Dossier: "Knowledge Organization: multi and interdisciplinary dialogues"

Knowledge Organization and Terminology: intersections, interlocutions and projections

Organización del Conocimiento y Terminología: intersecciones, interlocuciones y proyecciones

Organização do Conhecimento e Terminologia: intersecções, interlocuções e projeções

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Abstract

The objective of this work is to explore the space of intersection between Knowledge Organization (KO) and Terminology, with the intention of identifying the theoretical and methodological elements of one field that have been recognized as possible contributions in the other field. The research is qualitative. The space of conceptual, methodological and practical intersection between KO and terminology was established as the unit of analysis. Five variables were selected: recognition of the intersection space by the authors; identification of common or similar foundations; identified theories; identified methodologies; and, direction of theoretical and/or methodological influence, from one field to another. For each variable, several indicators were selected. An *ad hoc* corpus was established for the research. Among other final considerations, it is verified that both fields develop activities of subject representation and knowledge organization, although with different perspectives and objectives. The influence of terminology on KO is more evident than the other way around. The current state of exchange (theoretical, methodological, application) is still in an embryonic state, although there is evidence of an important potential for the development of theoretical thinking and methods that have proven to be effective in one field, to offer new solutions to pending problems in the other.

Keywords: KNOWLEDGE ORGANIZATION; TERMINOLOGY; INTERDISCIPLINARITY; QUALITATIVE RESEARCH; QUALITATIVE METHODS.

Resumen

El objetivo de este trabajo es explorar el espacio de intersección existente entre organización del Conocimiento (KO) y terminología, con la intención de identificar los elementos teóricos y metodológicos de un campo que han sido reconocidos como posibles contribuciones, en el otro campo. La investigación es cualitativa. Se estableció como unidad de análisis el espacio de intersección conceptual, metodológica y práctica entre KO y terminología. Se seleccionaron cinco variables: reconocimiento del espacio de intersección por los autores; identificación de fundamentos comunes o similares; teorías identificadas; metodologías identificadas; y, dirección de la influencia teórica y/o metodológica, de un campo a otro. Para cada variable se seleccionaron varios indicadores. Se constituyó un corpus *ad hoc* para la investigación. Entre otras consideraciones finales, se comprueba que ambos campos desarrollan actividades de representación y organización temática del conocimiento, aunque con perspectivas y objetivos diferentes. Es más evidente la influencia de la terminología sobre KO que a la inversa. El estado actual de intercambio (teórico, metodológico, aplicativo), está aún en estado embrionario, aunque hay evidencia de un potencial importante de desarrollo de pensamiento teórico y de métodos que han demostrado ser eficaces en un campo, para ofrecer nuevas soluciones a los problemas pendientes en el otro.

Palabras clave: ORGANIZACIÓN DEL CONOCIMIENTO; TERMINOLOGÍA; INTERDISCIPLINARIEDAD; INVESTIGACIÓN CUALITATIVA; MÉTODOS CUALITATIVOS.

Resumo

O objetivo deste trabalho é explorar o espaço de intersecção entre Organização do Conhecimento (OC) e Terminologia, com o intuito de identificar os elementos teóricos e metodológicos de um campo que tenham sido reconhecidos como possíveis contributos no outro campo. A investigação é qualitativa. O espaço de intersecção conceptual, metodológica e prática entre a OC e a terminologia estabeleceu-se como unidade de análise. Foram selecionadas cinco variáveis: reconhecimento do espaço de interseção por parte dos autores; identificação de fundações comuns ou similares; teorias identificadas; metodologias identificadas; e, direcionamento da influência teórica e/ou metodológica, de um campo para outro. Para cada variável foram selecionados vários indicadores. Foi constituído um corpus *ad hoc* para a pesquisa. Entre outras considerações finais, verifica-se que ambos os campos desenvolvem atividades de representação e organização temática do conhecimento, embora com perspetivas e objetivos diferentes. A influência da terminologia no KO é mais evidente do que o contrário. O estado actual do intercâmbio (teórico, metodológico, de aplicação) ainda se encontra num estado embrionário, embora haja evidências de um importante potencial para o desenvolvimento de pensamento teórico e métodos que provaram ser eficazes num campo, para oferecer novas soluções para problemas pendentes no outro.

Introduction

Knowledge organization (KO) is an interdisciplinary field. This assertion is recurrent in texts in the area. Thus, for example, Smiraglia points out that "KO is actually the domain that incorporates interdisciplinary approaches to the order of knowledge (Smiraglia, 2012, p. 226).

In the preface of a dossier that opens issue 2/3 of 2008 of Knowledge Organization Journal, dedicated especially to answering the question What is KO?, the guest editors explicitly stated the interdisciplinary nature of the field, and asked different authors to seek answers to, among others, the questions: "what fields have an interest in the defining questions of knowledge organization?" and "which epistemologies, theories, and methodologies are relevant in the knowledge organization field?" (Mcilwaine; Mitchell, 2008, p. 80). The analysis of the interdisciplinarity offered by KO and the spaces for exchange between KO and other domains also emerge in conceptual studies (Guimarães, 2017; Almeida, 2019) and methodological (Ridenour and Smiraglia, 2016).

The Classification System for Knowledge Organization Literature (CSKOL), created more than half a century ago by Ingetraut Dahlberg to classify the literature in the area, which continues to be updated by the International Society for Knowledge Organization (ISKO), shows in its decimal structure the variety of disciplines and areas of study that come together in the development of theory and research in KO. A quick look at the general outline of the system allows us to identify, among others, disciplines and thematic fields such as "mathematics, systems theory, psychology, science in general, semantics, grammar problems, online retrieval systems and technologies, terminology, translation" (Dahlberg,

2006, p. 15). In recent years, even a book has been published that directly addresses all the interdisciplinary issues related to KO (Szostak, Gnoli, and López-Huertas 2014).

Moreiro (2019) states that "in interdisciplinarity, various areas contribute their concepts, methods and practice to the common study of an object that is different from the objects of study of each of them" (Moreiro, 2019, p. 169, our translation). The process of epistemological and theoretical construction of the field of KO seems to clearly adjust to this process. According to Hjørland (2008), KO is related in different ways to "computer science, linguistics, natural language processing, theory of knowledge, theory of social organization, terminology, cognition and communication" (Hjørland, 2008, p. 98). For his part, Smiraglia establishes that KO has the closest bridge with the area known as information retrieval, since "without that which is learned in knowledge organization, information retrieval cannot work" (Smiraglia, 2014, p. 3). Both authors are explicit in establishing that, beyond the disciplinary intersections that have been consolidated over time, KO is located at the very heart of Information Science - IS- (Hjørland, 2008; Smiraglia 2014).

Terminology is also an area of interdisciplinary construction. In his classic manual, Cabré (1993) dedicates an entire chapter to the interdisciplinary subject matter of which it is composed. There he highlights the contributions and links with linguistics (both theoretical and applied), lexicology and lexicography, cognitive sciences, communication, computer science and documentation (a discipline, the latter, that shares many of the flags and territories that gave rise to IS. Krieger and Finatto (2004) add to this list semantics and translation as two other disciplines that contribute to the evolution of the field. On the other hand, Fedor de Diego (1995) and Antia (2000) also incorporate the perspectives of conceptology (or concept theory) considering that, although the object of study of terminology are the terms, their very existence refers to the concepts that are the hidden face of each term. The concepts are what, ultimately, weave the semantic networks that all terminological research requires.

Different works that explore the links between KO and terminology have appeared in scientific journals or have been presented at conferences and other events since the late 1990s.

The authors have sought to outline both fields, from the eighties of the last century to the present, especially in the field of KO. There is a growing awareness that both fields have evolved in parallel, each in its own lane, using similar theoretical and methodological elements, although with different scopes and purposes.

The authors have sought to outline both the common concerns of both fields, as well as the possible interactions that can occur, in theories, methodologies and applications, with special attention to the learning and lessons that specialists in one area can take from the other. The path taken so far has attempted to identify the effective collaborations that have occurred in the last thirty years between both thematic fields, as well as seeking to project from one field to the other, theories and methods that avoid 'reinventing the wheel' in one of the disciplines, simply by ignoring the advances made in the other.

This article is inserted in that line of exploration, providing a systematization of the authors' thinking, which contributes to organizing the space of dialogue between terminology and KO.

Objectives

The general objective of this work is to explore the space of intersection that exists between KO and terminology, with the intention of identify the theoretical and methodological elements of one field that have already been recognized as possible contributions in the other field.

Two specific objectives are pursued:

-To consolidate the permanent dialogue between KO and terminology, as thematic areas that participate in the processes of naming, structuring and representing concepts in specialized areas.

-To offer a corpus of literature that is available to specialists in both fields of knowledge, who are interested in deepening the intersection between the two fields, and expanding their theoretical, methodological and application toolboxes.

Methodology

The research is qualitative. The following methodological stages were followed to obtain results:

-The conceptual, methodological and practical intersection space between KO and terminology was established as the unit of analysis. The following five variables were considered: recognition of the intersection space by the authors; identification of common or similar foundations; identified theories or theoretical currents; identified methodologies; and, direction of theoretical and/or methodological influence from one field to another.

-Formation of a corpus of analysis in English, Spanish and Portuguese. In the case of KO, the search for papers was carried out in the complete collections of International Classification, Knowledge Organization Journal, and in the Advances in Knowledge Organization series, which brings together the proceedings of ISKO's international congresses. Likewise, the proceedings of the biennial congresses of the ISKO-Brazil, ISKO-Iberian and ISKO-USA+Canada (ISKO-NASKO) chapters were taken as sources. Texts by leading authors in the area were added, taken from the bibliographical references of previous works. In the sources, the occurrences of the term 'terminology' were located, preferably in the titles and abstracts of the works, since in a previous search it was verified that said term appears continuously in the KO texts, but almost only with the meaning of 'set of terms of a specialty'.

In the case of terminology, a search was conducted in the most widely used manuals at international and Latin American level (Ferber, 1984; Sager, 1990; Cabré, 1993; Arntz, and Picht, 1995; Fedor de Diego, 1995; Krieger and Finatto, 2004). Searches were also conducted in the following specialized journals on terminology available on the Internet, for the period 2014-2024: Debate terminológico (Brazil), Terminàlia (Catalonia) and Meta (Canada). The search was conducted using the following keywords in English and their equivalents in Spanish, Portuguese and Catalan: knowledge organization, library science, information science and documentation.

-Establishment of the variables, all of them qualitative in nature, and of the indicators associated with each variable, according to the following detail:

Indicators for the variable "Recognition of the intersection space by the authors": generic mention; description of the intersection space; analysis of the intersection space.

Indicators for the variable "Identification of common or similar foundations": epistemological and theoretical foundations; methodological and application foundations; linguistic and semantic foundations.

Indicators for the variable "Theories or theoretical currents identified": classical theories of terminology; modern theories of terminology; theories originating in KO.

Indicators for the variable "Methodologies identified": methodologies for the construction of domains; methodologies for the selection and representation of terms.

Indicators for the variable "Direction of theoretical and/or methodological influence, from one field to another": influence from terminology to KO; influence from KO to terminology.

-Analysis of the results and preparation of their graphic presentation.

Results

Below are the results by indicators for each of the variables established in this research. All the transcriptions and references that are made arise from the sources of the selected corpus.

Indicators for the variable "Recognition of the intersection space by the authors"

General mention: According to Fedor de Diego (1995, p. 62), the need for collaboration between information and terminology professionals has been evident since the 1930s, within the framework of the activities carried out by what is now called the International Federation of Information and Documentation (FID). The FID was created to facilitate access to documentation, and to this end

the Universal Decimal Classification (UDC) was created within its scope, one of the most widely used classification systems in the world. Eugen Wüster, who is still considered the father of terminology, and other specialists such as Danker Duyvis and Otto Frank came together in the FID. At that time, the importance of standardizing scientific and technical vocabulary for various purposes was already recognized, both considering the need to create technical standards for the technological and industrial development of processes and products, and to ensure specialized communication free of ambiguities, within a language, but also in relation to translation and cooperation between different languages.

When Wüster established the conceptual foundations of his terminological theory, he identified information sciences as an integral part of the interdisciplinary constitution of terminology (Krieger and Finatto, 2004, p. 58). He was also the first to make visible the advantages of this situation for the two thematic fields involved.

In parallel, and particularly from the 1980s onwards, the constant evolution of information and communication technologies promoted the rapid development of programs and applications aimed at improving the mediation between documents and users and access to specialized information (Fedor de Diego, 1995). IS accompanied this process, which had in particular its critical knots in relation to linguistic, semantic and graphic obstacles, knots that have not yet been fully untied, despite the advances in new areas such as Natural Language Processing (NLP) or Artificial Intelligence (AI), and metadata management.

KO and terminology have been at the very epicentre of these problems, developing their theories and methods in parallel spaces, although with sporadic interactions or, at least, mentions in their respective bodies of literature, on the importance of linking both fields (Budin, Galinski, Nedobity and Thaller, 1988; Cabré, 1993; Hjørland, 2023).

Cabré always conceived of terminology as a necessary gear for documentation work (Cabré, 1999, p. 233). Other authors, such as Hjørland (2023), have also identified spaces for theoretical and methodological collaboration from KO to terminology. Because of this reciprocal assistance, "most terminologists

nowadays believe in the effective marriage between terminology and KO" (Alexiev and Marksbury, 2010, p. 363).

Knowledge Organization, the official publication of ISKO, published since 1993 under that name, formerly 'International Classification', and which constitutes the main repository of scientific production in the area throughout the world, always carried as a note of scope the phrase: "international journal devoted to concept theory, classification, indexing and knowledge representation". Within those boundaries, and at least from 1993 to 2009, in each issue of the journal a note was added in which the editors declared their desire to integrate "the special literature relevant to classification (that) was published in piecemeal fashion, scattered over the numerous technical journals serving the experts of the various fields. And among those fields he specifically mentions terminology.

When Hjørland (2002) determined his eleven approaches to domain analysis, in one of them he brought together terminological studies, language for special purpose (LSP), database semantics and discourse studies. He pointed out that "information professionals have always had an intimate relationship with problems related to terminology, semantic relationships and similar problems of a linguistic nature. Thesaurus construction, problems related to the retrieval efficiency of controlled as well as natural language, etc., are obvious examples of this relationship" (Hjørland (2002, p. 441). This sequence demonstrates the awareness -continuous over time- that researchers have always had about the relevance of the interaction between KO and terminology.

Description of the intersection space: Naturally, it is one thing to recognize an intersection space between both fields, and another thing to describe its characteristics and scope. Based on the literature review carried out, it can be stated that the intersection space between KO and terminology is defined by the following four axes: the management of terms and their corresponding concepts; the processes of registration, ordering, classification, indexing and summary; the production of terminological works; and the reference to documents as a source of authority and legitimation of terminology.

Regarding the management of terms (and consequently, of their concepts), Woźniak-Kasperek (2014) points out that "the triad concepts÷terms÷semantic

interrelations is an important tool (organum) to organize knowledge in a given discipline and afterwards to create the image of KO in a knowledge organization system" (Woźniak-Kasperek, 2014, p. 309). In terminology, it is widely accepted that terms constitute the object of study, just as it is accepted in the field of KO that terms (renamed under names such as descriptors, keywords, subject headings and tags) constitute the raw material necessary for the construction of knowledge organization systems.

With regard to the processes of registration, ordering, classification, indexing and summarization, it can be said that these qualified activities, which require expert professionals, are key in libraries, archives, museums and other information centres, for the subject information retrieval by users. This quality traditionally appreciated in libraries, has extended its potential to all areas (corporate, governmental, cultural, professional) where decisions must be made based on current, reliable and well-organized terminology. As Krieger and Finatto (2004) point out,

> the main focus of documentation is on the specialized lexical component that, to a large extent, integrates the indexing language of documents registered in library databases. In contrast, theoretical and applied studies of terminology are validated to the extent that they describe and cover the terms in their real contexts of occurrence, that is, in specialized texts that, in principle, integrate the library collections, which are also specialized (Krieger y Finatto, 2004, p. 58, our translation).

Within this context, Dahlberg (1992) 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" (Dahlberg, 1992, apud Alexiev & Marksbury, 2010, p. 363).

The production of terminological works, for its part, constitutes an expected result in either of the two fields. In the case of KO, these are tools that mediate between the specialized vocabulary present in the documents and the language of the users of an information system. Thesauri, lists and other knowledge organization systems (ontologies, web taxonomies and classification systems) constitute the classic formats of this mediation (Abbas, 2010; Raghavan and Krishnamurthy, 2013). In contrast, in terminology, the works produced (particularly dictionaries, glossaries and specialized vocabularies, and more recently terminological data

banks) are the final product of terminological activity, and aim to resolve doubts about the concept, interpretation, validity or scope of the terms.

From Hodge (2000) onwards, specialized dictionaries and glossaries are considered, in a broad sense, to also be knowledge organization systems (Alexiev, 2006; Soergel, 2009; Zheng, 2022; Salatino et al, 2024). In this way, at least from the most contemporary approaches, the conceptual gap between terminological works per se, intended for specialized consultation, and terminological works intended for the organization of knowledge and the information retrieval by subject, has been reduced. As mentioned, another axis of interaction between KO and terminology is the reference to documents as a source of authority and legitimation of terms, in both thematic fields. In the case of KO, this foundation is known as literary warrant (Beghtol, 1986; Barité, 2018).

In the terminological field, this criterion does not receive a particular name, but it is mentioned in practically all manuals and methodological texts (Felber, 1984; Cabré, 1993; Krieger and Finatto, 2004).

Analysis of the intersection space: Although KO and terminology are distinguished by having different purposes, some authors express their concern about finding common territories that allow the development and enrichment of the intersection space. These shared areas include the analysis and comparison of the theoretical and methodological bases of both fields to promote interdisciplinary approaches and knowledge-oriented terminography (Alexiev and Marksbury, 2010, p. 363), research on the convergence of common foundations and their potential, which will be seen in the next subchapter (Hjørland, 2023), the terminological organization of disciplines and domains of knowledge and the various purposes that justify and guide it (Woźniak-Kasperek, 2014, p. 309), the use of terminological works for classification and indexing purposes (Hodge, 2000), and training in terminology within the scope of KO postgraduate courses (Barité, Parentelli, Rodríguez Casaballe and Suárez, 2023).

For his part, Sager (1990) mentioned numerous similarities between terminology and IS, which he described as surprising and which he analysed in some detail: both are applicable sciences; both fields, being very young, continue to expand their theoretical foundations and their areas of application; both aim to solve

problems of preferably specialised communication; specialists in both areas subject language to regularisation and normalisation processes to make communication more effective; and both fields require new software technologies with similar characteristics and functionalities (Sager, 1990, p. 25ff.)

Indicators for the variable "Identification of common or similar foundations"

Epistemological and theoretical foundations: Thirty years ago, Espelt (1995) had already mentioned the proximity between terminology and documentation, arguing that the two areas are mainly based on specialized texts, and broadly speaking they share some of their final objectives, particularly that of promoting specialized communication in all possible ways. Espelt also mentioned the prevalence in the two areas "of the technical aspect over the scientific" (Espelt, 1995, 126), to highlight the weight and the demands of terminographic practices, as well as classification and indexing practices, in the orientation of these two thematic fields.

As a reaffirmation of his arguments, Espelt (1995) established that

> one of the functions of (…) terminology is to organize concepts by establishing relationships, to create conceptual maps, called concept systems. The main application of this methodology in the documentary area is the creation of documentary languages (Espelt, 1995, p. 127, our translation),

today known as knowledge organization systems.

A few years later, Hjørland (2002) postulates that "language and terminology are very important objects for IS because they affect our thinking and thus the questions we put to databases as well as the texts we search" (Hjørland, 2002, 446).

After recognizing that both fields have had a similar and parallel process of evolution, Alexiev and Marksbury (2010) point out that

> 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 (Alexiev y Marksbury, 2010, p, 363).

For his part, Cabré finds a common epistemological attribute in that both documentation and terminology behave as transdisciplines, since both are at the service of each and every one of the specialties of science, technology and human activity. In other words, everything they analyse, develop and produce makes sense to the extent that it has a direct reference to each and every one of the disciplines of knowledge. Therefore, neither terminology nor documentation could be justified without this orientation (Cabré, 1993, p. 111).

In a recent work, Hjørland identifies other areas of convergence, and points out that both fields tend to take their point of departure in theories of concepts, in relations between concepts; both are practice-oriented, and both consider information retrieval as among their goals (Hjørland (2023).

Among the authors, there are arguments to propose the idea that terminology is organized knowledge (Alexiev and Marksbury, 2010), as well as to affirm that KO is a field that is substantially based on the terminology of the specialties, since its main objectives are the organization, structuring and representation of knowledge, objectives that are achieved only through standardized forms such as descriptors, subject headings and labels, that is, terms (Cabré, 1993, p. 112).

When Felber (1984) states that the terminologies are fundamental for the ordering and the structuring of knowledge, the transfer of knowledge, skills and technology, the formulation, dissemination, translation, abstracting and condensing of scientific and technical texts, and the storage and retrieval of scientific and technical information, he summarizes with precision and clarity many of the common issues that justify the existence and usefulness of the terminology and KO.

Methodological and application foundations: From the perspective of terminology, Krieger and Finatto (2004) recognize that the use of technical and scientific terms, duly formalized and organized, is the normal practice to facilitate user access to documentary sources in libraries, in the understanding that "these lexical units perform two essential functions: the representation and transmission of specialized knowledge" (Krieger and Finatto, 2004, p. 59, our translation).

From the perspective of KO, Espelt had already noted a few years earlier that "the methodology for developing thesauri follows a methodology very similar to that for developing vocabularies" (Espelt, 1995, p. 12, our translation).

The methodologies and applications are different, but they have a visible proximity and similarity because, first of all, both fields need to develop methods to obtain satisfactory terminological mappings of the areas of knowledge they decide to study. Secondly, they require a background in disciplines such as linguistics and translation to adapt the terms to the standards of each language, and also to protocolize the analysis and processing of neologisms; and they need lexicography and the classification of sciences, to establish organized lists of these terms, both in an alphabetical order, by random nature, and in knowledge structures that relate the terms to each other considering their conceptual proximity (Iyer, 2012, p. 70).

Linguistic and semantic foundations: The need to find common linguistic foundations focuses on terms, conceived as tools for recording, mediation, communication and thematic recovery. Terms are made up of a word, or a set of words that together represent(s) one (and only one) specialized concept. Each term subsists to the extent that it is transformed into the visible sign of a concept. There can be no term without a concept, and at the same time, it is not possible to visualize a specialized concept if there is not at least one term that expresses it.

From a strictly linguistic perspective, every term is subject to the grammatical, syntactical and orthographic norms of a language. It also supports the problems of interpretation and communication that are a consequence of the proliferation of synonyms, variants, neologisms, regionalisms and linguistic alternatives. From a conceptual perspective, every term has its own semantic load, which may be affected by different scopes or interpretations, depending on theories, currents, authors, or the still insufficient knowledge on a subject.

Therefore, Cabré states that "a term is the association of a form and a content; the content corresponds to a set of features coinciding with a cognitive node of a given conceptual structure and always in a specialized context" (Cabré, 1999, p. 134, our translation). She also points out that "terms are always thematically specific, so that there is no term without a field that accommodates it, nor a

specialized field without terminology" (Cabré, 1999, p. 134, our translation). These statements, which are valid both in terminology and in KO, help to understand the coincidences in the linguistic and semantic foundations in both fields, and the possibility of generating common perspectives.

Part of the path towards a confluence is done, because as Alexiev and Marksbury point out,

> 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 (Alexiev and Marksbury, 2010, p. 368).

The gradual construction of a common terminology is a step forward in the process of academic and scientific collaboration between terminology and KO, because it assumes certain conceptual agreements, and facilitates the comprehensive and critical reading of texts from one area by specialists from the other.

Indicators for the variable "Identified theories or theoretical currents"

There is an evident recurrence in the enumeration and description of the theoretical currents of terminology in the sources consulted for this research.

Classical theories of terminology: In principle, there is a common reference to the General Theory of Terminology (GTT), formulated by Eugen Wüster, based on his doctoral thesis of 1931 (later published in 1970), as well as several references to other classical theoretical schools, which are more or less subsidiaries of the GTT. In particular, the Vienna School, the Prague School and the Soviet School or Moscow School are mentioned. The development of the theoretical and procedural aspects of these classical schools is sufficiently explained in various texts (Campos, 2001, p. 60-65; Fedor de Diego, 1995, p. 18 ff.; Alexiev and Marksbury 2010; Woźniak-Kasperek, 2014).

The characteristics and premises of GTT include: the independence of terminology and terminography (i.e., the theoretical and practical aspects of the field) in relation to lexicology and lexicography; the need to accompany the evolution of science, technology and industrial processes from specialized language, in order to promote communication; the prescriptive spirit of the regulations of specialized language, and within this framework, the development of the principles of univocity and monoreferentiality (a name for each concept and vice versa), and the economy of language as an objective to be fulfilled.

Wüster paid attention to both the theoretical aspects of concept construction and the logical, ontological and causal relationships between terms, always within a normative conception of terminology (Felber, 1984; Fedor de Diego, 1995, Campos, 2001). The theories that have their origin in Wüster's ideas are those that have had the greatest influence in the area of KO, both for substantial reasons (the tendency towards normativity and vocabulary control), as well as for reasons of disciplinary policy (for example, the development of public libraries in the Soviet system, based on the development of the Universal Decimal Classification, developed with the support of the FID (San Segundo, 1996, p. 127 ff.).

Modern theories of terminology: Since the 1980s onwards, other theoretical lines have appeared in various parts of the world. Within these contemporary conceptions, it is essential to mention the contributions of the Catalan María Teresa Cabré, inspiration and promoter of the recovery of the Catalan language after Franco's dictatorship, during which this language was prohibited in educational centres, in the press and in the culture of Catalonia. Cabré promoted from TERMCAT (https://www.termcat.cat/es), the publication of dozens of dictionaries specialized in the Catalan language, while from the academy (Universitat Pompeu Fabra), she developed a set of theoretical works that finally came together in the so-called Communicative Theory of Terminology (CTT), which according to Cabré, she developed as she identified the inadequacy of the GTT solutions to contemporary terminological problems (Cabré, 1993, 1999). The main alternatives offered by the Cabré school are the incorporation of descriptive forms -rather than normative- of analysis and formalization of terminologies, attention to specialties that are not strictly scientific-technical, a communicative approach focused on people and their needs, and the emphasis on the

interdisciplinary and transdisciplinary possibilities of terminology, to enrich its final products (Cabré, 1993, 1999, 2017).

Other innovative theoretical bodies have also emerged from the need to overcome the inadequacies of GTT, particularly the socioterminological and sociocognitive currents. Gaudin (1993) was the one who promoted socioterminological approaches within terminology, emphasizing the sociocultural variants of specialized language. In the case of the sociocognitive current (Temmerman, 2000), the author proposed five terminological principles, replacing five Wusterian principles, "which she considers unfeasible, since they focus exclusively on the standardization of terminological work and not on a real description of the terms found in certain disciplines such as life sciences" (Filsinger, 2020, our translation). Another interesting feature of the sociocognitive approach is that Temmerman proposes the alternative of describing ontologies with terminological information, from a perspective that she called thermontography. At this point, the sociocognitive approach comes near in its strategies, the organization of knowledge through ontologies (Alexiev and Marksbury 2010; Woźniak-Kasperek, 2014).

Theories originating in KO: All the terminological theories mentioned above, and even others in full evolution, such as the frame-based terminology (Faber and López Rodríguez, 2012), or the cultural terminology movement (Diki-Kidiri, 2008), surely compatible with the cultural warrant principles (Beghtol, 1986; 2002), are the subject of attention and interest in the KO literature. Periodically, works appear that describe the scope of these theories, and project their usefulness in the field of KO. In various texts, these theories are taken as references or inspiration to think about possible spaces for collaboration. However, there are almost no texts in the field of terminology, except those mentioned in the section on the common foundations between the two most general fields (linguistics and IS) or more specific ones (terminology and KO), in which a concern of terminologists to explore, explain and incorporate theoretical elements of KO into their work spaces is expressed.

However, there have been explicit offers from KO: Jacques Maniez, a French linguist who wrote texts on the construction of knowledge organization systems, attempted to bring the theory of vocabulary control closer to terminology

(Maniez, 1976). Recently, the domain-analytic approach has also been proposed to offer solutions to specialized terminological works in disciplines with universal scope, as well as to others guided by sociological, sociocognitive and cultural conceptions (Hjørland, 2023). These offers have so far had little echo among terminologists.

Indicators for the variable "Identified methodologies"

The similarities and correspondences between KO and terminology also extend to methodological approaches. Indeed, in both fields there are two orientations: the first, aimed at organizing and formalizing the conceptual structures of the domains of knowledge; the second, aimed at establishing rules for the formalization of each term. In KO, the first orientation, focused on the construction of conceptual structures such as knowledge organization systems, is the one that prevails, although there are also rules for graphic formalization and guidelines for the creation of descriptors and subject headings.

In Terminology, there is a greater concern for the analysis of each term in particular, and long-standing lines of research on, for example, the study of neologisms, their validation and their forms of incorporation into target languages. KO focuses on literature-based research, while "terminography focuses on research is terminology-based knowledge organization research, which requires high precision and multidimensional conceptual analysis" (Zheng, 2022, p. 152). Beyond this methodological convergence in the treatment of terminological structures, on the one hand, and terms on the other, the areas have different ways of establishing protocols for methodological prescription or orientation. In the case of terminology, there are some ISO technical standards (or their corresponding ones in different countries) that regulate the management of terminology; among them the most general one (International Organization for Standardization, 1987a), and others more specific (for example, International Organization for Standardization (1987b).

Methodologies for constructing domains: In KO there is a tradition that goes back several decades, whereby the terminological operations of vocabulary control are prescribed from standards and norms of high formality for the construction of

monolingual or multilingual vocabularies (NISO, 2010, British Standard Institution, 2005; International Organization for Standardization, 2011-2013). The North American standard formulates principles for the creation of thesauri, web taxonomies, lists and rings of synonyms (NISO, 2010), although by extension the rules established can be used to create other similar tools for classification and indexing, such as ontologies, conceptual maps and classification systems. The teams that build these systems or schemes add to the common fund of standards, the rules specific to the structure and management of each controlled vocabulary.

In the field of terminology, since the typical products are specialized dictionaries and glossaries, it is natural that existing methodologies mark the stages of elaboration and development of this type of work. In this sense, terminology has benefited from the teachings of lexicography, with its centuries-old tradition of preparing dictionaries of different languages. In addition, there are more detailed methodological explanations, which are given through terminology manuals (Felber, 1984; Célestin, Godbout and Vachon-L-Hereux, 1984; Auger and Rousseau, 1988; Cabré, 1993; Sager, 1990; Alpízar, 1997), and tutorials on the management of terminology databases. The ISO standard on principles and methods of terminology provides generic guidance when it states that "the terminology of a domain (...) should not constitute an arbitrary set of terms, but rather a coherent terminological system corresponding to its notional system" (International Organization for Standardization, 1987, p. 11, our translation). In terminology, the methodological work carried out to develop the conceptual and terminological structure of a domain is known as systematic research (Bevilacqua, 2017, 69 ff.).

It is important to mention that the conceptual construction of a domain is carried out by exhausting the network of relationships that each term has with others, and that, by accumulation and linking, it ends up forming the map of the domain, with the scope and depth that terminologists have previously established. In this way, no term belonging to the domain can be left orphaned, that is, isolated from the network of conceptual relationships identified. These relationships can be hierarchical (where 'a' is a part or a kind of 'A') or associative, where 'a' is related in some non-hierarchical way to 'b' (Antia, 2000, p. 139 ff.).

Methodologies for the selection and representation of terms: In KO, the representation of terms requires guidance at two levels: the first corresponds to the formal aspects that must be met so that the terms can be considered descriptors, subject headings or tags (singular or plural, idiomatic principle, maximum number of words that a term can have, etc.). The second refers to the control of synonyms, which implies in many cases, choosing a synonym that will be preferred to be considered as a descriptor. The rules for resolving formal aspects and problems posed by synonyms and polysemic terms are found in standards such as those mentioned above (NISO, 2010, British Standard Institution, 2005; International Organization for Standardization, 2011-2013).

In terminology, on the other hand, the guidelines for determining the graphic form of the terms are as important as those that guide the elaboration of definitions for each term. In this last point, the traditional lexicographic method of elaborating definitions, also known as the Aristotelian method, is also of primary interest. The definitions thus constructed start from the genre to which the definiendum belongs, and phrases representing attributes are added, each one more specific than the previous, until a precise explanation of the definiendum is found (Berg, 1982).

On the other hand, it is worth highlighting the growing importance of the so-called specific terminological research, which is that which focuses on a single term, or on a very limited number of terms (Célestin, Godbout, and Vachon-L'Hereux, 1984). This type of research seeks to analyze the etymology, traceability, different spellings, conceptual scope, list of synonyms and any other information that may be useful to facilitate understanding. It is usually carried out on neologisms that are beginning to be used, sometimes in a dizzying and viral manner, and about which there may not be sufficient information in specialized texts (dictionaries, manuals, etc.). In a broad sense, any literature review on a specialized concept constitutes the result of a specific terminological research process.

As can be seen, KO and terminology can demonstrate a transcendent methodological tradition for the formation of conceptual structures of domains, as well as for term-by-term analysis. However, although the respective

methodologies are very similar, each field has been developing them in its own way.

Indicators for the variable "Direction of theoretical and/or methodological influence, from one field to another"

Influence from Terminology to KO: Several authors agree in stating that GTT, promoted by Wüster, has had a lasting influence on the creation of controlled vocabularies, and on the development of standards and norms to standardize the terminological structures of these vocabularies. Thus, Cabré mentions that one of the services that terminology provides to documentation is to provide standardized terminology to index documents, conferring systematicity and univocity (Cabré, 1993, 112). Fedor de Diego (1995) lists the benefits of the influence of the Wüsterian principles in the development of controlled vocabularies: better organization of the information system, better compatibility between the terminology of the processed document, the terminology of the information system and the terminology used by the user, facilitation of the terminological analysis of texts, and the assignment of descriptors, among others. (Fedor de Diego, 1995, p. 63-64).

For Wozniak-Kasperek (2014), it is not only GTT that is important for its use in KO. This author understands that both the sociocognitive approach and thermontography can provide solutions to some of the problems related to the analysis of knowledge structures. In the latter case, he points out that

> a key view in termontography is that knowledge analysis should precede the methodological processes which are generally conceived as the starting points in terminography, i.e. the compilation of a domain-specific corpus of texts and the knowledge included in them and the understanding and analysis of the categories that occur in a certain domain (Wozniak-Kasperek, 2014, p. 310).

However, Braz (2020), in his survey of Brazilian IS theses that analyze terminological theories for different purposes, provides evidence that CTT

receives greater attention in Brazil, both in postgraduate training and in the research potential it can offer in KO.

From a methodological point of view, Barité (2017) finds a natural and immediate utility in the development of domain trees for the construction of thesauri, ontologies and other controlled vocabularies. The notion of a domain tree has been in place for at least forty years in terminology (Auger et Rousseau, 1978), and its inclusion in the methodology for creating glossaries and dictionaries constituted a turning point regarding the influence of lexicography on the way of conceiving the development of specialized glossaries and dictionaries. Indeed, the lexicographic matrix of terminology led to the consideration of almost exclusively alphabetical organizations of terms, while domain trees forced us to look back at the taxonomic presentation of the notions specific to a field of knowledge.

In terminology, a domain tree is a graphic representation containing a vertical structure of concepts, and constitutes a basic scheme of the internal composition of an area of knowledge (De Bessé, Nkwenti-Azeh & Sager, 1997). For this reason, Krieger and Finatto state that the domain tree "is a hierarchical diagram composed of key terms of a specialty, similar to an organizational chart" (Krieger and Finatto, 2004, p. 134). In its formal expression, the domain tree is -then- a variety of taxonomy, since it only establishes hierarchical relationships between its elements, each element being a term. It is important to note that the creation of a domain tree is a stage in the process of creating a work or a terminological product; it therefore corresponds to a phase of a method. Today, these domain trees are included in the preliminaries of the publication that is the result of terminological research, in order to make part of the methodology visible and, above all, to offer the reader a general view of the field, its structure and its boundaries (Barité, 2017). Due to its nature and function, the creation of a domain tree can easily be incorporated into the process of build controlled vocabularies.

On the other hand, the experience accumulated in terminology with the creation of terminological banks, which are currently the source of registration, validation and consultation in different areas, and which constitute the necessary basis for the publication of specialized glossaries and dictionaries, also offers opportunities to KO specialists.

These banks can be used to manage the terminology of an area, through clear solutions for the incorporation of neologisms, the identification of obsolete terms, the aid of definitions that clarify the scope of the concepts and help overcome the ambiguities of the language, and the contexts of use of each term. As each piece of data has a certain date, these banks allow the analysis, comparison and explanation of the evolution of the disciplines in which a bank specializes. A paradigmatic example of a TDB is IATE (Interactive Terminology for Europe), the terminology bank of the European Union (https://iate.europa.eu/), which brings together some seven million terms, translated into the twenty-six official languages of the UAE.

In KO, at least the Universal Decimal Classification has the support of a TDB of these characteristics to manage the terminology of the classification system, which is known as the Master Reference File (Barát, 2012). Finally, terminology can provide a refined methodology for selecting a research corpus, as well as methods and techniques for term extraction and selection, all of which can be used in the creation of thesauri, taxonomies and lists (Sager, 1990; Arntz and Picht, 1995, p. 300 ff.).

Influence from KO to Terminology: Although it is understood that there is a two-way path between terminology and KO (Cabré, 1993; Alexiev, 2006), to date terminologists have not demonstrated that they recognize the specific territory of KO and its possibilities. The references made from terminology involve documentation or IS as a whole, but not KO in particular.

What actually happens in the development of terminological research is that terminologists prefer to privilege the content of documents (especially scientific, technical and specialized documents) as a source of search and data extraction. There is some occasional reference to the use of oral sources to track terms and their meanings, especially consulting experts if necessary (Fedor de Diego, 1995, p. 103). In any case, the usual methodology is through the creation of documentary corpora. Terminology specialists then appeal to what is called literary warrant in KO, as a principle and method, as already mentioned.

Cabré mentions this methodological approach explicitly:

> Technical documents are the basis of terminological work, because they contain the terms that are actually used by specialists. "The names that the terminologist must collect are found in the documents, and through them the terminologist informs each term in relation to its semantics, function, form and situation, to then proceed to an appropriate denominative proposal" (Cabré, 1993, p. 113, our translation).

Outside of these specific situations, the contributions that KO can make to terminology are still at the level of speculation. Those of Alexiev and Marksbury are frankly optimistic, when they mention that "practically all modern KO methods are fully applicable to the modern practices of terminology in general and terminography in particular" and that "all four fundamental methods of KO (empirism, rationalism, historicism and pragmatism) are also usable in terminology processing" (Alexiev and Marksbury, 2010, p. 368-369).

As mentioned above, Hjørland also offered the domain-analytic approach, in all its variety of methodologies and approaches, to support terminology-based works specialized in a particular domain of knowledge (Hjørland, 2023). Finally, Zheng argues that "the related research on the terminography in the field of KO focuses on taking the thesaurus, ontology and other KOS specific construction methods or technology research and development as the mainstream" (Zheng, 2022, p. 152). Beyond this verification, Zheng strongly argues for the possibility that in the future, KO related theories, although still huge and loose, can collaborate with terminology through three of their fundamental properties: systematicity (demonstrated in the methodological developments of vocabulary control), functionality (oriented to the diversity of situations in which documentation and information need to be treated and organized), and adaptability (proven in the versatility with which KO has been adapting to the profound technological transformations of the last thirty years) (Zheng, 2022, p. 153).

Final considerations

The thematic proximity between KO and terminology has been identified since the beginning of the eighties of the last century, in texts of different nature, which have been published mostly within the KO literature. On the contrary, only in some internationally used manuals and in a small number of articles in

terminology journals are there works, generally descriptive, on the relationships, not between terminology and KO, but between terminology and documentation. For this reason, there is a greater concern to explore the possibilities of cooperation and the use of theoretical and methodological exchanges from the KO area.

In the same sense, there are several authors based in KO who go further and, as we have seen, place terminology within the areas of knowledge that make up its interdisciplinary mosaic, due to the communicating vessels of its foundations, objects of study, theoretical concerns and the potential of the methodologies commonly used in one or the other field.

It is accepted that both fields are interdisciplinary in nature; In other words, they are made up of a core of their own knowledge while incorporating concepts, theories and methods from other areas. It is also accepted that both fields have forms of connection and communication, the analysis of which is usually carried out, with some exceptions, in a generic way.

One point of contact is that both areas deal with the analysis, selection and organisation of the names (usually called terms) of concepts in specialised areas. Both fields develop representation activities and the thematic organization of knowledge, although with different perspectives and objectives: in the case of KO, to establish forms of subject representation that favour the recovery -also thematic- of data, documents and information. Terminology, for its part, focuses on the names of concepts (commonly called terms), for descriptive, normalising and even translation or coining of new terms purposes.

Both fields also study the communication difficulties that arise from the ambiguity of language, due to polysemy, homonymy, the proliferation of synonyms, and the emergence of neologisms that are not always well defined or formalised. Another common concern is related to translations, which, in addition to transferring the semantic ambiguities of languages, add the usual non-existence of terms in the target languages, due to the rapid conceptual, scientific, technological and social updating of the words that represent new entities and phenomena, as well as the lack of linguistic adaptation that occurs with terminology that comes from English. In this sense, it is encouraging to see that

both areas consider the different languages as codes of registration and exchange, to promote specialized communication, and generate procedures to resolve, or at least control, these difficulties.

The current state of linkage and exchange (theoretical, methodological, application) seems to be still in an embryonic state, although there is sufficient evidence of an important potential for the development of theoretical thinking and methodological alternatives, and of methods that have proven to be effective in one field, to offer new solutions to pending problems in the other.

Bringing together specialists from both areas (as well as linguistics and communication) through the organisation of events, the publication of co-authored works, university training and the development of interdisciplinary projects can be ways of channelling this potential, from universities and research centres.

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