Learning How to Write an Academic Text: The Effect of Instructional Method and Writing Preference on Academic Writing Performance

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Abstract: In this study we investigated which instructional method is suitable for university students to learn how to write an academic text. We have compared observational learning with learning by doing, and we have explored the effects of writing preference (planning versus revising) on academic writing performance. In an experiment 145 undergraduate students were assigned to either an observational learning or learning-by-doing condition. In observational learning participants learned by observing a weak and strong models' writing processes. In learning by doing they learned by performing writing tasks. Prior to the sessions participants were labeled as either planners or revisers based on a writing style questionnaire. The effects of the sessions were analyzed with a 2x2 between-subjects design with instructional method (observational learning, learning by doing) and writing preference (plan, revise) as factors. To measure academic writing performance the participants wrote an introduction to an empirical research paper.

We found no main effects for instructional method and writing preference. Simple effect analyses did reveal that revisers benefitted somewhat more from observational learning than planners. Planners performed equally well in observational learning and learning by doing. However, planners who learned by doing did seem to outperform revisers who learned by doing. Our study suggests that observational learning presents interesting opportunities for academic writing courses. However, more research on the interplay between writing strategy and instructional method is called for.

Keywords: observational learning, learning by doing, academic writing, writing preference

1. Introduction

Academic staff often express concern about the inability of students to review, integrate and synthesize scientific literature (e.g., Granello, 2001). Over the years there have been several approaches to instructional methods for improving these academic writing skills. In the current study we compare two of these methods, observational learning and learning by doing, for learning how to write an academic text.

Writing a coherent and effective text is a complex and demanding task (Kellogg, 2008). Why is writing a text so difficult, and hard to learn? One possible explanation is cognitive overload (Braaksma, 2002). During writing there is a complex interplay of four main cognitive activities, namely planning (generating ideas, organizing information and setting goals), translating (putting ideas into language), reviewing (evaluating and revising text) and monitoring (deciding when to move from process to process). Writers have to attend to all these components, often simultaneously (Flower & Hayes, 1981). They have to carry out different processes, and pay attention to many textual characteristics simultaneously and therefore may lose track of their own thoughts during the process (Braaksma, 2002). This applies to all writers, but especially to those who are learning to write. When learning to write, the learner becomes so closely involved in the writing process that hardly any cognitive energy is left for learning from that process. A method that allows for a distinction between writing and learning to write, and explicitly allows for reflective activities and a direct link between writing processes and the resulting writing product is observational learning (Braaksma, 2002).

Observational learning occurs when people learn from observing the behavior of others (Bandura, 1997). In his Social Learning Theory, Bandura (1977) describes four sub-processes that lead from observation of modeled events to a matching pattern of behavior. Firstly, observers have to be attentive to the modeled behavior. Secondly, observers must be able to remember specific characteristics of the behavior in order to imitate it. Thirdly, in the reproduction sub-process observers organize and rehearse the modeled behavior symbolically and then enact it overtly. Finally, the decision to reproduce (or refrain from reproducing) an observed behavior is dependent on the motivations and expectations of the observer. This four-step model was also identified in the writing domain in a study by Braaksma, Van den Bergh, Rijlaarsdam and Couzijn (2001) on observation tasks that were effective when students were learning to read and write argumentative texts for the first time.

In learning to write, an important difference between observational learning and other approaches, such as most of the training available at universities (learning by doing), is the lack of actual writing. In observational learning learners do not write themselves, but observe and reflect on the writing processes of a model and the emergence of the resulting texts, which demonstrates the complexity of the writing

process. By observing, the cognitive effort is arguably shifted from executing writing tasks to learning (Couzijn, 1999; Rijlaarsdam & Couzijn, 2000; Braaksma, 2002).

Various studies have shown that observational learning is effective in the domain of writing (among various other school subjects) with learners of various ages (e.g. Zimmerman & Kitsantas, 2002; Braaksma, Rijlaarsdam, & Van den Bergh, 2002; Rijlaarsdam et al., 2008; Raedts, 2008). For example, Couzijn and Rijlaarsdam (2004) compared observational learning with learning by doing in an experimental course for 9th grade students on composing an argumentative text. Participants who learned by doing were presented with theoretical knowledge on writing argumentative texts. Based on the theory, they executed several writing assignments. In the observational learning condition participants were presented with the same theory. However, instead of performing the assignments themselves, the participants observed two peer models executing the tasks while thinking aloud. Before observing the participants were instructed to aim their attention to evaluating the models' performance so they could check whether the models applied the theory correctly. After the observation, the participants had to determine if one model did worse than the other, and explain what exactly made this performance less successful. In this way the participants were forced to designate 'strong' and 'weaker' models. Couzijn and Rijlaarsdam (2004) found that participants observing peer models outperformed students who learned by doing on writing an argumentative text.

Braaksma, Rijlaarsdam, Van den Bergh, & Van Hout-Wolters (2004) suggest that the effectiveness of observational learning in learning to write is a result from the observers' strong engagement in metacognitive activities. Observers internalize, apply, and develop criteria for effective writing, by observing the models' writing, identifying and conceptualizing the writing strategies, evaluating the performance of the models and reflecting explicitly on the observed performances.

Would observational learning also be a suitable method for university students to learn how to write an academic text? Only a small handful of studies, all by Raedts and colleagues, have asked this question (e.g., Raedts, Rijlaarsdam, Van Waes & Daems, 2007). These studies investigated the effects of observational learning with undergraduate students on task knowledge and text quality by comparing observational learning with learning by doing. During the first session all students were presented with theoretical knowledge. Afterwards, students who learned by doing performed writing exercises while students who learned by observation watched videos in which a weak and strong model performed these exercises. After observing the students were asked to identify the stronger model and they had write down the strategies used by the models. The studies showed that, contrary to the expectations, students in the observational learning condition did not have more detailed knowledge of what a good literature review should look like. However, their knowledge of effective writing strategies was significantly more extensive. More specifically, there were effects of instruction for strategies concerning information gathering and planning of the text, but no effects for strategies concerning text production and revision. With regards to text

quality, the studies showed that students in the observational learning condition outperformed those in the learning-by-doing condition. The students in the observational learning condition linked the source material more often, and wrote better organized literature reviews compared to the students in the learning-by-doing condition (Raedts et al., 2007).

The work of Raedts and colleagues offers a first indication that observational learning may be a useful strategy for students to learn how to write academic texts. However, various questions remain open, such as the influence of specific learner characteristics. Students for example may differ in writing preferences. Galbraith and Torrance (2004) distinguish between two different approaches to writing common in research: a planning approach and an interactive approach. In the planning approach writers concentrate on working out what they want to say before they actually start producing full text. After establishing what they want to say, they work on expressing the meaning they want to convey as effectively as possible. This approach can include activities such as creating a thinking scheme and planning the text by writing an outline (Kieft, Rijlaarsdam, Galbraith, & Van den Bergh, 2007). In the interactive approach writers work out what they want to say while writing and the content evolves over a series of drafts (Galbraith & Torrance, 2004). According to Elbow (1998) the interactive approach allows writers to look at writing as "an organic, developmental process in which you start writing at the very beginning." This approach can include several pre-writing activities such as free-writing (Elbow, 1998) and involves writing multiple drafts (Murray, 1980). Galbraith and Torrance (2004) indicate that a planning approach may be equally effective as an interactive approach. They suggest that, in general, in education it may be necessary to accommodate different cognitive styles, since there seem to be individual differences in preferences for different strategies. Galbraith, Torrance and Hallam (2006) found that students benefitted most from writing instruction opposite to their preferred strategy. The writing instruction helped to supplement and foster those strategies which students by themselves did not prefer.

Kieft, Rijlaarsdam, and Van den Bergh (2008) also studied the effect of adapting a writing course to students' writing strategies. They refer to the interactive approach as a revising strategy. In their study, they found an interaction between writing preferences and writing instruction. Students with a strong writing preference, either planning or revising, learned more from a writing course that was adapted to their writing preference. Rijlaarsdam et al. (2008) have suggested that adaption of observational learning tasks to students' writing preference therefore may be useful. Students with a planning preference might benefit from observational tasks providing feedback on planning problems while students with a revision preference might benefit more from observations of writing students coping with revision problems. However, based on Galbraith et al. (2006) it could also be argued that students benefit more from observational tasks opposite to their preferred strategies. Therefore, we explore in the current study how writing preference influences the effect of instructional method on academic writing performance.

Our research design is inspired by Raedts and colleagues and is in line with previous research comparing observational learning with learning by doing. Learning by doing typically includes studying a theoretical part followed by the participants executing several pre-structured writing tasks. In observational learning participants are confronted with the same theoretical part, but instead of executing writing tasks themselves, they observe models performing these tasks, and are asked to reflect upon the behavior of the models (see for example, Braaksma, Rijlaarsdam, & Van den Bergh, 2002; Couzijn & Rijlaarsdam, 2004; Raedts, 2008).

This is also what we have done in the current study. We compared observational learning with learning by doing. All participants studied a theoretical section on effective writing strategies. Afterwards, participants in the observational learning condition observed peer models that were thinking aloud while executing several (pre-) writing tasks. The observers were confronted with both a weak and strong model and they had to reflect on why they thought one model was better than the other. They did not actually write themselves. Participants in the learning-by-doing condition executed themselves the tasks that the models in the observational learning condition were performing.

The task the participants either observed or executed in the current study was writing an introduction to an empirical research report based on index cards (summaries of scientific articles). This task was new to the participants. Empirical research reports and literature reviews are among the most common types of reports students have to write during their studies (Froese, Gantz, & Henry, 1998). In both text types writers have to define and clarify the problem, summarize previous investigations and they have to identify relations, contradictions, gaps and inconsistencies in the literature. Compared to the writing tasks in previous research, such as for example Kitsantas and Zimmerman (2002), the academic writing tasks in Raedt's studies and the current study, are more complex and extensive, since writers have to combine multiple source texts, and the texts do not have a pre-arranged structure.

Granello (2001, p. 293) suggests that what seems to be missing in higher education is "a formalized, intentional, and well-grounded mechanism designed to teach students how to critically evaluate and synthesize the material they have collected into cognitively advanced reviews of the literature." This claim is supported by Green and Bowser (2006) who argue that university faculty often assumes that these skills are present in students, while the students might not be able to effectively evaluate and synthesize literature and have not received direct instruction to acquire these skills.

A difference between the literature review in Raedts and the introduction posttest in this study is that participants in our study had to make sure that the synthesis of the literature logically led to the (already provided) research question and hypotheses of the paper they had to write. Furthermore, our posttest, the introduction to an empirical research report, was part of the existing regular course program: the paper the participants had to write was part of the assessment of the course Dutch for Academic

Purposes and a methodology course. This way we could test whether the observational learning approach is beneficial in an existing course.

As mentioned earlier, a learner characteristic we want to take into account is writing preference. In the current study four of the six observation exercises focused on more planning-like activities, such as organizing content, planning the structure of the text, and combining information in a paragraph. Students with a planning preference therefore might benefit more from observation as a pre-writing activity than students with a revising preference since most of the observations are based on models performing pre-writing planning activities.

To summarize, in this study we investigate what the effect is of instructional method and writing preference on academic writing performance in learning to write a large and complex writing assignment, namely the introduction of a research paper. We hypothesize that observational learning leads to higher academic writing performance than learning by doing (H1). We expect writers with a planning preference to perform equally well overall as writers with a revising preference. However, we hypothesize that writing preference mitigates the effect of instructional method (H2).

2.   Method

2.1 Participants

The participants were recruited from the course Dutch for Academic Purposes, which is an obligatory course for undergraduate students Communication and Information Sciences (n = 211) at Tilburg University. The course offers an introduction to academic writing. The role of writing in academics and different types of texts are discussed. Writing an academic text at university level was new to all participants. Only students who took the course for the first time, were present for both sessions, were Dutch native speakers, and filled out the writing styles questionnaire were included in the analysis. This resulted in a final sample size of 145 participants (male = 54, female = 91). The sample consisted of two types of undergraduate students: 73 first-year bachelor students with a background in preparatory university education (M_age = 18.5, SD = 1.25) and 72 students enrolled in a pre-master program[1] with a background in higher vocational education (M_age = 22.5, SD = 1.64)

The participants were divided into nine tutorial groups. They first enrolled in a group by selecting a particular time slot in accordance with their teaching schedule, after which the groups were randomly assigned to one of the conditions: five groups were assigned to the learning-by-doing condition, four groups to the observational learning condition. Participants were unaware of the conditions when they enrolled in the tutorial groups. This resulted in 81 participants who took part in the learning-by-doing condition, and 64 participants who took part in the observational learning condition. An overview of the characteristics of the participants per condition can be found in Table 1.

Table 1. Sex and mean age in years (SD) of the participants per condition

Instructional Method	Sex		Age	Educational Background	
	Male	Female	M (SD)	Bachelor	Pre-master
Learning by Doing	30	51	20.5 (2.46)	43	38
Observational learning	24	40	20.5 (2.45)	30	34

Participants in both conditions were comparable in terms of gender (χ^2 (1) = 0.003; p = .95), age (t(139)=0.09; p = .93) and educational background (χ^2 (1) = 0.55; p = .46).

2.2 Design

The general design was a 2 (instructional method: observational learning, learning by doing) x 2 (writing preference: plan, revise) design. In the observational learning condition participants were presented with videos in which student-actors were performing writing tasks while thinking aloud. In the learning-by-doing condition students were confronted with more traditional writing exercises. Prior to the sessions participants filled out a writing style questionnaire. Based on this questionnaire they were either labeled as a planner or reviser. In the posttest the effect of instructional method and writing preference on academic writing performance was measured. An overview of the design can be found in Table 2.

Table 2. General Research Design

Lecture	Duration (minutes)	Measurement
-	-	Writing style questionnaire
		Language proficiency test
3	50	Session 1
4	50	Session 2
-	-	Posttest: introduction to an academic paper

2.3 Procedures and Material used in the Sessions

Content of the sessions

The sessions took place during the first two tutorials of the course Dutch for Academic Purposes. The participants had no prior knowledge on the subject and no experience with writing an academic text, since these tutorials took place in week 3 and 4 of their study program at the university. In week 2 all participants watched a video lecture on

the aims of a scientific article and the different components of an article: abstract, introduction, method, results, discussion, conclusion and references. The tutorials in the third and fourth week of the course program were carried out by four instructors, under supervision of the first author who was one of them. Each instructor was assigned to both an observational learning group and a learning-by-doing group. A week before the sessions the procedures, a detailed lesson plan and a presentation that contained the exercises were discussed in a meeting with the instructors.

The observational learning condition consisted of two sessions in which six videos were shown (three in each session). Each session lasted 50 minutes. In the videos the participants saw two peer models writing an introduction to an academic paper based on four index cards. All index cards contained a summary of a scientific article that the models had to include in their introduction. Each video focused on a certain aspect of writing an introduction to an academic paper (Table 3). The content of the videos was based on literature on effective and non-effective writing strategies (e.g. Van Weijen, 2009; Graham & Perin, 2007) and suggestions from a study by Raedts, Daems, Van Waes, & Rijlaarsdam (2009). Graham and Perin (2007) found that teaching students strategies for planning, revising and editing (strategy instruction) was a powerful method. They also argued that students should be taught strategies and procedures for summarizing reading material, since this improves their ability to concisely and accurately present this information in writing. Therefore we included these types of activities in the exercises and videos.

The models in the videos were student actors who had received a script for each exercise and had been instructed to think aloud during the exercise. The script contained concrete instructions for sentences to type and remarks to make while thinking aloud. An example of an instruction for the strong model is: 'Indicate that the opening paragraph should be about the increased attention there is for students nowadays and their ICT use. Type a bullet point with the keywords for the opening paragraph.' The student actors were also allowed to give their own input for the exercise, to make sure that the clips were natural and convincing. Two models were used, because observing multiple models increases the likelihood that students will view themselves similar to at least one model (Schunk, 1987). In line with previous research (Groenendijk, Janssen, Van den Bergh, & Rijlaarsdam, 2011; Raedts et al., 2008; Couzijn & Rijlaarsdam, 2004) one of the models used effective strategies to complete the assignments (strong model), the other model used counterproductive strategies (weak model). An effective strategy used by the strong model was comparing and contrasting the studies on the index cards, while the weak model read the studies on the index card without relating the methods and results of those studies. In all the videos the same student actor ("Anne") represented the strong model, and another student actor ("Kristel") the weaker model. The videos were only available for the participants during the sessions.

Table 3. Content of the Videos in the Observational Learning Condition

Session	Video	Content	Duration
1	1	Reading, selecting, organizing and paraphrasing the information on the index cards	50 minutes
	2	Planning content and main structure	
	3	Organizing the body of the introduction (relating the content information from the different sources)	
2	4	Zooming in on the paragraphs (combining studies within a paragraph)	50 minutes
	5	Adding an opening to the introduction and writing a sentence at the end of the (last) paragraph to bridge the gap to the research questions	
	6	Revising the text at word, sentence and text level.	

The videos were recorded with Camtasia, which allows simultaneous, picture-in-picture recording, and edited with iMovie. Each fragment contained a recording of the model working on the computer, the model's voice and the computer screen the model was working on in Word. By showing a recording of the models, the participants could observe the exact activities of the model, especially when the models were not writing, such as reading and scrolling through the index cards, pausing etc. The recording of the voice gave the participants insight into the thought processes and writing strategies of the models since the models were thinking aloud. The recording of the computer screen gave participants the opportunity to follow the on-screen writing activities of the models, such as typing, deleting and revising text. The length of the videos varied from five to thirteen minutes. Figure 1 illustrates one of the videos. In this fragment weak model Kristel is attempting to write an attractive opening sentence.

The learning-by-doing condition also consisted of two sessions of 50 minutes each. Participants were in both sessions instructed to write an introduction to an academic paper, based on four index cards. The first session contained five short and pre-structured exercises that led up to a complete introduction. The participants had to complete the exercises under time pressure. The exercises were closely based on the contents of the videos in the observational learning condition as outlined in Table 4 (in the next section the similarities between the two conditions will be discussed in more detail). The second session consisted of one longer, less structured exercise in which the participants were instructed to write an introduction to the topic provided using the information on four index cards. Details of the exercises in the learning-by-doing sessions can be found in Table 4.
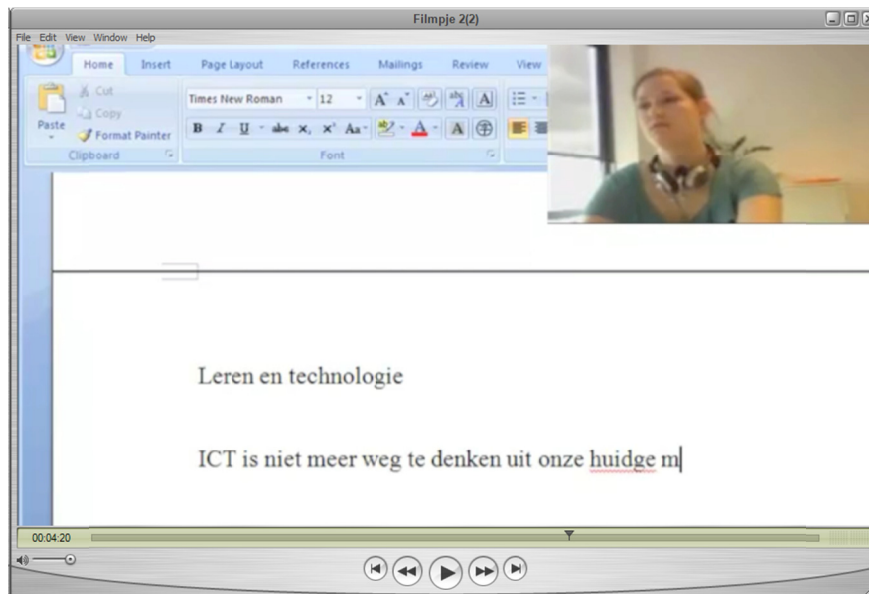
Figure 1: Screenshot of a fragment with weak model Kristel.
Translation of text in Figure 1: "Learning and technology.
It is impossible to imagine our society without ICT."

Similarities and differences between conditions

The conditions were as similar as possible. In the first week of the course all participants watched a video lecture that contained information on the different components of an introduction (opening, literature review, bridge to research question and hypotheses). In both conditions we told the participants that the goal of the exercises during the sessions was to prepare them for writing an introduction to a certain topic (the use of ICT in higher education, the role of gestures in non-verbal communication) by synthesizing information of several academic sources. They were also told that they could use this method of working when writing the introduction of the first paper for the course.

The content of the exercises in both conditions was also similar. Videos 1, 2, 3 and 4 (Table 3) of the observational learning condition correspond with exercises 1, 2, 3 (Table 4) of the learning-by-doing condition, video 5 is matched with exercise 4, and video 6 with exercise 5. The activities the models performed in the videos of the observational learning condition were the same as the exercises the participants of the learning-by-doing condition had to execute during the first session.

Table 4. Content of the Exercises in the Learning-by-doing Condition

Session	Exercise	Instruction	Time (minutes)
1	1	Read index card 1 and 2 and write a paragraph in which you describe the most important/relevant results. Refer to the sources by using APA standards.	10
	2	Read index card 3. Add the information of the index card to the paragraph you have written in exercise 1.	5
	3	Read index card 4. Add the information to the paragraph of exercise 1 and 2. Divide your text into two paragraphs, if necessary.	5
	4	Read the instructions once more. Add an opening to the introduction and write a sentence at the end of the (last) paragraph in which you bridge the gap to the research questions.	10
	5	Revise your text on text level (structure, composition) and sentence level (spelling, vocabulary, grammar).	5
2	6	Write an introduction to the topic provided. Use the information on the index cards.	50

Participants in both conditions were provided with index cards. As mentioned earlier, each index card contained a summary of an academic paper related to the topic of the introduction. The use of index cards speeded up the reading process and we could make sure all the students received exactly the same relevant information on the topic. On the index cards the following information could be found: the full reference of the article; the research question, the type of research and data; a summary of the most important findings of the study; and a quote from the original article. The first and third index card represented a similar viewpoint. The second and fourth index card contained a viewpoint that was opposite from index card 1 and 3. In Figure 2 an example of one the index cards can be found. The index cards the participants in the observational learning condition received in the two sessions were the same as the index cards the participants of the learning-by-doing condition used in session 1. Participants in the learning-by-doing condition were presented with four additional index cards for the second session.

Apart from the index cards we also provided the participants in both conditions with a table that contained effective writing strategies (Table 5). These strategies matched the strategies the 'stronger' model used in the videos. Participants in the observational learning condition had to indicate in the table which strategies they saw the models use in the videos.

Reference

Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British journal of educational technology*, *39*(5), 775-786.

Details about the research

Research theme: analysis of the digital natives debate, with the following research questions:

1. Do students nowadays possess extensive ICT knowledge and skills?

2. Do students have specific learning preferences that are different from earlier generations, because of their experience with ICT?

Type of research: literature review

Data: scientific articles

Results

1. ICT knowledge and skills

- Part of today's youth has extensive ICT knowledge and skills and uses these skills for information gathering and communication..
- However, there is also a large group with less access to technology or with less skills than is sometimes assumed.
- It is dangerous to generalize a whole generation: no room for individual differences between young people or between different age categories.

2. Learning preferences

- Research into learning strategies shows many individual differences in learning preferences. Students adapt their strategy, dependent on the task.

Conclusion

Not much empirical evidence to support the concept of *digital natives*. ICT can be important, but the situation is much more complex and unclear than expected. More empirical research is necessary to gain insight into the characteristics of students nowadays and the implications for education.

Quote

With generalization of a complete generation comes the danger that those less interested and less able will be neglected, and that potential impact of socio-economic and cultural factors will be overlooked.

Figure 2. Example of an index card.

In the learning-by-doing condition participants used the table to prepare themselves for the exercises. After completion of the exercises, they also had to indicate in the table which strategies they used during the exercises. We included the table in both conditions so the participants were equally exposed to effective writing strategies and in order to include a comparable reflective activity in both conditions.

Procedure in the learning-by-doing condition

The first session took place during the first tutorial in a computer room. Each participant had access to a computer. The participants received a handout that consisted of an introduction to the assignments, a table with effective writing strategies and corresponding actions, four index cards and an appendix containing basic APA-reference guidelines.

Table 5. Writing Strategies presented to the participants in both conditions

Effective strategies	Corresponding actions
Reading important information	Read the research question and the results.
Organizing the information	Identify general differences and similarities.
Paraphrasing	Put important information into your own words.
Planning	Plan the content and structure by organizing key concepts.
Connecting the content	Identify the differences and similarities between studies in detail.
Combining studies	Connect the content of the different studies in your own text. Use connective words/sentences to mark the relations explicitly.
Adding a quote (optional)	Add a quote using APA guidelines to support an important point.
Revising the text	Check your own text on text level (structure, logic) and sentence level (grammar, vocabulary, spelling).

The instructor explained to the participants that they would execute five small writing exercises in which they would work on an introduction to an academic article based on four index cards. The participants were given ten minutes to read the instructions, the effective writing strategies and the index cards. Subsequently a presentation containing the first exercise was displayed on a screen. At the end of the exercise an alarm bell went off and the instructor presented the next exercise. At the end of all five exercises the participants were asked to upload their introduction onto the electronic learning environment and to indicate in a table (see Table 5) on the last page of the hand-out which writing strategies they applied during the exercises. The table was the same as the one they had read before doing the exercises. At the end of the tutorial the instructor collected all the handouts. At the start of the second session an example of a

good introduction was discussed. This example was the introduction that the strong model ("Anne") wrote in the observational learning videos.

The second session took place during the second tutorial in the same computer room. Participants received another handout that consisted of the same elements as the first one. Participants were instructed to write an introduction to the topic on the handout by using the information on the index cards. They were told that the introduction should contain an effective opening, a synthesis of the academic literature and a bridge sentence to the (already given) research question and hypothesis. The text should also be perfectly written, which meant no spelling or grammar mistakes. They had thirty minutes to complete the assignment. Afterwards, the participants indicated in a table which writing strategies they had applied during the exercise and they had to upload their text onto the electronic learning environment. The instructor collected all the handouts at the end of the tutorial.

Procedure in the observational learning condition

The first session took place during the first tutorial and the second session during the second tutorial, in a regular classroom with a computer for the instructor and a beamer. The procedure was identical for both sessions. The participants received a handout that consisted of an introduction to the observation exercises, the same four index cards as in the first session of the learning-by-doing condition and three observation exercises: exercise 1, 2 and 3 for the first session and exercise 4, 5 and 6 for the second session (see Table 3). We told the participants that the goal of the exercise was to learn how to write an introduction to a certain topic by using the information of several academic sources and that they would learn that by observing participants who were completing writing tasks. The participants were unaware of the fact that the models were student actors. We told the participants they could use the strategies they observed while writing the introduction of their first paper for the course. The participants were instructed to carefully read the introduction to the exercises and the information on the index cards. Then the instructor started the first video. There was room on the handout for taking notes while watching. Once the video ended, the participants were given five minutes to answer the following questions: Which differences between the two writers did you observe? Who do you think is the better writer and why? What did the other writer do that made you think she was the lesser writer? The instructor would then start the next video. At the end of the last video of the session and accompanying questions, participants indicated in a table which strategies they saw the models use. This table was identical to the one used in the learning-by-doing condition (see Table 5).

2.4 Measures

Language Proficiency

Prior to the sessions, participants took a test on grammar, spelling and punctuation, and structure in order to check for possible initial differences in participants' language proficiency. The test was developed by the Language Centre of Tilburg University and has been used for over a decade as a diagnostic instrument for undergraduate students at Tilburg University. Grammar was tested with 25 items, containing congruency problems (8), verb conjugations (5) and endophoric expressions (12). Spelling and punctuation were tested with forty items on the spelling of verbs (20) and nouns (13), and the use of punctuation in sentences (7). Structure was tested with ten items on organizing sentences (4), the use of conjunctions (3), and structuring paragraphs (3). Per item one point could be scored, resulting in a possible minimal score of zero, and a maximal score of 25 for grammar, 40 for spelling and punctuation, and 10 for structure.

Writing Preference

Prior to the sessions participants were asked to fill out a questionnaire on writing styles created by Kieft, Rijlaarsdam, & Van den Bergh (2006) in order to determine their writing preference. We chose this particular questionnaire because it has been tested and used in writing research extensively (e.g., De Smet, Brand-Gruwel, Leijten & Kirschner, 2014; Kieft, Rijlaarsdam & Van den Bergh, 2008; Tillema, 2012). The writing style questionnaire measures reported degrees of planning and revising styles and consisted of 36 items: thirteen items reported planning-type behavior, twelve items reported revising-type behavior and the remaining eleven items were fillers. According to the writing style questionnaire planning-type behavior entails pre-writing activities, such as making a text schema and writing a polished first draft. The definition of revising-type behavior is twofold: it focuses on the tendency to rely on revision, and on how revisers use text production as a means to arrive at a content plan (Tillema, 2012).

In the questionnaire participants had to indicate on a five-point-scale how much they agreed with each item (1 = not at all, 5 = very much). An example of a planning item was 'Before I start writing, I want to be clear on which information to put in the text. Therefore, planning is important to me.' An example of a revising item was 'When I finish a text, I usually need to read through it carefully, to check if there is no superfluous information in it.' All the items, organized by dimension, can be found in the Appendix (taken from Tillema, 2012). The items in the actual questionnaire were presented in Dutch and in random order. The items on planning were summarized into one planning score (Cronbach's alpha = .65) and the items on revising into one revising score (Cronbach's alpha = .60). Even though these reliabilities are relatively low, they are comparable to those in previous research (e.g. Tillema, 2012, respectively .72 and .64, and De Smet, Brand-Gruwel, Leijten, & Kirschner, 2014, respectively .71 and .63).

Based on their responses, participants received a mean score for both planning and revising.

Academic Writing Performance

To measure the participants' academic writing performance after the sessions the first author scored the introduction section of the first paper the participants had to write for the course Dutch for Academic Purposes. In this paper participants described an experiment on the effects of the use of adjectives on the perceived attractiveness of an advertisement. The participants received four index cards that looked similar to the index cards used in the sessions. They contained the full reference of the article; the research question, the type of research and data; a summary of the most important findings of the study; and a quote from the original article. The studies on index card 1 and 3 showed similarities in their results, while the study on index card 2 displayed an opposing viewpoint. The study on index card 4 added an extra factor that could be of influence on the other three studies. The participants were instructed to write an attractive and suitable opening for their introduction. It was explained that the opening should draw attention of the reader, should not be too formal, nor too informal, and should introduce the topic of the text. These instructions were based on the video lecture the participants watched in week 2. They were also instructed to include all four index cards in the body of the introduction and to make sure that the introduction would lead to the research question and hypotheses in a logical manner. This instruction was identical for all groups.

To measure academic writing performance, the texts were analyzed on the structure of the argument. This dimension was scored on six items: (1) quality of the opening sentence/paragraph, (2) similarity between findings in the studies on index card 1 and index card 3, (3) contradiction between findings in the studies on index card 1/3 and index card 2, (4) connection between the study on index card 4 and the studies on index cards 1, 2 and 3, (5) paragraph structure, and (6) structure in general (e.g. connective words). For each item zero, one or two points could be appointed which resulted in a possible maximal score of twelve points.

Personal information in the documents was removed by a teaching assistant. Subsequently the texts were scored by the first author, who was unaware of the identity of the respondent and blind to the experimental condition. All the texts have been rescored by two trained student-assistants who each scored half of the papers (interrater-reliability respectively Pearson's r = .76 and .75). The texts were scored using a codebook that included three examples of each of the scores per category possible.

2.5 Statistical Analyses

The score on the posttest has been evaluated with an ANCOVA with Instructional Method (*learning by doing, observational learning*) and Writing Preference (*plan, revise*)

as the independent factors, and with Educational Background (*bachelor, pre-master*) as covariate, to control for possible effects of previous education.

3. Results

3.1 Language Proficiency and Writing Preference

Before presenting the results of the effect of instructional method on academic writing performance, the general findings concerning initial language proficiency and writing preference are reported.

Initial Language Proficiency

Initial language proficiency was assessed with a grammar, spelling and punctuation, and structure test. Table 6 displays the mean scores on these tests. There were no significant differences between the conditions in scores on grammar (t(140)= 0.94; p = .35), spelling and punctuation (t(140)= 0.07; p = .94), and structure (t(140)= -0.77; p = .45). Both groups can, thus, be assumed to be equivalent concerning language proficiency.

Table 6. Mean Scores on grammar, spelling and punctuation and structure (SD) per condition

	Grammar	Spelling	Structure
	M (SD)	*M (SD)*	*M (SD)*
Instructional Method			
Learning by Doing	18.25 (3.07)	32.73 (3.20)	5.57 (1.29)
Observational learning	17.72 (3.55)	32.69 (3.36)	5.74 (1.33)

Writing Preference

Based on the writing style questionnaire participants received a mean score for planning and revising. Participants who scored higher on planning than on revising were labeled Planners and participants who scored higher on revising than on planning were labeled Revisers. This resulted in 38 Planners and 120 Revisers (see Table 7 for the distribution over conditions). The proportion of participants with a planning (24.1%) and a revising preference (75.9%) appears to be in line with Torrance, Thomas and Robinson (2000). In their longitudinal study, they found that in 23.5% of the 715 essays they analyzed students used a detailed planning strategy, which included activities such as using an outline and one or more idea exploration activities. In the remaining essays students used either mixed or mainly revising strategies, in which ideas were allowed to develop during writing. However, it is worth noting that both in our study and in Torrance et al. (2000) writers with a planning preference also used

Table 7. Number of Planners and Revisers per condition

	Planners	Revisers
Instructional Method		
Learning by Doing	21	60
Observational learning	17	47

revising strategies and vice versa: the writing preferences are not mutually exclusive, although in general one of the preferences is more dominant.

There were no significant differences between the instructional method conditions in writing preferences, ($\chi2$ (1) = 0.01; p = .93). Both conditions can, thus, be assumed to be equivalent concerning writing preferences.
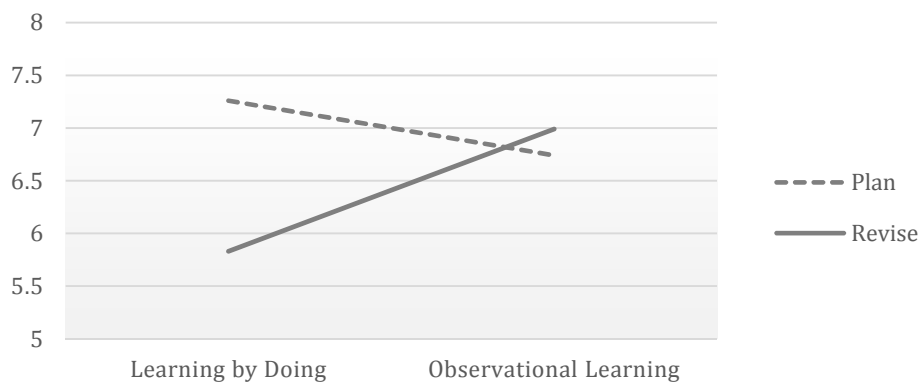
Academic Writing Quality

We investigated the effect of instructional method and writing preference on academic writing quality controlling for educational background. The covariate, educational background, was significantly related to academic text quality, $F(1, 140) = 4.97$, $p = .027$, $\eta_p^2 = .034$. After controlling for educational background, the ANCOVA revealed no main effects for instructional method, $F(1, 140) = 0.40$, $p = .53$, or writing preference, $F(1, 140) = 1.40$, $p = .24$. An overview of the mean scores for academic writing performance for participants with a planning and revising preference in both conditions is presented in Table 8.

Table 8. Academic Writing Performance in relation to Instructional Method and Writing Preference (minimal score 0, maximal score 12)

	Learning by doing Mean (*SD*)	Observational learning Mean (*SD*)	Total Mean (*SD*)
Revising preference	5.83 *(2.78)*	6.96 *(2.38)*	6.33 *(2.66)*
Planning preference	7.14 *(2.33)*	6.94 *(3.21)*	7.05 *(2.72)*
Total	6.17 *(2.72)*	6.95 *(2.60)*	

There was an indication for an interaction between instructional method and writing preference, $F(1, 140) = 2.78$, $p = .097$, $\eta_p^2 = .020$. Simple effect analyses revealed a significant effect of instructional method for participants with a revising preference, $F(1, 140) = 5.16$, $p = .025$, $\eta_p^2 = .036$. Revisers in the observational learning condition scored significantly higher ($M = 6.96$) than revisers in the learning-by-doing condition ($M = 5.83$). For participants with a planning preference no effects of instructional method were found, $F(1, 140) = .36$, $p = .55$.

Simple main effects tests were also conducted holding writing preference constant. Results from these analyses showed that in learning by doing participants with a planning preference scored significantly higher than participants with a revising preference, $F(1, 140) = 4.62$, $p = .033$, $\eta_p^2 = .032$. In the observational learning condition we found no effect, $F(1, 140) = .112$, $p = .74$. Figure 3 provides a graphical representation of the mean scores on academic writing performance.

Figure 3: Academic writing performance in relation to instructional method and writing preference (minimal score 0, maximal score 12).

4. Discussion

In this study we investigated the effect of instructional method (observational learning versus learning by doing) and writing preference (planning versus revising) on academic writing performance. Our aim was to explore whether observational learning is an effective tool for a large and complex writing assignment, taking writing preference into account. It is worth emphasizing that this study was executed in an ecologically valid situation: in an existing undergraduate course in a regular study program with an actual assignment as posttest.

In the current study no effect of instructional method was found. Contrary to what we expected, participants who learned by observing models did not outperform participants who learned by doing. The two methods seemed equally effective. This does not correspond with the findings by Raedts et al. (2007) who found clear effects of instructional method. Note that our sample was comparable to Raedts et al. and our statistical analysis was sensitive enough to find statistical differences under certain circumstances, indicating that the participants did learn from the sessions. Furthermore, the design of the current study closely followed that of Raedts et al. A minor difference was that we included a form of self-evaluation and reflection in the learning-by-doing condition. Participants who learned by doing indicated in a table containing effective

strategies which ones they had used while performing the tasks. Perhaps this has reduced the difference between observational learning and learning by doing. However, this was only a very small part of the sessions, so we are not sure whether this can account for the differences between the findings.

As expected we found no effect of writing preference. Planners and revisers performed equally well. This is in line with Galbraith and Torrance (2004) who stated that there is no clear evidence that a certain writing preference leads to a higher writing performance.

We did find some evidence for our second hypothesis: writing preference mitigates the effect of instructional method. Even though we found no overall effect of instructional method on performance, our data revealed different patterns for participants with a planning and a revising preference. Observational learning appeared to be somewhat more beneficial for students with a revising preference. Revisers in the observational learning condition seemed to link the content of the index cards better and they were more successful in adding a suitable opening paragraph and creating a logical bridge to the research questions than revisers in the learning-by-doing condition. For planners no effect of instructional method was found. This does not appear to be in line with Braaksma, Rijlaarsdam and Van den Bergh (2008) who found that students learned more from a writing course that was adapted to their writing preference. Since most of the observational activities focused on pre-writing planning activities one would expect planners to benefit more from observational learning. In accordance with Galbraith et al. (2006), it could be argued, however, that students with a revising strategy were confronted with pre-writing planning strategies new to them, which could lead to them experimenting with new, more effective strategies while writing the posttest introduction.

Our results also seem to suggest that planners benefit more from learning by doing than revisers. In the learning-by-doing exercises there is less explicit focus on acquiring pre-writing strategies. Planners tend to use (some of) these strategies anyway. For example, Tillema (2012) found that students who reported a higher degree of planner-type behavior on the writing style questionnaire applied more planning activities at the start of task execution. Van Weijen (2008) found a correlation between planning and text quality: participants who have a high probability of occurrence for planning at the start of the writing process, on average, are likely to have written good quality texts. This might explain why planners outperform revisers in learning by doing. This seems to suggest that the more traditional writing instruction suits planners more than revisers. Since the latter group, in our study, represents the majority of the students, it could be argued that observational learning is a more suitable instructional method for learning how to write an academic text since planners and revisers performed equally well when learning by observation. However, it could also be argued that planners can benefit more from observational learning than in the current study when the models focus on different strategies, such as more extensive revision strategies. Combining observational learning and learning by doing could also be an effective option:

applying the strategies acquired through observational learning in repetitive, deliberate practice in actual writing could help perpetuate the effects.

More research is needed to fully understand the interplay between writing preference, instructional method and writing performance. For instance, in the current study we have no information on which strategies the students actually used while writing the posttest: the writing style questionnaire is a self-reported measure. Depending on which strategies participants actually apply, the effect of instructional method could be mitigated. Also, it should be noted that perhaps our method of dividing the participants into revisers and planners has been of influence. The participants received a mean score for both planning and revising. Participants who scored higher on planning than on revising were labeled planners and vice versa. This resulted in a revising group that was considerably larger (76%) than the planning group (24%). It also means that even revisers in general may apply some planning strategies and planners will also use revising strategies.

In future studies it would be interesting to investigate the actual planning and revising behavior of participants prior to sessions and during the posttest, for example by including keystroke logging in the design. This way more insight can be gained in how observational learning and learning by doing influence the use of writing strategies and how this is related to writing performance. Also a pretest measure of academic writing competence should be included. This was missing is the current study. However, since there were no a priori differences in language proficiency between experimental groups, we have no reason to assume initial differences have mitigated the effect of the sessions.

It remains an intriguing question what causes observational learning to be at least as effective as learning by doing, particularly for writers with a revising preference. As mentioned earlier, Braaksma, Rijlaarsdam, Van den Bergh, & Van Hout-Wolters (2004) suggest that this is a result from the observers' strong engagement in metacognitive activities. By evaluating the performance of the models and reflecting explicitly on the observed performances, the intention is that observers develop criteria for effective writing. This evaluating and reflecting in observational learning is in most earlier studies explicitly encouraged by asking participants questions about the model's performance, while in learning by doing explicit evaluation and reflection are typically lacking. In the current study we included some evaluation and reflection in the learning-by-doing condition by asking participants to indicate which strategies they had used during the interventions. However, this was a smaller part of the interventions than the evaluation and reflection part in the observational learning condition. In future studies it would be interesting to further explore the role of self-evaluation and reflection in both observational learning and learning by doing.

5. Conclusion

We investigated the effect of instructional method (observational learning versus learning by doing) and writing preference on academic writing performance. More specifically, we wanted to explore whether observational learning is an effective tool for a large and complex writing assignment, and we wanted to explore the possible effects of writing preference.

In this study we found no main effects of instructional method and writing preference. This implies that the students learned how to write the introduction of an academic report equally well with both methods, and that we found no general evidence for one writing preference to result in higher writing performance than the other. However, observational learning seemed to be more beneficial for students with a revising preference. Revisers who learned by observation wrote better organized introductions than revisers who learned by doing. Planners performed equally well in observational learning and learning by doing. However, planners who learned by doing seemed to outperform revisers who learned by doing.

Our study suggests that observational learning can be an effective instructional method in learning to write an academic text in which multiple sources have to be combined and there is no pre-arranged structure. It presents interesting opportunities for (online) courses in academic writing that have little opportunity for individual feedback. However, more information on the exact relation between instructional method, writing preference and academic writing performance is desirable.

Note

1. A Pre-Master is a set of bridging courses that prepares students for a Master's programme. For more information on the Dutch educational system, see: https://www.epnuffic.nl/en/ publications/find-a-publication/education-system-the-Netherlands.pdf

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Appendix

Items in the Writing Style Questionnaire (Kieft et al., 2006; 2008), sorted according to which dimension they measure. *: item is negatively formulated

Planning
Before I start writing, I want to have it clear which information to put in the text. Therefore, planning is important to me.
If I have to write a text, I spend a lot of time on thinking about my approach.
I always make a text schema before I start writing.
If I have to write something, I jot down some notes, which I work out later.
Before I start writing a text, I write something on a scribbling pad, to find out my opinion about the topic.
* Planning is of no use to me.
* When I start writing, I don't yet have a clear idea of what will be in the text.
Before I start writing, I have a clear picture of what I want to achieve with the readers.
I need to have my thoughts clear before I am able to start writing.
Before I write a sentence down, I already have it in my head.
* When I am writing, I sometimes write down pieces of text of which I know that they are not completely right yet. Still, I prefer to go on writing at that point.
* When I read over my texts, I usually find a lot to improve.
* When I read over my texts, they are sometimes very chaotic.

Revising
* I always start writing straight away: I don't need to know exactly what I will write or how the text will be built-up. That will become clear as I write.
When my text is ready, I read it through thoroughly and make improvements: a lot can still be changed at that point.
During writing I regularly check if my text does not contain any sentences which are incorrect or too long.
While writing my text, I continually ask myself if readers will be able to follow it.
For me, writing is a way to get my thoughts clear.
* I usually hand in my text without checking if its organization is in order.
If I read over my texts, and rewrite my texts, it occurs regularly that I drastically change their organization
Before I hand in a text, I always check if its build-up is logical.
* I never pay much attention to whether I have forgotten to put any sentences or ideas in a text.
When I rewrite a text, the content usually changes drastically, too.
When I finish a text, I usually need to read through it carefully, to check if there is no superfluous information in it.
I never pay much attention to whether I am satisfied with my texts.

Fillers
I write and rewrite my text sentence per sentence. Only if I am completely satisfied with a sentence, do I proceed with writing.
When I am writing, I find it hard to organize my thoughts.
Only if my text is complete, do I read what I have written.
If finally I have an approximate idea of what to say in my text, the words will flow out of my pen.
When I write, I stop writing after every few sentences to read what I have just written.
I try to write a correct version of my text in one go, so that I hardly have to make any alterations when it's finished.
When I write a text, I find it hard to come up with ideas.
When I am writing, I often find that all kinds of new ideas pop into my head.
For writing tasks, I do not find it very hard to think of arguments to support my point of view.
The texts which I write are usually not very original.
I make sure that every sentence is perfect, before I start with the next sentence.
When my text is finished, the only thing I do is check for language or spelling mistakes.