Approaches to terminology. Now that the dust has settled…

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> Not terms for things,
> but terms that are living things
> with the power to move
> (inspired by contemporary novelist
> Jeanette Winterson)

Summary

In this article we show examples of how the discipline of terminology is evolving and how diversification in methodology and new research questions emerge thanks to the participation of terminology theorists in multidisciplinary applied research projects. The origins of the discipline are revisited, some recent developments are discussed and examples are given of terminological research projects at CVC Brussels.

Even though the disciplinary status of terminology remains a subject of some debate (Myking 2001; L'Homme et al. 2003; Cabré 2003) many specialists with a background in a panoply of disciplines (e.g. computer and information scientists, linguists and translation scholars, knowledge engineers and semantic Web application developers) have shown an interest in terminology theory and in methods for terminology description and terminology management. Terminology is evolving into a multidisciplinary achievement, establishing cooperative links with many domains of scientific interest.

In this article we first briefly revisit the origins of terminology as a discipline and the criticisms that were published (mainly in the 1990s) concerning the established principles of what is often referred to as the Vienna School and discuss some alternatives to the traditional theory that were formulated more or less simultaneously in different countries and by people with various backgrounds (section 1). In section two we discuss a recent study on "What can be considered a term?" and then relate terms to sociocognitive terminology (Temmerman 2000) and embodied and situated experience. The third section gives examples of terminological research in a multidisciplinary and applied context performed at the Centrum voor Vaktaal en Communicatie of Erasmushogeschool Brussels, where a termontography methodology is being developed.

1. From then to now: from Wüster to wüsteria (Smith et al. 2005) and beyond

It seems safe to say that terminology − in the sense of vocabulary used in specific domains of knowledge − has existed since humankind found the need to refer to specialised knowledge. As a discipline, terminology came into existence in the beginning of the thirties of the 20th century. This was basically the results of the strong efforts made by Eugen Wüster (Wieselburg 1898 − Vienna 1977), an electrotechnical engineer and Doctor in Technology from the University of Stuttgart with a dissertation entitled International Standardisation of

Technical Terminology[1]. He had a strong interest in information science (as a member of the *Association Internationale de Documentation (FID)*) and became a fierce proponent of unambiguous professional communication. For that reason he developed a theory of terminology on the basis of his terminographic experience in compiling *The Machine Tool. An interlingual Dictionary of Basic Concepts* (Wüster 1968), a systematically arranged dictionary of standardised terms in eight languages, for international usage, dealing with concepts that were held to be standardised prior to being referred to by one term. This project was sponsored by the Organisation for Economic Cooperations and Development (OECD) of the United Nations and published in 1968.

Cabré (2003:165) writes that it is fair to say that all Wüster's life was devoted to terminology and she summarizes the main objectives pursued by Wüster as follows:

- To eliminate ambiguity from technical languages by means of standardisation of terminology in order to make them efficient tools of communication.
- To convince all users of technical languages of the benefits of standardised terminology.
- To establish terminology as a discipline for all practical purposes and to give it the status of a science.

Cabré mentions the following three mayor tasks that Wüster set himself in order to achieve these objectives:

- The development of standardised international principles for the description and recording of terms.
- The formulation of the General Theory of Terminology which he initially saw as a branch of applied linguistics but later as an autonomous field of study. It was quite remarkable that the Linguistics Department of Vienna University appointed Wüster Professor in General Theory of Terminology (1972−1974) at the age of 74.
- The creation of an international centre for the collection, dissemination and coordination of information about terminology, which became *Infoterm* (of which he was director since 1971 till he died in 1977), under the sponsorship of Unesco.

It was Wüster's ambition to eliminate ambiguity in technical language through standardisation of terminology at an international level in order to create an efficient tool for communication and to institutionalise terminology not only as a practice and an industrial necessity but as a discipline. Wüster's work of a lifetime was influential and was continued in circles of standardising bodies in an international setting. Especially in the German speaking and the Nordic countries researchers at several universities continued the development of what they referred to as the General Theory of Terminology, e.g. Gerhard Budin, Christer Laurén, Heribert Picht and Anita Nuopponen.

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[1] Triggered by the publication of E. Wüster's book *Internationale Sprachnormung in der Technik* [International standardization of technical language] (1931) the predecessor to the International Organization for Standardization (ISO), i.e. the International Federation of Standardizing Associations (ISA, founded in 1926) – established in 1936 the Technical Committee ISA/TC 37 "Terminology" for the sake of formulating general principles and rules for terminology standardization. In 1952, ISO/TC 37 was put into operation in order "to find out and formulate general principles of terminology and terminological lexicography" as terminography was called at that time.

Yet the Wüsterian or the Vienna School approach had been subject to criticism as early as 1979 by Rey and 1981 by Kocourek. As Cabré (2003) explains the early criticism was ignored in circles of Vienna school proponents. In the 1990s the Vienna school principles were criticised based on empirical research by scholars in different disciplines. In 1990 Sager published his seminal work *A Practical Course in Terminology Processing*, in which he supplemented a conceptual terminological analysis by a linguistic and a communicative analysis based on text corpora. These ideas were further elaborated by Cabré (1999). Critical observations came from terminologists taking an interest in computer linguistics and corpus analysis (Pearson 1998; Condamines 1995) or relating computer linguistics and knowledge management (Meyer 1992). A lot of research was done by French scholars resulting in e.g. socioterminology (Gaudin 1993) and the exploration of the intimate relationship between terminology theory and philosophy of science (Slodzian 1995). Developing sociocognitive terminology, we (Temmerman 1997, 1998, 2000) explored the possibilities of alternatives to the Vienna school principles (figure 1).

Principles of traditional terminology	Our observations concerning the terminology of domain specific language (life sciences)
First principle: terminology starts from the concept without considering language.	Language plays a role in the conception and communication of categories.
Second principle: a concept is clear-cut and can be assigned a place in a logically or ontologically structured concept system.	Many categories are fuzzy and can not be absolutely classified by logical and ontological means.
Third principle: a concept is ideally defined in an intensional definition.	An intensional definition is often neither possible nor desirable.
Fourth principle: a concept is referred to by one term and one term only designates one concept.	Polysemy, synonymy and figurative language occur and are functional in special language.
Fifth principle: the assignment concept/term is permanent.	Categories evolve, terms change in meaning, understanding develops.

*Figure 1: Contrast between the principles of traditional Terminology and
the reality of terminology in texts, based on an empirical study of the
special language of the life sciences (Temmerman 2000)*

These Vienna school principles can be summarised as follows: concepts are clear-cut and can be defined on the basis of necessary and sufficient conditions; there is univocity of terms and concepts (i.e. ideally each concept is named by one term and one term refers to just one concept) which is essential for unambiguous and therefore effective and efficient communication; figurative language and change of meaning are linguistic subjects which are of no concern to terminology as terminology restricts itself to the onomasiological perspective. Sociocognitive terminology starts from the observation that the theoretical framework behind the methods and principles of traditional terminology is strongly rooted in objectivism. If the belief in an objective world is replaced by the belief that the understanding of the world and of the words used to communicate about the world is based on human experience, and if this understanding is considered to be prototypically structured and

embedded in frames, as has been put forward in cognitive linguistics, the basic principles of traditional terminology needed re-evaluation.

Terminology in its Vienna tradition has the vocabulary of special language as its field of study. It also has an objective, the standardisation of terminology, which is reflected in its principles and methods. However, the third requirement for terminology to be considered a scientific discipline, namely that it must define its basic concepts and create a theoretical framework which underpins its own principles and methods on the basis of empirical research (i.e. starting from facts instead of from utopia) was not given much consideration. The main reason was that the interest in terminological research was hindered by the main interest of Wüster and Infoterm, i.e. how to organise standardisation. If for Wüster the main object of terminology was to avoid ambiguity in international intra-professional communication, it is obvious that the scope of terminology was limited to the standardisation of concepts and terms. But, as Cabré (2003:179) states, working with terms can occur in other environments of representation and communication which then require a broader view of terminology.

2. Sociocognitive terminology: terms in an embodied and situated environment

In the perspective of sociocognitive terminology, not concepts but terms are held to be central in terminological analysis. Terms can be studied in text corpora (Sager 1990; Cabré 1997; Pearson 1998 etc.) and their meaning will vary in different types of contexts (lexical contexts, situational or cultural contexts and cognitive context) (Temmerman et al. 2005).

Collet (2005) revisited the term and came to the conclusion that terms in texts exhibit behaviour which is contrary to the prescriptive demands of traditional terminology. Terms show variability both on the level of their content and on the level of their linear structure. Examined within the framework of text linguistics this variability contributes to text coherence and text cohesion. Collet tries to formulate a new definition of the term, a definition which underscores the role the term plays in bringing about texture in texts for specific purposes. The definition of the term Collet proposes will encompass both its naming function as well as its cohesion producing function. For Collet (2005:109) the term is

> a semantically charged linear structure, which names an abstract or concrete reality studied by a special-subject field; When used in a special text, it plays a dynamic and important part in the bringing about of text coherence and text cohesion; This contribution to text coherence and to text cohesion may translate into variability both on the level of its meaning content and its linear structure, especially if its linear structure is syntactically transparent; This variability may lead to polysemy on the one hand, and signals on the other hand that terms exhibiting syntactic transparency are, in fact, paradigms, i.e. sets of all possible forms the linear structure can have in text.

Yet, despite the fact that according to sociocognitive terminology terms in texts are the starting point in a terminological analysis, it remains important to try to understand how terms (elements in human language) relate to concepts or units of understanding or categories (elements of the human mind) and objects or realia (elements of the observable world or reality). In sociocognitive terminology theory the traditional semiotic triangle (Temmerman 2000:58-59) gets extended (figure 2). Our knowledge about the world (also on scientific and technological subjects) is based on experience. Moreover, much of what we know and understand about the world is embodied, i.e. it is acquired via our sensory perceptions. It should be added that the other part is the result of our reasoning capacities, which interacts with the input via on the one hand sensory perception and on the other hand the interaction

via communication (language) with other members of a domain community. Language has a cognitive function, as well as a textual and a communicative function. Language is a means for categorization and for communication about categorization. Sociocognitive terminology incorporates the idea that humans do not just perceive the objective world but have the faculty to create categories in the mind and to communicate about them. This may also be the reason why many categories have prototype structure (Temmerman 2000).
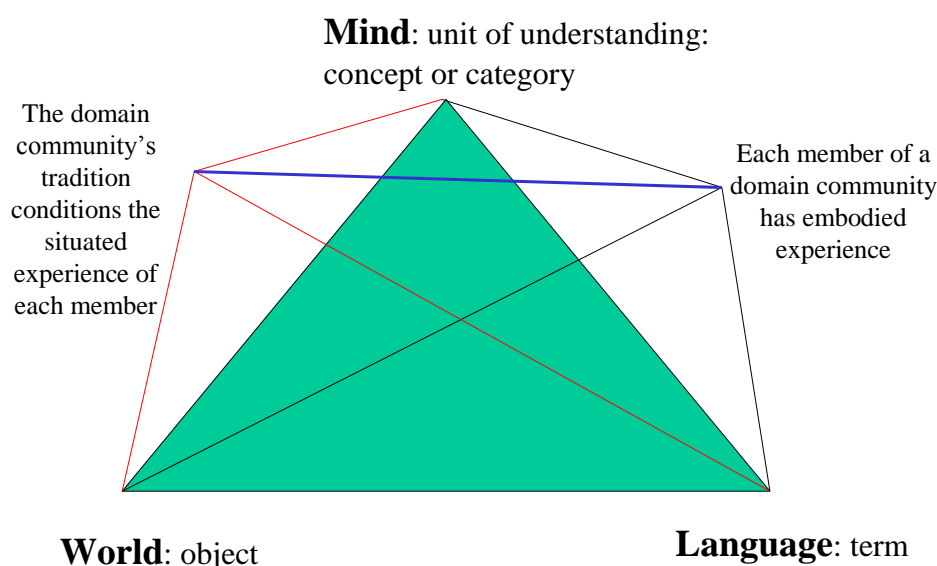
Mind: unit of understanding: concept or category

The domain community's tradition conditions the situated experience of each member

Each member of a domain community has embodied experience

World: object

Language: term

Figure 2: The extended semiotic triangle

3. Now that the dust has settled…

Terminology as a discipline has come a long way since Eugen Wüster did his pioneering work. With Cabré (2003:182) we believe that terminology will only advance as a scientific field of study if those of us interested in terminology can explain our ideas and discuss them on a basis of hard data. If we cannot do this, we shall continue putting forward principles which do not necessarily correspond to the observable data. What is needed in order to contribute effectively to the construction and development of a theory of terminology are case studies. Assumptions should be made, conjectures should be investigated leading to refutation or acceptance. Axioms, principles, definitions of basic units of understanding, beliefs, theoretical assumptions need to be questioned time and again and tested in case studies. Terminology specialists need to participate in a multidisciplinary exchange of ideas with linguists, knowledge engineers, computer scientists, semantic web technicians, etc. Exchanges with specialists in many domains is not only enriching from a theoretical perspective but results in the creation of terminological resources that serve a particular purpose, that are useful and reusable in information systems for problem resolutions of several types. If there is a need for an encompassing theory, it is going to exist thanks to the ongoing efforts and exchanges of ideas and research results leading to discussions in workshops and at international scientific conferences.

3.1 Terminology as an applied discipline

In recent years, in the framework of Centrum voor Vaktaal en Communicatie at Erasmus-hogeschool in Brussels (http://cvc.ehb.be) my fellow researchers and myself have chosen to concentrate on projects that can be related to terminology as an applied discipline. Our research projects have social value as they contribute to solutions for communication problems of different types and as they result in the creation of terminological resources that are multilingual and that take the description of multicultural and intercultural information into consideration. Methods are proposed and put to the test, software is being developed for more to the point terminology management within the constraints of concrete problem solving situations in response to needs and demands in society at large.

In applied research the objective is to find solutions for a problem e.g. "How can we describe terminology in order to contribute to a knowledge management problem?". The question is no longer: "What is a term?", but "What will be considered a term in the framework of this particular problem solving project?". We are no longer interested in "What is a concept?" and "Should we start from term or concept?" but we reflect on how concepts and terms can be related in a data management system that will help improve communication and that will support not just human understanding but also support the computational management, processing and retrieval of information.

3.2 Termontography

The need for Semantic Web applications call for terminological management systems combining ontology development and (multilingual) terminology resources allowing for the dynamic processing of terms in context.

Dynamic terminology processing needs methods and tools. The termontography approach (Temmerman et al. 2003 & 2004) is a multidisciplinary approach in which theories and methods for multilingual terminological analysis of sociocognitive theory are combined with methods and guidelines for ontology engineering. A clear distinction is made between conceptual modeling at a language-independent level and a language-specific analysis of units of understanding. The prototypical nature of understanding is taken into account. Whereas *ontology* can be defined as the study of being, i.e. of what exists and how the entities that exist relate to each other, *an ontology* is a representation of the knowledge within a domain, using frames and first order logic (Gruber 1993 in 1995:908). An ontology identifies different components: e.g. classes, relations, functions, formal axioms and instances; is intelligible to a domain expert, and is formalised in a way that allows it to support automatic information processing. Termontography is a methodology for knowledge management and representation in specific domains of experience (figure 3). Based on a requirements report for a particular application, an initial framework of categories, concepts, sets and relationships is developed. This framework serves as a template for manual and semi-automatic extraction of knowledge from a corpus of texts. The framework gradually evolves towards an enriched and more fine-grained network of semantic relations. The Termontography Workbench is a prototype of a tool suit allowing for a distinction between a language independent analysis resulting in a categorisation framework plus ontology on the one hand and a language and culture dependant terminological description on the other hand. The results of this analysis are stored in a termontological database which can be a supportive resource for different types of applications.
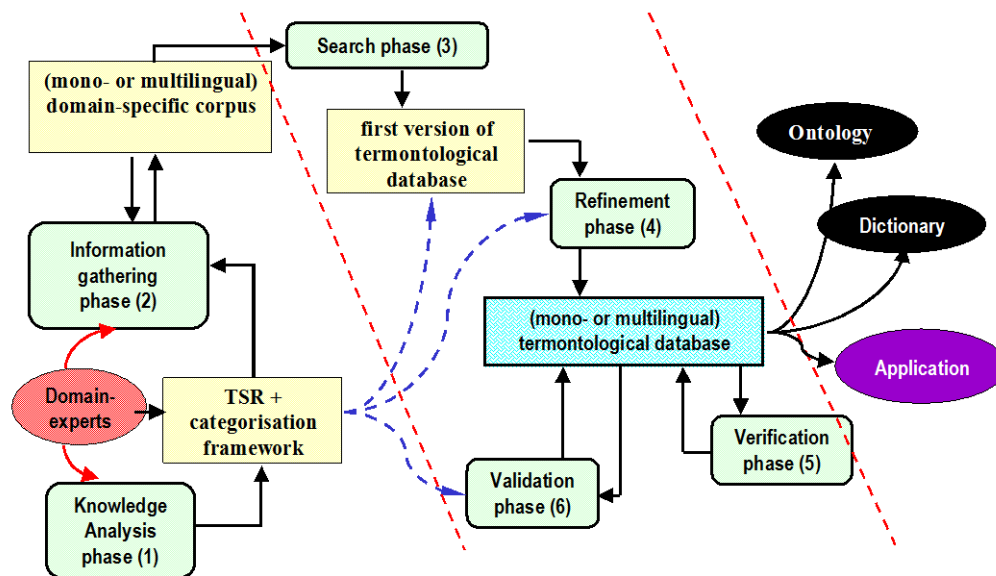
Figure 3 : Termontography methodology

At CVC Brussels the termontography method is applied in projects concerning dynamic terminology processing for applications. In what follows we give three examples of applications: the FF-POIROT European Project, the project on competencies and functions in eHR-management, and the project concerning communication quality enhancement in a multilingual and multicultural setting: the case of senior care.

The FF POIROT project (Financial Fraud Prevention-Oriented Information Resources using Ontology Technology) http://www.ffpoirot.org

One of the aims of the FF POIROT project (IST-2001-38248), a European research project in the fifth framework, was to develop formal and shareable knowledge repositories (i.e. ontologies) and terminological resources for applications detecting and intercepting e.g. securities fraud on the Internet. Securities fraud refers to the selling of overpriced or worthless shares, or other financial instruments to the general public

The contribution of CVC in this project resides to:
- apply Semantic Web technology to fraud detection and prevention, thereby showing the potential of ontologies in these areas.
- construct multilingual terminological as well as formal knowledge repositories covering the domains of interest.
- propose methods and guidelines in terminology and knowledge engineering.
- develop new and/or improve existing tools to support terminology and knowledge engineering. This resulted in a first version of the Termontography Workbench.

Competencies and functions in eHR-management

In this project we apply Semantic Web technology to competencies and functions management, thereby showing the potential of ontologies in these areas. A trilingual terminological resource as well as a formal knowledge repository are constructed covering the domain of interest. Methods and guidelines in terminology and knowledge engineering are proposed to SMEs (Small and medium enterprises). We also intend to further develop the Termontography Workbench into a software suit for the support of terminology and knowledge engineering.

The senior care case

This pilot project aims at a methodology for the compilation of a multilingual terminological information resource on aspects of welfare in multicultural Europe. We use the Termontography Workbench to develop ontologically structured multilingual terminological resources on welfare in general and on the senior care case in particular.

The KBExplorer was developed to access the information of the terminological resource to solve a particular communication problem. It is a tool to support communication on the multifaceted, multidisciplinary subject of care for senior citizens in multilingual and multicultural Europe.

In multilingual Europe terminology related to the welfare sector is a complex matter. Each European region has culturally specific definitions for similar but non-equivalent phenomena and consequently one-to-one equivalence between existing terms in different languages is rare. Communication between welfare professionals in a multinational, multiregional and multilingual European context is often confusing and cumbersome. Existing multilingual glossaries on the subject are largely inadequate. What is needed is a multilingual termino-logical resource providing professionals (e.g. decision makers in the domain) with the relevant contextual information (linguistic context, cultural context and cognitive context) (Temmerman et al., 2005) and a sufficient amount of intra- and intercategorial information, in order to facilitate communication in a multilingual and multicultural environment.

The pilot terminological resource was constructed in accordance with the insights of sociocognitive terminology management (Temmerman 2000) and termontography (Temmerman et al. 2003 & 2004). Using the termontography software developed at CVC Erasmushogeschool Brussels, criteria for setting up a categorisation framework were agreed between termontographers and field specialists. Relevant texts in several languages to be terminologically analysed were provided by (legal) specialists in the field. The multilingual text corpus contained legal texts like decrees and directives in Dutch (published in Belgium and in the Netherlands), French (published in Belgium and in France) and English (UK), as well as informative texts taken from brochures aimed at care house residents and reports written by professionals. The pilot project resulted in a report on the types of possible communication problems in a multilingual and multicultural setting based on the analysis of the senior care domain and a fine-tuned methodology for setting up a multilingual ontologically supported terminological database aimed at reducing communication problems between users from diverse regional, national and linguistic backgrounds. The results of the pilot project could be the input for the requirements definition and inspire the methodology for making a more elaborate resource.

4 Caveat

There exists a potential danger for the traditional opposition between the objectivist against the experientialist discussion to reoccur between ontology, if it is conceived as the question of what things exist (concepts), and terminology, if it is conceived as the question of what things are referred to by our terms (Smith et al. 2005). In sociocognitive terminology the problem is defined in a more complex fashion taking different parameters and their interdependancy into consideration. The termontography methodology and software are developed with the aim of creating resources that allow for a distinction between a language independent analysis resulting in a categorisation framework plus ontology on the one hand and a language and culture dependant terminological description on the other hand. The termontological databases resulting from this analysis can be supportive resources for different types of applications. The termontography method has so far been applied in projects concerning dynamic terminology processing for applications.

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