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A model for systematic terminological analysis

1. Background

From the middle of the 80's I have been doing research in the theoretical basis of the terminology science and at the same time teaching theory and methods of terminology. These activities have resulted, on the one hand in an extensive theoretical classification of concept relations and systems (Nuopponen 1994), based mainly on Wüster's work, and on the other hand in the development of a more practical method for systematic concept and term analysis that we have called the "satellite method".

In this paper I shall try to outline and formalise this method of analysis, which has its origin in the practical needs of students working on their terminology projects. Since the beginning of 90's, the method has been evolving and it has been used in different contexts at our department by my colleagues, students and myself. Behind the development is also the fact that we teach terminological methods and theory not only to translation students but also to communication and technical communication students, as well as to some students from marketing and computer science. Instead of concentrating on terminological vocabularies and term banks, we also focus on the core of the terminological theory: terms and concepts, especially on concept (system) analysis, because it is fundamental to all human activities.

In the satellite method I have combined concept systems as an integrative part of the terminological analysis. This systematic analysis is meant to be a tool for those professionals or lay people who struggle with concept and term problems when analysing and organising subject field knowledge, whether in compiling a vocabulary, writing or reading technical documentation or other specialised texts, structuring a data base, hypertext, LSP teaching, etc.

The method consists of several components that are familiar from terminological literature. Here these components, however, are combined to form a flexible method of analysis with emphasis on the concept system. The model has many similarities with the mind-mapping techniques, but has been developed independently by using as a help the theories of terminology presented by Eugen Wüster and Ingetraut Dahlberg as well as the practical terminology working methods used in the Nordic countries, especially Finland. Visualisation plays a central role in this method, because it primarily concentrates on the needs of a person - not those of a computer - but a person who has to structure a field and its concept system - even though a computer program can be used as an instrument to register and present the findings. In many cases paper and pen will, however, be enough in the first phase.

The Canadian CODE (Conceptually Oriented Description Environment) project, which aims at a knowledge-management system, realises similar types of ideas in a form of a computer program and is very interesting for us, too (cf. also Nistrup Madsen & Erdman Thomsen, LSP Symposium 97). We have also plans to develop a terminology management

program, but till now my interest has been mostly in developing the theoretical foundations for the model and to unify the graphic representation.

The basic phases of the satellite analysis consist of

1) restricting and defining the field of study
2) extracting or collecting data and organising it in a macro level satellite system covering the concepts and terms or different aspects of the field
3) a thorough concept system analysis and
4) a synthesis of the individual micro level concept systems. (See fig. 1)

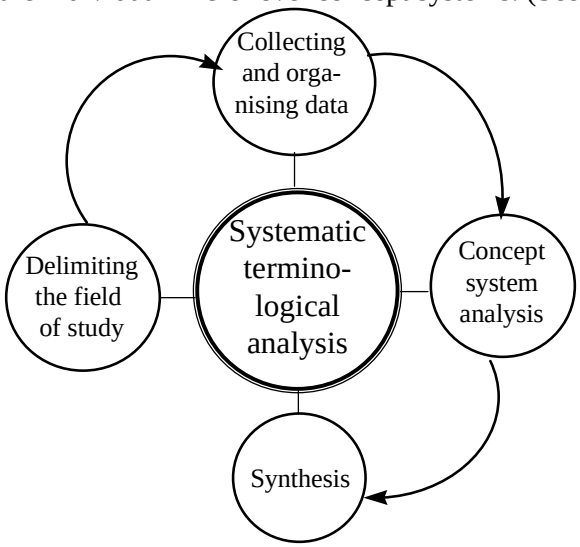

Fig. 1 Basic phases of the satellite method

2. Graphic representation

Instead of traditional types of graphic tree diagrams, I introduced a so-called “satellite model” or “satellite system”. The reason for selecting this form to represent concept relations was that it is more flexible than a tree form and new nodes can be added more easily without having to draw the figure anew - particularly important when we use paper & pen! Also, many different kinds of relations can be illustrated and we do not have to teach/learn many different types of graphical representation types (cf. Nuopponen 1994).

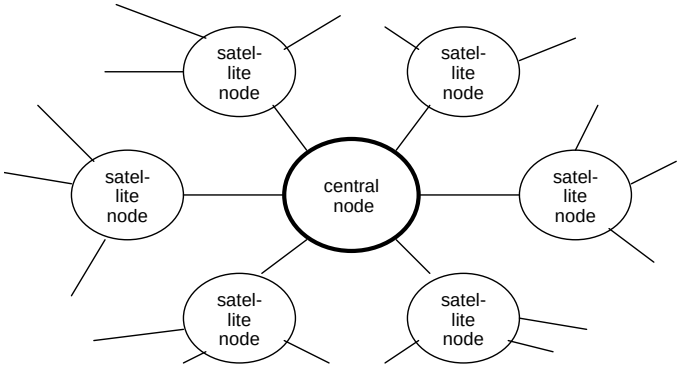

Fig. 2 The basic form of the satellite system

In a satellite system, the most central and essential concept is placed in the centre node and other concepts in so called “satellite” nodes around it (see Fig. 2). The satellite nodes can

receive their own satellites, too. The nodes can contain a concept or they can represent the relationships between the concepts. Relation nodes can be summarising titles, e.g. “parts”, “types”, “functions”, “instrument”, or more precise expressions for the concept relations, e.g. “generic or logical relation”, “partitive relation”, “temporal relation”. The relation nodes can be left out if the type of relation is clear, or difficult to define.

3. Selecting and defining the field of study

In this paper, I use as an example the field of terminology. The goal may be e.g. a vocabulary of terminology, a text book or hand book of terminology etc. The material is taken from various terminological sources, the main source being ISO’s draft for a vocabulary of terminology work (others: Felber 1984; SFS 1988; etc.). (NOTE: the analysis used here is **only** to give an idea of the use of the satellite method, and not any complete analysis of the concept field “term”.)

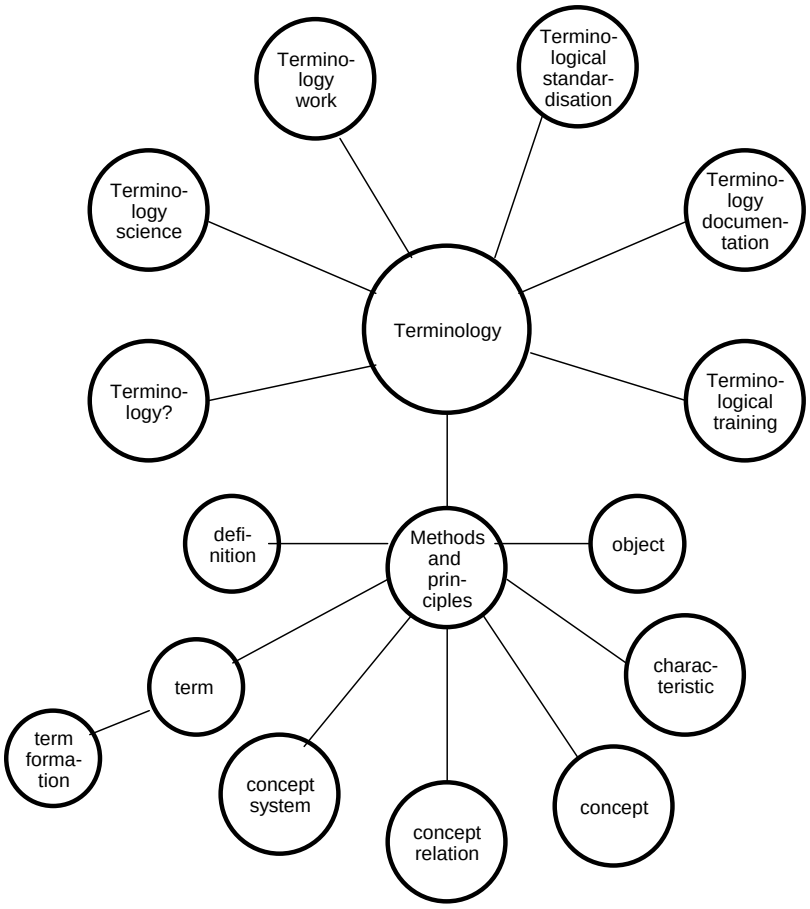

Fig. 3 A preliminary analysis of the field “terminology” as often presented in textbooks

With the help of a satellite model we can structure the field and try different divisions (see Fig. 3). We can analyse various sources separately and finally agree on one that suits our own purposes if needed. Even if we have chosen to concentrate on only one of the components, here: *terms*, the overall picture of the field may prove helpful many times later on. Depending on the purpose we could also return to this first satellite system and select other nodes for further analysis.

4. Collecting and organising data

The purpose of the next phase is to give us an overall picture of the concepts, terms or other elements of the selected field. It includes both extracting or collecting the information as well as organising it preliminarily. Extraction of data from sources and drafting a provisional schedule of concepts are often separated as different phases in terminology work. According to ISO/DIS 1087-1 (a draft for a vocabulary of terminology work), the first phase, i.e. '*term excerption*', includes identifying terms and concepts as well as different kinds of relevant information about the concept. Term excerption and *term identification* result, according to the standard, in a *base list*, a list of terms to be used as a basis for further terminology work. Drafting a provisional schedule of concepts is often indicated as the next step.

In the graphical satellite method, these two phases – extraction of data and drafting a provisional concept system – are integrated. Every new term and concept we find in the material we are analysing is added to the satellite system and connected preliminary to a node which is closest to it (see Fig. 4). We are not restricted to the concepts that have designations, but all the interesting data can be included.

The material and sources for knowledge acquisition depends on our purpose and selection; in some cases the source material consists of written special texts, in other cases of knowledge that we have ourselves, or of knowledge that we acquire by interviewing a specialist, or a group of specialists. The analysis method can be used especially when brain-storming in any context, or for instance, when a technical writer is seeking information on the product he/she is writing about.

In the preliminary system, relation nodes can be added or left out depending on the needs of exactness and information available. Even though many concepts inside the system are related to each other, it is better, for the sake of clarity, to connect a concept as a satellite only to one centre node (main or secondary). Instead of drawing many crossing lines we can draw several nodes for a certain important concept. In a pen-and-paper analysis this is important, but in a special computer program the number of connections does not matter. Which concepts are connected with each other depends also on the approach taken.

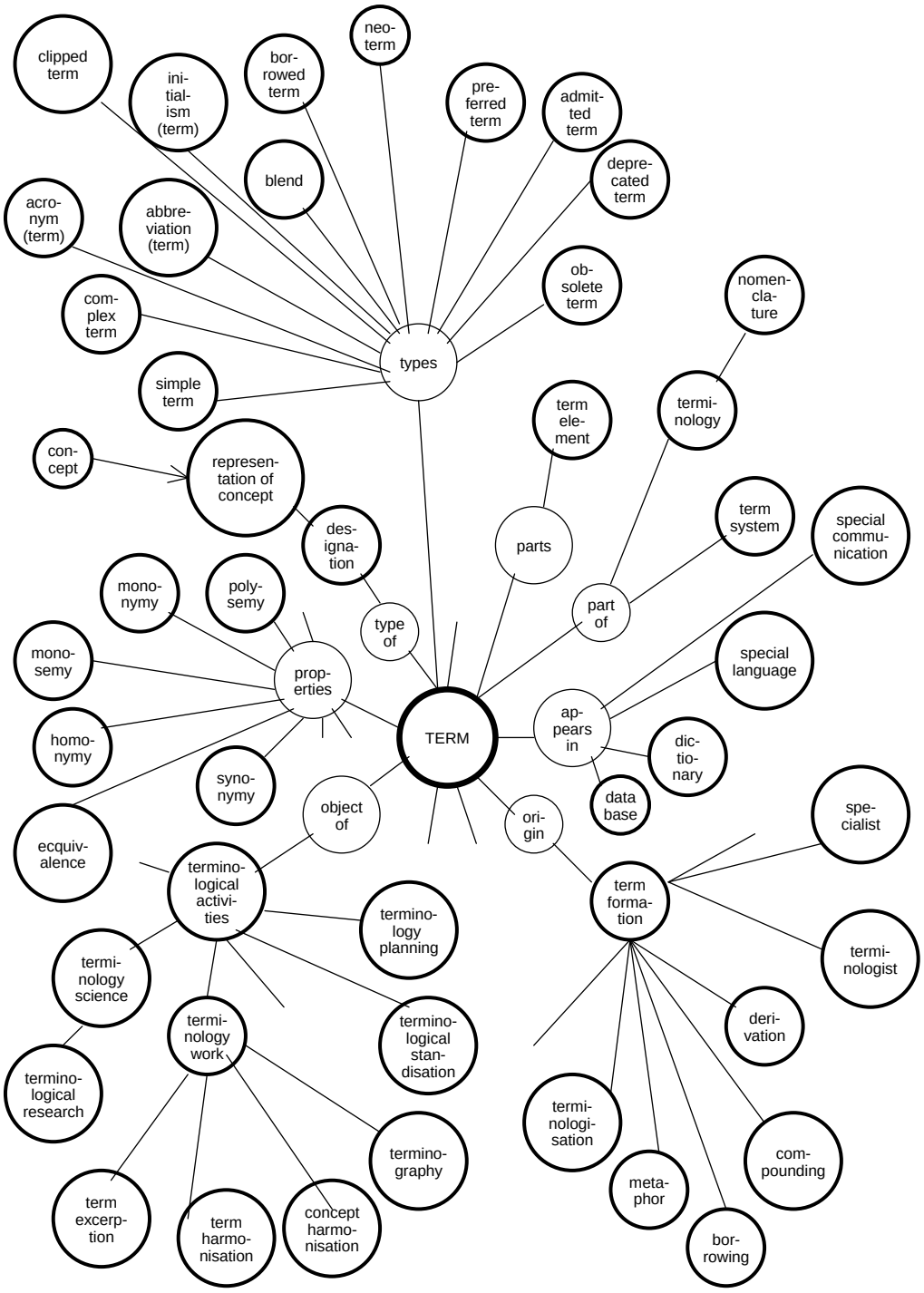

Fig. 4. A first draft for the satellite system of the field “term”

When we notice that a certain concept - other than the concept in the centre node - has multiple relations, it can be fruitful to handle it separately in its own satellite system, provided that it does not exceed the defined scope. Also otherwise, it is useful to divide the area into smaller subfields after a preliminary mapping of the main components of the field. In many cases, it is enough to get an overall picture of the concept field, and the analysis is complete when the satellite model has been outlined. A further analysis is needed e.g. when compiling

vocabularies and writing theses, i.e. when it is important to gain a deeper knowledge of the relationships between the concepts involved. In this phase further restrictions of the field can be made.

5. Concept system analysis

In the next phase, we continue to a deeper analysis of the concept field and specify the relationships between the concepts and structure different types of micro level concept systems. Some of the systems may already be more or less complete from the earlier analysis, some parts may be studied further and extended or restricted to a certain degree. Here we can use the traditional ways to represent the concept systems graphically, or continue with the satellite systems.

Additionally, matrixes can be used for comparing the characteristics of the concepts, especially in the case of polydimensional logical concept systems, in a similar way as in the CODE project. In the example material "term" and "term formation", I have found the following relation types and concept system types (see Fig. 5):

1) **Logical** (or generic) concept systems can appear as a monodimensional system: e.g. different types of *terminological activities*; different types of *concept representations*. Logical concept systems also often appear as polydimensional, e.g. the classification of *term* types according to different criteria. Poly- or multidimensionality can be presented by using pseudo-nodes including the criteria of division.

2) **Partitive** concept relations appear in the example, on the one hand between the central concept *term* and *term element* - its partitive subordinate concept, and on the other hand between the concept *term* and its partitive superordinate concepts *term system* and *terminology*: a term can be said to be parts of a term system or a terminology

3) **Local** concept relations are based on a relationship between an object and a place, container etc., where it is situated or where it occurs, without being a part, just as *milk* is not a part of a *bottle*. *Terminologist - terminology centre*.

4) A relation of **property**, based on a relationship between of an object and its property, e.g. *term - synonymy / synonymous*, *term - polysemy / polysemous*, *term - transparency / opaqueness*.

5) A relation of **rank**, based on a relationship between objects that are evaluated and ordered according a certain type of property, e.g. *preferred term - deprecated term.*

6) Relations of **origin**, based on the origin of the object (material or immaterial): a) relations of **result**, based on a relationship between of an activity and its result, e.g. *term formation - term*; b) **genetic** relation, based on a relationship between of an object and its creator, e.g. *specialist - term* (cf. *baker - bread*); c) **instrumental** relation, based on a relationship between of an object and a tool or a method used to produce it, e.g. *term - terminologisation*, *borrowing* etc.

7) Relations of **activity**, based on activity and concepts associated with it: a) an **object** relation, based on a relationship between of an activity and its object, e.g. *terminology work - term*; b) an **agent** relation, based on a relationship between of an activity and its performer, e.g. *standardising - standardisation committee; terminology work - terminologist*; c) a **locative** relation, based on a relationship between of an activity and the place, e.g. *terminology work - terminology centre*; d) a relation of **purpose**, based on a relationship between of an activity and its purpose, e.g. *terminology planning - developing and improving the terminology of a subject field*.

8) A **symbol** relation, based on a relationship between of an object and its representation, e.g. *concept - designation*.

Additionally, there can be found other relations, e.g. temporal, causal, transmission relations or relations based on e.g. a development of the object. (Fore more details, see Nuopponen 1994) Usually, only logical and partitive relations are used in terminology work. The rest - if relevant - are referred to as **associative** relations. In some other activities, e.g. data base design, a more detailed description of relation types is needed.

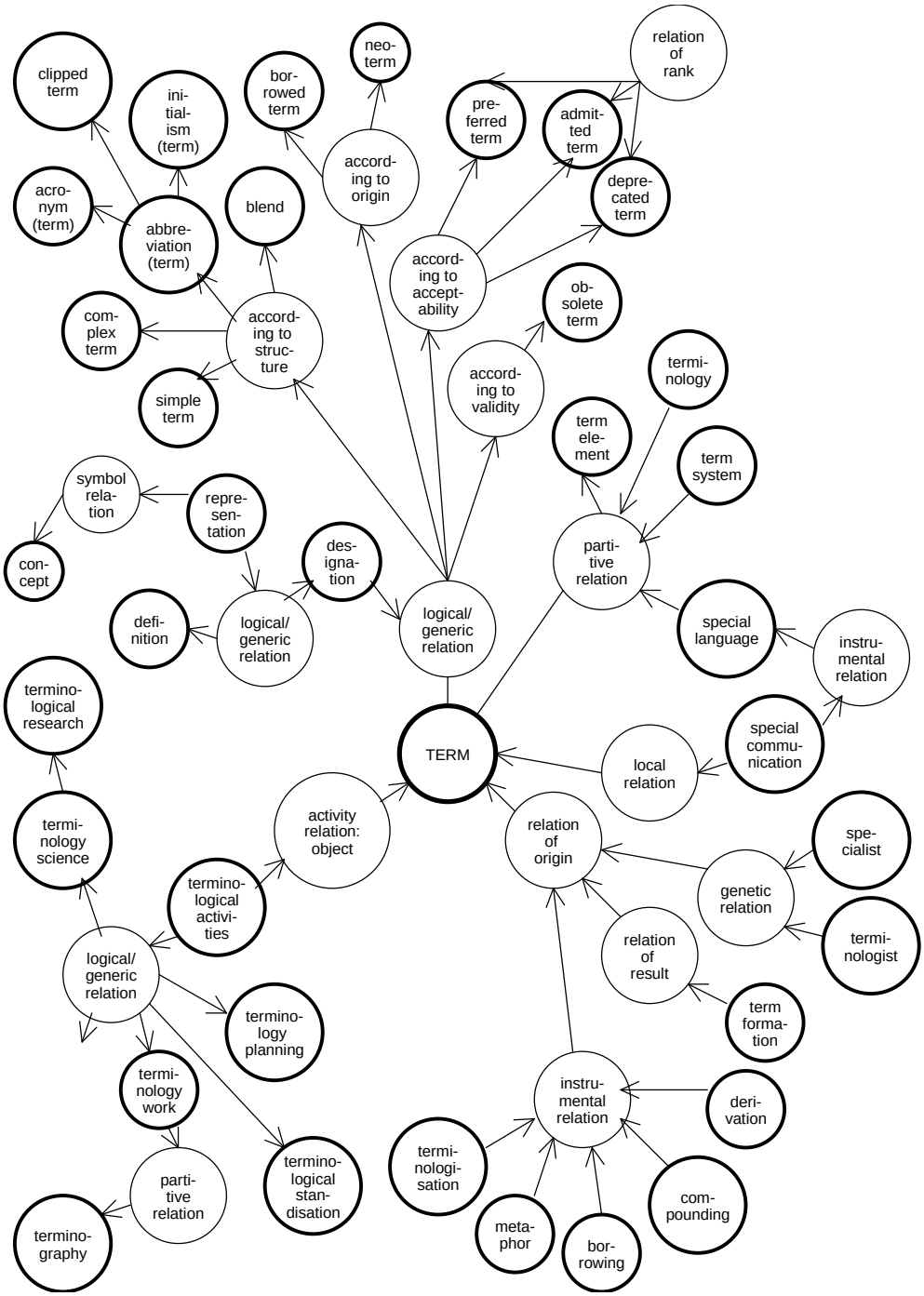

Fig. 5. Different types of concept relations integrated in a satellite system

6. Synthesis

After the micro level concept systems have been studied and the relations between the concepts defined, we can return to the overall picture of the field and see how the different systems fit together. This is especially important if several persons are working on the same concept field. As a result we shall have a good overall picture of the field and we have collected quite a lot of information about the concepts. We can now continue in different directions according to the purpose of our task, e.g. select the concepts and terms to be used in an article, or to be included in a dictionary; create a term entry organisation in a systematic terminological vocabulary or a data base; decide the concept systems to be followed e.g. in definition writing; etc.

7. Conclusion

I have outlined here the core of a systematic terminological analysis that has been called the "satellite method". It is an attempt to develop the theory and methods of terminology further and to make them applicable for multiple purposes - not only independent of the field and language but also of the task (e.g. standardising, vocabulary compilation). The method comprises the terminological analysis based on concept systems. Applications for different purposes are under development.

Terminological analysis is thus regarded 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 for lay people trying to cope with the ever increasing information flow, or for a student reading for his/her exams or writing his thesis.

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