Abstract
The paper aims to explore the possibilities of integration between knowledge organization (KO) and terminology based on analyzing and comparing the basic theoretical and methodological premises of the two disciplines, thus identifying the common threads that could be of use in applying an interdisciplinary approach to a knowledge-oriented terminography. A conclusion is drawn that both KO and terminology are basically concerned with concepts and concept relations and have been influenced by the post-modern epistemological understanding of the world and its symbolic representation as socio-cultural creation rather than objective reality thus tending toward domain-specific methodological approaches.

1: Introduction
The relationship between knowledge organization (KO) and terminology has been pointed out by both information scientists and terminologists. Dahlberg (1992), for example, voices her support for “reconciliation of the approaches of the two subject fields for the sake of an improved access to the knowledge of mankind”. Sager (1990, 5-7) refers to a concept as “a unit of knowledge” and sees a number of overlaps between information science and terminology such as solving communication problems in special languages, making use of common information management tools as keywords, indexes and thesauri and benefiting from modern database storage and retrieval systems. Cabré (1999, 43) defines terminology as “the basis for the structure of thematically specialized knowledge”. Most terminologists nowadays believe in the effective marriage between terminology and KO. Over the past two decades knowledge-based terminology management has become an object of intensive research for terminologists directed towards the need of both technical translators and LSP (language for special purposes) learners for knowledge-oriented terminological databases and terminographic reference tools. For example, Meyer (1994; 2001) introduces the concept of “knowledge-rich contexts” and proposes methods for extracting and using them in constructing definitions and acquiring domain knowledge. Bowker (2003) places the retrieval of lexical knowledge patterns from texts within an international context. Temmerman and Kerremans (2003) introduce the method of termontography resulting from the collaboration between terminologists and ontology engineers. Cabré (2006) reports on the development of a specialized knowledge database on the Human Genome Project emphasizing the applicability of such conceptually organized terminology resources to technical translation. The latest developments in modern terminology research show an obvious interdisciplinary bias towards incorporating the achievements of information science in pursuing practical terminology processing goals. This tendency is metaphorically synthesized by Dahlberg (2009) as “drifting” of terminology from the area of computer sciences into the field of KO. If the automatic and semi-automatic extraction and ordering of terminological items is seen nowadays as processing of knowledge items, then the process of organizing terminological data and the product of that organization in the form of some terminological collection can be interpreted largely as knowledge organization. In other words, we can look at terminology as organized knowledge.
The paper aims to explore the possibilities of integration between KO and terminology based on analyzing and comparing the basic theoretical and methodological premises of the two disciplines thereby singling out the common threads that could be exploited in applying an interdisciplinary approach to a knowledge-oriented terminography.

2: Theoretical and methodological premises of KO

The concept of knowledge organization within the field of library and information science (LIS) encompasses “every type and method of indexing, abstracting, cataloguing, classification, records management, bibliography and the creation of textual or bibliographic databases for information retrieval” (Anderson 1996). Considering KO from this narrow perspective, we can generalize that it deals mainly with such activities as description, indexing and classification of documents, i.e. organization of knowledge resources and knowledge representations, focusing on the nature and quality of the knowledge organization systems (KOS) designed to organize documents, document representations and concepts. A broader definition of KO will place it within information science, concerned primarily with the nature of knowledge in general and the manner of its organization, i.e. “ordering of what is known” (Smiraglia 2005). Hjørland (2008) asserts that in its broader meaning “KO is about the social division of mental labor, i.e. the organization of universities and other institutions for research and higher education, the structure of disciplines and professions, the social organization of the media, the production and dissemination of “knowledge”, etc.” In this broader sense of the term, KO is about how knowledge is socially organized and how reality is organized. There are two dominant epistemological views on how the knowledge of the world is organized, viz. the cognitive view assuming that the human mind naturally organizes its knowledge of the world into conceptual systems, and the domain-analytical view which postulates that taxonomies are generally embedded in local cultural and social systems and serve various social functions.

Hjørland (2003) identifies five KO paradigms with references to their respective interpretations in philosophy and psychology. Since the third paradigm is a combination of the first two, the number could be reduced to four main paradigms which, presented in terms of the interpretation of concept formation, are: (a) empiricism (concepts corresponding to sensations); (b) rationalism (simple concepts inborn and complex concepts defined from simple ones); (c) historicism (concept formation affected by traditions and social communities) and (d) pragmatism (concepts formed by people’s practical activity). The first two paradigms underlie the modernist (positivist) view of the world and world knowledge, respectively, whereas the latter two determine KO as social construction concerned with human needs and interests.

The epistemological basis of any theory of KO is an accepted postulate. In other words, how knowledge is organized and represented depends largely on the understanding of how knowledge is generated and realized. The traditional theories of classification (Dewey, Richardson, Bliss, Ranganathan, etc.) are based on the modernist view of the world which is neutral and objective, nature has always existed and has always been there and what modern scientists do is just discover its secrets. Language within this framework is simply the medium of communication of ideas. If we assume that a world of thought and ideas exists a priori independently of language and
communication, then the task of classification is reduced to mapping and representing this world of ideas. This implies that the physical world is primordial to mental understandings of it, which in turn are derived from our perceptions of the world. Perceptions are assimilated into concepts, which are again organized into knowledge (Bliss 1929, 128). This view has focused research and thinking in KO on rules and guidelines for creating classification systems. Mai (1999, 550) exemplifies this modernistic approach with the methodology and practices (manuals and standards) adopted for thesaurus construction concerned primarily with exact rules and guidelines, e.g. factoring of compound terms, creation of relations. As a result, the analysis of the individual domains is often ignored. In summary, the realistic epistemological view assumes that the world can be described without any reference to social, cultural or individual contexts.

The post-modernists, on the other hand, believe that “knowledge organization is an active construction of a reality and a particular view of the world” (Mai 1999, 552). Therefore, a knowledge field can be organized according to various methods based on the epistemological tradition in that field. It is also important to note the post-modernist interpretation of language as the organization of knowledge defined in terms of organization of words and their meanings. In this view the meanings of the words are not related to their reference but are formed in their use. Hence, the semantics of words cannot be studied separately from the discourse community in which they are used. On the whole, it can be concluded that the post-modernist conception defines KO as a social construction in which it is possible to make a KOS (ontology, thesaurus, etc.) more transparent for the users and more effective. Thus KO is interpreted as part of the social and cultural context.

A question that has not yet found a definite answer in KO theory is what the unit of knowledge organization is. A number of candidates meant to perform that role have been proposed such as artifacts, concepts, disciplines, genres, knowledge representations, objects, works, etc. depending on whether we look at KO as an intellectual or a social activity. Hjørland (2003) posits the semantic relation between two concepts as the basic unit in KO. Dahlberg (2006) postulates four levels of KO in relation to their referents in the real or abstract world within a conceptual framework: (a) knowledge elements, i.e. characteristics of concepts gained by predications about the referent; (b) knowledge units, equated with concepts; (c) larger knowledge units, i.e. concept combinations; (d) knowledge systems, i.e. entities composed of knowledge units arranged in an adequately planned, cohesive structure. From the intellectual perspective all four levels can be stipulated as KO units.

As far as KO methods are concerned, they are generally related to fundamental theories of epistemology. The four fundamental methods of KO are summarized by Hjørland (2003) in relation to two types of classification: scientific and bibliographic. We will summarize them further by referring only to the scientific methods without providing the examples:

• Empiricism (observations and inductions): classification provided by statistical generalizations based in “similarity”
• Rationalism (principles of pure reason; deductions): classification based on logical, universal divisions
Historicism (study of context and development; explicating pre-understanding): classification based on historical or evolutionary development (taxonomies). Classification of the sciences based on their history and organizational structures

Pragmatism (analysis of goals, values and consequences in both subject and object): classifications based on specific values, policies and goals

Methods in KO are usually understood to encompass methods of constructing KOSs such as classifications and thesauri. Indexing and classification as processes are also considered KO methods. Hjørland (2003) lists a number of KO methods such as standardization, computer-based and intellectual methods, quantitative and qualitative methods, bibliometric, sociological, historical, pragmatic, etc. methods.

3: Theoretical and methodological approaches to terminology
Terminology as a discipline has undergone a similar process of development. Starting from the classical Vienna School of Terminology emphasizing the precision of concepts (monosemy) and univocity of the term (absence of synonymy) thus aiming at standardization of terms, nowadays new social and cognitive approaches to terminology have sprung up, acknowledging the functionality of synonymy and polysemy in special languages and the experiential rather than objective nature of special concepts. Modern terminology science assumes that a theory of terminology should be primarily concerned with a referential system that relates knowledge structures, i.e. concepts, to lexical structure. Sager (1990, 14-17) proposes a model of knowledge for terminology conceived as a multidimensional knowledge space with intersecting axes representing conceptual primitives or characteristics. A concept (knowledge unit) is defined by its position in that space determined with respect to each axis. Taking into account the discrete medium of language (finite items) used to transmit knowledge, the model imposes a limitation postulating that the value of a concept with respect to a given axis is generally defined as a range, i.e. a concept must be considered as occupying a region or a set of points in space and not a single point. The model assumes an idealized knowledge structure determined by the social norm to which all individual knowledge tends.

An interesting sociocognitive approach to terminology is proposed by Temmerman (2000) and is developed on the basis of an empirical study of categorization and lexicalization processes in a corpus of scientific publications. By taking a semasiological approach to the study of categories in the life sciences starting from the terms that designate units of understanding and investigating how these units of understanding and their designations get defined and explained in texts, Temmerman verifies her hypothesis that in texts, concepts do not often appear as clear-cut entities (of an objective world). Concepts can be clearly delineated from one another and defined by indicating a superordinate concept, yielding the characteristics which distinguish the concept from related concepts in a concept system. The findings show that units of understanding have prototypical structure, both intensionally and extensionally and that these units are experiential rather than objective. On the basis of these results, two types of concepts/categories are postulated: (a) clear-cut concepts that can be submitted to the principle of univocity and hence, standardized; (b) prototypically structured categories for which univocity cannot be the aim as polysemy, synonymy and figurative language are part of their naming history.
Cabré (1999; 2003) presents a model for a communicative theory of terminology starting from two main assumptions. Terminology is firstly assumed to be simultaneously a set of needs, a set of practices to meet these needs and a unified field of knowledge. Secondly, terminological units are assumed to be the central object of terminology. These units are multifaceted because at the same time they are units of knowledge, units of language and units of communication. They should be studied within the framework of specialized communication whence the approach to terminology is defined as communicative. The broad communicative framework involves a number of communicative scenarios for specialized knowledge transfer. Therefore specialized discourse is the natural environment of the terminological units and it is through discourse that special knowledge and its units of expressions are acquired.

The terminology research methods are generally determined by the two main approaches to analyzing terminological items. The first approach is basically onomasiological, i.e. concept-based whereas the second one is semasiological, i.e. lexically-based and since both approaches rely heavily on large computerized textual corpora for identifying and representing various conceptual and lexico-semantic relations, L’Homme (2006) calls them “conceptual corpus-based approach” and “lexico-semantic corpus-based approach”, respectively. The conceptual corpus-based approach presupposes the compilation of a terminological database that modern terminologists, following Meyer et al. (1992), refer to as “terminological knowledge base” (TKB). A TKB organizes concepts into networks of relations including both hierarchical (generic-specific and whole-part) and non-hierarchical (cause-effect and object-function) ones. The advancement of computer applications in terminology promoted further work on identifying conceptual relations in running text. Meyer (2001) developed a method for finding these relations in specialized corpora for terminographic purposes. The method makes use of knowledge-rich contexts that contain at least one item of domain knowledge, i.e. a conceptual characteristic to be involved in conceptual analysis. The search for such contexts is performed by using linguistic patterns such as “type of”, “defined as”, etc. The driving force behind the lexico-semantic corpus-based approach is the belief that “conceptual analysis ignores important aspects of terms, namely their linguistic properties” (L’Homme 2006). These properties include the collocational behavior of terms as well as other semantic relations such as synonymy, antonymy, argumental relationships, etc. Terms are viewed as lexical units and their complete descriptions are supposed to reveal the lexical structure of a special domain.

Temmerman and Kerremans (2003) introduce the method of termontography defined as a multidisciplinary approach in which theories and methods for multilingual terminological analysis of the sociocognitive approach are combined with methods and guidelines for ontological analysis. The motivation for combining these two research fields derives from the view that existing methodologies in terminology compilation and ontology development share common threads. The method works out combining top-down and bottom-up approaches so as to capture and represent knowledge acquired from texts. First, an initial framework of categories and inter-categorial relationships is developed top-down in close collaboration with domain specialists. The resultant categories and relations are then subjected to ontological analysis thus arriving at a
categorization framework serving as a template for the manual and semi-automatic extraction of knowledge from a corpus. The network of semantic relations is gradually enriched by eliciting culture-specific knowledge, and categorizations, respectively, from texts. The new knowledge is confronted with the categorical frame (a bottom-up analysis). The results of this analysis are entered in a termontological database to be used for various terminographic purposes.

4: Commonalities between KO and terminology

The commonalities between KO and terminology are sought in three directions: (a) semantic similarity in terminology used; (b) similar theoretical underpinnings and (c) similar methodological approaches. Empirical investigations were conducted by searching the words knowledge and term in contexts used by both terminology and KO authors. The terms used by two domains that can refer to both fields with a similar meaning such as broader term, narrower term, ontology/thesaurus, dictionary, glossary, types of conceptual relations (generic, meronymic, associative, causal, etc.) certainly testify to the same set of problems they are trying to solve thereby presupposing useful collaboration between the two disciplines. It is pertinent to emphasize that the interaction is bidirectional. At the same time some terminological discrepancies have been identified in KO and terminology in terms of using different terms for the same concept or the same terms for different concepts that need to be solved, such as the unnecessary homonymy of keyterm meaning a generic term in terminology and a word entered in a search engine in KO. Sometimes it may be reasonable to preserve the separate identity of the two disciplines allowing for certain synonymy, i.e. linking phrases in concept maps and knowledge patterns in terminology.

Regarding similar theoretical grounds, both KO and terminology are all about concepts and conceptual relations and both have been influenced by the post-modern philosophical, psychological and linguistic understanding of the world and its symbolic representation as a socio-cultural creation rather than objective reality resulting in a shift towards pragmatic, historical and phenomenological approaches in KO, and mixed onomasiological and semasiological approaches in terminology. A clear tendency can be observed in both disciplines toward a domain-specific approach to classification proceeding from the domain-dependent variations in conceptualization of knowledge. For example, the sociocognitive paradigm in terminology assumes very few clear-cut (easily definable) concepts, the rest being prototypically structured categories.

Practically all modern KO methods are fully applicable to the modern practices of terminology in general and terminography in particular. All four fundamental methods of KO are also usable in terminology processing. For example, empirical methods are used both in term and concept relation extraction; rationalistic, i.e. logical divisions are still relevant identifying hierarchical relations; a historical interpretation of the division of disciplines in different cultural discourse communities can explain variations in classifications and multilingual terminology; the pragmatic approach can account for the different perspectives from which even very concrete concepts can be seen in different socio-cultural discourse communities (e.g. “concrete bleeds and cures” in English but “cement paste outpours on the concrete surface” and “concrete matures” in Bulgarian). In other words, pragmatism can explain the socio-cultural variations in
concept formation and term phraseology thus providing clues to solving problems in translation-oriented terminography.

5: Conclusion
In conclusion, both KO and terminology have been influenced by the post-modern epistemological understanding of the world and its symbolic representation as a cultural creation rather than objective reality. There is a clear tendency in both KO and terminology to move toward a domain-specific approach that presupposes organizing the knowledge in general (e.g. for classification) and for specific terminographic purposes, e.g. for compiling learner’s glossaries (Alexiev 2006) within a narrow domain, thereby bringing to the fore its specificity regarding conceptual organization and its linguistic or other form of knowledge representation as a result of the specific perspective of the respective discourse community. A final conclusion can be drawn that combined KO and terminology research methods would lead to strengthening the collaborative links between specialists in the two fields bringing about the development and improvement of their theoretical, methodological and practical achievements.

References
Meyer I., 1994, Linguistic strategies and computer aids for knowledge engineering in terminology, L’actualité terminologique, 27, n. 4, p. 6-10.


