

PROO

Application form for a separate project 2003/2004

Programming Council for Educational Research (PROO)
(Social Sciences Research Council –
Netherlands Organization for Scientific Research (NWO))

File number: 411-03-115

Before completing the form, we advise you to read the explanatory notes to this form, as well as the PROO Guidelines.

This application participates in the experiment of assessment by one foreign reviewer (only applications submitted under Innovative Learning Arrangements)	
<input checked="" type="checkbox"/> YES	
Suggestions for referees: xxx	

1. Applicant(s)

Main applicant / Contact person	
Name, titles	Rijlaarsdam, G.C.W., prof. dr. M
Correspondence address	
University	University of Amsterdam
Faculty/Department	Graduate School of Teaching & Learning
Address	Wibautstraat 2-4
Postal code	1091 GM City Amsterdam
Telephone	+31 20 5251288 Fax +31 20 5251290
E-mail address	rijlaars@ilo.uva.nl
Research school	ICO

2. Recent publications and other information from the past performance of the main applicant (see explanatory notes)

Author	Title	Journal	Year, nr
Braaksma, M.A.H., Rijlaarsdam, G., & Van den Bergh, H.	Observational learning and the effects of model-observer similarity	<i>Journal of Educational Psychology</i>	2002, 94
Braaksma, M.A.H., Rijlaarsdam, G., Van den Bergh, H., & Van Hout-Wolters, B. H.A.M.	Observational learning and its effects on the orchestration of writing processes	<i>Cognition and Instruction</i>	2004, 22 (1)
Braaksma, M.A.H., Van den Bergh, H., Rijlaarsdam, G., & Couzijn, M.	Effective learning activities in observation tasks when learning to write and read argumentative texts	<i>European Journal of Psychology of Education</i>	2001, 1
Van den Bergh, H., & Rijlaarsdam, G.	Changes in cognitive activities during the writing process, and relations with text quality	<i>Educational Psychology</i>	2001, 4
Broekkamp, H., Van Hout-Wolters, B.H.A.M., Rijlaarsdam, G., & Van den Bergh, H.	Importance in instructional text: Teachers' and students' perceptions of task demands	<i>Journal of Educational Psychology</i>	2002, 94

3. Title of the research project

English
Writing hypertext: learning and transfer effects
Dutch (optional)
Hypertekst schrijven: leer- en transfereffecten

4. Under which research theme of the programme 2004-2007 is this application submitted?

Focal point	Innovative learning arrangements
Theme	a. Teaching methods of new forms of learning b. Learning processes and individual differences

5. Summary

Concise summary of the problem definition
<p>With the introduction of the new examination program in the Netherlands, writing education in the upper forms of secondary education ('Tweede Fase') has changed considerably. It has led to more frequent writing tasks and more variation in writing tasks for the school subject Dutch ('writing for communication') and to an increased use of writing and presentations in the other subjects ('writing as a learning tool'). Furthermore, information and communication technology (ICT) plays an important role in information retrieval and in text composition and revision.</p> <p>Until now, practice and research are mostly restricted to the traditional paper format and focused on the deconstruction of the phases of the writing process. Underneath, two assumptions about learning guide this restricted view on learning to write: (1) the adage 'practice makes perfect': when students have to learn to <i>write</i>, than they have to <i>write</i> a paper, and (2) the idea of similarity of tasks: when students have to learn to write a <i>paper</i>, then they have to write a <i>paper</i>. Besides, guidelines for writing a paper focus strongly on the instrumental function of writing ('writing to communicate'), neglecting the epistemological function ('writing as a learning tool for creating knowledge').</p> <p>In this research project, these two assumptions about learning are <i>refuted</i> to improve practice and to extend and refine theory on writing processes. We propose to study whether two innovative learning arrangements could improve the quality of learning in two respects: the quality of writing (text and processes), and the quality of content knowledge. Two learning arrangements will be studied: learning by writing <i>hypertexts</i> (instead of 'linear' texts), and <i>observational learning</i> (instead of performing). In addition, we study how students' learning processes develop during learning-to-write hypertexts and linear texts. From the data collected in the experiments, we contribute to the further development of the writing process model, by relating writer variables, writing process variables, and text quality variables. Furthermore, we extend the writing process model for writing a different text format: the hypertext format.</p>

6. Publications (output)

In what form will the results of this research project be published?
Articles in international journals. Manuals for teachers in upper secondary education about effective learning arrangements (hypertext writing and observational learning) for 'writing for communication' and 'writing as a learning tool'.

7. Duration for which you are applying

Duration (years)	5 years (0,8 fte)
Starting date	September 2004

8. Domain of research (see explanatory notes)

Domain of research according to the Reference Expertise Educational Research. 5 codes maximum.

Code	Description
10300	Voortgezet onderwijs
11120	Schrijven
13010	Didactiek
12800	ICT
12220	Taalpsychologie

9. Composition of the research group

Name, titles:	Discipline	University	Number of hours per week	Charged to
G.C.W. Rijlaarsdam, prof. Dr	Educational Studies in Language	UvA	2	ILO
M.A.H. Braaksma, dr	Educational Studies	UvA	32	ILO
R. Bromme, prof. dr	Educational Psychology	University of Muenster	Pm	UM
E. Stahl, dr	Educational Psychology	University of Muenster	Pm	UM
D. Galbraith, dr	Psychology of Writing	Staffordshire University	Pm	SU
L. van Waes, prof. dr	Language & Communication	University of Antwerp	Pm	UFSIA

10. Renewed application

No	<input type="checkbox"/>	Continue to question 11	
Yes	<input checked="" type="checkbox"/>	Previous year(s)	2002
		Previous qualification(s)	B
		Title(s)	Learning to write combination papers in the 'Studiehuis'. Effects of hypertext writing and observational learning on domain knowledge, writing processes and text quality.
		PROO/NWO file number(s)	411-02-003-V

11. Where will the research be carried out?

Organisation	University of Amsterdam
Institute	Graduate school of Teaching and Learning
Address	Wibautstraat 2-4
Postal code	1091 GM
City	Amsterdam

12. Is this application submitted elsewhere?

No	<input checked="" type="checkbox"/>	Continue to question 13
Yes	<input type="checkbox"/>	At:

13. Financial contribution to the project by others (what, how much and by whom): (see explanatory notes)

Yes	<input checked="" type="checkbox"/>	Applicant confirms that the institute where the research will be carried out, will provide a fully equipped working place for the researcher, administrative support, supervision and computational and laboratory facilities	
		What?	
		How much?	
		By whom?	

14. Description of the project

14.1 Scientific relevance

This study is aimed at filling in gaps in two domains of the science of writing: the domain of effective innovative learning environments and the domain of writing process models. The strength of the proposal is especially this combination. Therefore, its purpose is twofold:

- (1) to improve writing education for improving students' *writing skills* and *content knowledge* via a relatively new text format (hypertext), and a promising process-oriented learning method (observational learning);
- (2) to contribute to the further development of models of *writing processes* and *learning-to-write processes* by studying the learning and writing processes for two different text formats (hypertexts and linear texts), including all components (knowledge, process and output).

Innovation of writing education

Our study of effective learning arrangements may contribute to the field of writing pedagogy in two respects: (1) writing as a communication tool (improvement of writing skills), and (2) writing as a learning tool (improvement of content knowledge). In both respects, the proposal aims at combining, extending and replicating other studies, focusing on two elements of the innovation of learning arrangements: type of learning task (writing hypertexts) and type of learning method (observational learning). In the following sections, we will elaborate these points.

The study builds on research by Braaksma, Rijlaarsdam, Couzijn & Van den Bergh (2002b) who found that students who wrote hypertexts performed more planning and analyzing activities during writing than students who wrote linear ('normal') texts. These planning and analyzing activities were positively related to text quality, both in the hypertext and in the linear text. Students who planned and analyzed relatively often in particular episodes of the hypertext writing process wrote better hypertexts and linear texts. However, the tasks in that study were rather limited and highly structured. It would be valuable to see if findings are replicated with larger, less structured hypertext tasks.

There is much research about the effect of writing as a learning tool (Klein, 1999). However, the results of these studies are fragmented and inconsistent. The conditions under which writing is an effective learning activity and the types of writing tasks that are effective for the acquisition of content knowledge are still not clear. Theoretically, positive effects are expected from hypertext writing: researchers (Lohr, Ross, & Morrison, 1995; Yoshimura, 1998) claim that students acquire more knowledge by writing hypertexts, because they are then involved in active text construction. Hypertext writing stimulates knowledge transforming processes (Bereiter & Scardamalia, 1987).

We know of only one empirical study (Bromme & Stahl, 2002b; Stahl & Bromme, in press) that tests the potential of hypertext in knowledge building. The proposed study will investigate if the results of the Bromme & Stahl study, which involved university students, can be replicated with secondary school students.

Therefore, more knowledge is needed to design learning arrangements for writing hypertexts. Our proposal fills a gap in the teaching methodology of hypertext writing. Some work has been done on *reading hypertexts* in an educational setting (Dillon & Gabbard, 1998), but hardly any research has been conducted on *producing hypertexts* (Bromme & Stahl, 2002a). What is available are advisory texts about hypertext writing (Troffer, 2000). However, these are focused on technical aspects of writing (e.g., text size, screen design, creating links). In our study, we will develop lessons for hypertext writing that are based on findings in the field of studying and learning with hypertexts (e.g., structural cues, navigation, coherence; Rouet & Levonen, 1996) and Stahl & Bromme's (in press) five-unit instructional course for writing hypertexts. Besides, we propose to innovate learning arrangements in learning to write (hyper)texts by applying the observational learning method (i.e., learning from models), building on the findings that observational learning is an effective method for learning to write different types of linear texts (Graham & Harris 1994; Zimmerman & Kitsantas, 2002; Couzijn, 1999; Braaksma, Rijlaarsdam & Van den Bergh, 2002a).

Writing process model and the learning-to-write process model

The second purpose of our study is to contribute to the further scientific development of the writing process model (Hayes, 1996) and the learning-to-write process model. Researchers from various disciplines, using different research methods, have made available much information about writing processes (Alamargot & Chanquoy, 2001). However, most of this information focuses on one of the components of the writing process model: knowledge, process or text quality. Only a few studies focus on the relations between two components (e.g., process-text quality: Van den Bergh & Rijlaarsdam, 2001; knowledge-text quality: Ferrari, Bouffard & Rainville, 1998). Therefore, Braaksma (2002, page 101-102) pleads for an integrative approach, in which data about knowledge processes and output are collected and analyzed. Furthermore, no empirical data are available about the writing process of hypertexts. Espéret (1996) pleads explicitly for a consideration of the cognitive constraints on the production of hypertext in the light of the current cognitive models of writing.

In addition, with the exception of some case studies, knowledge about the learning-to-write process is almost non-existent. What students do during learning activities aimed at improving writing skills and/or changing writing processes, and to what extent better and weaker students differ in exploiting learning activities, is not known.

14.2 Elaboration of problem definition

The Dutch context: writing in upper secondary education

In the last few years, writing education in the Netherlands has changed considerably due to the introduction of a new examination program for the upper secondary grades. Both the place of writing tasks in writing education and the use of writing in the subject domains have changed. It has led to more frequent and varied writing tasks for the school subject Dutch ('writing for communication') and to an increased use of writing and presentations in the other subjects (focus on 'writing as a learning tool'). Schools must assess students' writing skills by means of a documented writing assignment (writing from sources) (Ministerie van OCenW, 1998). This writing assignment is connected with the writing portfolio students have to build up during the last years of secondary education. The writing portfolio requires students to write several types of texts and to develop, choose, order, and process elements of content from several sources of information (Projectgroep Nederlands V.O., 2002). Furthermore, information and communication technology (ICT) plays an important role in information retrieval and in text composition and revision. Students can choose to produce a hypertext (i.e., a non-linear, non-sequential text containing different elements of content that are connected by different types of links; Pander Maat, 2001).

In this proposal, we study the process and outcomes of innovative learning arrangements for documented writing in upper secondary school on (1) writing skills and (2) content knowledge (knowledge of the topic of writing). The learning arrangements will be situated in an electronic learning environment: students must gather and select elements of content (e.g., texts, databases, multimedia) stored on the computer. They *perform* writing tasks (hypertexts or linear texts) on the computer or *observe* peer models executing these tasks, by watching digital video fragments on the computer.

Hypertext writing versus linear writing

We expect that implementing hypertext writing in writing education will have beneficial effects on learning outcomes in two respects: (a) acquisition of writing skills and (b) acquisition of content knowledge.

A. Effects on writing skills. A significant problem in text composition is the linearization process (Bereiter & Scardamalia, 1987; Coirier, Andriessen & Chanquoy, 1999). Students have to transpose elements of content (i.e., a network of ideas, a mental structure) that are hierarchically ordered into linear prose, with enough linguistic indicators to help their readers to reconstruct this hierarchical content structure from the (linear) text. Two processes are at issue here: cognitive processes, in particular the ordering of elements of content (super-, sub-, and co-ordinated) and linguistic processes (availability of linguistic means to put relations between components of content into words).

Research showed that with the transposition of a given network of ideas into linear text (i.e., linear writing), planning and analyzing activities contribute significantly to the quality of the resulting text (Braaksma et al., 2002b). Secondary school students who demonstrated relatively more planning and analyzing activities when performing a writing task wrote texts of a better quality. However, these activities are more often elicited in hypertext tasks than in linear writing. In addition, in the hypertext tasks, the planning and analyzing activities contribute to the final quality of the hypertext (Braaksma et al, 2002b). It seems that the hypertext tasks offer more opportunities for students to practice with planning and analyzing activities.

In summary, because while composing a hypertext, students are practicing the important planning and analyzing activities in a more natural way, we expect that stimulating and guiding students to write hypertexts will have a positive effect on their writing process and the resulting text quality in linear writing.

B. Effects on content knowledge. Writing can also be seen as a means of transforming the writer's knowledge. However, it is difficult to engage writers in knowledge transforming activities (De Jong, Kanselaar & Lowyck, 2003). We expect that hypertext writing will be an effective means to engage students in these activities. Producing a text in an unfamiliar (hypertext) format represents a problem-solving process in which writers cannot simply fall back on previously acquired routines. They cannot make use of their default 'knowledge-telling' strategy. Instead, producing hypertexts places particular constraints on the design of the documents that are due to features of the text format: the non-linear structure, the nodes, the links, ways of navigation, etc. It is assumed that these constraints help to support a production process that can be equated with the 'knowledge-transforming' strategy described by Bereiter & Scardamalia (1987), which proposes that writing can contribute to knowledge acquisition only when the text is formulated within a continuous interaction between the content-related knowledge (on the topic addressed in the text) and the rhetorical knowledge (on the design of the text and, among others, its structure). This problem-solving procedure (Hayes, 1996) requires text producers to reflect on and to extend their knowledge. A study by Bromme & Stahl (2002b; Stahl & Bromme, in press) confirmed these assumptions. It is found that producing hypertexts enlarged the students' knowledge about content relations and structures.

Observational learning

Observational learning might be an effective learning activity to teach students writing hypertexts. Observational learning has been shown an effective method for learning to write several types of (linear) texts, for several types of students (Graham & Harris, 1994; Zimmerman & Kitsantas, 2002; Braaksma et al., 2002a; Couzijn, 1999). We claim that observational learning is especially effective in teaching students how to write hypertexts because with observational learning it is possible to make covert ('mental') processes visible. With observational learning the important planning and analyzing activities during the production of a hypertext can be made visible so that students can learn to perform these activities when they have to write. Braaksma, Rijlaarsdam, Van den Bergh & Van Hout-Wolters (in press) showed that observational learning indeed affected the management of writing processes: students who learned by observation organized their writing processes differently, with more goal-orienting and analyzing processes in the beginning of the writing processes and generally more planning processes than students who learned by performing writing tasks.

Modeling writing processes and learning-to-write processes

With our study, we want to contribute to the further scientific development of the writing process model (Hayes, 1996) because there is a lack of knowledge about the relations between knowledge (content knowledge, knowledge about writing), writing processes and output (text quality) (Braaksma, 2002). Furthermore, we want to contribute to the further scientific development of the learning-to-write process model. There is almost no knowledge available about learning processes in writing on a larger scale than case study research.

14.3 Methodical and technical design

The project flows out into two experimental studies (study 3 and study 4). Both studies will contrast the effects of a learning arrangement for writing hypertexts (HYP) with a control learning arrangement for writing linear texts (LIN). The studies differ in the dominant learning method. Study 3 will focus on direct learning (DIR): students will learn by performing hypertext writing tasks or linear writing tasks themselves. Study 4 will focus on observational learning (OBS): students will learn by observing peer models (students) who perform hypertext writing tasks or linear writing tasks.

Two studies (study 1 and 2) will precede both experimental studies. In study 1, the learning arrangements HYP and LIN for study 3 and all testing materials will be developed and tested. In study 2, the learning arrangements HYP and LIN for study 4 (OBS) will be developed and tested (construction of peer models). At the same time, study 2 is a process study, the data from which will serve as input for our study about the learning-to-write process model. Study 5 focuses on the writing process model for (hyper)text writing by relating different knowledge components (content knowledge, knowledge about writing), writing processes, and quality of the writing product to each other.

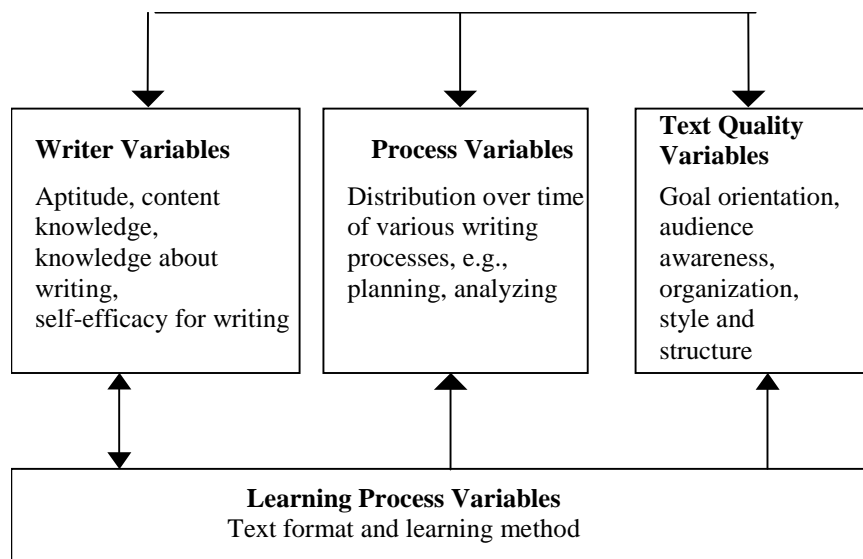


Figure 1. Overall scheme of variables included in the studies

Figure 1 depicts the components involved in the whole project. In the experimental studies 3 and 4, two Learning Process Variables are manipulated (text format (study 3) and learning method (study 4)) to measure the effect on Writer Variables, Process Variables, and Text Quality Variables. In studies 2 and 4, the learning-to-write activities are studied during linear text and hypertext writing (study 2) and observational learning (study 4), and their relations with Start (Writer Variables) and Result (Writer Variables, Writing Processes, Text Quality) variables are determined. In study 5, the writing process model will be explored by connecting the different components (Writer Variables, Process Variables and Text Quality Variables). The target group in all studies is students from grade 11 (senior general secondary education) and grade 12 (pre-university level).

Study 1. Construction study: learning and testing materials

With teachers in Dutch Language and Culture we develop and test two learning arrangements for the writing of ‘documented’ texts. The basic assumptions include the developments in the practice of writing education in upper secondary education (senior general secondary education and pre-university level) (Projectgroep Nederlands V.O., 2002) and the characteristics of effective writing didactics (Hillocks, 1986; Overmaat, 1996; Vanmaele, 2002).

Two learning arrangements will be developed: one for the writing of linear texts (LIN) and one for the writing of hypertexts (HYP). For each learning arrangement, different topics of writing will be developed. These topics will be related to actual events in the society (e.g., norms and values, the recurring debate about the death penalty, methods for tracing criminals¹), and students have to use a variety of (actual) sources of information (e.g., articles from newspapers and magazines, encyclopedias television fragments). These sources of information will be available on the computer.

In both learning arrangements, the students learn how to write ‘documented’ texts via direct learning (DIR: students perform hypertext writing tasks and linear writing tasks), and in both arrangements the students are writing their texts on the computer, with a frequently used software program (Microsoft Word). Students in LIN write their texts in a ‘normal’ linear form. Students in HYP write their texts in hypertext form, using the ‘bookmark’ and ‘hyperlink’ options in Microsoft Word.

In addition, the construction study will also include the development and evaluation of the testing materials. The learning and testing materials will be tested first in a pilot study (N=6), pretest materials will be tested on 100-120 students and then all materials will be tested in a real educational setting with two intact groups for each condition (N= 60-80).

Study 2. Study of learning-to-write processes in hypertext and linear text writing

This study (design and materials as study 3) fulfills two functions. On one hand, it provides insight into the learning processes whereby students learn to write linear texts and hypertexts, and the relations between Start (Writer Variables) and Result variables (Writer Variables, Writing Processes, and Text Quality). On the other hand, this study provides materials to be included in the learning materials of study 4.

Weak and strong writers (according to teachers’ evaluations and writing tests) (N=8 per learning arrangement) follow one of the two learning arrangements (LIN and HYP) via direct learning while thinking aloud during the whole learning arrangement and perform all pre- and post-tests under normal circumstances. The learning processes will be recorded on (digital) video. From this video material, fragments (peer models) will be selected and the learning arrangements (OBS) for study 4 are constructed and tested.

Table 1: Experimental studies 3 and 4: Overview of research design

Variables	Pre-test	Learning arrangement	Post-test Session 1	Post-test Session 2 (week after post-test 1)
Aptitude	X	Study 3: Documented writing about certain topics in two text forms: writing hypertexts (HYP) versus writing linear texts (LIN).	X	
Content knowledge about topic in learning arrangement	X			
Content knowledge about topic in writing task post-test		Dominant learning method in both conditions: <u>direct learning</u> (DIR).		X
Knowledge about writing	X			X
Self-efficacy for writing	X	Study 4: Idem, but now both text formats taught by <u>observational learning</u> (OBS).		X
Text quality				X
Writing process		For measurements during learning arrangements: section <i>measurement of processes</i> .		X

¹ see http://www.cambiumned.nl/nederlands_schoolexamenvwo_schrijve.htm.

Study 3. Effectiveness of hypertext writing versus linear writing (both via direct learning)

The effectiveness of the learning arrangements LIN and HYP will be compared in an experimental study (pre-test/post-test design). Students (N=30 per learning arrangement) follow one of the two learning arrangements (LIN and HYP) via direct learning (DIR).

Study 4. Effectiveness of hypertext writing versus linear writing (both via observational learning)

The effectiveness of the learning arrangements LIN and HYP, developed in study 2, will be compared in an experimental study (pre-test/post-test design). Students (N=30 per learning arrangement) follow one of the two learning arrangements (LIN and HYP) via observational learning (OBS). In both the LIN and HYP arrangements, there will be many opportunities for students to evaluate and to reflect on the peer models' performances (Braaksma, Van den Bergh, Rijlaarsdam & Couzijn, 2001).

By contrasting the results of study 3 with those of study 4, we can examine whether the findings of Couzijn (1999) and Braaksma (2002) that observational learning is effective for text quality and writing processes also apply for longer linear texts, writing from sources, and a different text format (hypertext).

Study 5. Modeling the writing process model for linear text and hypertext writing

The writing process model will be explored by connecting the different components (Writer Variables, Process Variables and Text Quality). The data will be taken from studies 3 and 4.

Testing materials

Pre-test only

(1) Aptitude. To control for initial differences between the learning arrangements LIN and HYP, and to make possible a comparison between studies 3 and 4, aptitude tests will be assessed (intelligence: Cognition of Meaningful Units Word List and Verbal Analogies (DAT, 1984; Braaksma, 2002).

Pre- and post-tests

(1) Content knowledge (i.e., knowledge about the topic of the texts written in learning arrangements and post-test 2) is included because it plays a central part in the writing process model (Hayes, 1996) and effects from hypertext writing on this variable are expected. The format will be adapted from Bromme & Stahl (2000b): topic dependent tests for factual knowledge, relations between concepts, logical relations, analogies and open-ended essay questions about the topics addressed in the 'documented' texts and post-test (to be) written by the students.

(2) Knowledge about writing (i.e., declarative and procedural knowledge about writing). This measurement is included because it plays a central part in the writing process model (Hayes, 1996) and it is assumed that writing processes are influenced by knowledge about writing (Braaksma, 2002). Knowledge about writing will be measured by using an advisory letter (Schoonen & De Glopper, 1996).

(3) The measurement of self-efficacy for writing will be included as an intermediary variable, because motivation plays a central part in the writing process model (Hayes, 1996) and it is assumed that self-efficacy (or beliefs and attitudes) will influence cognitive writing processes. Furthermore, it is assumed that observational learning will enlarge students' self-efficacy, which in turn influences learning and achievement (Graham & Harris, 1994; Schunk, 1998). Self-efficacy for writing will be measured using a questionnaire adapted from Zimmerman & Bandura (1994).

Post-test only

(1) Text quality will be measured by a written 'documented' text in linear form to assess the transfer effects of hypertext writing. We focus on four related qualities of texts: goal orientation, audience awareness, organization, and style and structure. A rating scheme adapted from existing schemes used in the school exams for the documented writing assignment will be applied by a trained team of raters; raters will use examples of texts with a known quality (essay scale, see for examples Rijlaarsdam, 1986) as anchors.

(2) Writing processes will be measured while students write the (linear) writing post-test (see above) by using think aloud protocols (Braaksma et al., in press; Breetvelt, Van den Bergh & Rijlaarsdam, 1994)

and direct measurement of the writing process ((keystroke) log files: Scriptlog). A coding scheme is available.

Measurement of learning processes in hypertext writing, linear writing and observational learning (during the learning arrangements LIN and HYP)

In study 2, the learning processes during hypertext writing and linear writing are measured to get more insight into the learning-to-write process model. Moreover, we focus in study 2 explicitly on the writing processes and text quality of the hypertexts and linear texts (processes measured by thinking aloud, and (keystroke) log files: Scriptlog). With the measurement of writing processes, it can be assessed whether students who are writing hypertexts do plan and analyze more than students who are writing the same tasks in linear form (Braaksma et al., 2002b). With the measurement of text quality (hypertexts and linear texts), we can examine whether the texts written by students who plan and analyze more during their writing in the learning arrangements are of better quality. Combining the process measurements during the learning arrangements LIN and HYP with the measurements of post-test (linear) text quality, it can be assessed whether students who plan and analyze relatively more during the learning tasks, write post-test linear texts of a better quality (Braaksma et al., 2002b).

In study 4, the quality of students' evaluation and reflection activities while learning by observation (LIN and HYP) will be assessed by analyzing the work books to explore the effective components of these activities (replication and extension of Braaksma et al., 2001).

Analysis

In principle, the analysis is rather straightforward. Analyses of (co)variance are used to assess effects on content knowledge, knowledge about writing, text quality, and self-efficacy (Braaksma et al., 2002a). For the effects of learning arrangements on writing processes as well as the relations between processes and text quality (in different learning arrangements), multilevel analyses are more appropriate (Van den Bergh & Rijlaarsdam, 1996; Braaksma, 2002). For the assessment of effective learning activities in observational learning, a LISREL analysis will be applied (Braaksma et al., 2001).

14.4 relevance

This proposal involves studies in the PROO-domain 'Innovative learning arrangements, sub-domain, 'Teaching methods of new forms of learning' and sub-domain 'Learning processes and individual differences'. It includes studies into processes that promote transfer. It combines a fundamental approach (writing process theory) and an experimental approach (intervention studies), and is explicitly embedded in the educational practice to insure that application of the results is feasible.

Number of words 14.1-14.4: 3899

14.5 references

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14.7 International orientation

This study is embedded in international research on writing processes, writing as a learning tool, writing pedagogy, and learning via hypertext writing. Results from research approaches similar to the approach proposed in this project were accepted by international journals (*Journal of Educational Psychology*, *Cognition and Instruction*, *European Journal of Educational Psychology*). International key-persons from different fields (writing, hypertext) will act as members of the advisory board in this project (section 9).

15. Work plan

15.2 Global work plan

15.3 Dissemination

Scientific articles and teacher manuals are published from studies 1, 2, 3, 4 and 5.

Target journals: *Journal of Educational Psychology, Cognition and Instruction, European Journal of Educational Psychology, Learning and Instruction, Pedagogische Studiën.*

From the experiences and learning materials in this project and an international review of the factors that contribute to effective writing pedagogy, teacher manuals will be composed.

Number of words 14.6-15.3: 303

Total number of words: 4157

16. Financial support

16.1 Staffing costs

Explanation of and motivation for the staff for which you are applying. (if available, please attach a short CV of the researcher(s):

Choice researcher:

Martine A. H. Braaksma combines theoretical, methodological and practical interests in education. Her PhD-thesis (2002) illustrates this statement. In this thesis, she combines different methodologies (experiment, post-hoc analysis, observation of learning & writing) and bridges different domains (observational learning, argumentation & rhetoric, writing processes).

Curriculum researcher:

M.A.H. Braaksma (1971) studied Dutch Language and Culture at the University of Groningen and graduated on a study about navigation strategies in hypertext. Subsequently she attended teacher training at the University of Groningen and graduated cum laude. She took her PhD at the Graduate School of Teaching and Learning of the University of Amsterdam (1996-2002) in the field of writing education and published a thesis, several articles and book chapters. She is a member of the research group of the Graduate School of Teaching and Learning, involved in projects on 'Observational learning in language education', 'Literary reading processes' and a review study on empirical studies about the subject Dutch in secondary education. She published in international journals and presented at international conferences. In the school year 2002-2003, she taught part time at a school for secondary education. During the academic year 2003-2004 she will teach and do research at the University of California, San Diego, under supervision of Prof. dr. Michael Cole.

16.2 Running costs

16.2.1 Bench-fee

17. Signature

Main applicant: Prof. Dr G.C.W. Rijlaarsdam

City: Amsterdam

Date (D-M-Y): 30-09-03

Only applications submitted through IRIS, NWO's electronic system for submitting applications, will be dealt with. Before submitting your application, you will be asked to sign it electronically.