Training Terminographers: the Sociocognitive Approach

Rita TEMMERMANN, Bruxelles, Belgium

Abstract

Teaching sociocognitive terminography implies introducing students to some basic insights of cognitive semantics, confronting them with various methods for the analysis of units of understanding and introducing them to flexible templates for the description of terms.

Existing terminology manuals are of two types. Those of the first type (Felber, 1984; Picht & Draskau, 1985; W5; Wüster, 1991) limit terminography to the standardisation-oriented approach (section 1.1). Those of the second type take aboard ideas developed in linguistics, philosophy of science, psychology and artificial intelligence, but they lack guidelines on how to analyse a textual corpus for a real terminography project.

In sociocognitive terminology training, students are first familiarised with a number of theoretical insights (1), are taught methods for the analysis of textual information (2) and introduced to methods for designing relevant templates for description (3). We illustrate this with examples from a terminography project on the life sciences

1 Theoretical insights

Future terminographers first of all need to understand the distinction between the objectives of standardisation-oriented terminology theory (e.g. The Vienna school) and sociocognitive terminology theory (1.1). They should also be introduced to some of the basic insights of cognitive semantics, like prototype structure theory (1.2). Most importantly they should be given insight in the variety of units of understanding which they can come across when sifting textual material for terms (1.3).

1.1 Standardisation-oriented and sociocognitive terminology theory

The distinction between standardisation-oriented terminology theory (SOTT) and sociocognitive terminology theory (SCTT) (Temmerman, 1998 & 2000) needs to be explained to terminographers in training. Students should be made aware of the following contrasting principles between SOTT and SCTT.

Firstly, SOTT starts from concepts which are believed to be clearly delineated, whereas SCTT starts from *units of understanding* which more often than not have prototype structure. Secondly, in SOTT concepts are attributed a place in a logical or ontological concept structure, whereas in SCTT, a unit of understanding is considered to have intracategorial and intercategorial structure and to function in cognitive models. Thirdly, in SOTT a concept needs to be defined in an intensional definition and/or an extensional definition. In SCTT, depending on the type of unit of understanding and on the level and type of specialisation of sender and receiver in communication acts, what is more essential or less essential information for a definition will vary. Fourthly, in SOTT a term is assigned permanently to a concept. It is believed that ideally one term only should be assigned to one concept. In SCTT synonymy and polysemy are believed to be functional in the progress of understanding and therefore need to be described. Fiftly, in SOTT concepts and terms are studied synchronically, whereas in SCTT units of understanding are studied in their constant evolution. Moreover cognitive models are studied as playing a role in the development of new ideas which implies that terms may be motivated

1.2 Prototype structure

After having introduced students to the basics of cognitive semantics (Geeraerts, 1989; Geeraerts et al., 1994) it is good practice to have them analyse the degree of prototypicality of some of the units of understanding they encounter in the textual corpus under consideration (figure 1). This exercise may result in a better understanding of the intension and extension of a unit of understanding.

	intension		**extension**	
	clustering of senses into family resemblance and radial sets	absence of definitions in terms of necessary and sufficient attributes	differences of salience among members of the category	fluctuations at the edges of the category
cloning	**yes**	**yes**	**yes**	**no**
biotechnology	**yes**	**yes**	**yes**	**yes**

Figure 1 Characteristics of prototype structure in two units of understanding.

type of unit of understanding in the life sciences	***types of information modules***				
	e.g. historical informatio n	e.g. steps in the process	e.g. attributes		
			e.g. aim	e.g. application	e.g. result
umbrella unit e.g. *biotechnology*	2	0	0, 1, 2.	0, 1, 2.	0, 1, 2.
entity e.g. *intron*	1	0	0, 1, 2.	0, 1, 2.	0, 1.
activity e.g. *cloning*	1	2	1, 2.	1, 2.	1, 2.

Figure 2 Depending on the type of unit of understanding different information modules can vary in informational importance on a scale from 0 to 2 (0=irrelevant, 1=relevant, 2=prominent).

1.2.1 Types of units of understanding

The terminographer should be trained to start from units of understanding, which can only be discovered by terminographers as soon as they exist in language, i.e. as soon as there is a term or description to communicate the unit of understanding in language. Different types of units of understanding can be distinguished, which hold different types of *information modules* (figure 2). In the language of the life sciences we came across umbrella units e.g. *biotechnology*, entities e.g. *intron* and activities e.g. *cloning*. Examples of information modules are: historical information, steps in a process, different attributes like aim, application, result.

2 Methods for analysis

Terminographers working within the paradigm of SCTT need to be trained in different methods for the analysis of units of understanding. In section 1.2 we saw an example of an intensional and extensional analysis of the degree of prototypicality. Other methods for analysis are the drawing of visual representations of how core definitions relate to information modules of different types (2.1), analyses of the degree of relevance of information modules (2.2) and historical development analyses of units of understanding (2.3).

2.1 Core definitions and information modules

Reflective text fragments are parts of texts in which authors define their terminology. Figure 3 illustrates how the information found in the following reflective text fragment from Harford (1988:149) can be represented visually.

> *Biotechnology can be defined as the commercial application of engineering and technological principles of the life sciences. The history of biotechnology can be traced over many millennia and it has been described as the world's second oldest profession. For its first five thousand years, the food and drinks industries were the main province of biotechnology with the manufacture of bread, beer, wine, cheese, and many other fermentable products. Over more recent times the chemical and pharmaceutical industries have used biotechnological processes for the synthesis of many natural products, e.g. industrial alcohol, citric acid, a range of amino acids, antibiotics, vitamins, etc..*
>
> *During the past decades research successes in engineering, biochemistry and genetics have led to the major upsurge of interest in biotechnology. This has been largely brought about by the advent of recombinant DNA (rDNA) technology, otherwise known as gene cloning or genetic engineering. It was soon realized that the methods of genetic engineering greatly enhanced the potential of biotechnology, providing the prospect for the development of many new products and bioprocesses.*(Harford, 1988:149).

Definition	*Biotechnology can be defined as the commercial application of engineering and technological principles of the life sciences.*		
History		**Biotechnological techniques**	**Products and results**
	over the past 5000 years	fermentation	food and drinks, including: bread, beer, wine, cheese and many others
	in recent times	biotechnological processes used by chemical and pharmaceutical industries	synthesis of many natural products such as industrial alcohol, citric acid, a range of amino acids, antibiotics, vitamins, etc.
	in the past decades	recombinant DNA technology (= gene cloning, = genetic engineering)	new products bioprocesses

Figure 3 The categorisation expresses the relationship between products and results and biotechnological techniques and categorises these according to three periods in time. (Harford, 1988:149)

2.2 Visual representation of information modules

Terminography trainees should be capable of distinguishing between intracategorial information i.e. facets showing degrees of essence and intercategorial information i.e. perspective and intention. The study of a textual corpus on the life sciences (Temmerman, 1998 & 2000) allowed for an analysis of the units of understanding *cloning* and *biotechnology* (figure 4).

	core definition	**historical information**	**intracategorial information: facets showing degrees of essence**	**intercategorial information: perspectives and intention**
cloning	relevant	less essential	e.g. steps in the process, aim	e.g. the human genome
biotechnology	relevant	essential	e.g. field of application (bioprocess technology, enzyme t., waste t., environmental t., plant and animal agriculture, healthcare/types of companies involved/legal aspects/educational aspects	e.g. another discipline like biology/ the interdisciplinary pursuit/ public awareness/ economic growth/ the developing world

Figure 4 Information modules of *cloning* and *biotechnology*

2.3 Historical analysis

A third type of analysis results in a visual representation of the development of a unit of understanding. Figure 5 shows how the term *cloning* extended and modified its meaning.

CLONING: 1. (A,B,C,D,G,H,I) the asexually produced progeny of an organism. 2. (E, F) a large number of identical copies of genetic material.			
since when?	**what is cloned?**	**method?**	**number of copies?**
A. since beginning of agriculture; name in Engl. in 1903 (Rieger,1991).	plants	cutting grafting	one or a few or large number of plants
B. 1929 (Barnhart, 1988)	bacterial cells	cell cultivation	a colony of cells
C. 1939 (Smith, 1988)	plant cells to achieve full plants	cell cloning and regeneration	ranging from one to thousands of plants
D. late 1940s (Levine & Suzuki, 1993:183)	amphibians	enucleation	one or a few amphibians
E. 1973 (Cohen *et al.*, 1973, Rieger, 1991)	DNA	**molecular cloning**	a large number of DNA fragments
F. 1985 (by Saikai, according to Rieger, 1991; by Karry Mullis according to Watson *et al.*, 1992, 79)	DNA	PCR (polymerase chain reaction)	a large number of DNA fragments
G.1988 (Burton, 1992:15)	mammals	embryo splitting	two or more identical mammals
H.1988 (Hawkes, 1991:15)	mammals	nuclear transplan−tation. of embryo cell DNA into ovum	four or more identical mammals
I 1997 (by Wilmut, Nash, 1997: 38)	mammals	nuclear transpl. of body cell DNA into ovum	one or more identical mammals

Figure 5 The development of cloning

3 Methods for description

Insight in the paradigm underlying sociocognitive terminology theory (section 1) and familiarity with methods for the analysis of units of understanding (section 2) will help the terminographer design templates for the description of units of understanding belonging to a particular discipline like the life sciences. This will result in alternatives for the traditional intensional and/or extensional definition. For each type of unit of understanding (activities, entities and umbrella units) the terminographer will design a template for description. For describing activities for example this will be a template which allows for supplementing the core definition by the description of the different steps in the process of the activity. For describing umbrella units the template will allow for entering historical information on how the umbrella unit came into existence (figure 6).

	entity	**activity**	**umbrella unit**
Core definition	essential	essential	essential
Intracategorial descriptive modules	degrees of relevance	degrees of relevance	degrees of relevance
Intercategorial descriptive modules	degrees of relevance	degrees of relevance	degrees of relevance
Historical descriptive modules	optional	optional	essential
Procedural descriptive modules	irrelevant	essential	irrelevant

Figure 6 How different information modules have differing relevance in three types of units of understanding in the life sciences

When information is to be added to a terminology bank on the life sciences a template offering the following possibilities will have been designed:

Example 1:

- *add term*/ **biotechnology** /OK/
- *core definition/* **biotechnology is the application of biological techniques in order to achieve commercial results***/OK/*
- *select type of unit* (entity, activity, umbrella unit)/ **umbrella unit** /OK
- *history/*a historical description of the discipline of biotechnology is given in which the following terms are indicated for hyperlinks: **new biotechnology (hyperlink a), traditional biotechnology(hyperlink b), recombinant DNA technology(hyperlink c), gene cloning(h&), genetic engineering(h&),**etc./OK/
- *hyperlink a core definition/ . . . .OK/ etc.*

Example two:

- *add term/* **cloning** /OK/
- *hyperlink/* **cloning 1**/**cloning2**/OK/
- *core definition cloning 1/* **the asexually produced progeny of an organism/**OK/
- *core definition cloning 2/* **a large number of identical copies of genetic material/**OK/
- *select type of unit cloning 1/* **activity**/OK/
- *types of cloning1/***cloning of plants (hyperlink a)/cloning of bacterial cells (hyperlink b)/cloning of plant cells (hyperlink c)/cloning of amphibians (hyperlink d)/cloning of mammals (hyperlink e)/**OK/
- *technique hyperlink a/* description of the phases in the cloning of plants/OK/

- *technique hyperlink b*/............in the cloning of bacterial cells...../OK/
- *technique hyperlink c*/............in the cloning of plant cells..../OK/
- *etc*./OK/OK/
- *types of cloning 2/***molecular cloning (hyperlink A)/PCR (hyperlink B)/**OK/
- *technique hyperlink A/* description of the phases in molecular cloning/OK/
- *technique hyperlink B/* ....in PCR/OK/OK/

4 Results

Thanks to the sociocognitve approach in terminography, a terminological database is likely to be superior in quality. This is mainly due to the three pillars of sociocognitive terminography training: a sound theoretical basis, a panoply of methods for textual corpus analysis and a training in how to design templates for the description of different types of units of understanding.

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