approach, Richard Smiraglia (2012, 114) defined domain “as a unit of analysis for the construction of a KOS. That is, a domain is a group with an ontological base that reveals an underlying teleology, a set of common hypotheses, epistemological consensus on methodological approaches, and social semantics. [...] It is the interactions of the ontological, epistemological and sociological that define a domain and reveal its critical role in the evolution of knowledge.” This group has also been called an epistemic community in some studies in knowledge organization (Guimarães et al. 2015; Martínez-Ávila et al. 2017; Hjørland 2017).

Research question, hypothesis, objectives and methods
While domain analysis has been presented and used as a fruitful methodology in knowledge organization (e.g., Smiraglia 2015), our research question is: how can this approach be applied in the diachronic evaluation of knowledge organization systems and production of knowledge? Our hypothesis is that the theoretical framework of epistemic communities, and more specifically considering the dynamics of these communities, together with Kuhnian views on paradigms and scientific revolutions (1962), can assist the development and interpretation of diachronic studies in
knowledge organization. The objectives of this paper are: to develop the concept of epistemic communities within the domain analytic approach to knowledge organization; to discuss the dynamic aspects of epistemic communities in relation to domain analysis; and to relate these concepts to Kuhn’s views on paradigms and other concepts of the sociology of science that are inherent to the foundations of library and information science and knowledge organization.

We conducted a conceptual analysis of epistemic communities and other aspects related to our research question, such as domain analysis, domains, paradigms, scientific revolutions, and other concepts related to domain analysis and Kuhn in knowledge organization. We conducted a literature review of these aspects and discussed them in the context of studies that work with domain analysis as a methodological framework and diachronic studies in knowledge organization.

Results

Diachronic studies in knowledge organization include several possibilities, such as studies on scheme versioning of knowledge organization systems (see for instance the work on “methodological challenges in scheme versioning” by Joseph Tennis, 2016, and the special issue of the journal Knowledge Organization on “Subject Ontogeny and Knowledge Organization System Change”), and domain analyses working with bibliometric studies in various periods of time (e.g., Guimarães et al. 2015).

While production and interpretation of bibliometric studies is recognized as one of the main approaches to domain analysis (Hjørland 2002; 2017), Kuhn himself (1996, 177-178) also stated that communication networks can be studied (revealed) in the linkages among citations (and Kuhn here cited the works of Garfield, 1964, Kessler, 1965, and Price, 1965 as examples). Rolin (2017, 3) aptly dubs these networks as “specialty communities” (a term used by Kuhn elsewhere), and also quotes Kuhn to define “specialty communities” as “the producers and validators of scientific knowledge” (178). In this vein, the term specialty communities inevitably also evokes the domain analytic approach in information science, not only in relation to the definition of domain but also to other aspects such as the discussion on the relevance of subject-knowledge or information specialists (see Hjørland 2017). The domain analytic approach in Kuhn also seems to be present in the following sentence: “If, as I have already urged, there can be no scientifically or empirically neutral system of language or concepts, then the proposed construction of alternate tests and theories must proceed from within one or another paradigm-based tradition” (Kuhn 1996, 146).

Epistemic community is a concept introduced by German sociologist Burkart Holzner (1968). In the words of Håkanson (2010), “Epistemic communities consist of individuals with identical or similar ‘frames of reference’ and cognitive ‘orientation systems’. These are associated with specific social roles, such as those of different occupational groups, and are acquired in a process of cognitive socialization, usually
through a combination of formal training and on-the-job experience” (p. 1.807). Epistemic communities have been applied to a wide range of areas, from political science (Haas 1992) to sociology (Meyer and Molyneux-Hodgson 2010), among others. Its first use in information science, to the best of our knowledge, was in Guimarães et al. (2015). Epistemic communities can be studied for a given domain as they can be understood as networks of knowledge-based experts that “not only hold in common a set of principled and causal beliefs but also have shared notions of validity and a shared policy enterprise. Their authoritative claim to policy-relevant knowledge in a particular domain is based on their recognized expertise within that domain” (Haas 1992, 16). In philosophy, the link between these scientific communities, as described by Kuhn, and bibliometric studies has been termed “epistemic interest communities” (Massey 2014).

The correspondence between epistemic communities and science communities is not always obvious. Although the concept of epistemic communities has been related to scientific communities (e.g., Meyer and Molyneux-Hodgson, 2010, who state that “Scientific communities matter. The enduring importance of journals, conferences, university departments, peers, discussion lists, museums, as well as the formation of new kinds of collectives around new problems and mediums prove this point”), it has also been often applied to the study of business firms and other kinds of organizations (e.g., Håkanson, 2010) mixed with concepts from knowledge management such as “tacit knowledge” and “explicit knowledge” (Nonaka 1994). If the concept of epistemic communities has until now mainly been associated to this context, one possible argument to make it relevant for our discussion on domains and knowledge organization would be the interpretation of tacit knowledge by Thomas Kuhn (based on Michael Polanyi, 1958). Accordingly, it is said that much of the scientist’s success would be dependent upon knowledge that is acquired through practice and not articulated explicitly (albeit guided by a paradigm). Likewise, several authors have highlighted the resemblance between the concepts of “epistemic communities” and “communities of practice” (e.g., Håkanson, 2010, Meyer and Molyneux-Hodgson, 2010). In this vein, based on the work of Holzner (1968, 51-59, Holzner and Marx, 1979: 103–106), Håkanson (2010, 1807) also pointed out that the reality constructs accepted by an epistemic community reflect the epistemic criteria of validity and reliability that it subscribes to, recognizing the empirical tests and methodological procedures employed in scientific communities as one example.

The concept of epistemic community has been likened to Kuhn’s paradigm (Meyer and Molyneux-Hodgson, 2010) and also to scientific community (Cross 2013). The relation between paradigms and scientific communities in Kuhn is not trivial. In the 1969 postscript, Kuhn clarified that “a paradigm is what the members of a scientific community share, and, conversely, a scientific community consists of men who share a paradigm […] the practitioners of a scientific specialty” (Kuhn 1996, 177). In the first edition of the book, Kuhn had stated that paradigms are “universally recognized
scientific achievements that for a time provide model problems and solutions to a community of practitioners” (1996, x).

In the context of epistemic communities, Meyer and Molyneux-Hodgson (2010) summarize the relationship between paradigms and scientific communities as follows: “Kuhn's definition of science assumes a clear demarcation around and within the scientific community. For Kuhn to be a member of a scientific community, to be accepted as a scientist, is to accept and to work within a paradigm. The study of these paradigms is what 'mainly prepares the student for membership in the particular scientific community’”.

We can also link Kuhn’s concept of paradigm to the bibliometric approach to domain analysis if we consider the following definition of paradigm by Kuhn as achievements that share the following two characteristics: “Their achievement was sufficiently unprecedented to attract an enduring group of adherents away from competing modes of scientific activity. Simultaneously, it was sufficiently open-ended to leave all sorts of problems for the redefined group of practitioners to resolve.” Kuhn also added that these achievements “are recounted, though seldom in their original form, by science textbooks, elementary and advanced. These textbooks expound the body of accepted theory, illustrate many or all of its successful applications, and compare these applications with exemplary observations and experiments” (Kuhn 1996, 10). The importance and problems of textbooks is discussed by Kuhn throughout his work and is linked to the concept of “normal science” (a moment prior to a scientific revolution). In fact, Kuhn seems to talk about a rudimentary version of a domain analysis following a bibliometric approach when he talks about the determination of a paradigm in the following terms: “Close historical investigation of a given specialty at a given time discloses a set of recurrent and quasi-standard illustrations of various theories in their conceptual, observational, and instrumental applications. These are the community's paradigms, revealed in its textbooks, lectures, and laboratory exercises. By studying them and by practicing with them, the members of the corresponding community learn their trade. The historian, of course, will discover in addition a penumbral area occupied by achievements whose status is still in doubt, but the core of solved problems and techniques will usually be clear. Despite occasional ambiguities, the paradigms of a mature scientific community can be determined with relative ease” (p.43). In this vein, the analysis and characterization of any textbooks and literature before or after a scientific revolution could also be used to define the boundaries of the epistemic community at a given moment, while the transformation of the paradigm (and the literature) with each revolution can reveal the dynamic transformation of the domain.

The transformation of the group (arguably an epistemic community) is discussed by Kuhn in the following passage: “it is sometimes just its reception of a paradigm that transforms a group previously interested merely in the study of nature into a profession or, at least, a discipline. In the sciences (though not in fields like medicine, technology,
and law, of which the principal *raison d'être* is an external social need), the formation of specialized journals, the foundation of specialists' societies, and the claim for a special place in the curriculum have usually been associated with a group’s first reception of a single paradigm” (p. 19). In this regard, for instance, the foundation of societies such the ISKO or the journal “Knowledge Organization” could be seen as indicators of the emergence of a domain, in this case the domain of knowledge organization.

On the other hand, although it is true that Kuhn’s work mainly focused on hard science (understandable given that he was a physicist), we believe many of the concepts and ideas he posited can be applied to other domains and disciplines. Therefore, if we accept the existence of other fields and domains than the natural sciences, Kuhn seems to leave the door open to define them even if only by exclusion (“We have already seen, however, that one of the things a scientific community acquires with a paradigm is a criterion for choosing problems that, while the paradigm is taken for granted, can be assumed to have solutions. To a great extent these are the only problems that the community will admit as scientific or encourage its members to undertake. Other problems, including many that had previously been standard, are rejected as metaphysical, as the concern of another discipline” 37). It should be remembered that, even if Kuhn did not feel comfortable with the application of his ideas to the Social Sciences and Humanities, he did not hesitate to cite Wittgenstein, Bacon, and other social scientists to support his arguments.

**Conclusion**

We believe that our hypothesis seems to be confirmed since epistemic communities can be studied in a dynamic way in order, for instance, to evaluate the development of knowledge organization systems or the transformation of domains in time. In this sense, Kuhn’s theoretical framework seems to be a valuable methodological resource for the interpretation of results. As an example, Guimarães *et al.* (2015) divided the domain analysis of the epistemic communities in knowledge organization into periods of five years, revealing a shift from an epistemic community led by Ingetraut Dahlberg (some might say theoretically driven by ontology) to an epistemic community led by Birger Hjørland (in which the epistemological/domain analytical approach seems to prevail). Using Kuhn’s terms for interpretation of the results, it could be said that there has been a paradigm shift within the knowledge organization domain/epistemic community; that is, a scientific revolution, after a period of competition in which a previously accepted theory was rejected in favor of a new one.

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References


