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Concept systems and analysis of special language texts. Towards a terminological text analysis

Introduction

My interest in special language texts comes from terminological work and research as well as teaching in the theory of terminology. Special language texts are an important source for terminological analysis. The terminologists use texts to extract information about terms, concepts, equivalents in other languages, and relationships between concepts and concept systems, for instance to compile vocabularies and data banks.

An experienced terminologist or terminographer finds the information he is searching very quickly from special language texts, even if he is not very familiar with the subject field in question. He can distinguish between terms and non-terms, related concepts, different classifying criteria, etc. For a student or any other inexperienced reader of a special language text, it is often more time-consuming to find such information in a text. For a translator, the use of texts in different languages as sources in the search for translation equivalents is often a necessity, especially when the subject matter is new and no vocabularies exist yet. Also Bühler (1992: 425) emphasises the importance of texts:

"Foreign-language equivalents suggested in special-language dictionaries always remain disputable and we are therefore convinced that for the specialist translator only textual information is a reliable indicator of language use." (Bühler 1992: 425.)

From the point of view of terminology work, special language texts are seen as a means of **knowledge acquisition**. Terminological principles and guidelines help in distinguishing between concepts, formulating definitions, structuring concept systems, establishing relationships between the concept and a term, handling with multilingual material etc (see e.g. Hohnhold 1990: 64 ff.; Stetting & Gorm Hansen 1977). There is, however, also another point of view to the special language texts - that of the **writer**.

Louis Trimble (1985: 85), who has done research on writing scientific and technical English, says that one of the most common functions of this kind of discourse is **to put order into our universe**, i.e. to classify. Trimble (1985: 94) notes that even though the rules governing the writing of paragraphs of classification are fairly obvious, "yet it is surprising how often they are not followed even by 'published' writers". He continues that "if they are not followed (or are followed 'badly'), the result can be an unordered mish-mash of details or, at the very best, an example of fuzzy thinking". Trimble (1985: 84) treats classification as a rhetoric means, and as another rhetoric means he mentions **partition**, dividing an object into its components. These two are also the most common concept systems used in terminological analysis (logical and partitive concept systems). Trimble who is talking about scientific and technical writing emphasises that it is worth spending time on teaching these rhetoric means. He complains that

"Despite classification being an everyday activity on the part of most humans and especially for those involved in academic work, it is surprising how much difficulty many seem to have in understanding the concept or even in recognising or producing a simple complete classification." (Trimble 1985: 152.)

While the terminologist is looking for specialist knowledge and terminological information in texts, e.g. a researcher, technical writer or editor, a translator is encoding the specialist knowledge and conceptual structures into the texts. In many cases the same person, e.g. a researcher has to take both approaches.

Extended terminological analysis

In this paper I am discussing **an outline for a terminological text analysis method** where I shall be combining elements from the theories of terminology and text linguistics and from other disciplines, such as cognitive science. The core of the method will, however, be terminological analysis.

I base my definition of **terminological analysis** on the Wüsterian tradition, including the following elements: analysing characteristics of concepts, delimiting and defining concepts, determining relationships between the concepts and structuring concept systems, as well as establishing relationships between terms and concepts thus solving term problems such as equivalence, synonymy and polysemy.

I prefer to consider terminological analysis as a **universal tool** for anybody dealing with special languages and special field knowledge, including those who are working with translation, LSP teaching and learning, scientific and technical writing, popularisation, documentation, hypertext and hypermedia authoring, or even to laymen trying to cope with the ever increasing information flow, or to a student reading for his exams or writing his thesis.

In the terminological literature the longest text passages that have been described most thoroughly are definitions, but they are treated from the point of view of vocabulary entries and not from the point of view of how concepts are or should be defined in special language texts. Usually, text analysis and terminological analysis are treated in isolation. In the terminological literature there are only a few descriptions of special language texts, see e.g. Arntz & Picht 1989 (pp. 10-36) in which the most common features of such texts are explained and two short texts are analysed. Translation-oriented terminology work adds also textual context of the terms to the objects of terminological analysis (see Hohnhold 1990: 75ff.).

I want to expand terminological analysis with some features from **text analysis** and especially to find out the role of **concept systems** in understanding and composing texts. A central role in this extended terminological analysis will be given to concept systems - the object of my previous research.

Concept systems

When I am talking about concept systems and concept relationships, I do not mean only the results of classification and partition that I already mentioned. It is often understood that concept systems are just strict logical hierarchies in which concepts are either superordinated or subordinated to each other. There are also other concept relationships and corresponding concept systems that need clarification in texts, e.g. temporal relationships referring to a process consisting of several stages, causal relationships, etc. (see Nuopponen 1994). In my dissertation I created an extensive classification of concept relationships and concept system types.

As a continuation of that work, I am interested in describing special language texts with the help of the concept system models in order to acquire useful information for both extracting and representing special field knowledge. I will analyse different kinds of texts to find out how they represent concepts and concept relationships and concept systems, looking for possible inconsequences and ambiguities in particular.

Text types

Elements from text linguistics, especially LSP text research (*Fachtextlinguistik*) are needed and the extensive research in LSP texts will be used e.g. in text type analysis and contrastive text analysis etc. Knowledge about different text types (descriptive, expository, narrative etc.) and text genres (manuals, textbooks, brochures) play an important role when terminological information is searched, because there are differences between their usefulness for terminological work. Texts that describe a material or immaterial object and its relationships to other objects on a general level often contain more of the kind of information that a terminologist is looking for.

There are recommendations in the terminological literature for text sources to be used in terminology work. For instance, a Finnish handbook of terminology work lists the following sources: a) laws, documents issued by authorities, standards, b) textbooks, dissertations, professional journals, dictionaries, thesauri, classifications, c) brochures, manuals, catalogues, contracts, reports, protocols, advertisements etc. and d) oral sources (specialists) (Ahmad (1993: 61): 142-143).

Ahmad (1993: 61) classifies the texts they successfully have used in compiling term banks in the University of Surrey as:

- a) "*instructional*, including text books, technical manual, encyclopaedic texts;"
- b) "*informative*, including learned papers, advanced treatises, interview transcripts of experts expounding about a subfield, and patent documents;"
- c) "*imaginative*, including popular science material, public information material, so-called 'made-simple' texts, advertisements about the goods and services of the subject domain." (Ahmad 1993: 61)

My material will also consist of texts from these 3 classes. I shall compare them e.g. with regard to the depth of the concept systems and amount of information. In certain

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texts the concept systems can be discovered more easily than in others. Koskela and Puuronen (1995) have compared a scientific text and its popularised version and noticed that it was impossible to restructure the concept system of the field on the basis of the popularised text, while the research report yielded a clear description of the relationships between the concepts.

One part of my study will be the analysis of different ways to express the concept systems and concept relations. In a pilot study I analysed both linguistic and non-linguistic textual means used to express the concept relationships in encyclopaedia texts. Orthographic means such as italics and parentheses, but also titles are often used to convey to concept relations. (Nuopponen 1993). Encyclopaedic texts provide good materials for terminological analysis e.g. in classroom, because their purpose is to represent the most central concepts of the field in an extremely compact and structured form. (see fig. 1 and 2)

Other texts are not always as "classificatory" as encyclopaedic texts, but they may convey other types of relationships, e.g. causal relations referring to cause and effect or local relations referring to a place and the objects situated there. From the writer's point of view, it could be noted that even though the writer chooses a text form that is not concentrated on the relationships between concepts, it is essential in special language communication that he has made the concept system clear to himself and composes the text according to it. In many cases, however, it looks like the writer deliberately or undeliberately hides an unclear concept system behind complicated sentence structures. Some of the problems involved in extracting terminological knowledge from specialist texts are caused by **poor exposition** that fails to make the relationships between concepts clear.

Contrastive analysis of texts and concept systems

An important component of the terminological text analysis shall be contrastive analysis of texts. For a terminologist as well as for a researcher it is important to compare the concepts, concept systems and terms presented in different texts. The texts may be by the same author or from several different sources. The goal of terminological analysis is often to describe a generally accepted concept system and terminology. In some cases, like in scientific research, it is essential to contrast different concept systems and terminologies with each other, e.g. in order to develop new ones based on them.

A problem is that the reader's **prior knowledge** and purpose are different from those of the writer (cf. Meyer 1985). The textual world, the picture of the "real world", may be more or less different from the generally accepted and might confuse the reader (see de Beaugrande & Dressler 1992: 84-85). In such cases Bonnie Meyer (1985) suggests that the text could be analysed from the **point of view of the writer**. This is what one has to do when analysing scientific texts and comparing different theories. The concept systems may differ very much from each other, and mixing them up does not lead anywhere, e.g. in text linguistics *text typologies* differ from one researcher to another.

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Cultural and other differences interfere when we have texts written in different countries, even if the language is the same, for instance in the case of texts describing school systems.

Hypertext

My research into text analysis is part of a larger project in which we need working methods for compiling and editing multilingual hypertext documents. Terminological analysis serves this purpose in several ways: when extracting special field knowledge and terminological information, editing and writing the documents and linking the documents to each other. Hypertext offers a new way to distribute specialist knowledge, because it makes it possible to combine different views and dimensions more easily than a traditional linear text but it also imposes its own restrictions and requirements on the texts which are used. I do not have time to go into the details here but we are going to provide more details about this hypertext project in another context.

Conclusion

I would like to conclude that even though our present project involves data bases and structured texts, we see terminological analysis as a tool for many different purposes, not only for terminologists and vocabulary compilation or for knowledge engineering. My purpose is not to create any automatic text analysis system, but I rather would like to develop a universal analysis model for those professionals or laymen who struggle with concept and term problems in knowledge transfer. My aim is thus to create an **extended terminological analysis** method, serving as a practical method with a two-fold function:

- 1) to analyse special language texts for terminological and other knowledge acquisition purposes and
- 2) to help to produce conceptually unambiguous special language texts.

The method comprises of the terminological analysis based on concept systems, complemented with components from other theories that are needed to understand the nature and functioning of special language texts.

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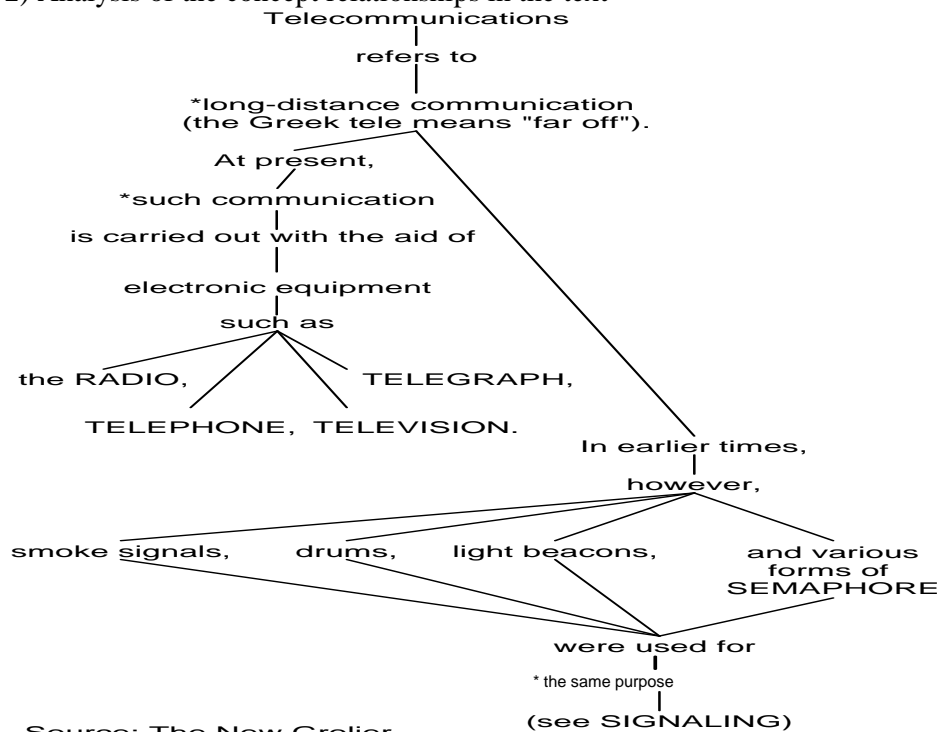
Example of terminological text analysis

1) The text

telecommunications

Telecommunications refers to long-distance communication (the Greek tele means "far off"). At present, such communication is carried out with the aid of electronic equipment such as the RADIO, TELEGRAPH, TELEPHONE, and TELEVISION. In earlier times, however, smoke signals, drums, light beacons, and various forms of SEMAPHORE were used for the same purpose (see SIGNALING).
(The New Grolier Multimedia Encyclopedia. CD-ROM)

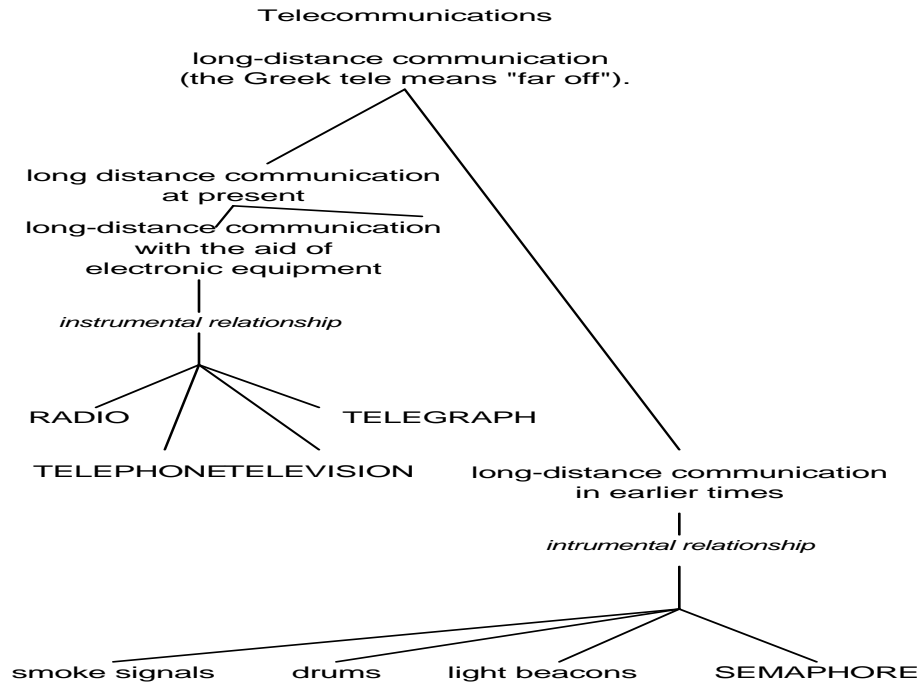
2) Analysis of the concept relationships in the text



Source: The New Grolier Multimedia Encyclopadia

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3) The conceptual system of the text



Source: The New Grolier
Multimedia Encyclopadia