Workplace Communication IV

Use of Concepts and Terms in Research Plans: Effects of Enriched Metacognitive Genre Awareness through Concept Analysis Assignment

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This paper discusses findings from a study conducted during an academic writing course for master's students[1]. The purpose of the study is to determine how the metacognitive genre awareness gained from an analysis assignment influenced students' ability to write effective research plans. In this study, the focus is on concepts and terms, and the participating students were given two assignments: to analyse concepts of an existing master's thesis in their field and to rewrite their research plans, taking into account the learning outcomes of the concept analysis assignment. This paper describes how students have changed the use of terms and concepts in their research plans. The data consists of two versions of research plans written in Finnish by 14 students of University of Vaasa in spring 2019. The analysis showed that students' research plans changed and became more detailed: students modified their research plans by adding central concepts, generic concepts and specific concepts, and by specifying relationships between concepts or adding definitions. They also eliminated synonymous terms. Based on these results, a conclusion can be drawn that a concept analysis assignment is a tool that is effective in enriching students' metacognitive genre awareness of the use of terms and concepts when teaching academic writing.

Key words: academic writing, metacognitive genre awareness, genre knowledge, concept, concept analysis

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[1] This article is partly a translation of an article previously published in Finnish (Katajamäki 2020a). However, the scope of this article is different and the text has been rewritten and developed further accordingly and based on a new peer-review round.

1 Introduction

In discipline-specific academic discourse communities, the use of a special language is a resource for maintaining the production of knowledge. The term special language refers to language patterns used by experts of a field and includes, for instance, lexico-grammatical patterns, such as terms and grammatical metaphors (Antia 2007: 13–14; Martin & White 2005: 33–35; Hao 2020). Each academic discourse community is governed by its expert members, as they have the power to maintain or change the established discourse practices. Unlike expert members of academic discourse communities, university students are novices who are studying to become members of a discourse community (Swales 1990). Socialization into academic communities means learning how to participate successfully in the different practices of the discourse community. During writing processes, but also on academic writing courses, students gain knowledge of academic texts as a genre that is used in certain contexts and written with specific structural and linguistic resources, and learn to create for themselves authorial identities that are appreciated and convincing within the community. (Swales 1990; Bhatia 1993; 2004; Hyland 2002; Duff 2010: 169–170.)

In addition to genre knowledge, learning to write requires metacognitive awareness (Negretti & Kuteeva 2011; Negretti & McGrath 2018) through which the students perceive their own knowledge and competences and are also able to regulate how and when these can and should be utilized. Negretti and Kuteeva (2011) bring the concepts of genre knowledge and metacognitive awareness together when they discuss metacognitive genre awareness, which refers to becoming aware of genre, discourse and rhetorical aspects expected of a genre, and concludes that increased metacognitive genre awareness supports writers' ability to make deliberate writing choices, and thus transfers into texts. Metacognitive genre awareness can be gained by writing, but also by analysing texts. Different kinds of text analysis assignments might be used to reinforce the students' genre knowledge, and therefore text analysis is seen as an important pedagogical tool within genre pedagogy (see Swales 1990; 2016; Hyland 2003: 17–20; 2007: 149–150). By analysing texts, students are able to become aware of expectations of genre and the linguistic resources that are used for constructing meanings in texts. The benefits of analysis assignments as a pedagogical tool have been examined in several writing studies (e.g. Negretti & Kuteeva 2011; Jou 2019), which describe how students have acquired metacognitive genre awareness by analysing texts based on genre theory (Swales 1990) or appraisal theory (Martin and Rose 2003).

This paper discusses findings from a study conducted during the academic writing course Academic Writing in Finnish (L1), which aims to support students in their development as academic writers. Several analysis assignments are used to foster students' awareness of the expected language use in a specific genre, i.e. metacognitive genre awareness. The focus of this study is on how students have learnt to apply in their writing what they have understood of the role of concepts and the use of terms by doing a concept analysis assignment. Irrespective of the field of science, academic writing can be demanding even for expert writers, due to the fact that academic writing is always connected to thinking about the phenomena that are studied, and thus, the use of terms

and concepts used to approach the phenomena. Especially novice writers, such as university students, struggle to express themselves with conciseness and preciseness, thus avoiding terminological problems (Katajamäki 2020b). The purpose of the study is to find out how the metacognitive genre awareness gained from the concept analysis assignment influences students' ability to write academic texts. The concept analysis assignment aims at raising students' awareness of academic language use, and thus might have an impact on students' writing. The learning outcomes of the assignment are studied by comparing two versions of student texts: a research plan before completing the concept analysis assignment and a revised version after the assignment. This paper describes how students have changed the use of terms and concepts in their research plans. These changes are illustrated by a description of how students modified the use of terms and concepts within their research plans after doing a concept analysis assignment.

This study contributes to research in teaching and learning in higher education by shedding light on different kinds of writing abilities among students, which might help teachers to identify students' abilities or lack thereof. This study leans on the field of Language for Special Purposes (LSP) and approaches the language use of novices from a pedagogical point of view. In addition, this study approaches language use in academic writing through the lenses of discourse analysis (Martin & White 2005) and traditional terminology research (Wright & Budin 1997; Nuopponen 2003b). LSP studies provide the theoretical frame for approaching students' academic writing as a social activity that might be improved through increased awareness of preferred discourse practices within a discourse community. Discourse studies provide a background for illustrating how the language is used. In discourse analysis, language use is approached as a contextual phenomenon, and therefore, according to that approach, academic texts written by students belong to the context of a university course, including teaching, assignments and other course work. However, academic texts are also a part of an institutional setting. Besides this, words and expressions used in texts are parts of the discourse of a specific field (Fairclough 1992). Whereas discourse analysis is focused on interpreting language use that construes meanings in each situation, terminology research approaches language use from the point of view of concepts (Nuopponen 2003b). In other words, while discourse analysis is based on social constructionism, terminology research follows a cognitive approach. According to L'Homme (2020: 7–11) traditional terminology research provides a background that sets a theoretical frame for language use in professional communities, highlighting the importance of using accurate terminology for communicating expert knowledge.

2 From Metacognitive Genre Awareness to Observing Influences on Texts

Metacognition refers to human thinking about one's own thinking; it is the ability to reflect, understand, and regulate one's learning (El-Hindi 1997: 10; Schraw & Dennison 1994: 460; Schraw 1998: 113–114). Through metacognition, students perceive what they know about the subject and about themselves, they learn how to proceed and organize their thoughts in order to get the job done (metacognitive knowledge) and how to modify and develop their knowledge (metacognitive regulation) (Schraw & Dennison

1994: 460; see Negretti & McGrath 2018). Negretti and Kuteeva (2011) combine frame-
works of metacognitive knowledge and genre analysis in their study, in which students
wrote their final essays after doing genre analysis assignments and in addition wrote
also comments during the writing processes. They concluded that "a genre-based ap-
proach catalysed students' metacognitive awareness of genre-specific features of aca-
demic writing", because acquired genre knowledge supported students' abilities to eval-
uate a rhetorical situation, including genre-relevant aspects, and then to make decisions
in terms of content, organization and style during writing processes. In conclusion, dur-
ing these kinds of writing processes, both the students' metacognitive knowledge and
metacognitive regulation might improve. By becoming aware of the characteristics of
the genre and the language used therein, students' metacognitive genre awareness in-
creases. Negretti and Kuteeva (2011: 104) divide metacognitive genre awareness, para-
phrasing Schraw (1998), into declarative, procedural and conditional knowledge: stu-
dents become aware of 1) what knowledge they need to learn in order to write an aca-
demic text (declarative knowledge), 2) how they benefit from their knowledge while
writing (procedural knowledge) and 3) why and when their knowledge can and must be
exploited (conditional knowledge). Consequently, an increase in metacognitive genre
awareness might result in an improvement in academic texts written by students partic-
ipating in organized learning events.

Declarative knowledge concerning genre can be approached through Tardy's (2009) di-
vision of genre knowledge into formal, procedural, rhetorical and professional
knowledge. Writers need knowledge of structural and linguistic practices belonging to a
given genre, which Tardy (2009: 20–22) calls formal knowledge. Formal knowledge is
information about the typical structure and preferred expressions, words and forms
used in a genre, but also about the medium through which genre is transmitted. Accord-
ing to Tardy, when producing text, formal knowledge also always overlaps with other
types of genre knowledge, such as process knowledge, rhetorical knowledge, and sub-
ject-matter knowledge. Subject-matter knowledge is discipline-specific, and needs to be
articulated with expertise in academic texts. (Tardy 2009: 20–22, 222). Subject-matter
knowledge is characterised by its own concepts and concept systems, through which
subject matter is considered in a way that is established in and characteristic to the field
(Nuopponen 2003a; 2020). Moreover, subject-matter knowledge is communicated by
special language that is – like general language – a semiotic system which is a relatively
constant culture of specialists working in the same field (Schröder 1991: 5–6; see Martin
1999: 48–52; Martin & Rose 2003: 266–267).

In academic communities, discourse practices are discipline-specific (see Tusting et al.
2019: 64–65), and becoming an expert also involves adopting subject-specific language
(e.g. Nuopponen 2003a: 18), including the concepts and terms of the field. Concepts are
units of thought shared within the expert community. Nuopponen (2003b: 225) defines
concepts as follows: "units of thought formed by abstraction, or as units of knowledge.
Concepts consist of characteristics based on properties observed in a (material or im-
material) object or in its relation to other objects." Concepts are defined based on the
characteristics of the concepts, and defined concepts generally are designated by terms.
Concepts exist as part of concept systems, in which concepts are not distinct elements
but related to each other. (Nuopponen 2003b) Because concepts function on the levels

of both thought and language, managing the use of concepts in academic texts requires genre knowledge and subject-specific knowledge. Within research processes, writers need to do concept reviews, which means becoming familiar with how the concepts are described in different studies, in order to be able to accurately use terms and concepts in their texts. Based on this, writers are able to achieve the communication purposes by choosing words from a language system that construe meanings and ultimately function as a whole text (Halliday 1994). Experts are able to use words in their texts so that different parts of the text form a characteristic, complete generic structure. Where experts are able to produce texts intuitively, in which case many of the things taken into account in the production of text are automated (Tardy 2009: 23), learning to write requires becoming aware of the possibilities for choices in the text. Linguistic awareness is increased by observing, comparing and analysing the use of language (Jou 2019: 1475). Thus, learning how to use terms and concepts can also be approached through the concept of linguistic awareness. In this study, linguistic awareness is also considered to be a part of metacognitive genre knowledge.

Adopting concepts means acquainting oneself with past thinking. Concept formation in the case of academic research and writing is a process that is based on reading others' thoughts, and this process can be made more effective by analysing concepts systematically (Nuopponen 2005; 2020). The process often proceeds simultaneously with the writing process, because as the research (process) progresses, the contents and definitions of concepts become more detailed and linguistic designations can be changed. Thus, the first step for researchers is to work through the "jungle of concepts" and clarify concepts for themselves. Moreover, when students become aware that concepts may have different terms, or that the same linguistic designation can be used to refer to different concepts, it might encourage them to use terms and concepts precisely. Furthermore, it is beneficial for students to perceive that the concepts and terms are discipline-specific and that their choices are linked to their own field of study and research problem in many ways. In academic texts, according to Koskela and Pilke (2020: 126), structural conventions of genre are often detailed, but how to arrange the content from the point of view of conceptual logic is not as clear, because this depends on the subject and reflects the thoughts of the writer. Ideals of academic language are perceived differently in distinct disciplines (Hynninen and Kuteeva 2017). Moreover, characterizations of ideal academic language are also approached from various perspectives[2]. However, when language use is approached from a terminological perspective, the ideals are quite clear: special language aims at fulfilling functions and strives to achieve precision, clarity and economy (Schröder 1991: 5), for example by avoiding indeterminacy, which means using words (lexical items) in texts in a vague or ambiguous manner (Andersen 2002; 2007). In accordance with these ideals, some guidelines for handling terms and concepts in academic texts can be outlined. First, the central concepts of the study should be clearly designated by choosing or forming terms (and possible translations) for them, and after each term is chosen or formed, it is important use the same term always when referring to the same concept (Rogers 2007: 16, Nissilä & Koskela 2020: 138–139; Koskela & Pilke

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[2] Therefore, preciseness defined from a terminological perspective differs greatly from definitions within studies that approach academic language from a systemic-functional perspective (see Thompson & Watkins 2021).

2020: 130). In addition, the concept must be defined distinctively (Koskela & Pilke 2020: 130–131; Nuopponen 2020). In academic texts, it is important to be able to use concepts in such a way that the reader of the text becomes convinced that the author understands them. My earlier study (Katajamäki 2020b) illustrated why there is a need to teach how to handle concepts and terms. The use of concepts and terms in a text should function so that it serves the rhetorical goals of the genre and the goal of the study (see Koskela & Pilke 2020: 130–131).

In genre pedagogy, being able to write as expected is considered to develop through learning conventions of genre, whether concerning structure, functions or discourse-semantic meanings of a text. The uses of terms and concepts are approached here as discourse-semantic meanings, which are meanings "beyond the clause", created by meanings "within the clause" (lexicogrammatic meanings). In systematic functional linguistics, language use is seen as achieving three functional goals: language use constructs simultaneously interpersonal meanings to reflect our relations with ourselves and each other, ideational meanings (i.e. experiential meanings and logical relations) to reflect reality, and textual meanings to organize all types of meanings together. These three linguistic meanings – chosen from the language system by writers – create texts, their functions and generic structure, and ultimately also their cultural contexts, which all, vice versa, create linguistic meanings. In appraisal theory, texts are approached from an interpersonal point of view, highlighting that all three meanings create authorial identities. (Halliday 1994; Ivanič 1998; Martin & Rose 2003; Martin & White 2005: 7–12; Katajamäki 2017.)

In this study, I approach texts written by students through discourse analysis, in order to interpret discourse-semantic meanings that are used in texts to express a function of designating concepts. I use the term term-like words to refer to these words, because even though they might be terms, verifying this is out of the scope of this study. Besides the function of designating concepts, also functions of expressing concept relations (realized through e.g. verbs), defining concepts (realized through sentences) and describing subjects (realized through sentences) are constructed by discourse-semantic meanings that are considered essential when focusing on the use of concepts and terms. In this study, these are approached as parts of orbital structure (see White 1998), selectively taking into account changed words and sentences that are semantically linked through ideational meanings to the central concept. For creating these functions, especially ideational meanings are crucial as they construct "abstractness, technicality, density, objectivity, authoritative voice, cohesive and coherent structuring, and academic reasoning" (Ryshina-Pankova 2018: 16). Especially ideational meanings construed by technical lexis are crucial for creating scholarly identities, because ultimately objectivity of the studied phenomena (subject) is anchored to (socially constructed) reality with lexis. However, all three discourse-semantic meanings are used to construct functions that are essential when examining the use of terms and concepts.

3 Context, Data and Methodology

In this paper, I describe changes in the usage of terms and concepts within a text written on the course Academic Writing in Finnish (5 ECTS) at the University of Vaasa. As part of the course, students write two versions of research plans for their master's theses[3]. In between these two, they give a report which analyses concepts in a previously completed master's thesis, written by someone else from their own field of study. The data includes texts written by 14 students collected from the course held in spring 2019. The data consists of two different versions of the research plans, and the analysis is based on comparisons of the two versions written by each student. To analyse the changes between the versions, I implemented a discourse analysis approach, focusing on discourse-semantic meanings related to the use of terms and concepts of the texts.

The study follows the pattern of intervention research (see Cappella et al. 2016: 284–292): I examine the impact of completing a concept analysis task (intervention) by analysing the changes in the research plans during the course. Both the master's thesis and the research plan are academic texts that can be seen as genres of the same genre colony, thus sharing general communicative purposes (Bhatia 2004: 57–84), and because of this one can assume that the knowledge acquired from one genre of text may be reflected in the making of another. The research question is: What kinds of changes in the usage of terms and concepts can be found in different versions of research plans when the concept analysis assignment has been performed between versions?

The concept analysis assignment consists of instructions for a written assignment, a short video lecture and PowerPoint slides to familiarize students with the theory of concept analysis, analysis of concepts from a previously completed master's thesis of choice from their own field, and a report of the analysis in the form of a mini-thesis. The idea and the course materials created for the concept analysis assignment are based on concept analysis as developed by Anita Nuopponen (2003a; 2016; 2020). The students are instructed to analyse the terms and concepts of a master's thesis of their choice. They are asked to analyse the central concept of the thesis and its generic and specific concepts, to identify relations between these, to find at which point in the text concepts are defined and at which points and how much e.g. the central concept is described. Finally, they are asked to illustrate the results of the analysis by writing a short mini-thesis with a concept map based on the satellite model.

The instructions for the research plan assignment are quite detailed, and the students are instructed to write eight chapters whose headings should be included in the texts as interim headings (1 Introduction, 2 Aim, 3 Data, 4 Methods, 5 Theory, 6 Expected results, 7 Implementation plan and References). The research plan is expected to follow communication practices specific to the master's thesis, but to differ from them, in particular

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[3] Ideally, students write research plans for their master's theses. In reality, some students have not yet decided on their thesis topic and might change it after writing the research plan on the academic writing course.

in terms of semantic density. The first version of the research plan should be at least two pages long and based on at least four sources[4]. The second version of the research plan should be 4 pages maximum, based on at least 8 sources and include a one-page commentary on how it has been developed, based on what was learnt from the concept analysis.

While this study concentrates on showing the changes in the texts, students' experiences of learning are also an essential element to consider, when evaluating the pedagogical tool that was implemented. At the end of the course I gathered students' views of their learning from the concept analysis assignment via a survey, in which 24 students (the same 14 students and 10 from the previous course) were asked whether or not they think their academic writing skills developed by doing the concept analysis assignment, and if so, how (reported fully in Katajamäki 2020a). Students felt that they had learnt to recognize and perceive linguistic designations, central concepts and relations between them, and the importance of defining the central concept, which means that their declarative metacognitive genre awareness had increased. The procedural metacognitive genre awareness in responses was evident, since students felt that defining concepts, finding central concepts, and understanding the relationships between specific concepts and generic concepts might help understanding texts written by others, in gaining insight into the subject they study, planning their own text and producing coherent text. The development of conditional metacognitive genre awareness is evident in the students' comments in which they describe how the use of concepts in the texts makes texts easier to understand from the viewpoint of the reader. In this case, students stated that they learnt that precise naming of concepts (avoiding synonymy by removing linguistic designations) and defining concepts is important for readers not previously familiar with the text and subject. In addition to these, students had learnt that the comprehensiveness and logic of the network of concepts are also crucial from the reader's perspective.

The discourse analysis of changes in usage of terms and concepts is focused on the use of language. While the discourse analysis is theoretically linked to appraisal theory (Martin & White 2005; White 1998), I also utilized some of the concepts of systematic concept analysis (Nuopponen 2005; 2020). I scrutinized the changes made by the students comparing the first versions of the research plans with the second versions written by each student. In this paper, the use of terms and concepts in the texts is examined without paying attention to their accuracy. The analysis of textual changes proceeded in the following way on two levels, which are structural and linguistic.

At the structural level, the changes the students made could be classified as 1) extensive modifications (EM), which means additions and removals had been made but also the order of expressions had changed within the same chapter or between chapters, 2) limited modifications (LM), which means additions and removals had been made within

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[4] Students gave each other peer feedback on the first versions of the research plan before doing the analysis. This too may have supported their decisions to make changes to the second versions of the research plans.

the same chapter or 3) the chapter remains unchanged (-). The categories used in the analysis of structural level were based on the research plan assignment, which included instructions for a structural model with 8 chapters. In most cases (11/14), the students followed the instructions.

At the linguistic level, the analysis combines ideas from White (1998) and Nuopponen (2020). The analysis is based on the idea that, through its overall meaning, one can interpret the core (nucleus) of the text to which other units (satellites) of the text are in subordinate relation (see White 1998: 195). The interpretation of the orbital structure proceeds from interpreting discourse-semantic meanings (bottom-up) to the interpretation of the nucleus and its satellites (top-down) (see White 1998: 191–200). In this study, rather than placing the focus on the orbital structure of a text as a whole, the focus is on the central concept of the nucleus of the text. With this restriction, the analysis resembles the systematic concept analysis as described by Nuopponen (2020: 103–105), in which the central concept is the starting point for the analysis of concept relations. In addition to concept relations, in this study, the linguistic designations of concepts and the definitions and descriptions of concepts were identified. In other words, I analysed all the changes that I interpreted as relevant from a conceptual point of view. The chapters Implementation plan and References did not include any relevant changes from a conceptual point of view and were therefore excluded from the analysis. In all research plans, the central concept could be found in the sentence expressing the aim of the study. After this, I proceeded linearly and classified the changes that were found in relation to the central concept or the previous changes as content-based or concept-based additions (A) or removals (R).

Content-based additions are expressions formed by one or several sentences. They included concept definitions or subject descriptions. Concept definitions were classified in two groups: those that were without a source (cd) and those that had a source reference (cds). Subject descriptions (su) were more or less relevant, i.e. semantically either more tightly or loosely connected to the central concept of the text. Thus, even though subject descriptions were not concept definitions, they semantically constructed meanings that enrich the content of the research plans and understanding of its concepts.

Concept-based additions are expressions that are formed by a word or several words (X-generation / X-sukupolvi, saving rate / säästämisaste, intangible benefits / aineettomat hyödyt, capitalisation of operational leasing contracts / operatiivisten leasingsopimusten pääomittaminen). The additions to the terms may alter the concept network of the research plan entirely, because a different central concept (cc) is set as nucleus. Alternatively, concept additions might have the effect of making more detailed concept networks. Thus, this interpretation is crucial for the whole analysis. Quite often, the additions introduced new concepts into the text but kept the central concepts in the second version the same as in the first version. In this case, the addition may be the generic concept (gc) or the specific concepts (s) creating new conceptual relations with the concepts already existing in the text. In these cases, the new conceptual relations with the retained concepts are named as the connection of concepts (con). When identifying the concept relations, I have utilized the generic concept relationships described in concept

analysis (see Nuopponen 2020: 101–103). In addition, changes concerning naming con-
cepts were identified, ie. term changes (te), and synonym use (sy).

Students had also made changes classified as removals (R) in the second versions of
their research plans, either by leaving out one or several sentences, or by removing only
a word or a few words. Additions that were interpreted as irrelevant (IR) from a concep-
tual point of view were general descriptions (e.g. of the theoretical benefits for society),
which were not analysed in detail. Changes in grammatical correctness were excluded
from the analysis.

4 Results of the Analysis

In this section, I describe the changes in the research plans of 14 students by comparing
as described above. Both structural and linguistic changes could be found in the research
plans of all students. Table 1 illustrates the number of different types of change and the
number of those who made the change type. In total, 51 structural changes were made
by 14 students. Within the category of structural changes, limited modifications (LM, 45
in total) are significantly more common than extensive modifications (EM, 6 in total).
The most common linguistic changes (123 in total) are additions of subject descriptions
(40), which occur in the texts of 12 students. For several other types of change, it ap-
pears that those students who made a certain type change made the same type of
change more than once.

Table 1. Number of change types and number of students who made the change type

Level	Classification	Changes	Students
Structural level	Total amount	51	14
	Extensive modifications (EM)	6	3
	Limited modifications (LM)	45	14
Linguistic level	Total amount	123	14
Additions (A)	Central concept (cc)	2	2
	Concept definitions (cd)	11	7
	Concept definitions based on a source (cds)	15	9
	Concept connections (con)	12	7
	Generic concept (gc)	5	4
	Specific concept (s)	9	5
	Subject descriptions (su)	40	12
	Synonyms (sy)	1	1
	Term change (te)	8	7
	Transferred from another part of the text (tra)	4	2
	Total amount	107	14
Removals (R)	Something is removed and something added (rep)	10	5
	Something is removed (re)	3	2
	Synonyms (sy)	3	3
	Total amount	16	8

The detailed analysis of all structural and linguistic changes made by students to research plans in various chapters is illustrated in Appendix 1. It points out that the coverage and types of the changes varied considerably both between different students (ST) and the research plans. From Appendix 1 it can be noted, that one student made changes to only one chapter, one to only two chapters and one to each of six chapters. The rest of the students made changes to three (5 students), four (3 students) or five (3 students) chapters. Most of the structural and linguistic changes were made to the Introduction. Few students made extensive modifications (EM), as most of the structural changes are limited modifications (LM).

The student who edited their text most widely (ST13) has made extensive modifications to multiple chapters in addition to linguistic changes. Apart from this student, only two students made extensive modifications to their text (ST1, ST7). The extensive modifications can be seen as indicative of writing skills: the students have been able to work on their text in such a way that they think of the text as a whole, where the parts are related and connected, and thus changes in one part of the text affect the other parts. It seems that they have adopted the strategy of knowledge-transforming model[5] of expert writers (see Bereiter and Scardamalia 1987: 4–6, 10–12) and thus are able to combine editing on both structural and linguistic levels. Three students (ST4, ST9, ST12) made three or fewer than three (relevant) changes. However, some of the changes of each students were several sentences long and they included concept definitions, with or without sources. Because the first versions of these texts did not include any concept definitions, even these changes might be significant.

Next, I illustrate the changes with two examples[6] from the research plans of two students. In these examples, the changes are marked with abbreviations in front of the changes, and in cases of additions, also with underlining. Example 1 illustrates how the student (ST5) has made changes that render the second version of the research plan more specific and clear than the first version. He has shown increased ability to define a concept and to combine the concept with other concepts and with relevant knowledge. The student relates the harmful nitrogen oxides with nitrogen monoxide and nitrogen dioxide and the chemical formulas for these. I have interpreted this expression as a concept definition (dc) that was given without the source, because it was not clearly marked as such according to the rules of the University of Vaasa's reference style manual. However, it is clear that this definition is a paraphrase from the source rather than an invention of the student. Beyond that, the student uses verbal processes to describe in greater detail how the harmful nitrogen oxides are the ones referred to when he discusses the emissions of internal combustion engines. Thus, the student has set out to refine the generic concept of nitrogen oxides (typen oksidi) to the specific concepts (nitrogen monoxide/typpimonoksidi, nitrogen dioxide/typpidioksidi) and the definition of harmfulness in relation to the emissions, which is an important measurement in the study.

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[5] Unlike novice writers, expert writers, according to Bereiter and Scardamalia (1987: 4–6; see also Tardy 2009: 16–17) produce texts by using the knowledge-transforming model and moving between two levels of texts, which in this study are seen as a generic structure and a linguistic level, which are always connected with each other.

[6] Original Finnish-language versions of the examples can be found in Appendix 1.

(1)

Introduction of the research plan/First version (ST5) (translated example)	Introduction of the research plan/Second version (ST5) (translated example)
Nitrogen oxides are formed in the internal combustion engine mainly by oxidation of nitrogen molecules contained in the air. (Heywood 2018:606) – – This study focuses on the ways in which motor manufacturers seek to reduce NOx emissions in their internal combustion engines. (ST5/K2019/Vers1/Introduction)	Nitrogen oxides are formed in the internal combustion engine mainly by oxidation of nitrogen molecules contained in the air (Heywood 2018:606). [A/cd/1se] [A/gc] Of the harmful nitrogen compounds, the main ones are [A/s] nitrogen monoxide (NO) and [A/s] nitrogen dioxide (NO2), and it is these that is referred to when talking about nitrogen oxide emissions from internal combustion engines. [A/su/1se] Of these, it is common to use [A/te] collective name [A/con] NO_x (Raiko, Saastamoinen, Hupa & Kurki-Suonio 2002:300). – – This study focuses on the ways in which motor manufacturers seek to reduce NOx emissions in their internal combustion engines. (ST5/K2019/Vers2/Introduction)

Example 2 is from a research plan by a student (ST1) who made both structural and linguistic changes to the text and illustrates how a very skilled student has been able to develop the text. Even the first version of the research plan was well written, particularly because it was structured according to the Swales' genre model that was taught at the beginning of the course. In the second version, the student has improved her text conceptually, while still preserving the same generic structure. The comparison of versions of the research plan shows that the student has modified the text by making both additions and removals. The student has removed the definition of the generic concept (Bankruptcy is…/Konkurssi on…) and added the central concept (bankruptcy prediction models / konkurssien ennakointimallit). She connects to the central concept two specific concepts (economic variable and non-economic variable / taloudellinen muuttuja and ei-taloudellinen muuttuja), which she in turn relates to the specific concept of adjusted audit (mukautettu tilintarkastus). The specific concepts are classified as connections of concepts [con], since the concepts were already mentioned in the earlier version. In addition, the student has removed the word early warning (varhainen varoittaja), which was synonymous with non-economic variable (ei-taloudellinen muuttuja) [R/sy].

As noted before, the student has succeeded in following the Swales' (1990: 140) CARS model in both versions. Both the first and second versions of the research plan contain three mandatory steps (the points in which the steps change are marked in example 1 with the notation |*|) described in the CARS model. The Introductions of both versions first establish a territory (move 1) by stating that the phenomenon studied is important and telling of previous studies. After this, both versions establish a niche (move 2) by pointing out the research gap. But the second version has an addition: it adds criticism of previous research by describing its limitations and thus, distinguishes the student's own study from the ideas of other research traditions. Both Introductions end with sentences that constitute occupying the niche (move 3), as they present what the subject

of the study is. In example 2, subject descriptions (su) are semantically quite tightly connected to the central concept of the text. Moreover, in this text, as in many others, the descriptions that were added seem also to be relevant information.

(2)

Introduction of the research plan/First version (ST1) (translated example)

Introduction of the research plan/Second version (ST1) (translated example)

Forecasting bankruptcy aims to help companies avoid failure and stakeholders assess the risk associated with the company (Laitinen & Suvas 2013). Bankruptcy is the heaviest of the forms of discontinuation of the business, since it usually causes large losses to all stakeholders of the company (Laitinen 1990:7). It is typically described as the final stage of the company's failure process. The process of failure of a company describes why and how a company fails. Non-economic variables can be utilized to try to find the reasons for bankruptcy, namely why a company fails and financial variables to how a company fails. (Crutzen & Van Caillie 2008.) |*| The earlier the early warnings, i.e. the reasons for bankruptcy, the more time to react to them (Korol 2013). |*| In this study, an early warning variable describing the causes of bankruptcy, the adjusted audit report is considered. (ST1/K2019/Vers1/Introduction)

[IR] Forecasting bankruptcy helps companies avoid failure and stakeholders assess the risk associated with the company. [R (re/1v)] [A/su/1v] Foresight of bankruptcy has been the subject of extensive research for several decades. [R/rep/1v] Extensive research explains the negative consequences of bankruptcy for each corporate stakeholder (Laitinen & Suvas 2013) [R/re/2v] [A/tra/2v] [A/cc] Bankruptcy prediction models are based mainly on [A/con] economic variables and play a strong role in anticipating bankruptcy. |*| However, efforts have been made to find alternative ways to develop the accuracy of forecasting a bankruptcy. In this case, [A/con] non-economic variables, such as the [A/con] adjusted audit report (e.g. Altman, Sabato & Wilson 2010.) [A/su/2v] It has been noted that bankruptcy anticipation models based solely on economic figures do not take a position on the causes of bankruptcy. In this case, the model gives a short-term prediction of the last stages of bankruptcy. [R/rep/1v] Non-economic variables, in turn, describe the causes of bankruptcy. (Crutzen & Van Caillie 2008.) [R/re/1v] |*| This study looks at [R/sy] as a non-economic variable adjusted audit report. (ST1/K2019/Vers2/Introduction)

In conclusion, the analysis of changes in the use of terms and concepts showed that, after undertaking the concept analysis, students had modified their research plans to be more detailed and informative. Students modified the use of terms and concepts in their research plans by adding central concepts, generic concepts and specific concepts, and connections or definitions of concepts, as well as by eliminating synonymous linguistic designations. Besides these modifications, students added subject descriptions, which seemed to be information that was relevant to the aims and functions of the research plans. In addition to these results, the students' survey responses confirmed that their declarative, procedural and conditional metacognitive genre awareness had increased (see Katajamäki 2020a). Considering this in combination with the results of the change analysis, it seems evident that a concept analysis assignment is a viable tool to enrich the metacognitive genre awareness of usage of terms and concepts.

5 Conclusions

The aim of this study was to describe the changes in usage of terms and concepts that students were able to make after first performing an analysis of concepts that reinforced their metacognitive genre awareness, which was expected to influence their writing. It seems that analysing concepts of previous theses appears to be an useful tool for learning genre knowledge, through which the students learn to understand what kind of functions are achieved by linguistic resources, and how they are achieved. By becoming more aware of the usage of terms and concepts, the students were able to make changes to their research plans. A wide range of changes were observable in the research plans. Therefore, analysing concepts of the master's thesis combined with developing their own research plans, clearly increased the students' awareness of the use of terms and concepts, and might consequently help them to crystallize their understanding of the concepts they need when writing their own master's thesis.

The analysis did not focus on whether the changes were improvements or not. However, after the analysis I evaluated them also from this perspective. Overall, eliminating synonymous linguistic designations seemed to be a change that strengthened the precision of the research plan texts. Likewise, adding general concepts, specific concepts and concept connections (near the previous ones) seemed to create sentences that were more tightly connected semantically and thus, through this increase of cohesiveness these sentences became more easily comprehensible. The subject descriptions that were added also seemed to be relevant information, and thus could be considered as improvements, also because in this case the text processes are aimed to grow longer texts, from the first to the second versions of the research plans and further on to the master's theses. On the contrary, the additions interpreted as irrelevant did not seem to be improvements, but rather additions that were done because of the lack of time, in order to fulfil the demands of assignments (writing more text). Of course, these might also be seen as examples of lack of skill, because for expert writers it is possible to add some relevant information even in a very short time span. From the conceptual perspective, the concept definitions always seemed to me to be possible to interpret as improvements. Especially, the concept definitions that were supported by a source/sources seemed to give semantically relevant information of central concepts. In addition to these, also concept definitions that were given without the source seemed to be semantically relevant information from a conceptual perspective. Even though it is possible in academic writing to invent own definitions, for example by connecting a concept with a unique empirical case, the cases of this study appeared to be paraphrasing from the source although there was no referencing to indicate this. Clearly, intertextual analysis of concept definitions in academic texts offers a fruitful starting point for further studies.

Based on my experiences, it seems that one of the writers' main problems in academic writing is that they underestimate what the readers expect or overestimate what the readers know. For example, writers might think that because the supervisors know the concepts and the definitions, they do not expect that these are stated. On the other hand, writers might think that the intended readers know what is meant by the linguistic designations, not seeing that meanings of a word are contextual and each reader may have a different meaning in mind than the writer. If the writer realizes that the meanings

of words/terms are not self-evident, it might strengthen her/his ability to write more precisely, which in this case is done by adding concept definitions to the text. In future studies, the additions of concept definitions in texts might be used for studying this kind of learning process.

Besides how concepts are named, defined and described, the structure and readability of the text is influenced by where in the text the concepts are introduced. For example, in some texts detailed concept definitions should be earlier and in others later, in order to optimize comprehensibility. Some students seemed to be able name, define and describe concepts, but did not necessarily position them ideally to optimize clarity. Therefore, after learning to name, define and describe concepts it might be fruitful to focus on helping students learn where to position these in the text. In addition, the writers have realized that these meanings are significant in their texts. One student commented that he realized when writing his second version of the research plan that the central concept of the first version is rather a generic concept in his master's thesis research and thus, writing helped him to define the subject of the master's thesis. This case illustrates how writing processes might help to evolve writing considerably. The change of the central concept of a text is a good example of how the generic structure and linguistic structure levels are connected and how a change of a word, or in this case, a term of the central concept, affects the whole text and its ways to construe meanings.

While this research focuses on the learning outcomes of the academic writing course, the idea behind the study is that the goal of teaching writing is to help the student towards mastering the text. Becoming a master of academic writing is always connected to one's own disciplinary field. By mastering the text, I mean professional writing skills, in which the text is approached as a whole, thus consisting of wider generic structure and functional parts, and produced as choices of language system. This approach I see as corresponding to what Bereiter and Scardamalia (1987: 11–12) refer to when discussing the knowledge-transforming model, in which an expert writer balances between the levels of content and language. In this study, text as a whole is approached from the point of view of the appraisal theory (see White 1998; Martin & Rose 2003; Katajamäki 2017). Using terms and concepts always in itself requires the merging of both meaning ("content") and form ("language"), such as linguistic designations, and combining these in such a way that reality, phenomena and purposes within the community are described in an understandable way. When the use of concepts is combined with the students' subject knowledge of the disciplinary field and with their own research process, the students can combine these as required by the genre and the situation. As a conclusion of the study, it might be claimed that combining the concept analysis assignment and the research process in the student's own disciplinary field, within an organized learning situation, supports the student's growth towards mastering the text.

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Appendix 1. Table 1. Structural and linguistic changes made by students (ST1–ST14) in the analysed chapters of the research plans.

	Introduction	Aim	Data	Methods	Theory	Expected results
ST1	EM+ IR, R (re/1se), A (su/1se), R (rep/1se), R (re/ 2se), A (tra/2se, cc, con,con, con, su/2se), R (rep/1se, re/1se, sy)	-	-	-	EM+ A (tra/1se, su/1se, tra/4se, su/1se, cd/2se)	LM+ A (su/1se)
ST2	LM+ A (su/2se, gc), IR	LM+ A (su/1se, s, s, su/1se)	-	-	LM+ IR	-
ST3	LM+ A (su/1se), IR, A (su/1se, cds/1se, gc, su/1se, s)	LM+ A (con, te), IR, A (su/4se)	LM+ IR	LM+ A (su/3se), R (re/1se), IR	LM+ R (re/1se)	LM+ A (su/1se)
ST4	LM+ A (su/1se)	-	-	-	LM+ R (rep/1se), A (cds/2se)	-
ST5	LM+ A (cd/1se, gc, s, s, su/1se, te, con, cd/1se, cds/1se)	LM+ A (su/1se, gc)	LM+ A (su/1se, s)	LM+ IR	-	-
ST6	LM+ IR A (gc, con, cd/3se, cd/3se, te)	LM+ IR	LM+ IR, A (cd/1se, su/2se)	-	-	-
ST7	LM+ A (IR, su/2se, cd/3se), IR	LM+ A (su/1se), R (re/2se), A (cd/1se, te)	-	EM+ IR, A (su/3se)	LM+ A (su/1se)	LM+ IR, IR
ST8	LM+ R (sy), A (te, cds/2se, cds/2se)	LM+ A (su/1se)	LM+ IR*	-	-	-
ST9	LM+ A (cd/3se)	-	LM+ IR	LM+ IR*	-	-
ST10	LM+ R (sy)	LM+ A (con, con, con)	LM+ A (su/1se, su/3se), IR, A (cds/3se)	LM+ A (su/1se), IR	-	-
ST11	LM+ A (te, cds/2se, su/1se)	LM+ R (re/2se)	LM+ A* (te)	LM+ A (su/2se, s)	-	-
ST12	-	LM+ A (cds/se1, cd/se11)	-	-	-	-
ST13	EM+ A (su/2se), R (re/1se), A (s, cds/1se, su/3se), R (re/1se), A (su/2se, su/2se, con, s), R (re/7se)	EM+ A (cd/1se, cds/1se, su/1se, su/2se, su/4se, con)	LM+ IR, A (su/6se)	LM+ A (cds/5se)	EM+ IR, A (cds/1se, tra/5se, cds/3se, cds/1se)	-
ST14	LM+ IR, A (su/6se, su/5se)	LM+ A (cds/2se, te)	LM+ A (sy)	LM+ A (cc (te), su/1se)	LM+ A (con), IR	-

* A student has combined the chapters (Data and theory (ST8, ST11), Methods and theory (ST9)).

Abbreviations:
Structural changes: EM = extensive modifications, LM = Limited modifications (v = amount of sentences), (-) = no changes. Linguistic changes: A = additions, SUCH AS cc = central concept added, cd = concept definition added, cds = concept definition based on a source added, con = new concept connection (not new concept), gc = generic concept (or generic concept of generic concept) of central concept) added, s = specific concepts (or specific concepts of specific concepts) of central concept) added, su = subject descriptions added, sy = synonym for concept added, te = change in term, such as more accurate linguistic designation, tra = transferred from another part of the text but was already in the first version of the text, R = removal, SUCH AS rep = something is removed and something added to the same place; re = something is removed or sy = removal of a synonym. IR = irrelevant addition or removal from the conceptual point of view.

Originals of the translated examples 1 and 2.

Introduction of the research plan/First version in Finnish (ST5)

Typen oksideja muodostuu polttomoottorissa pääasiassa ilman sisältämien typpimolekyylien hapettuessa. (Heywood 2018: 606) – – Tässä tutkimuksessa keskitytään keinoihin, joilla moottorivalmistajat pyrkivät vähentämään NOx- päästöjä polttomoottoreissaan. (ST5 /K2019/Vers1/Introduction)

Introduction of the research plan/Second version in Finnish (ST5)

Typen oksideja muodostuu polttomoottorissa pääasiassa ilman sisältämien typpimolekyylien hapettuessa (Heywood 2018: 606). [A/cd/1se] [A/gc] Haitallisista typpiyhdisteistä tärkeimmät ovat [A/s] typpimonoksidi (NO) ja [A/s] typpidioksidi (NO$_2$), ja juuri niihin viitataan puhuttaessa polttomoottorien typenoksidipäästöistä. [A/su/1se] Näistä on tavallista käyttää [A/te] yhteisnimitystä [A/con] NO$_x$ (Raiko, Saastamoinen, Hupa & Kurki-Suonio 2002: 300). – – Tässä tutkimuksessa keskitytään keinoihin, joilla moottorivalmistajat pyrkivät vähentämään NOx- päästöjä polttomoottoreissaan. (ST5/K2019/Vers2/Introduction)

Introduction of the research plan/First version 1 in Finnish (ST1)

Konkurssin ennakoinnin tavoitteena on auttaa yrityksiä välttämään epäonnistuminen ja sidosryhmiä arvioimaan yritykseen liittyvää riskiä (Laitinen & Suvas 2013). Konkurssi on yrityksen toiminnan lopettamisen muodoista raskain, koska se aiheuttaa yleensä suuria tappioita kaikille yrityksen sidosryhmille (Laitinen 1990: 7). Sitä kuvataan tyypillisesti yrityksen epäonnistumisprosessin viimeiseksi vaiheeksi. Yrityksen epäonnistumisprosessilla kuvataan, miksi ja miten yritys epäonnistuu. Ei-taloudellisia muuttujia voidaan hyödyntää pyrittäessä löytämään konkurssin syitä eli miksi yritys epäonnistuu ja taloudellisia muuttujia siihen, miten yritys epäonnistuu. (Crutzen & Van Caillie 2008.) |*| Mitä aikaisemmin varhaiset varoittajat eli konkurssin syyt havaitaan, sitä enemmän niihin on aikaa reagoida (Korol 2013). |*| Tässä tutkimuksessa varhaisena varoittajana eli konkurssin syitä kuvaavana muuttujana tarkastellaan mukautettua tilintarkastuskertomusta. (ST1/K2019/Vers1/Introduction)

Introduction of the research plan/Second version in Finnish (ST1)

[IR] Konkurssin ennakointi auttaa yrityksiä välttämään epäonnistumisen ja sidosryhmiä arvioimaan yritykseen liittyvää riskiä. [R/re/1v] [A/su/1v] Konkurssin ennakointi on ollut laajan tutkimuksen kohteena usean vuosikymmenen ajan. [R/rep/1v] Laajaa tutkimusta selittää konkurssin aiheuttamat negatiiviset seuraukset, joita konkurssista aiheutuu jokaiselle yrityksen sidosryhmälle (Laitinen & Suvas 2013.) [R/re/2v] [A/tra/2v] [A/cc] Konkurssin ennakointimallit perustuvat pääosin [A/con] taloudellisiin muuttujiin, ja niillä on vahva asema konkurssin ennakoinnissa. |*| On kuitenkin pyritty löytämään vaihtoehtoisia tapoja, joilla pystyttäisiin kehittämään konkurssin ennakoinnin tarkkuutta. Tällöin tarkasteluun on otettu [A/con] ei-taloudellisia muuttujia, kuten [A/con] mukautettu tilintarkastuskertomus (mm. Altman, Sabato & Wilson 2010.) [A/su/2v] On todettu, että pelkästään taloudellisiin tunnuslukuihin perustuvat konkurssin ennakointimallit eivät ota kantaa konkurssin syihin. Tällöin malli antaa lyhyen aikavälin ennusteen konkurssin viimeisistä vaiheista. [R/rep/1v] Ei-taloudelliset muuttujat puolestaan kuvaavat konkurssin syitä. (Crutzen & Van Caillie 2008.) [R/re/1v] |*| Tässä tutkimuksessa tarkastellaan [R/sy] ei-taloudellisena muuttujana mukautettua tilintarkastuskertomusta. (ST1/K2019/Vers2/Introduction)