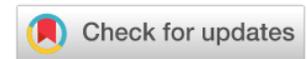

TERMINOLOGICAL STUDIES AS DOMAIN ANALYSIS: A critical exploration

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Abstract

This paper aims to thoroughly analyze terminological studies as a particular modality of domain analysis (DA). To this end, we establish the following methodological sequence: i) a broad description of the field of terminology, with emphasis on a general characterization of the theoretical currents and the two traditional types of research: systematic research and punctual research; ii) review of the background information on the theoretical and methodological intersection between terminology and knowledge organization (KO); iii) the problematization of terminological studies seen as DA, based on the study of background information and a series of trigger questions. The answers to these questions will allow us to progress in their understanding. The results show the need to further define the profile of terminological studies to use them in KO better. They also suggest considering terminological studies as a separate DA category, specifically in relation to language for special purposes (LSP) and discourse analysis. Finally, the preliminary conclusions will guide future research in the field. In particular, we stress that terminological research methods seem not to be sufficiently recognized as suitable for application in KO.

Keywords: Knowledge organization; Terminology; Domain analysis; Terminological studies.

1. Introduction

In the almost thirty years of development of the domain analysis (from now on DA) concept, at least three milestones – not necessarily successive – define its history. The first is related to its proposal and coinage, through the pioneering contributions of Hanne Albrechtsen and especially the Danish researcher Birger Hjørland (Albrechtsen 1993; Hjørland and Albrechtsen

1995). The second corresponds to the systematization and presentation of the first typology of DA in a reference document published twenty years ago (Hjørland 2002).

The third corresponds to the gradual emergence of explorations, revisions, and applications of the concept (Beghtol 1995; Robinson 2009; Guimarães 2014; Hjørland 2017), as well as various critical and propositional texts (Tennis 2003; Smiraglia 2012, 2015; Guimarães and Tognoli 2015), which make up its basic body of literature.

Smiraglia (2015) explored the nature of DA with greater detail by considering the concept as a paradigm, a metatheory, or a methodological paradigm within Knowledge Organization (KO). However, he had already stated in a previous study that the enumeration of the eleven types of DA formulated by Hjørland (2002), in his first systematic field study, constituted a “panoply of methodologies” (Smiraglia 2012 p. 114).

Guimarães (2014) also supported this position. He reaffirmed that beyond the theoretical aspects involved, the interaction between central concepts for understanding DA (such as domain and discourse communities) essentially constitute methodological expressions that allow identify “as categorias fundamentais do campo (a partir das questões e tópicos que os pesquisadores da área consideram relevantes para estudo)” (Guimarães 2014 p. 16).

Along the same line of thought, in this paper, DA is the generic name given in KO to a set of methodologies or methodological approaches aimed at designing a map or a conceptual representation of a knowledge domain’s structure. The purpose of traditional Library and Information Science (LIS) is the subject representation for information retrieval. On the other hand, for different purposes unrelated to LIS, it identifies research trends or the analysis of support structures for the management and production of knowledge in specialized areas.

The number of proposed modalities of DA is still an open discussion. Hjørland (2002) identified and established an initial list of eleven different types. It was partly contested and extended by Smiraglia (2015) and Guimarães and Tognoli (2015).

Table 1 shows the state-of-the-art consensus and dissension on the DA typology established so far in the literature.

Table 1 - Consensus and dissension in types of DA

No.	Type of domain analysis	Consensus/Dissension
1	Literature guides and subject gateways (Hjørland 2002)	Consensus
2	Special classifications and thesauri (Hjørland 2002)	Consensus
3	Research on competencies in indexing and retrieval (Hjørland 2002; Smiraglia 2015, disagrees.)	Dissension
4	User studies in subject areas (Hjørland 2002)	Consensus
5	Bibliometric studies (Hjørland 2002)	Consensus
6	Historical studies (Hjørland 2002)	Consensus
7	Studies of documents and genres (Hjørland 2002)	Consensus
8	Epistemological and critical studies (Hjørland 2002)	Consensus
9	Terminological studies, LSP (languages for special purposes), and discourse analysis (Hjørland 2002; Smiraglia, 2015, partially disagrees.)	Consensus except for the dissension on considering discourse analysis as an autonomous type of DA.
10	Studies of structures and institutions in scientific and professional communication (Hjørland 2002; Smiraglia 2015, disagrees.)	Dissension
11	Methods and results from domain-analytic studies on professional cognition, knowledge representation in computer science, and artificial intelligence. (Hjørland 2002)	Consensus
12	Database semantics (Smiraglia 2015)	Consensus
13	Discourse analysis (Hjørland 2002; Smiraglia 2015 suggests considering it an autonomous category).	Partial dissension
14	Provenance (Guimarães and Tognoli 2015)	Consensus

Source: the authors.

As shown in table 1, terminological studies correspond to the ninth type of DA. Hjørland (2002) grouped them with two other fields: languages for special purposes or LSP and discourse analysis. The table also shows that terminological studies are smoothly accepted as a specific type of DA since they have not caused dissension.

This exploratory work aims to delimit and analyze the terminological situation as a modality of DA. To this end, the following methodological sequence is established: (1) a broad description of the field of terminology, with emphasis on a general characterization of the theoretical currents and the two traditional types of research: systematic research and punctual

research, (2) a review of background information on the theoretical and methodological intersection between terminology and KO, (3) the problematization of terminological studies seen as DA, based on the background information. The answers to these questions will allow progress in their understanding.

2 Terminology as a domain

The expression ‘terminology’ has two meanings: “1. the aggregate of terms representing a system of concepts of a particular subject field, and, 2. an interdisciplinary field comprising linguistics, logic, information sciences, and individual subject fields” (Felber 1974 p. 89).

It is an interdisciplinary field, integrating knowledge not only from the areas mentioned by Felber, but also from communication, translation (Cabré 1993), semantics, lexicology and lexicography (Krieger and Finatto 2004), among others. Thus, the terminology has evolved based on the successive development of different theoretical and methodological schools.

Among the classical conceptions, we find the General Theory of Terminology (GTT), advocated by Wüster in his doctoral thesis defended in 1931 and published many years later (Wüster 1970). This theory has been supported up to the present by authors such as Felber and Picht. As for more recent developments, there is a widespread reference to the Communicative Theory of Terminology – CTT- (Cabré 1993), Socioterminology (Gaudin 1993), and the Sociocognitive Terminology Theory (Temmerman 2000).

To a greater or lesser degree, many authors outline the main characteristics of these currents of thought (Cabré 2003; Krieger and Finatto 2004; Benítez 2009; Senftleben 2020). In the context of this paper, we will only say that the GTT responds to a normative vision of terminology. It does not recognize variety and believes it is instrumental to different processes of normalization and standardization of designations and meanings in specialized fields that in Wüster’s original vision seem to be limited to sciences and technologies.

The CTT identifies, primarily through Cabré, the inadequacies of the classical theory personalized in Wüster, although it involves other schools such as those of Prague and Russia.

The CTT proposes to relaunch the discipline based on communicative principles and a descriptive vision based on recognizing terms as expressions of natural language, which follow the grammatical and syntactic rules of the languages they belong to. Furthermore, they are identified by the possibility of being used as specialized units in sciences, technologies, and specialties considered in a broad sense.

Gaudin (1993) introduces variation as a central concept for understanding the flow of dialogues between specialists and users of terminologies.

Temmerman (2000) constructs her thought in opposition to the classical theory. Instead, she offers five alternative principles. First, she enhances the historical or diachronic analysis of terminology and the need to incorporate cognitive models to frame the creation, use, and understanding of the concepts represented by the terms.

All these theories are of interest to KO. Both the classical standardization criteria and the concern for variants are present in the development of vocabulary control types. They are formalized in the standards for creating controlled vocabularies (*British Standard Institution* 2005; National Information Standards Organization 2005; International Organization for Standardization 2011).

On the other hand, the communicative conception of terminology and the sociocognitive aspects introduced by Temmerman reinforce the attention on the mediating processes of knowledge organization systems (from now on KOS) and natural language indexing between classifiers or indexers and users.

From the perspective of the development of methods and techniques for research, terminology has followed a more homogeneous path, traditionally running along two tracks: systematic research (Corbeil 1973; Sager 1990; Bevilacqua 2017) and punctual research (Célestin et al. 1984; L'Homme 2004).

Systematic research deals with the identification, systematization and presentation of the terminology of a knowledge area following to a certain extent the methods of compilation, definition, and organization of data used in lexicography.

The typical product of this type of research has been the preparation of specialized dictionaries and glossaries, and more recently, the implementation of terminological data banks (Krieger and Finatto 2004). Cabré and Tebé emphasize that systematic research “sigue unas pautas metodológicas bien establecidas”, las que “están bien descritas en las normas ISO del TC37 [<https://www.iso.org/committee/48104.html>], puesto que es el tipo de trabajo que responde históricamente a la necesidad de ingenieros y técnicos de representar, estructurar y denominar de forma sistemática sus ámbitos de conocimiento” (Cabré and Tebé 2005 p. 20).

In systematic terminological research, the study and compilation of terminology cannot be separated from the analysis of the epistemological and theoretical foundations that sustain the existence, validity, and use of terms with more or less shared meanings within a given discourse community. There are often divergences even in the relevance of using or not certain terms to represent the entities or phenomena under study.

Within a discourse community, there are often different currents of thought, sometimes with contradictory or opposing approaches and interpretations of the scope and particularities of their objects of study.

Punctual terminological research consists of “une technique d’investigation d’un terme ou d’un groupe restreint de termes appartenant à n’importe quel domaine de l’activité humaine, en vue de satisfaire un besoin immédiat exprimé par un usager” (Célestin et al. 1984 p. 17). These authors also establish a typology of punctual research, which includes the analysis of the meaning of a term, the most appropriate term to represent a new concept, the certification or validation of the use of a term, or the search for an exact or approximate equivalence in another language.

Dubuc points out that there are those who underestimate punctual research by considering that “un trabajo ‘por pedazos’ [a ‘piecemeal’ work] no aporta realmente soluciones de conjunto a las necesidades terminológicas” (Dubuc 1999 p. 65). However, he finds at least the following advantages in getting involved in this work: (1) the solution to urgent problems in translation and writing, (2) the opportunity to use this type of research as a training school by putting the future terminologist in direct contact with users and their needs, and (3) the possibility of studying in-depth the existing documentation in a certain domain (Dubuc 1999).

To these advantages, we should add the possibility of quickly solving problems of designation, conceptualization, translation, and historical or etymological precedence, continually presented by neologisms.

As Cabré and Tebé point out, the first methodological descriptions of punctual research refer to Quebec, in particular to the contributions of the Consultation Service of the Office de la Langue Française in a context of terminological work targeted at linguistic planning, and without a standardized international regulation (Cabré and Tebé 2005).

Nevertheless, the demands and urgencies posed by the avalanche of neologisms to translators, communicators, journalists, and information professionals make punctual research a helpful tool for selecting terms in target languages, or descriptors or indexing terms for the retrieval of information in native languages.

In short, we can establish that terminology research offers two types of approach: a microstructural one (that of punctual terminology), which refers to the study of a term or a restricted set of generally related terms, in questions concerning the etymology, coinage, conceptualization, definition, and identification of synonyms of each term, as well as its grammatical, syntactic and orthographic aspects.

The second type of approach, corresponding to systematic research, is macrostructural. It seeks to obtain the mapping of a domain, as generic or specific, as primary or exhaustive as necessary for the research objectives. This overall approach to a specialized area also allows visualizing the links with other domains, facilitating the insertion of a notional system in the preexisting knowledge maps.

3 Terminology and knowledge organization

The intersection points between linguistics and LIS are mainly centered on terminology and KO. This can be documented in different ways. For example, when in 1993, Dahlberg argues for changing the name of the journal *International Classification to Knowledge Organization Journal* (KOJ), she points out that:

the new title, denoting a superordinate concept to ‘Classification’, clearly indicates that we do not wish to confine ourselves to the problems falling under the ‘Classification’ concept, but rather are interested - as in fact we always have been, although many a one did not notice it - in all questions of knowledge organization such as they are now alluded to in the subtitle of our journal: hence in Conceptology, Classification (including Thesaurus Problems), Indexing, and Knowledge Representation (including the relevant Linguistic Problems and Terminology. (Dahlberg 1993 p. 1)

The reference to terminology already appears in the first issue of the KOJ in 1993, in the introductory pages: in the *Scope section*, when mentioning the willingness to accept, among others, contributions “concerning themselves with the problems of terminology in general and with respect to special fields”; and under the title *Aims*, when referring to the research area and its purposes “with special attention being given to the problems of terminology”.

Previously, this author had explored the philosophical and linguistic foundations that Terminology and KO could share (Dahlberg 1992). Dahlberg also added division 77 - *Problems of Terminology*, within class 7 – *Knowledge Representation by Language and Terminology* in her *Classification System for Knowledge Organization Literature* (CSKOL), used to classify the literature in the field (Dahlberg 1999).

With these signs, there is no further doubt about Dahlberg’s willingness to introduce terminology as one of the essential areas in constructing the semantic universe of KO. The regular publication of articles and papers specifically on intersection issues between terminology and KO (Espelt 1995; Campos 2001; Alexiev 2006; Mayr and Petras 2008; Alexiev and Marksby 2010; Woźniak-Kasperek 2014; Braz 2020) reaffirm the validity of the interdependence of both fields.

As if we needed further evidence, in volume 17 of the *Advances in Knowledge Organization* series, corresponding to the *proceedings* of the *Sixteenth International ISKO Conference 2020*, the word terminology appears 584 times in the 583 pages of the volume (International Society for Knowledge Organization 2020).

According to the consulted authors, the flow of the influences (from terminology to KO, from KO to terminology, or the bidirectional communication) is a matter that we will describe here, in the absolute certainty that it requires a more precise systematization.

The analysis of the links between terminology and KO cannot avoid the reference to the theoretical and methodological profiles of both domains to clearly determine the nature of the intersections that have occurred and can occur.

From the theoretical perspective, Espelt (1995), concerned with determining the bases that support KO subjects' theoretical/practical teaching focuses mainly on the contributions of documentation, the faceted classification theory, and terminology. Along the same line, Campos considers terminology as one of the three principal theoretical substrata, along with Ranganathan's faceted classification theory and the concept theory formulated by Dahlberg (Campos 2001).

Both authors focus mainly on describing terminology as a domain without delving deeper into the concrete links with KO. However, both make progress in analyzing the principles common to the theories on which they focus.

From a methodological perspective, recent research provides brief and rather general approaches. Alexiev and Marksby (2010) point out that almost all KO methods (empirical, rationalist, historicist or pragmatic) are applicable in the modern terminographic practice. Although these authors do not explore the peculiarities of terminology research thoroughly, they conclude that “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” (Alexiev and Marksby 2010 p. 369).

Woźniak-Kasperek (2014), on the other hand, situates the main contributions of terminology to the development of KOSs and takes the risk of saying that one of the most interesting conceptions to optimize the quality of KOSs is termontography, an approach advocated by the sociocognitive theory.

The contributions of terminology can also be found in three other areas: first, in everything related to the processes of classification and indexing, because in these practices the most accurate and appropriate names to represent the subject content of documents are discussed daily.

Second, the explicit use of terminology-based criteria by those responsible for the standards that guide the construction and revision of KOSs (*British Standard Institution* 2005; National Information Standards Organization 2005; International Organization for Standardization 2011),

allows offering consistent solutions in the selection or exclusion of terms and their relationships, as well as in the standardization of their orthographic, syntactic and morphological aspects.

The potential that may exist in the accumulated development in KO on warrants (literary, cultural, user, academic) becomes visible in the processes of selection or exclusion of terms, for example, in the selection of terms for a dictionary or specialized glossary. This implies a real contribution from KO to terminology in the reciprocal use of theories and methods.

Finally, the creation of domain trees (necessary in the process of organizing a domain and made in any systematic terminological research) has recently been valued as a particularly suitable tool in any process of mapping an area of knowledge, as in the case of the development of thesauri, subject headings lists, and other KOSs (Barité 2017 p. 97).

4 Terminological studies

As already said, Hjørland (2002) joined terminological studies with LSP (languages for special purposes) and discourse analysis as expressions of DA. This starting point opens the way to a series of questions, the answers to which are necessary to make progress in their problematization and scope.

What are terminological studies in general and in KO in particular? What do authors understand as terminological studies considered as modalities of DA? What concrete examples of terminological studies as modalities of DA have been identified? How do terminological studies as modalities of DA relate to usual research lines in the field of terminology? With what other forms of DA is it possible to combine terminological studies to establish the characteristics of a field of knowledge? Finally, does it make sense to group terminological studies with LSP and discourse analysis in the same category?

Given the characteristics of this paper, we can only aim at an initial treatment of these issues, with the possibility of expanding it in future contributions.

What are terminological studies in general and in particular in KO? It is not easy to determine the precise scope of the word ‘study’ in this context. In English, the Merriam-Webster

online dictionary, in its fifth meaning, states that *studies* are “*a branch or department of learning*” and adds that in this sense, it is often used in the plural, for example: “*American studies*” (*Encyclopedia Britannica* 2021).

On the other hand, in Spanish, Moliner establishes as the third meaning of the word: “(pl.) Conjunto de cosas que se estudian de cierta manera: Los estudios filosóficos” (Moliner 2016 p. 1114).

The expression ‘terminological’ has equally generic meanings. For Moliner (2016 p. 2494), this adjective deals with “De [o del] término o de [la] terminología”, in English “Of [or of] the term or of [the] terminology”, a general formula that is further opened up by the possibilities provided by square brackets, to incorporate any sense, relation or link to aspects of terminology or especially of terms.

Although at first *studies* could be assimilated to research literature, it seems more appropriate to consider that they refer to a more general conception of the work in an area. Thus, they reflect both the state-of-the-art (such as handbooks, dictionaries, or specialized teaching texts) and the possibilities for experimentation, innovation, or invention within a field of knowledge (the research literature itself).

Establishing the precise meaning of what can be considered a priori terminological studies seems as arduous a task as seizing Proteus and holding him forever.

Provisionally, and just to venture a basic agreement, we can say that terminological studies comprise a set of works of different nature (descriptive, analytical, speculative). This work seeks to explain general or particular aspects of terminologies or specialty languages concerning their foundations, theories, methods, applications, or products.

It is possible to add three ideas: the first is that by their nature, terminological studies may need contributions to or from other knowledge areas (lexicography, semantics and logic, for example).

The second is that not all terminological studies are directly relevant to KO. The third is that even when the presence or influence of terminological studies in KO is identified, this does not imply an automatic reference to any of the modalities of DA.

Indeed, the close links with the selection, use, and organization of terminology, both in terms of processes (classification, indexing, abstracting) and systems (thesauri, lists, taxonomies, subject ontologies, and others), it is possible to accept the existence of studies that do not intend to analyze a domain. On this basis, it is possible to ask the following question: Which are the terminological studies that authors consider as modalities of DA? Hjørland (2002) and Almeida (2021) place terminological studies in the broad areas of intersection between IS and linguistics. Hjørland warns about the relative lack of communication between both domains until now, despite having so many common issues to explore. He attributes this situation to theoretical problems that linguistics itself has. In particular, its structure with related subdisciplines affects the holistic view of linguistic phenomena. Furthermore, he mentions a certain resistance to considering sublanguages (and terminologies are ultimately sublanguages) as objects of study (Hjørland 2002).

Guimarães shows the way when he assures that terminological studies, together with LSP and discourse analysis “prestam-se para a análise de como, nesse domínio, se nomeiam conceitos, e se organizam palavras, textos e enunciados, segundo critérios semânticos e pragmáticos” (Guimarães 2014 p. 18). Following this line of thinking, terminological studies would include the set of analyses of specialized designations and their organization or conceptual structuring, based on their meanings or other useful alternative criteria.

Almeida and Dias propose a list of possibilities related to terminological studies, LSP, database semantics and discourse analysis (without making further distinctions between these fields). They summarize them as follows: terminological studies, specialized lexicography, semantics, specialized languages, relations with gender studies, construction of thesauri, and, as an important note, problems related to the efficiency of controlled or natural language retrieval (Almeida and Dias 2019 p. 30).

In the three preceding references, there remain at least two problems to solve: i) the impossibility of identifying what in particular is attributable to terminological studies, and ii) the lack of a specific and definitive list of situations in which one we can say ‘here there is a concrete application of terminological studies as a modality of DA while in this other situation there is not’.

Which are the identified specific examples of terminological studies as modalities of DA? Smiraglia (2015) has been the most exhaustive in this regard. He gathered almost a hundred

research reports on DA and classified them under the general label of ‘*Terminological studies, language for special purpose, database semantics, and discourse studies*’. He broke down nineteen papers published between 2002 and 2014 as follows: eleven papers published in the Proceedings of the international conferences of the *International Society for Knowledge Organization (ISKO)*, five articles published in the *Knowledge Organization Journal*, and three additional papers published in LIS journals.

Without prejudice to accepting that Smiraglia’s compilation (2015) corresponds to a partial and targeted sample, which may be further conditioned by the author’s particular interpretation, the fact is that having resorted to the international conferences and ISKO’s reference journal, he provided a consistent view of the selected documents.

Based on the consultation of the original documents and the stipulations of the authors themselves, Table 2 below was drawn up with the nineteen documents mentioned by Smiraglia.

It includes the authors, the publication year, the modality of DA, the methods used, the domain on which the analysis was performed, and the final product. The modality of DA is established according to Smiraglia’s opinion when it is explicit; otherwise, the type is assigned based on the technical reading of each document. Finally, data that raise doubts are presented with a question mark.

Table 2 – Terminological studies, discourse analysis and LSP according to Smiraglia (2015)

No.	Paper	Type	Method	Domain	Product
1	Ørom 2003	Discourse analysis	KOS Comparison	Visual arts and exhibitions	Results and conclusions
2	López-Huertas, Barité & Torres 2004	Terminological study	KOS Comparison	Gender studies	Results and conclusions
3	Miller et al. 2006	Discourse analysis	Critical reading of texts. KOS Comparison	KO education	Results and conclusions
4	Lin et al. 2006	Terminological study	Terminology extraction by users	Influenza virus	Prototype testing: concept map
5	Christensen 2008	Terminological study	Comparison of KO terms	Homosexuality	KOS evaluation
6	Ibekwe-San Juan 2008	Discourse analysis	Research discourse analysis	Astronomy	Area terminology according to geographic areas
7	Mustafa El Hadi 2008	Discourse analysis	Political discourse analysis	Darfur conflict	Results and conclusions
8	Barros & Moraes 2010	Discourse analysis	Comparison of two terms in handbooks	Archival science	Results and conclusions
9	Zherebchevsk & 2010	Terminological study	Term extraction from ISKO proceedings	Formalism in KO	Results and conclusions
10	Kwaśnik & Flaherty 2010	Terminological study	Term comparison in KOS	Autism	Results and conclusions
11	Jeong & Kimn 2010	Terminological study	Co-occurrence analysis. Term comparison in KOS	Biomedical information	KOS evaluation
11	Dutta et al., 2011	Terminological study	Cluster analysis	String theory	Results and conclusions

13	Gontijo et al. 2012	Discourse analysis	Critical discourse analysis	Public policies	Conceptual network for an ontology
14	Scaturro 2013	Terminological study?	KOS Comparison	Performing arts	Model for digital library development
15	Pattuelli & Rubinov 2013	Terminological study?	Case study	Jazz	Results and conclusions
16	Guimarães et al. 2014	Terminological study	Content analysis as per Bardin	Knowledge organization	Results and conclusions
17	Dodebei y Orrico 2014	Terminological study and discourse analysis	Conceptual analysis and discourse analysis	Social memory	Terminological maps
18	Campbell 2014	Terminological study?	Facet analysis	Dementia	Results and conclusions
19	Pinto, Rabelo & Giraõ 2014	Terminological study	Neofunctionalism and content analysis	Clinical record	Results and conclusions

Source: Adapted from Smiraglia (2015)

The data in Table 2 show that of the nineteen documents surveyed by Smiraglia, six correspond to research using discourse analysis. The other twelve can be classified, with doubts in some cases, within terminological studies. The remaining work presented the possibility of classification in both categories. None of the nineteen papers could easily be categorized as an example of LSP. It is possible that given the relative indeterminacy of the boundaries between LSP, terminological studies, and discourse analysis persisting in the DA literature, some of these papers could admit a different or mixed categorization.

Most of the works identified are close to the systematic terminology research modality (more or less comprehensive approach to a domain). At the same time, at least one fits in the category of studies of punctual terminology (Barros and Moraes 2010).

Comparative analyses of the terminology of an area as presented in various KOSs prevail among the former group (López-Huertas 2004; Christensen 2008; Kwaśnik and Flaherty 2010; Jeong and Kim 2010; Scaturro 2013).

Also noteworthy are several studies based on the extraction of terminology to establish different forms of knowledge representation in a domain (Lin et al. 2006; Zherebchevsky 2010; Dutta et al. 2011; Guimarães et al. 2014).

Other terminological studies propose the analysis of preexisting classifications or information organizations to extract the basis of the conceptual structure of a domain (Pattueli and Rubinov 2013; Campbell 2014).

The methods used to develop terminological studies include facet analysis, content analysis, conceptual analysis, comparison, *clustering*, and the critical appraisal of terminology extracted from different corpora.

The spectrum of domains studied is comprehensive (theories, arts, natural sciences, health sciences, political science, and social phenomena). This fact confirms the applicability of DA and, in particular, of terminological studies to any area of knowledge, by the power of conceptual representation and communication available to scientific, technical, and specialized terms in general.

In most cases, the product is a set of results described from which conclusions are drawn. For example, in some studies, a prototype is tested, while in others, the graphic visualizations of the domain studied are proposed.

Looking through the collection of the *Knowledge Organization journal* and the *Advances in Knowledge Organization* series, we get the feeling that Smiraglia could have included many other papers in his compilation. Nevertheless, the list of examples provides an approach to the scope and possibilities of terminological studies. In KO, systematic and punctual research tasks are processed through methods and techniques that have their tradition, such as facet analysis or content analysis.

How do terminological studies as modalities of DA relate to the usual research lines in terminology? Interestingly, in the IS, KO or DA literature on terminology or terminological studies, it is quite common to find reviews of their main theoretical currents (GTT, CTT, Socioterminology or Sociocognitive Theory). However, they tend to provide a summary and general explanation and establish possible connections with some of the aspects linked to KO.

However, in these papers, there is almost no mention either to the two classic aspects of terminological research (systematic and punctual) or to the techniques or methods usually attached to them, and how they could be applied or adapted to solve specific problems of KO.

The lack of studies on these specific points constitutes, for now, an obstacle to systematically insert terminological studies in the area of KO and everything related to DA. However, as was said, many of the cases studied by Smiraglia (2015) fit as a matter of fact in particular types of systematic and punctual research.

Let's consider the following two approaches to terminological research (microstructural for punctual terminology and macrostructural for systematic research). The first finding is that macrostructural approaches are naturally associated with the comprehensive mappings that aim to construct DA and can, therefore, be considered as an area of methodological exploration.

Systematic research in terminology requires a prior delimitation of the domain boundaries, the determination of a specific hardcore, and the decision on what to do with the terminology coming from other areas into the domain under study.

On the other hand, the microstructural approach proposed by terminology can also be considered as a support for the construction of a domain map through its significant units: the terms. Their particular treatment, one by one, also requires the definition of warrant criteria to validate or exclude terms and definitions (selection of a corpus, expert consultation, studies of use, and frequency of use of the language, among others).

In each of these activities associated with systematic or punctual research, it is possible to find points of support, intersection, or possible reciprocal contributions between terminology and DA.

Can other modalities of DA be combined with terminological studies to establish the characteristics of a knowledge field? It is an established opinion that each type of DA can be used autonomously or in combination with others if this contributes to the better design or mapping of a specialized knowledge area. For example, Hjørland mentions that “terminology as an approach to domain studies in IS [information science] should be combined with bibliometrical studies; historical studies; and epistemological and critical studies” (Hjørland 2002 p. 446). This is a

possibility that has to be assessed in each situation, particularly if we want to promote quantitative, qualitative, or mixed approaches in research.

For instance, in systematic terminological research, and perhaps as a derivation of traditional lexicographic methods, qualitative criteria are often considered for selecting lemmas. In this sense, bibliometric studies can provide terminology with different ways of measuring or validating this selection process based on quantitative data from the documentation.

Does it make sense to group terminological studies with LSP studies and discourse analysis in the same category? This association may be controversial since it is arguable that the three fields have a common epistemological background in their theories, methodologies, and applications. However, Hjørland provides two arguments for bringing these areas together: all three have experience in analyzing their respective relations to IS, and all three are related to language (Hjørland 2002 p. 441).

The characteristics of the article itself limit the development that this author makes of his argument. Thus, although he establishes a necessary starting point, we still lack a serious contribution that can refute or confirm with sufficient epistemological foundations.

Within the terminology discourse community, there are different opinions regarding the nature of the domain: some think it is a branch of applied linguistics, while others postulate its independence either as an autonomous discipline or as an interdisciplinary or transdisciplinary activity.

In the intersection of terminology and other fields, the links with LSP or discourse analysis have not been studied from a different perspective than, for example, the links between terminology and translation.

Therefore, as a first working hypothesis, we suggest that terminological studies have their own knowledge profile, without prejudice to recognize possible exchange levels and interoperability with LSP or discourse analysis studies.

The autonomy of terminological studies as a type of DA would allow clarifying and going deeply into the different aspects mentioned in this paper as critical or insufficiently developed points.

5 Conclusions

The history of domain analysis in KO is summarized in a growing body of original studies published over almost thirty years. During this period, the foundations of its theoretical construction and methodological potential have been laid. The latter starts with the typology proposed in 2002 by Hjørland, which has been partially discussed and extended.

As the advances are still tentative, it is possible that the general discussion on DA will continue to be open for an extended time, although on the common basis of considering the different types of DA as methodological approaches.

It is possible to insert terminological studies within the interlocution between linguistics and IS, specifically between terminology and KO. As to the visibility of this interlocution, we have to acknowledge Ingetraut Dahlberg's leadership. Since the early nineties and on a recurring basis Dahlberg brought to the table the number of possibilities that the theories and tools of terminology could offer to KO (and vice versa), through the common work they carry out around subject representation in specialized areas.

KO has focused on systematizing the processes of knowledge representation for information retrieval, and providing the rules for the construction of a wide variety of knowledge organization systems.

On the other hand, terminology has traditionally focused on criteria and methods (many of them taken from lexicology and lexicography) for the elaboration of specialized dictionaries and glossaries, and the creation of terminological databases, as well as for the development of punctual studies on a term or families of terms. Terminology and KO have served all knowledge domains from their respective scopes of action. They have had to resort, for operational issues, to disciplines such as translation, specialized communication, and technical writing, as well as linguistics and LIS.

As a particular manifestation of DA, terminological studies have received little attention in the literature to date. For this reason, in this paper, we have sought to problematize different issues whose resolution will allow to better define their conceptualization and operationalization.

Progress has been made in determining the very concept of terminological study as a particular form of DA.

On the other hand, an approximation was made to the nineteen cases explicitly recognized by Smiraglia (2015) as terminological studies of DA, in order to offer a systematic picture of the methods applied, the domains studied, and the results obtained.

From these data also emerges, as was expected, a clear predominance of systematic terminological studies over those that can be assimilated to punctual terminology research. We have hypothesized that terminological studies should be considered a completely autonomous form of DA, separating them from the established association with LSP and discourse analysis.

As this is exploratory research, the conclusions should be considered preliminary, possibly guiding future research on the subject. For example, one of the possible lines of research development is related to the question of consensus and dissension within a discourse community and how it directly impacts the orientation and outcome of the mappings.

In most scientific, social, technological, and human disciplines, we find different trends or currents of thought. Consequently, they may restrict the possibility of constructing neutral and objective languages.

The prevalence of comparative analysis in the cases studied has points of connection with this circumstance. In this way, terminological studies demonstrate the need for reliable methods and forms of interpretation to assess consensus and dissension. both in contemporary studies and analyses of the historical evolution of terminologies.

References

Albrechtsen, Hanne. "Subject analysis and indexing: from automated indexing to domain analysis". *The Indexer*, vol. 18, no. 4, 1993, pp. 221-224.

Alexiev, Boyan, and Marksby, Nancy. "Terminology as organized knowledge". *Paradigms and conceptual systems in knowledge organization*, vol. 12, 2010, pp 363-370.

Alexiev Boyan. "Terminology structuring for learner's glossaries". *Knowledge Organization*, vol. 33, no. 2, 2006, pp. 96-118.

Barité, Mario, and Rauch, Mirtha. Terminological studies as domain analysis: a critical exploration. *Brazilian Journal of Information Science: Research trends*, vol. 16, *Dossier Domain Analysis*, 2022, e02140. DOI: 10.36311/1981-1640.2022.v16.e02140

- Almeida, Bruno. “Terminologia e organização do conhecimento: linguagens, vocabulários e sistemas”. *Linha D’Água, São Paulo*, vol. 34, no. 2, mai./ago. 2021, pp. 26-46.
- Almeida, Josiana Florêncio Vieira Régis de, and Dias, Guilherme Ataíde. “Estado da arte sobre análise de domínio no campo da Ciência da Informação brasileira”. *Brazilian Journal of Information Studies*, vol. 13, no. 3, 2019, pp. 26-45.
- Barros, Thiago Henrique Bragato, and Moraes, João Batista Ernesto de. “From archives to archival science: elements for a discursive construction”. *Paradigms and Conceptual Systems in Knowledge Organization*, vol. 12, 2010, pp. 398–404.
- Barité, Mario. “Los árboles de dominio”. *Teoría y praxis en terminología*. Coordinated by Sara Álvarez Catalá and Mario Barité. CSIC, 2017, pp. 91-102.
- Beghtol, Clare. “Domain analysis, literary warrant, and consensus: The case of fiction studies”. *Journal of the American Society for Information Science*, vol. 46, 1995, pp 30-44.
- Benítez, Pamela Faber. “The cognitive shift in terminology and specialized translation”. *MonTI, Monografías de Traducción e Interpretación*, no. 1, 2009, pp. 107-134.
<http://www.redalyc.org/articulo.oa?id=265119728010>. Accessed 10 set. 2021.
- Bevilacqua, Cleci. “Investigación sistemática en terminología”. *Teoría y praxis en terminología*. Coordinated by Sara Álvarez Catalá and Mario Barité. CSIC, 2017, pp. 69-90.
- Braz, Márcia Ivo. *Panorama das contribuições da Terminologia para a Organização do Conhecimento: uma análise das teses e dissertações no Brasil a partir da Teoria da Complexidade*, 2020. Universidade Católica de Pernambuco, Tese de Doutorado.
- British Standard Institute*. Structured Vocabularies for Information retrieval: Guide: BS 8723-1. BSI, 2005.
- Cabré, María Teresa. “Theories of terminology: Their description, prescription and explanation”. *Terminology*, vol. 9, no. 2, dec. 2003, pp. 163–199.
- Cabré, María Teresa. *La terminología: Teoría, metodología, aplicaciones*. Empúries, 1993.
- Cabré, María Teresa, and Tebé, Carles. “El trabajo terminológico multilingüe de enriquecimiento lingüístico: una propuesta metodológica”. *Revista española de lingüística aplicada*, vol. monográfico, no. 1, 2005, pp. 19-41.
- Campbell, D. Grant. “The human life as warrant: a facet analysis of protocols for dealing with responsive behaviors in dementia patients”. *Knowledge Organization in the 21st Century: Between Historical Patterns and Future Prospects*. Edited by Wieslaw Babik. Ergon-Verlag, 2014, pp. 121–128.

- Campos, Maria Luiza de Almeida. *Linguagem documentária: Teorias que fundamentam sua elaboração*. EdUFF, 2001.
- Célestin, Tina, et al. *Méthodologie de la recherche terminologique ponctuelle*. Office de la Langue Française, 1984.
- Christensen, Ben. "Minoritization vs. universalization: lesbianism and male homosexuality in LCSH and LCC". *Knowledge Organization*, vol. 35, no. 4, 2008, pp. 229–238.
- Corbeil, Jean-Claude. *Guide de travail em terminologie*. Government du Québec, 1973.
- Dahlberg, Ingetraut. "Classification System for Knowledge Organization Literature". *Knowledge Organization*, vol. 26, no. 4, 1999, pp. 192-201.
- Dahlberg, Ingetraut. "Editorial: Why Knowledge Organization? The reasons for IC's change of name". *Knowledge Organization*, vol. 1, no. 1, 1993, pp. 1.
- Dahlberg, Ingetraut. "Knowledge organization and terminology: philosophical and linguistic bases". *International Classification*, vol. 19, no. 2, 1992, pp. 65-71.
- Dubuc, Robert. *Manual de terminología*. Unión Latina, 1999.
- Dutta, Bidyarthi, et al. "Study of subject domain by keyword cluster analysis based on research articles: a case study from physics". *Information Studies*, vol. 17, no. 4, 2011, pp. 195–210.
- Encyclopedia Britannica*. Merriam-Webster Inc., 2021, <https://www.merriam-webster.com/>. Accessed 10 set. 2021.
- Espelt, Constanza. "Bases teóricas en la enseñanza de los lenguajes documentales". *Actas del I Encuentro de ISKO: España, ISKO*, vol. 1, 1995, pp. 125-134.
- Felber, Helmut. "An outline of international terminological activities". *International Classification*, vol. 1, no. 2, 1974, pp. 89-91.
- Gaudin, F. *Pour une socioterminologie: Des problèmmes semantiques aux pratiques institutionnelles*. Université de Rouen, 1993.
- Guimarães, José Augusto Chaves. "Análise de domínio como perspectiva metodológica em organização da informação". *Ciência da Informação*, vol. 43, no. 1, 2014, pp.13-21, <http://revista.ibict.br/ciinf/article/view/1415>. Accessed 10 set. 2021.
- Guimarães, José Augusto Chaves, et al. "The conceptual dimension of knowledge organization in the ISKO proceedings domain: a Bardinian content analysis". *Knowledge Organization in the 21st Century: Between Historical Patterns and Future Prospects*. Edited by Wieslaw Babik. Ergon-Verlag, 2014, pp. 101–106.

- Guimarães, José Augusto Chaves, and Tognoli, Natália Bolfarini. “Provenance as a domain analysis approach in archival knowledge organization”. *Knowledge Organization*, vol. 42, no. 8, 2015, pp. 562-569.
- Hjørland, Birger. “Domain analysis”. *Knowledge Organization*, vol. 44, no. 6, 2017, pp. 436-464.
- Hjørland, Birger. “Domain analysis in information science: eleven approaches – traditional as well as innovative”. *Journal of documentation*, vol. 58, no. 4, 2002, pp. 422–462.
- Hjørland, Birger, and Albrechtsen, Hanne. “Toward a new horizon in Information Science: domain analysis”. *Journal of the American Society for Information Science*, vol. 46, no. 6, 1995, pp. 400-425.
- International Organization for Standardization. *International Standard ISO 25.964-1: Information and Documentation: Thesauri and Interoperability with other Vocabularies*. ISO, 2011.
- International Society for Knowledge Organization. “Knowledge organization at the interface”. *Proceedings of the Sixteenth International ISKO Conference: Aalborg*, Ergon Verlag, 2020.
- Jeong, Senator, and Kim, Hong-Gee. “Intellectual structure of biomedical informatics reflected in scholarly events”. *Scientometrics*, vol. 85, no. 2, 2010, pp. 541–551.
- Krieger, Maria da Graça, and Finatto, Maria José Bocorny. *Introdução à terminologia: teoria e prática*. Contexto, 2004.
- Kwaśnik, Barbara.H., and Flaherty, Marie Grace. “Harmonizing professional and non-professional classifications for enhanced knowledge representation”. *Paradigms and Conceptual Systems in Knowledge Organization*. Edited by Claudio Gnoli and Fulvio Mazzochi. Ergon Verlag, 2010, pp. 229–235.
- L’Homme, Marie-Claude. *La terminologie: principes et techniques*. Presses de l’Université de Montréal, 2004, <https://books.openedition.org/pum/10693>. Accessed 10 set. 2021.
- Lin, Xia, Aluker, et al. “Dynamic concept representation through a visual concept explorer”. *Knowledge Organization and the Global Learning Society*. Edited by Gerhard Budin, Christian Swertz, and Konstantin Mitgutsch. Ergon Verlag, 2006, pp. 367–374.
- López-Huertas, María José, et al. “Terminological representation of specialized areas in conceptual structures: the case of gender studies”. *Knowledge Organization and the Global Information Society*. Edited by C. McIlwaine. Ergon Verlag, 2004, pp. 35-39.
- Mayr, Philipp, and Petras, Vivien. “Terminology for information retrieval: effectiveness of cross-concordances”. *GESIS Social Science Information Centre*, 2008.

- Miller, Steven J., et al. “Great expectations: professionals’ perception and knowledge organization curricula”. *Knowledge Organization for a Global Learning Society*. Edited by Gerhard Budin, Christian Swertz and Konstantin Mitgutsch. Ergon Verlag, 2006, pp. 349–358.
- Moliner, María. *Diccionario de uso del español*. 4th ed. Gredós, 2016.
- National Information Standards Organization. *Guidelines for the Construction, Format and Management of Monolingual Controlled Vocabularies: An American National Standard ANSI/NISO Z39.19-2005(R2010)*. NISO Press, 2005,
http://www.niso.org/apps/group_public/download.php/12591/z39-19-2005r2010.pdf. Accessed 10 set. 2021.
- Pattuelli, Cristina, and Rubinow, Sara. “The knowledge organization of DBpedia: a case study”. *Journal of Documentation*, vol. 69, no. 6, 2013, pp.762–772.
- Robinson, L. “Information science: communication chain and domain analysis”. *Journal of Documentation*, vol. 65, no 4, 2009, pp. 578–591.
- Sager, Juan Carlos. *A practical course in terminology processing*. John Benjamin Publishing Company, 1990.
- Scaturro, Irene. “Faceted taxonomies for the performing arts domain: the case of the European collected library of artistic performance”. *Knowledge Organization*, vol. 40, no. 3, 2013, pp. 205–211.
- Senftleben, Gustavo Filsinger. “Evolución diacrónica de la terminología y disciplinas en contacto”. *Tonos digital: Revista de estudios filológicos*, no. 39, 2020, pp. 1-25.
- Smiraglia, Richard P. *Domain analysis for Knowledge Organization: Tools for ontology extraction*. Chandos Publishing, 2015.
- Smiraglia, Richard P. “Epistemology of Domain Analysis.” *Cultural Frames of Knowledge*, Edited by Richard P. Smiraglia and Hur-Li Lee. Ergon Verlag, 2012, pp. 111-124.
- Temmerman, Rita. *Towards new ways of terminology description: The sociocognitive approach*. John Benjamins Publishing Company, 2000.
- Tennis, Joseph T. “Two axes of domains for domain analysis”. *Knowledge Organization*, vol. 30, no. 3/4, 2003, pp. 191-195.
- Woźniak-Kasperek, Jadwiga. “Terminology as a picture of Knowledge Organization in a scientific discipline”. *Knowledge Organization in the 21st Century: Between Historical Patterns and Future Prospects*. Edited by Wieslaw Babik. Ergon-Verlag, 2014, pp. 305-311.
- Wüster, Eugen. *Internationale Sprachnormung in der Technik, besonders in der Electrotechnik*. Bouvier, 1970.
-
- Barité, Mario, and Rauch, Mirtha. Terminological studies as domain analysis: a critical exploration. *Brazilian Journal of Information Science: Research trends*, vol. 16, *Dossier Domain Analysis*, 2022, e02140. DOI: 10.36311/1981-1640.2022.v16.e02140

Zherebchevsky, Sergei. "Formalism in knowledge organization: thematic analysis of ISKO 10 proceedings". *Paradigms and conceptual systems in knowledge organization*. Edited by Claudio Gnoli and Fulvio Mazzochi. 2010, pp. 98-105.

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