

Summary

Professionals in organizations often make use of source material in order to write an evaluation, a report or a recommendation. This task, also known as writing-from-sources, is increasingly being performed, either totally or partially, in a digital environment. Reasons for this could be that the source material is too extensive, or unable to be effectively searched if it were to be printed.

In this dissertation we study the writing-from-sources task based on the behaviour of professionals who have been asked to write a text, in an on-screen environment, based on a website containing information while being allowed to make notes using a note-taking tool.

Chapter 1

Little research has been done into writing-from-sources performed by professionals. Existing research into how professionals read categorizes the professional reading process as active, purpose-driven, selective, and steered by prior knowledge.

Existing research into writing-from-sources employing schoolchildren and students is characterized by a great variety of methodologies and dependent variables. This makes it difficult to compare results. The research has predominantly been performed within an educational context, so that the findings can not be generalized to professional situations. However, the results from previous research into writing-from-sources do help to identify the process variables that appear to have the most influence:

- The task
- The sources
- The role of prior knowledge and experience
- The relation between the reading process and the writing process
- The role of notes

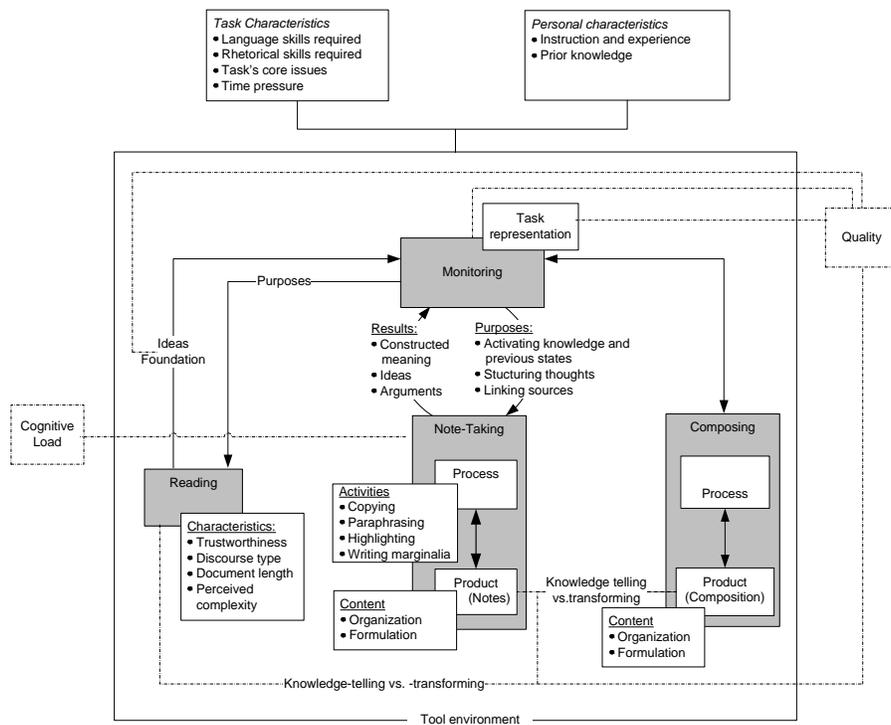
The results from earlier writing-from-sources research suggest that in the case of more advanced writing students, the task in question plays a dominant role in the whole process, dependent on the expertise of the writers. Inexperienced writers allow themselves to be led more by the sources and less by the task at hand, which results in a text that consists of a collection of ideas (*knowledge-telling*). Experienced writers with much prior knowledge allow themselves to be led primarily by the task that they are performing. They analyse their task and, based on this, they consult the sources with the aim of collating arguments for the final task (*knowledge-transforming*).

Existing research has established that reading and writing are strongly inter-related. There is no strict division between reading and writing, even though reading dominates at the start of the process, while later on in the process, writing plays the more dominant role.

Little research has been done into note-taking in an electronic environment. The research that is available paints a picture of new possibilities, but also of the complexity of working with note-taking tools and a clear preference on the part of readers for notes on paper. Extremely little is known about the role of digital notes in a writing-from-sources task.

The subject of this study is the course of the writing-from-sources process in a digital environment for professionals. A framework has been constructed based on the above-mentioned factors, which forms the research agenda for this dissertation. The model in question is shown in Figure 0.1

Figure 0.1. Framework of the writing-from-sources process



The subject of this study is the extent to which the characterization of the writing-from-sources process applies in a professional context and within an electronic environment.

Chapter 2

In a pilot study, we investigated the relations between note-taking *activities*, the *content* of the notes and the *quality of the text* written by professionals who had to perform a writing-from-sources task on screen.

The test subjects, seven American Masters students of Technical Communication, wrote two reports in the field of web design. They were allowed to use a website, while also being able to use a separate screen for taking notes. When they had finished reading, they were able to write the report in a new window while making use of their notes. While they wrote, they were not allowed to make use of the original sources.

The test subjects were asked to read and think out aloud. The whole process was captured on video. Protocols were constructed for the seven test subjects, in which their verbalizations were written out and the activities that they were carrying out in relation to navigation, note-taking, and writing were added to them. The quality of the reports produced was established by asking website experts to rank the reports three times, based on three dimensions: completeness, applicability, and persuasiveness.

The study showed that the way in which test subjects make notes is linked to the task representation. Test subjects who proved to have a purpose-driven approach in which the goal, audience, and content of the report dominate, copy less from the sources, formulate their own notes more, and organize notes differently compared to test subjects who allow themselves to be influenced more by the sources. The notes of the latter group consist primarily of a list of copied citations.

The majority of the test subjects in the pilot allow themselves to be influenced more by the sources than by the task itself. This is striking in view of the fact that Masters students would be expected to read as experts. The reading behaviour of experts is after all characterized by a purpose-driven approach.

The degree to which notes were made proved to influence the quality of the reports. The greater the number of notes, the lower the quality of the advisory papers. The comments of the test subjects seemed to indicate that switching screens between reading (the screen containing the website) and writing (the window with the notepad) distracted the test subjects.

Chapter 3

The main study was designed based on the results of the pilot study. Thirty-eight test subjects wrote an advisory paper based on a website with source material. The test subjects were civil servants working for the province, or employees of the National Institute for Public Health and Environment. The test subjects had wide experience in the field as well as in public administration.

Half of the test subjects were allowed to take notes using a digital notepad (*notepad condition*), while the other half were allowed to use a marking tool (*marker condition*). Using this tool, the test subjects were able to highlight passages of text in yellow, make notes in the margin using a sticky note, and divide notes into categories that they were allowed to create themselves. The notes were able to be displayed in an overview per category or per page.

Because the test subjects had followed a strongly source-based approach in the pilot study, we wanted to see to what extent a purpose-driven approach could be stimulated by more explicitly steering the authors with respect to the text to be written. To achieve this, in this experiment half of the test subjects were presented with the most important issues of the task by inserting these issues as headings in the note-taking tool. It was expected that test subjects would work in a more purpose-driven manner than in the pilot study.

We investigated the role of notes in the writing-from-sources process. We analysed:

- The *process*: goals and activities concerning the making of notes, as well as the *cognitive load* that authors experience as a result of this process
- The *product*: the use of sources and notes for the final advisory paper
- The *effect*: the relation between the quality of the advisory papers and the process and product of note-taking

The participants were asked to think aloud throughout the whole process. To measure the cognitive load, every ten minutes test subjects were asked to indicate on a nine-point scale how difficult they were finding the task at that moment. In addition, all note-taking actions were registered in log files.

After the task was completed, test subjects were asked to fill in a questionnaire containing questions about their background, their prior knowledge, their experience and their valuation of the tool that they were allowed to use to take notes.

The verbalizations of the test subjects were written out in protocols, segmented, and coded based on the activities of the test subjects while reading, writing and taking notes.

Chapter 4

Before discussing note-taking within the writing-from-sources process in an on-screen environment, we describe the process at a more global level in both qualitative and quantitative terms.

Characteristic of the process is its active nature. Instead of processing information passively, the authors are actively engaged with the sources, based on their ideas about the task. The cognitive load as reported by the test subjects was fairly moderate, whereby a positive relation appears to exist between the cognitive load and the formulation of reading goals, and a negative relation between the cognitive load and prior knowledge of the subject matter.

Chapter 5

We analyse in detail the goals and activities concerned with note-taking. Test subjects in the marker condition proved to make far more notes than test subjects in the notepad condition. Being presented with the most important issues of the task proved to have little effect.

The notes proved to serve three types of goals:

- *Increasing understanding of the task*
In the notepad condition, the most important condition is the paraphrasing or copying of parts from the task description to the notepad. In the marker condition, the most important activity is the marking of passages from the task description. In both conditions, test subjects copy passages from the task description to the advisory paper.
- *Restructuring information from the sources*
In the marker condition sticky notes were used to restructure information with the purpose of constructing an outline for the final advisory paper. In the notepad condition a similar process was found. However, participants only used the notepad to restructure information from the task description rather than information from the sources as well.
- *Selecting information to be used later as arguments in the advisory paper*
In the notepad condition, selecting information as an interim step before using this information in the advisory paper rarely occurs. In the marker condition, passages were not commonly marked. From these passages a selection was made at a later stage, based on their usability for the advisory paper, after which they were copied to the advisory paper.

Although the peak number of the note-taking activities is located at the beginning of the process in all conditions, the marker tool proved to be used throughout the whole process, while the use of the notepad was restricted almost entirely to the processing of the task description.

Chapter 6

To gain an insight into the relation between the sources, the notes and the advisory paper, we performed both a quantitative analysis and a qualitative one of the degree to which passages from the sources, whether modified or not, appear in the final advisory paper via the notes.

Only half of the passages from the notes were used in the final advisory paper. This can be partly explained through the fact that the majority of the notes were taken while reading the task description, thus did not need to be incorporated in the final advisory paper. The study showed that notes are used both to increase the understanding of the task and to gather arguments for the advisory paper. The use of the notes in the final advisory paper supports this finding.

We analysed the origin of clauses in the advisory paper. Half of the clauses in the advisory papers proved to have been derived from the sources or the notes, while the other half originated from the author's own expertise, whereby a part of these clauses are represented by structuring elements such as headings. The role of the notes is therefore relatively limited, depending on the expertise of the author.

The headings in the notes have both a planning function and a function for organizing information that needs to be included in the advisory paper. A large proportion of the headings are used to categorize information based on the central themes of the task. While they read, test subjects arrange information under headings that indicate what has to be included in the advisory paper: they are headings that have a planning function.

The analysis of the 'flow' of information between sources, notes, and advisory paper shows that authors start working in a rhetorical manner because, with the goal of the text in mind, they adapt material from the sources and the notes in various ways, even though the scale on which this occurs is relatively limited. This demonstrates that authors in a professional situation adapt their texts to the target group of the text.

Chapter 7 Relation between Notes and Advice quality

In this chapter, a relation is established between the process of note-taking and the notes themselves on the one hand, and the quality of the advisory papers on the other. The advisory papers were assessed by six raters on a five-point scale, focusing on the degree to which the potential reader would follow the advice given. Three raters were experts in the subject matter (domain experts), the three other raters were lecturers of communication skills. In addition to their assessment, the raters were asked to indicate what they considered to be important when assessing advisory papers.

The analysis of the dimensions of advice quality that were considered to be most important by the raters demonstrates that the individual advisory paper that is assessed has a strong influence on what the raters consider important. For example, spelling was considered important only at the moment that a lot of spelling errors were found in the advisory paper. In that case, spelling proved to have a negative effect on the quality of the advisory papers.

The results provide few points of contact for assuming a relation between notes and the quality of the advisory papers. However, some indications were identified. A positive correlation was found between advice quality and the frequency with which citations were copied to the advisory paper, as well as a positive relation between advice quality and the number of content headings.

Chapter 8 Conclusions

In this final chapter, conclusions are drawn and recommendations made for follow-up research:

1. The writing-from-sources process of professionals is highly purpose-driven
2. In professional writing-from-sources tasks, note-taking not only serves as an aid to the comprehension of the source material, but also as a facilitator of the interpretation of the rhetorical and the content problem.
3. The extent to which cognitive effort is distributed between the individual and the notes depends on the note-taking tool writers were able to use to take notes.
4. Taking notes affects the process and the product, but affects the quality of the advisory papers to a lesser extent
5. Writers take notes most often when they have only moderate levels of prior knowledge
6. Writers engage in rhetorical reasoning to modify information from the sources via the notes to the final advisory paper

Based on these conclusions, experimental research is recommended. The effect of important factors such as the task in question, the tool with which notes are taken, and the amount of prior knowledge should be investigated further with the purpose of developing a predictive theory on writing-from-sources.