Concept system analysis for academic writing

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Tutkielmien ja väitöskirjojen laatijat joutuvat työnsä eri vaiheissa pohtimaan käsitteitään ja niiden muodostamia käsitejärjestelmiä. Tässä on apua terminologisten tutkimusmenetelmien tuntemuksesta, erityisesti käsitejärjestelmien analysoinnista. Tutkimukseni kohteena ovat toisaalta itse tutkimusprosessi ja toisaalta tutkimusraportit. Näitä tarkastelemalla pyrin kehittämään terminologian teoriaan pohjautuvia käsiteanalyysimenetelmiä tieteelliseen tutkimukseen soveltuviksi. Tutkija tarvitsee deskriptiivisiä menetelmiä kuvatessaan olemassa olevaa käsitteistöä, teorioita, menetelmiä tai tutkimuskohteena olevaa ilmiötä yms., mutta myös normatiivisia menetelmiä muodostaessaan tutkimukselle yhtenäistä käsitteistöä ja termistöä esim. aineistonsa analyysia varten. Tutkimuksen eri vaiheissa käsitejärjestelmät muotoutuvat ja tarkentuvat sitä mukaa kun tutkimuksen kohteesta saadaan lisää tietoa. Tutkimusraportissa tämä käsitteellinen evoluutio tulee tieteen perusperiaatteiden mukaan tuoda näkyville ja perustella valinnat.
Keywords: terminological methods, concept analysis, research, academic writing, concept system

Terminological methods concern analysis, evaluation and formation of concepts, terms, definitions, concept relations and concept systems. They originate from practical terminology work, i.e. harmonizing and standardizing terms and concepts of special fields and compiling vocabularies, data bases and standards. I have noticed, however, the benefits of terminological methods while supervising bachelor's and master's theses as well as PhD dissertations in communication sciences. Additionally, I have given tree one day workshops in concept analysis for doctoral students from several Finnish universities. The goal of these workshops has been to make the students to pay attention to the concepts and concept systems they work with in their dissertations. The experiences have been positive and encourage me to develop further the workshop design and to apply terminological concept analysis methods to academic writing in a greater extent.

In order to adapt terminological concept analysis – and especially concept system analysis – to fit the specific needs of academic research and writing, I am looking for information on the research process and its phases as well as its result, the research report. This study is a part of my ongoing project where terminological concept analysis methods are being developed to accommodate needs of different specialist groups, e.g. terminologists, technical writers and researchers.

This article examines academic writing from the point of view of terminological theory and methods. With academic writing I refer here mainly to writing dissertations and thesis. I discuss here research process and research report from the point of view of concept system analysis and give examples on concept systems in a doctoral dissertation.

1. Terminological methods

Terminological methods are often criticised for being all too focused on normative measures, e.g. prescribing or recommending terms and concept definitions to be used. However, all practical terminology work needs descriptive methods to analyse and describe terms, concepts and definitions that are already in use. Additionally, normative terminology work needs methods to select the terms, concepts, concept systems and definitions to be preferred or recommended.

Both descriptive and normative approaches can be utilised in terminological theses – i.e. research into terms, concepts and concept systems of a field in one language or contrastively – and research generally. Descriptive approach is needed when terminologies and concepts of a special field are treated as research objects. The same applies for any research work when describing concepts and concept systems from previous research. On the other hand, terminologies and concepts that form part of both the methods and the theoretical framework of the study need to be made clear and consistent. This is an example of the need for normative guidelines also outside the practical terminology work. Thus, guidebooks for academic research often give similar guidelines as manuals for terminology work.

What I have been especially interested in, is concept system analysis. In my dissertation (Nuopponen 1994) I made a classification of concept relation and system types, many of which have proved to be useful when analysing ongoing research projects:

- Generic relations (taxonomies, typologies, genres etc.) appear practically in every study.
- Contiguity relations: partitive (entity and its parts, components, aspects), property, material component, location, temporal (processes, events), rank relations etc. are very frequent.

– Influence relations: causal (entity and its causal connections), developmental (development of an individual, species, material), interactional, teleological (purpose), origination, activity (e.g. activity and its object, result, instrument), representational (object and its symbol, representation) relations, etc. are often needed.[1]

Even though the classification was originally created for terminology work and concept system analysis, concept system models have been used also for constructing other knowledge structures and systems of facts[2]. Several of those models originate indeed in scientific research methodology and philosophy of science.

2. Research process

Research processes vary according to the approach and method to be used. A general model could look like this:

– identifying and developing the topic,
– finding information and evaluating it,
– research design,
– creating a theoretical framework,
– material an data collection,
– data analysis,
– drawing conclusions, and
– writing a research report.

In all of these phases concept systems are involved, and I believe terminological methods – especially concept analysis – can be utilized in all of them. But how, that is what I want to find out in my research project. The phases that I have preliminary looked at are: identifying and developing the topic and the research design as well as creating a theoretical framework.

As to **identifying and developing the topic**, some guidebooks recommend using mind maps or concept maps as help. This is also my recommendation. In terminological analysis I utilise a model that I have called "satellite model" to preliminary map the concept systems (see the figures 1–5). Similarly, for **finding information and evaluating it**, information retrieval guides recommend using concept maps to facilitate the search and compiling a set of search terms. **Research design** involves planning how

research question(s), hypothesis, methods and material are combined together, or as Trochim (2005)[3] says: "Research design provides the glue that holds the research project together". Different types of relation and system models are needed to show the connections between the elements in research design. In this work especially causal relations are needed, but also temporal and partitive relations are relevant in this phase.

When **creating a theoretical framework,** an essential part is to develop a conceptual framework, i.e. a network of concepts to be utilized in the study. As a starting point researchers have a variety of theories consisting often of very different sets of concepts, and thus often abundantly polysemic and synonymic terms. They need to select the theory that suits for their purposes, modify it, or combine existing theories and create thus their own. This involves often creating own concepts and concept systems. Particularly in this phase, the normative methods I mentioned earlier, are needed. The task is to create a unified theoretical framework for the needs of the study. Concept systems from earlier research go through stages of evolution and give rise to new concept systems and form a basis for the research.

Material and data collection differs from case to case, and it is difficult to give any general description, but various kinds of classifications are involved in this phase too. **Data analysis** utilizes categories and conceptual frameworks developed for the study. After that findings are analysed and **conclusions are drawn**. In this phase the researcher returns back to the research design and creates an overall picture of the whole research process and its results.

3. Research report

Writing a research report is the last phase of the research project in the list above, but usually it is done parallel with the other phases. Students often see research process and writing a research report as the same thing. This is reflected in the layout of the manuscripts and wording used in them. However, these two are not the same, and it is not always the best way to organize the report according to the actual steps of the research process.

A typical structure of a research report (e.g. thesis, dissertation, paper) follows the model: abstract, introduction, research problems, theory, analysis, results, conclusions, and discussion. Naturally, there are variations, especially material-based methods (e.g. Grounded Theory) lead often to somewhat different report structures that reflect the actual research process in a greater degree (see Kiviniemi 2001: 81).

In the following I discuss abstract, introduction and theoretical framework and give examples from Monika Höge's doctoral dissertation *Towards a Framework for the Evaluation of Translators' Aids' Systems* (2002) presented at the Department of Translation Studies at the University of Helsinki. The dissertation consists of the following main chapters:

- Abstract
- Introduction and approach
- 1. Translation and evaluation – the context
- 2. What translators want – featuring users and systems
- 3. Structuring and preparing for evaluation
- 4. User-oriented testing for evaluation
- 5. Assessment in software evaluation
- 6. Summary and conclusion

In her dissertation she creates a vast network of concepts including several types of concept systems. Höge illustrates the models and concept systems in her dissertation with many graphical representations. The figures in this article are my interpretations based on her text and illustrations. I have analysed the beginning of the dissertation, and take the following examples from *Abstract, Introduction and approach*, and *1. Translation and evaluation – the context*. The abstract will be dealt as the last one here, because it sums up the whole dissertation.

3.1 Introduction and research problems

In a research report, the introduction outlines the research design. Here the reader expects to find the most central concepts and their connections introduced in a way that helps him/her to understand what follows, even though most of the concepts and facts will be explained and discussed further in the later chapters. This part includes

information on research object, goal, hypothesis, disciplines involved, theoretical framework, methods, research process, expected results etc.
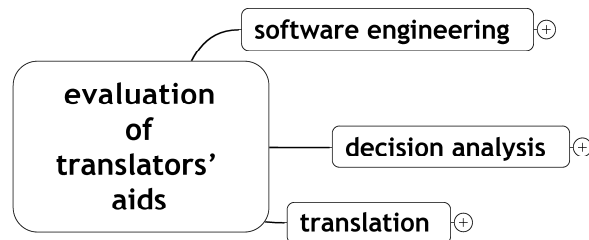

Figure 1. The main components of Höge 2002

In Höge's dissertation, three main components are emphasized right in the beginning in the chapter *Introduction and approach* (Höge 2002: 1-11): *software engineering*, *decision analysis* and *translation* (see figure 1). They form a basis for the rest of the network of concepts in the dissertation. Translation is dealt thoroughly in the chapter 1, but the two first ones are discussed more detailed already in the introduction. Therefore, two (temporal) concept systems can be retraced in the introduction: *life-cycle model of software development* (see figure 2) and *evaluation cycle* (see figure 3).
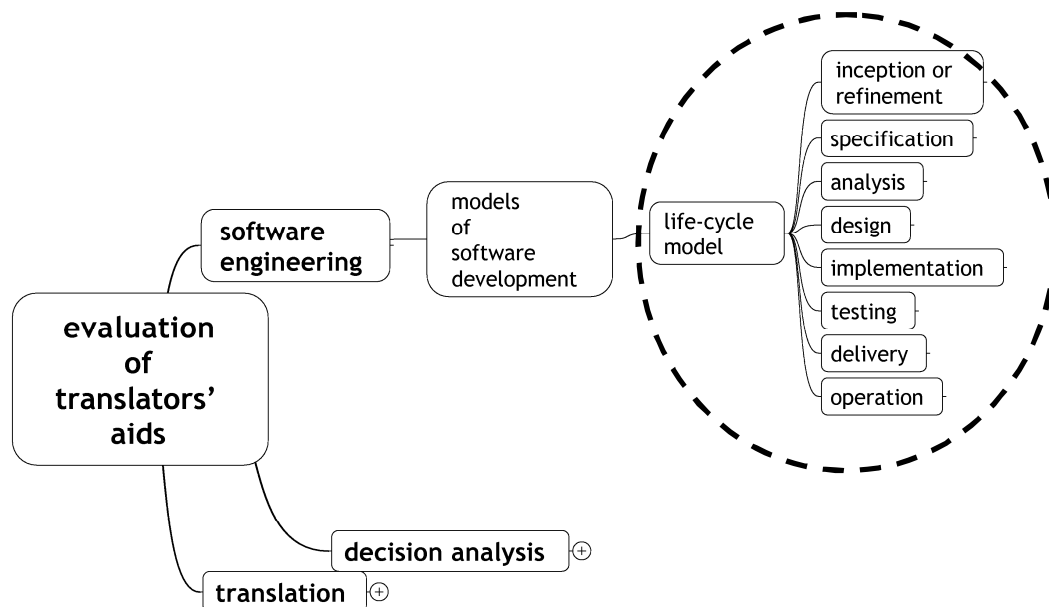

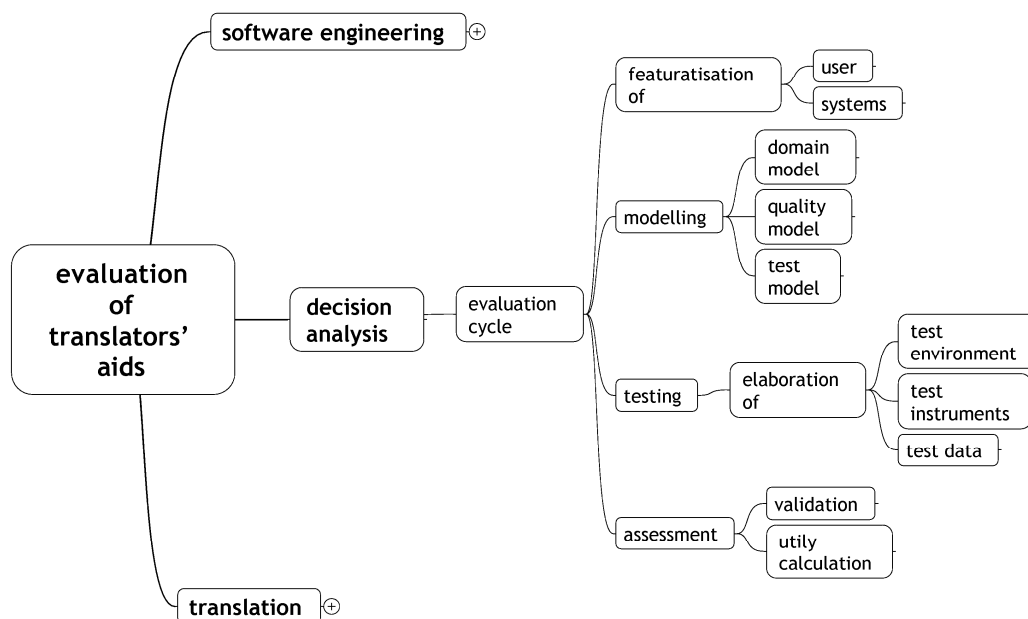**Figure 2.** Life-cycle model of software development in Höge 2002

Figure 3. Evaluation cycle in Höge 2002

These two models are borrowed from other disciplines, and the author combines them to form a further model to be applied in the study (Höge 2002: 18). The models are all discussed later on in the dissertation, but a basic understanding of the concepts involved in them is given already here.

3.2 Theoretical framework

Theory and theoretical framework are often discussed in two or more main chapters. In this part of the work the author usually discusses context of the study, research object, different methods, theories, and concept definitions as well as develops them further to fit the purpose of the study. This work benefits greatly if the researcher has been utilizing systematic concept analysis when building up the theoretical framework for the study. Here we can see a difference between a terminologist and a researcher: the terminologist presents only the finished product of the concept analysis, e.g. a preferred term, a definition, and possibly a graphic representation of a concept system, while the researcher must make the whole analysis process visible. The researcher discusses different possibilities and motivates the choices in order to facilitate an evaluation and tracing back to the sources by other researchers.
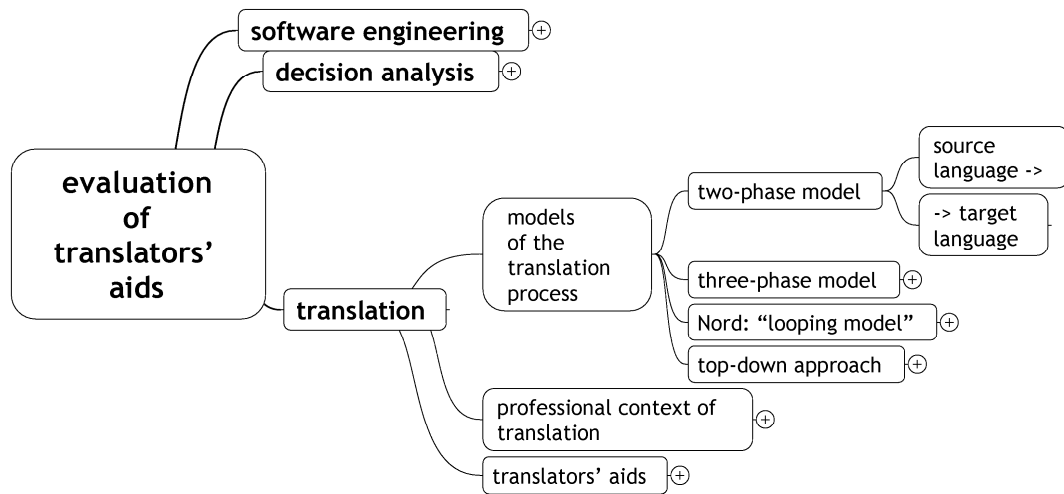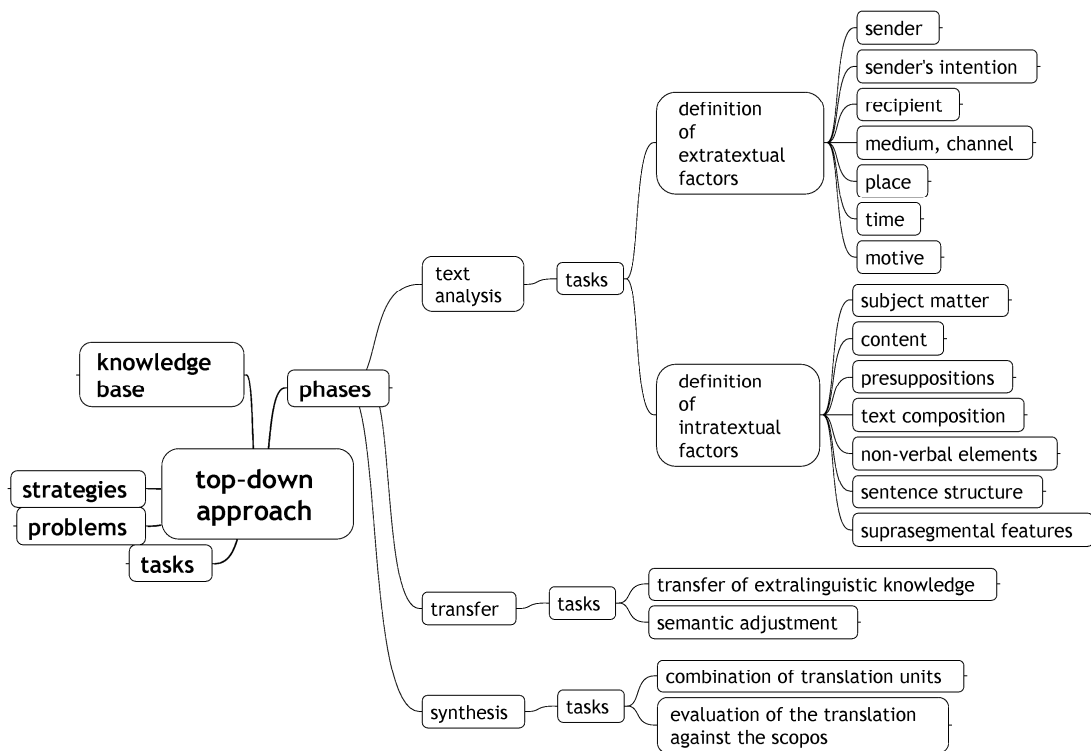
Figure 4. Translation models in Höge 2002

Figure 5. Top-down approach in Höge 2002

In Höge's dissertation translation and evaluation are discussed detailed in the chapter following the introduction. For this paper I have analysed part of what she says on translation (see figure 4). At first she presents several translation process models, then selects one – Nord's looping model – and continues to work on a model called "top-

down approach", which involves an extensive system of concepts of which I have presented only a part in the figure 5.

3.3 Abstract

An abstract presents the research report in a condensed version summarising the key elements of the research design, object, methods, goal, theoretical framework, results and conclusions. Its emphasis is on the author's choices and results. Thus the concept systems reflected in it are those developed and used by the researcher.
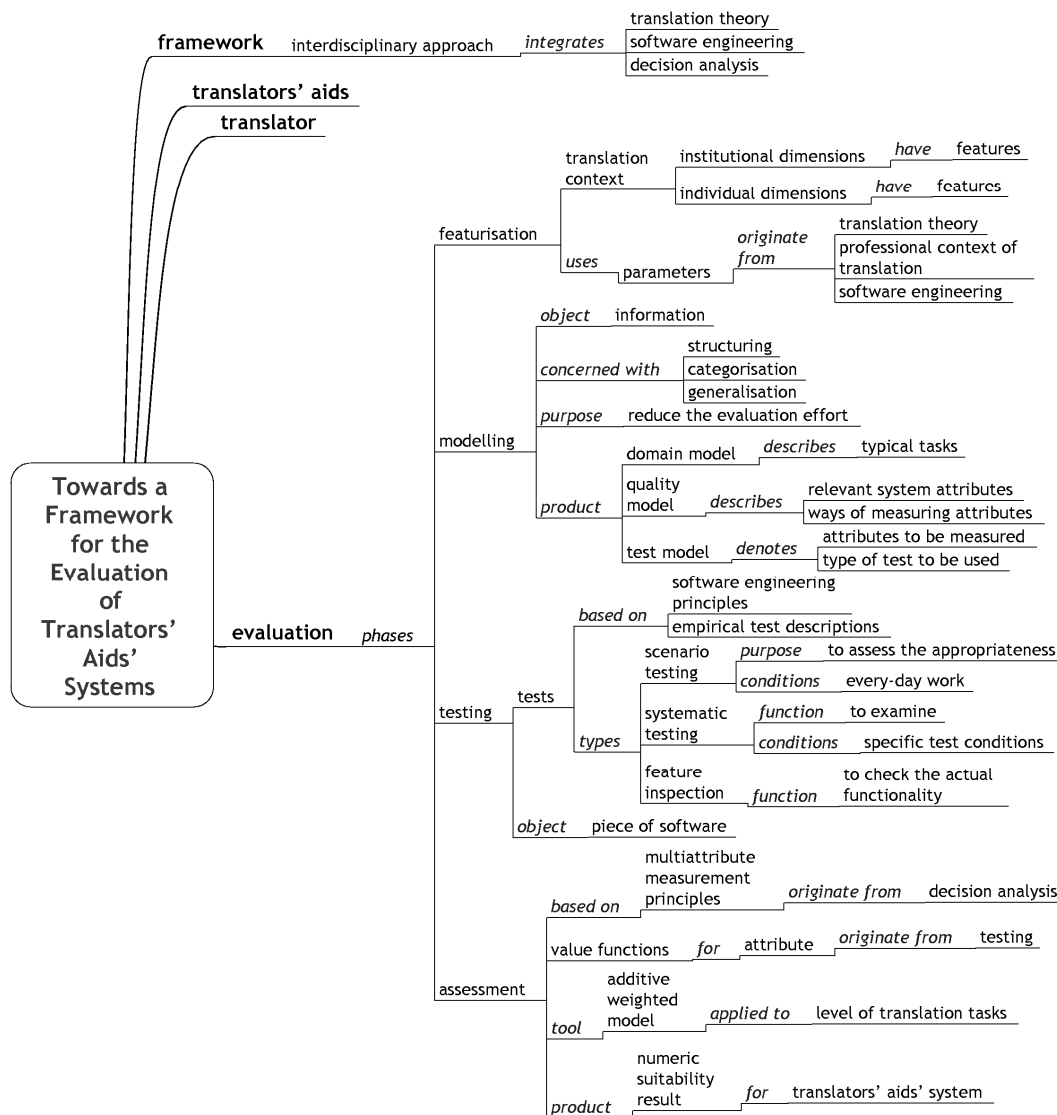

Figure 5. The concept system in the abstract in Höge (2002)

In figure 6 I have analysed the network of concepts reflected in Höge's abstract. The goal of the dissertation was to create a framework for evaluation of translator's aids, which can also be seen in the themes covered by the abstract: framework and the disciplines it integrates, translator's aids, translator, and evaluation. The phases of the evaluation are presented detailed. In the figure I have added relation markers in italics. The markers are mostly taken from the text itself. Relations that appear are e.g. generic (*types*), partitive (*integrates*), teleological (*concerned with, purpose, function*), resultative (*product*) and instrumental (*uses*), and representational (*describes, denotes*), as well as relations of origination (*originate from*), property (*have*), situation (*conditions*), and ingredient (*based on*)[4].

4. Discussion

Guides to academic writing do emphasize the importance of clear and unambiguous concept definitions but they do not pay much attention to the clarity of the conceptual systems utilized in the thesis/dissertation. It is not however enough to define concepts in isolation, but to see them as part of a whole network stretching all over the research work. I believe that paying more attention to concept systems weeds out unnecessary conceptual vagueness, synonymy, polysemy, flaws in classifications etc. It is not only the structure of the report that must be logically consistent, but also the concepts used in the study must form a consistent network of concepts.

I have discussed here some preliminaries for a study the purpose of which is to develop concept analysis methods for purposes of academic writing. Interesting research questions will be on the one hand, how concept systems evolve in a research process, and on the other hand, how this evolution is presented in academic writing. Answers to these questions will be searched by scrutinising the research process by analysing dissertations and other research reports.

Nuopponen, Anita (2005). Concept system analysis for academic writing. In: Laurén & Vesalainen (eds), *Erikoiskielet ja käännösteoria. VAKKI-symposiumi XXV*, 270- 280. University of Vaasa.

References

Hedin, A., L. Jernberg, H. C. Lennér, T. Lundmark & S-B. Wallin (2000). *Att mena och mäta samma sak – en begreppsorienterad metod för terminologiskt arbete*. Lund: Studentlitteratur.

Höge, Monika (2002). Towards a Framework for the Evaluation of Translators' Aids' Systems. Helsinki: Helsinki University Press. Available online: http://ethesis.helsinki.fi/julkaisut/hum/yleis/vk/hoge/

Kiviniemi, Kari (2001). Laadullinen tutkimus prosessina. Teoksessa Aaltola, J. & Valli, R. (eds.) Ikkunoita tutkimusmetodeihin, 68-84. Jyväskylä: PS-kustannus..

Nuopponen, Anita (1994). Begreppssystem för terminologisk analys.. Vaasa: University of Vaasa.

Nuopponen, Anita (2005). Concept Relations v2. An update of a concept relation classification. To be printed in the Proceedings of the 7th International Conference on Terminology and Knowledge Engineering 17-18.8.2005, Copenhagen. (In print).

Trochim, William M. (2005). The Research Methods Knowledge Base, 2nd Edition. Available online: http://www.socialresearchmethods.net/kb/ (version current as of 16.1.2005).

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[1] For more, see Nuopponen 1994; 2005.
[2] See e.g. Hedin, Jernberg, Lennér, Lundmark & Wallin (2000).
[3] http://www.socialresearchmethods.net/kb/design.htm
[4] More on the types of relations in Nuopponen 1994, 2005.