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Reflection in Learning to Write an Academic Text. How Does Reflection Affect Observational Learning and Learning-by-Doing in a Research Synthesis Task?

Janneke van der Loo, Emiel Krahmer and Marije van Amelsvoort*

Tilburg Center for Cognition and Communication, Tilburg University, Tilburg, Netherlands

In this study, we focused on the effect of reflection on different instructional methods, comparing observational learning and learning by doing, in the context of an academic writing task. Our goal was to investigate how reflection and instructional method affect academic writing performance, self-efficacy beliefs and students' satisfaction with the learning activities. In a quasi-experiment, 111 undergraduate students were assigned to either an observational learning or learning-by-doing condition, with or without reflection. In the observational learning condition students learned by observing a weak and strong model's writing processes. In the learning-by-doing condition they learned by performing writing tasks. Half of the students reflected on either the models' or their own performance. In our study, reflection did not affect academic writing performance and self-efficacy beliefs, and neither did instructional method. Both reflection and instructional method did influence students' satisfaction with the learning activities. Students preferred learning by doing over observational learning, and reflecting over not reflecting. From this study, we can conclude that in academic synthesis writing the interplay between reflection, observational learning and learning by doing is not evident yet: students seem to perform equally well in all conditions, even though they prefer learning by doing over observational learning, and reflecting over not reflecting.

Keywords: reflection, observational learning, learning by doing, academic writing, self-regulated learning

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****Correspondence:***
Janneke van der Loo
j.m.vdrloo@tilburguniversity.edu

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INTRODUCTION

The effectiveness of observational learning as an instructional method in the writing domain has been studied extensively (e.g., Braaksma et al., 2002; Zimmerman and Kitsantas, 2002; Raedts et al., 2007; Rijlaarsdam et al., 2008; Van der Loo et al., 2018). In observational learning to write, learners watch and listen to someone else, a model, performing a writing task. By thinking aloud, the model may provide insight into their writing process. This way, learners can construct a cognitive representation of the model's behavior and hopefully connect that to their prior knowledge for future recall (Bandura, 1997, 2016).

In writing research, observational learning is often compared to learning by direct experience, mostly referred to as learning by doing. In learning by doing, writers learn by performing a writing task themselves. Only a few studies compared the effect of observational learning to learning by

doing in learning to write a complex text at university level (Raedts et al., 2007; Van der Loo et al., 2018). From these studies, no clear view can be established on the effect of observational learning and learning by doing in writing an academic text.

The goal of this paper is to get a clearer perspective on the two different methods for writing research, by focusing on one specific aspect, namely reflection. In these aforementioned studies, reflective activities were an intrinsic part of the observational learning process. Observers were explicitly encouraged to carry out different (meta)cognitive, reflective activities, by asking them to compare and evaluate the model's performance. However, reflection was not prompted in the learning-by-doing conditions, and therefore did not necessarily take place, which may have influenced the findings.

In recent research (e.g., MacArthur et al., 2015; Koster and Bouwer, 2016; Raedts et al., 2017), reflection is often a part of curricula directed at promoting self-regulated learning strategies in order to enhance writing performance. These studies suggest a positive correlation between self-regulated learning curricula, including reflective activities, and writing performance. However, because of the interplay between reflection and other instructional activities in these studies, it is hard to determine the exact role of reflection in learning to write.

In the current study, we investigate the role of reflection in learning to write in a more controlled way. We systematically compare observational learning and learning-by-doing in learning to write a complex, academic text, with a specific focus on the role of reflection in both methods. In addition to writing performance, we also examine the effects on self-efficacy beliefs and the extent to which learners are satisfied with the instructional methods, because we conjecture that reflection may have an impact on those factors as well. Self-efficacy refers to people's beliefs in their capabilities to produce given attainments (Bandura, 1997) and has consistently been found to be correlated to writing performance (Bruning and Kauffman, 2016). The extent to which learners are satisfied with the instructional method, is also included as a measure. Often there is a mismatch between the way that someone prefers to learn and what actually leads to effective and efficient learning (Kirschner, 2017). An early, illustrative discussion of this can be found in a review by Clark (1982) on studies where two or more instructional methods were allowed to interact with student aptitudes to predict enjoyment and achievement. Clark found that students often report enjoying the method from which they learn the least. In the current study, we therefore explore whether the instructional method, with or without reflection, affects the extent to which learners feel satisfied with the method and whether this is related to writing performance and self-efficacy beliefs.

Observational Learning in Writing Research

Even though the effect of observational learning in learning to write an academic text at university level is still unclear, other studies have reported on the effectiveness of observational learning with other types of writing tasks, with different audiences (e.g., Braaksma et al., 2002; Zimmerman and Kitsantas, 2002; Rijlaarsdam et al., 2008; Van Steendam et al., 2010; Groenendijk et al., 2013; Fidalgo et al., 2015). For example, Zimmerman and Kitsantas (2002) demonstrated that observational learning led to better performance on a sentence-combining task. While observational learning did not directly affect self-efficacy beliefs, students who learned by observing models constructed sentences with less errors, stated that they were more satisfied with their performance and showed more intrinsic interest in the task than those who learned by doing. In a study by Braaksma et al. (2002), high school students wrote higher quality argumentative texts when they learned by observing models. Fidalgo et al. (2015) found that upper primary students wrote higher quality texts, and applied more structured and goal-focused planning processes after observing and reflecting on a model. Observational learning has also been reported to influence writing processes in poetry writing with high school students, even though this did not result in better poems (Groenendijk et al., 2013), and to positively affect writing revision skills in foreign language learners (Van Steendam et al., 2010).

Braaksma et al. (2002) argue that the effectiveness of observational learning in these studies can be explained by a reduction in cognitive load in observational learning that allows learners to focus on learning instead of executing tasks. Learners gain insight into the writing processes and the emergence of the resulting text, by observing and reflecting on real models thinking aloud, rather than directly engaging in the cognitively demanding writing task itself (Couzijn, 1999; Rijlaarsdam and Couzijn, 2000). In other words, learners can take a step back from the writing task and focus their cognitive effort on the learning task (Braaksma et al., 2004). This explanation implies that reflection may be an important factor in observational learning. However, this complicates the comparison between the methods, since reflection is typically absent in learning by doing in this field of research.

In this paper, we want to further investigate the effect of instructional method (observational learning and learning by doing) in learning to write a complex, academic text. The learning task in this study involved writing the introduction to an experimental research paper. This constitutes a type of synthesis text: an introduction typically includes a review of the literature in which writers have to synthesize information from multiple sources. They have to summarize previous studies and identify relations, contradictions, gaps and inconsistencies in the literature, which is a cognitive demanding and complex task (Mateos and Solé, 2009).

In the study by Raedts et al. (2007), 144 undergraduate students learned to write a literature review by either observing a weak and a strong model writing a literature review, or by performing writing exercises. The results indicated that students who learned by observation had more extensive knowledge of effective writing strategies. This was however only the case for strategies concerning information gathering and planning of the text, but not for strategies concerning text production and revision. With regards to text quality, the study showed that students who learned by observation wrote texts of higher

quality than those who learned by doing: in the observational learning condition, students linked the source material more often, and wrote better-organized literature reviews compared to the students in the learning-by-doing condition. Students who learned by observation were also better calibrated for self-efficacy than the students who learned by doing: they were better able to predict their scores, while the students who learned by doing were biased toward overestimating their writing performance.

In a previous study, we also compared observational learning with learning-by-doing in learning to write an academic synthesis text (Van der Loo et al., 2018). In a quasi-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. In contrast to Raedts et al. (2007), no effects of instructional method were found: students who learned by observing models performed equally well as students who learned by doing. No differences were found in organization and overall quality of the text. There was some indication that writing preference influenced the effect of instructional method. Students with a revising preference appeared to write higher quality introductions when learning by observing models compared to learning by doing. For students with a planning preference no differences were found between methods.

The results by Raedts et al. (2007) and Van der Loo et al. (2018) are thus inconclusive on the effect of instructional method on learning to write an academic synthesis text. However, it should be noted that reflection was present, and actively prompted in the observational learning conditions, but absent and not prompted in learning by doing. In the observational learning conditions, students were asked to evaluate and elaborate on the models' actions. Since several studies report positive effects of reflective activities during learning to write on writing performance, it could be argued that reflection possibly confounded the results by Raedts et al. (2007) and Van der Loo et al. (2018).

Reflection in Writing Research

Reflection engages individuals in exploring their experiences in order to lead to new understandings and appreciations (Boud et al., 2005). It requires learners to explicitly attend to actions and performances and carefully process them, which could contribute to higher transfer performance (Wouters et al., 2009). In the current study, we add reflective activities to learning by doing. To the best of our knowledge, this has not been studied within the observational learning domain. However, as we have seen, findings from studies focusing on self-regulated learning, suggest that including reflective activities in instructional programs, with or without the presence of models, might be beneficial to writing performance and might also affect self-efficacy beliefs (see e.g., Graham et al., 2012).

Within the observational learning domain, reflection is directed at the actions and performances of models. Learners are for example asked to monitor the actions of models, which refers to activities in which deliberate attention is payed to some of one's behavior (Schunk, 1983). Subjects are for example asked how models apply certain theories in the writing task (Braaksma et al., 2001). This requires learners to attend selectively to specific actions and cognitive processes. Learners are often also asked to evaluate and elaborate on models' actions or products, by answering questions as "Which model is doing better?", and "Explain why the less well model is doing less well." To our best knowledge, only the study by Braaksma et al. (2001) has explicitly examined the role of reflection in observational learning within the writing domain.

In order to identify which learning activities were effective within observational learning tasks, Braaksma et al. (2001) examined in a *post-hoc* study the workbooks, pretests and post-tests of 84 ninth-grade students who took part in an observational learning study by Couzijn from 1995. In Couzijn's study, the students participated in four lessons on argumentative reading and writing. They were presented with theory which they had to apply in observation tasks. In these observation tasks, models performed reading and writing tasks while thinking aloud. The models gave insight in orientation, execution and text revision activities, while some models also expressed self-monitoring activities, in which they reflected on their own writing process. The students were explicitly asked to monitor, evaluate and elaborate on the models' performance. They were free to choose whether they would focus on the processes or the products of the models. Braaksma et al. found that reflective activities, in particular evaluating the performance of models and elaborating on the product of the models, contributed to argumentative writing skill. Students who evaluated and elaborated on the model's writing seemed to develop criteria for effective texts and writing processes which transferred to their own writing, yielding higher quality writing performance. They found no effects of process-elaboration on text quality which could possibly be explained by the low number of students that actually elaborated on the models' processes.

When reflective activities are added to learning by doing, these reflective activities are of necessity subtly different from the reflective activities in observational learning: in observational learning, reflection is directed at a model, while in learning by doing, these are directed at the performance of the subjects themselves (self-reflection). Self-reflective activities can be divided into self-observation, self-judgment, and self-reactions (Zimmerman, 2008; Broadbent and Poon, 2015). Self-observation focuses on learners' ability to monitor progress toward their goals. Through self-awareness, learners may develop a better and more appropriate control of certain strategies (Zimmerman, 1989; Chang, 2007). In self-judgment, they evaluate their performance by comparing it to a standard or goal, and by self-reactions learners respond to their performance outcomes, for example by seeking to enhance their personal processes during learning (Zimmerman, 1989).

In recent research, these types of reflective activities are often part of curricula directed at self-regulated learning. Self-regulated learning refers to the modulation of affective, cognitive, and behavioral processes throughout a learning experience in order to reach a desired level of achievement (Sitzmann and Ely, 2011). A number of studies have shown that self-regulated learning curricula, including one or more of these reflective activities, are positively related to learning to write with different types of

audiences (e.g., Zimmerman and Kitsantas, 2002, 1999; Graham et al., 2005; MacArthur et al., 2015). For example, MacArthur et al. (2015) found that university students who learned to write an argumentative essay through a self-regulated strategy curriculum, including reflecting on one's progress, wrote essays of overall higher quality than students who followed the regular curriculum in which there was only very limited attention for self-regulation strategies. The self-regulated strategy curriculum also led to a significant increase in self-efficacy scores. In a study with young, struggling writers by Graham et al. (2005) a program with self-regulated learning strategies, including self-monitoring, led to longer, more complete, and qualitatively better papers. Self-efficacy was however not affected by the program. Zimmerman and Kitsantas (1999) found that self-regulated strategies, in particular the reflective activity self-observation (monitoring of one's actions), significantly enhanced writing skill, self-efficacy and self-reaction beliefs with high school students.

These studies on self-regulated learning imply that writing performance could benefit from including self-reflective activities, such as metacognitive monitoring and evaluation. These self-reflective activities might also affect self-efficacy beliefs, although the findings on self-efficacy are not consistent. However, since self-reflection in these studies is part of a larger curriculum, it is hard to establish the exact role it plays in learning to write.

Research Questions

From the findings of the studies discussed, in both the observational learning domain and the self-regulated learning domain, we can conclude that reflective activities, with or without the presence of model, may affect writing performance. Reflective activities might also affect self-efficacy beliefs, even though the effects are not consistent. For example, MacArthur et al. (2015) and Zimmerman and Kitsantas (1999) report an increase in self-efficacy scores, while in Raedts et al. (2007) observational learning leads to a better calibration for self-efficacy, but not necessarily an increase in self-efficacy scores. In Graham et al. (2005) and Zimmerman and Kitsantas (2002), however, self-efficacy was not affected.

To gain a better understanding of the role of reflection in learning to write, we will systematically compare observational learning and learning by doing with and without reflection, applied to academic writing. Our research questions are the following. First, how does instructional method influence academic writing performance, self-efficacy beliefs and satisfaction? Second, how does reflection affect academic writing performance, self-efficacy beliefs and satisfaction? Third, what is the interplay between instructional method and reflection? By focusing on reflection, we aim to get a clearer perspective on the two different methods for writing research.

MATERIALS AND METHODS

Design

In this quasi-experiment we used a 2 × 2 between subjects factorial design with reflection (yes, no) and instructional method (observational learning, learning-by-doing) as factors. This resulted in four conditions: observational learning with reflection, observational learning without reflection, learning by doing with reflection, learning by doing without reflection. We measured the effect on three dependent measures: academic writing performance, self-efficacy and satisfaction with the learning activities. Since we found indications in a previous study (Van der Loo et al., 2018) that writing preference may influence the effect of instructional method, we included writing preferences (planning, revising) as covariates in the design.

TABLE 1 | Schematic overview of the experimental design.

Pretest phase	Intervention phase		Post-test phase
Language Proficiency Test Writing Competence assignment Writing Style Questionnaire	Session 1 (in four conditions)	Session 2 (in four conditions)	Academic writing performance assignment Self-efficacy questionnaire Satisfaction questionnaire

In the pretest phase, participants completed a writing style questionnaire, in order to establish writing preference. We also benchmarked participants' initial writing competence and language proficiency. This pretest phase was followed by an intervention phase in which participants learned in two sessions how to write an academic synthesis text by either observing models performing this task (observational learning), or by executing the tasks themselves (learning by doing), both types of learning either with or without reflection. In the post-test phase we measured the effects of both instructional method and reflection on the dependent measures. A schematic overview of the design can be found in **Table 1**.

Participants

The participants were recruited from an obligatory course on academic writing for first-year undergraduate students in Communication and Information Sciences at Tilburg University. The course took place in the first weeks of the study program, therefore writing an academic text at university level was new to all participants. The study was first conducted in September 2015 and then run again with a new group of students in September 2016 to increase power. The content, materials, measures and procedures were identical in both years[1].

We included in the analyses only students who took the course for the first time, were Dutch native speakers and completed the post-test Academic Writing Performance. An extra four participants were excluded, because it was unclear in which tutorial group they had been enrolled. The final sample consisted of 111 participants (85 women). The average age was 18.7 years (SD = 1.7). The average grade they received on their

[1] *Post-hoc* analyses revealed a significant interaction between reflection and year in which the study was conducted for self-efficacy beliefs, $F_{(1, 98)} = 8.18$, $p = 0.005$, and satisfaction with the learning activities, $F_{(1, 63)} = 4.36$, $p = 0.041$. Participants in 2015 who did not reflect had higher self-efficacy beliefs and were more satisfied than the participants in 2016 who did not reflect. No other interactions were found (all p's > 0.12).

TABLE 2 | Descriptives participants per condition.

	Observational learning, reflection	Observational learning, no reflection	Learning by doing, reflection	Learning by doing, no reflection	Total
Age (in years)	18.6	19.0	18.8	18.4	18.7
Gender	6 males 14 females	3 males 19 females	10 males 26 females	7 males 26 females	26 males 85 females
Grade final examination Dutch language	6.8	7.0	6.7	6.8	6.8

TABLE 3 | Summary of the tasks used in the observational learning videos and learning-by-doing exercises.

Session	Task	Content
1	1	Reading, selecting, organizing and paraphrasing the information on the index cards
	2	Planning the content and main structure of the introduction
2	3	Writing the body of the introduction
	4	Adding an opening and scientific/social relevance
	5	Revising at text, sentence and word level

final examination in Dutch Language at secondary school was 6.8 out of 10 (SD = 0.69). The participants enrolled into one of four tutorial groups. Each group was randomly assigned to one of four conditions: observational learning with reflection ($n = 20$), observational learning without reflection ($n = 22$), learning-by-doing with reflection ($n = 36$) and learning-by-doing without reflection ($n = 33$). **Table 2** presents an overview of the descriptives of the participants per condition.

Materials

Videos in Observational Learning

Five videos have been used in the experiment. The content of the videos was based on literature on effective and non-effective writing strategies (e.g., Graham and Perin, 2007; Van Weijen, 2009) and suggestions from a study by Raedts et al. (2007) and Van der Loo et al. (2018). In each video two peer models were writing an introduction to an academic paper based on three index cards. The index cards contained a summary of a scientific article, which consisted of the full reference to the article, the research question, the type of research and data and a summary of the most important findings of the study. The first and third index card represented a similar viewpoint. The second index card contained an opposing viewpoint. Each video focused on a certain task in writing an introduction to an academic research paper. These tasks were identical to the tasks the participants in the learning-by-doing condition had to perform. The tasks can be found in **Table 3**.

The models in the videos were two student actors who received a script for each exercise and had been instructed to think aloud during the exercise. Two models were used, because observing multiple models has been argued to increase the likelihood that students will view themselves similar to at least one model (Schunk, 1987). In line with previous research (Raedts et al., 2007; Groenendijk et al., 2013; Van der Loo et al., 2018) one of the models used effective strategies to complete the assignments (strong model), the other model used counterproductive strategies (weak model). The script contained specific instructions for sentences to type and remarks to make while thinking aloud. The student actors were also allowed to give their own input to the exercise, to make sure that the videos were natural and convincing. The strong model started out by reading the research question, the information about type of research and data, and the findings of each study on the index cards and highlighting relevant information, while the weak model skipped important parts while reading and did not highlight relevant information (task 1). The strong model also connected the different studies on the index cards, establishing similarities and differences, while the weak model did not make any connections between the index cards (task 1 and 2). Then the strong model constructed a text schema while the weak model immediately started writing the opening sentence (task 2). The strong model continued with writing the body of the introduction based on the text schema, paraphrasing the information on the index cards. The weak model wrote the body of the introduction by copying most of the sentences verbatim directly from the index cards (task 3). The strong model then added a suitable opening and described the relevance of the study, while the weak model forgot to add the relevance (task 4). Finally, the strong model revised her text at text, sentence and word level, while the weak model only corrected some minor spelling mistakes (task 5).

The videos were recorded and edited with Camtasia, which allows simultaneous, picture-in-picture recording. The strong and the weak model were depicted alternately in the videos. In order to avoid recency and primacy effects, three videos started with the weak model and two videos with the strong model. 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. **Figure 1** displays a screenshot of the weak model in exercise 4.

Exercises in Learning-by-Doing

In the learning-by-doing conditions participants executed five writing exercises in which they wrote the introduction to an academic paper based on the same three index cards as the models in the observational learning videos used. The exercises were identical to the tasks the strong model executed in the

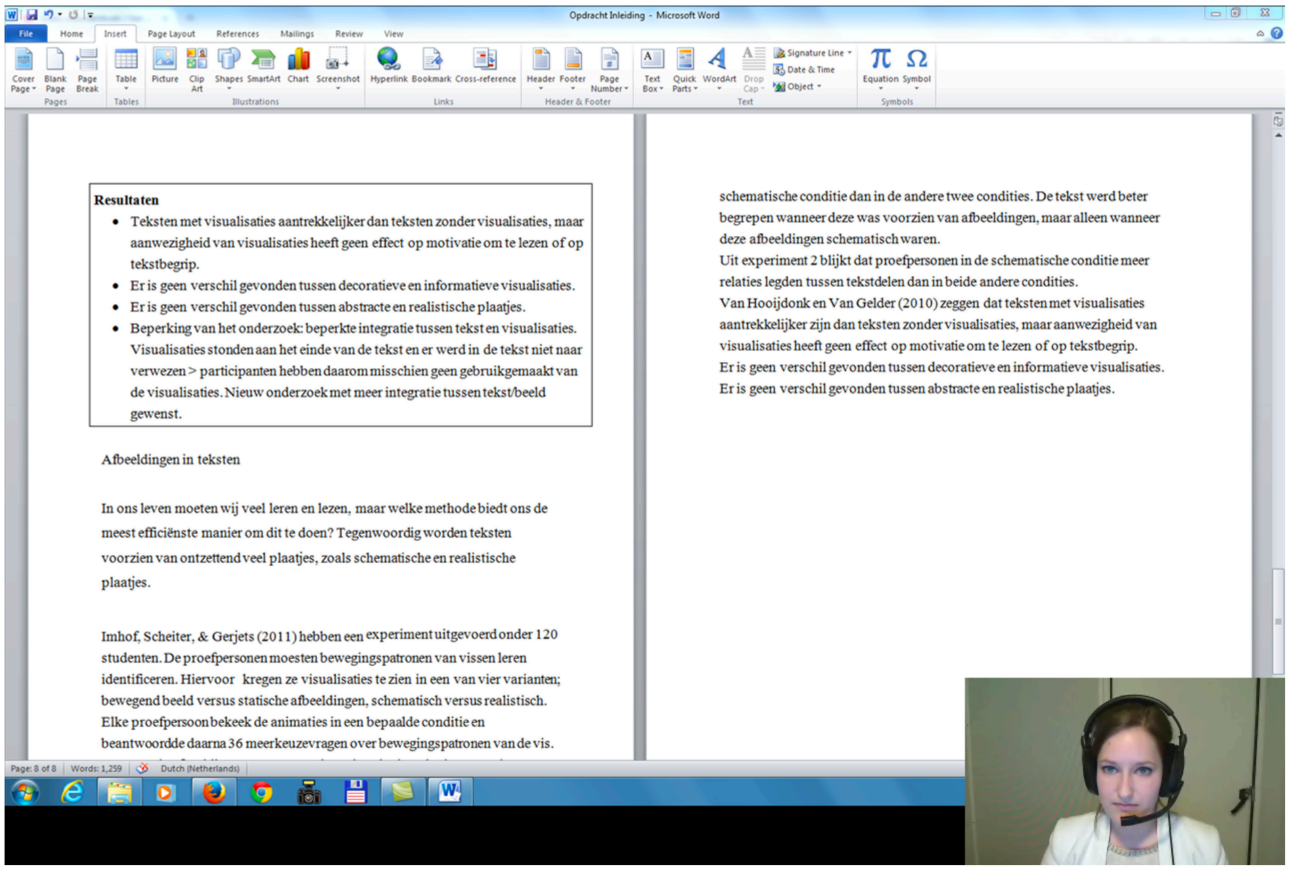

FIGURE 1 | Screenshot of a video clip with the novice model. The individual depicted in this image has granted written permission for this image to be used in all languages and for all editions and formats, including digital/electronic.

observational learning videos (see **Table 3**). In the first exercise participants were instructed to read the research question, the information about type of research and data, and the findings of each study on the index cards and to highlight relevant information. In the second exercise participants had to reread the index cards and write down the most important similarities and differences between studies. Then they were instructed to make a text schema based on their notes. In the third exercise participants had to write the body of their introduction in which the most important findings of the studies were described. In the fourth exercise, they were asked to add an opening to the body of the introduction and to add a closing paragraph in which they described the scientific relevance of the study. In the fifth exercise, they were asked to check their text at text, sentence and word level.

Reflection Questions

To prompt reflection, participants in the reflection conditions answered three questions about either the performance of the models they observed (observational learning) or about their own performance (learning by doing). Participants in the observational learning condition were asked to answer the following questions: Which differences did you observe between the two writers? 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? In learning by doing participants answered the following questions: How did you handle the last exercise? What went well during the exercise? What would you do differently next time? These questions allowed participants to identify, evaluate and elaborate on writing strategies in both conditions.

Procedure for the Experimental Sessions

Prior to the experimental sessions all participants were asked to complete the language proficiency test and the writing competence assignment via the university's learning management system. They also filled out the writing style questionnaire online. The experimental sessions all took place during the first two tutorials of the academic writing course and were led by the same instructor (the first author).

Observational Learning Without Reflection

The sessions took place in a regular classroom. At the start of the first session the instructor told the participants they were going to watch five videos of two models writing the introduction to an academic paper: two during the first session and three in the second session. Then the instructor distributed

a handout that contained an introduction to the tasks, and the index cards. The instructor read the introduction out loud while the participants could read the text on the handout. The instructor also explained what the index cards were for. Then the instructor started the first video. The video was projected with a beamer. All participants watched the same screen so the instructor could check whether all participants were looking at the video. If not, the participants were redirected by the instructor to the screen. The first video was followed immediately by the second one. At the end of the first session the instructor collected all the handouts. At the start of the second session the handouts were redistributed and the introduction was repeated. The participants then watched the three remaining videos in the same way as during the first session. At the end of the second session the instructor collected all the handouts again. The participants spent 55 minutes in total watching the videos.

Observational Learning With Reflection

The procedure in the observational learning with reflection condition was identical to the procedure without reflection, but the reflection questions were added. Before the instructor started the first video, the participants were asked to make notes on their handouts while watching the videos. After each video, they had a maximum of 5 min to answer the reflection questions on the handout.

Learning-by-Doing Without Reflection

The learning-by-doing sessions took place in a computer room. Each participant had access to a computer. The instructor told the participants that they would be writing an introduction to an academic paper based on three index cards by executing five pre-structured exercises: two during the first session and three during the second session. Then the instructor distributed a handout that contained an introduction to the tasks, and the index cards. The instructor read the introduction out loud while the participants could read the text on the handout. The instructor also explained what the index cards were for and told the participants that they could use the computer to execute the tasks. Then the first exercise was displayed through a beamer on a screen. The participants had 10 min to complete the first task. Then the second exercise was displayed. After 15 min the participants were asked to upload their work on the first two exercises and to hand-in the handouts. At the start of the second session the handouts were redistributed and the introduction was repeated. The participants could also open the file with their work on the first two exercises on their computer, and they had 5 min to review their previous work. Then the third exercise was started, followed by the fourth and fifth exercise. They had respectively 15, 10, and 10 min to complete the assignments. In total participants spent 55 min working on the exercises. At the end of the second sessions the participants were asked to upload their work on all the exercises and the instructor collected the handouts.

Learning-by-Doing With Reflection

In the learning-by-doing condition with reflection the procedure was identical to learning-by-doing condition without reflection, except the reflection questions were added. After each exercise participants were asked to reflect for a maximum of 5 min on their activities by answering the reflection questions on the handout.

Measures

Pre-test Writing Performance

To benchmark the participants' initial writing performance, they were asked to write an argumentative text. We avoided administering a pre-test on writing an academic text because of possible learning effects: we wanted the task in the post-test to be new to all participants. For the pre-test, participants therefore were asked to write an argumentative text on the future use of English as a lingua franca at Dutch universities. They were provided with a list of eight arguments pro and eight arguments contra. To make sure the texts were comparable, we asked all participants to take position against the statement. In the assignment, the participants had to combine and integrate arguments. This way the pre-test resembled the post-test as closely as possible. The pre-test was scored on the number of arguments (min. 0, max. 3 points), the organization of the arguments (min. 0, max. 3 points), the quality of the opening sentences (min. 0, max. 2 points) and the conclusion (min. 0, max. 2 points) and the general structure of the text (min. 0, max. 2 points). This resulted in a maximum possible score of 12 points.

Pre-test Language Proficiency

All participants completed a language proficiency test on grammar, spelling and punctuation, and structure in order to check for possible initial differences. The test was developed by the Language Center 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 minimum score of zero and a maximum score of 75 points for the language proficiency test[2].

Writing Style Questionnaire

Prior to the sessions participants were asked to fill out a questionnaire on writing styles created by Kieft et al. (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., Kieft et al., 2008; Tillema, 2012; De Smet et al., 2014; Van der Loo et al., 2018). The writing

[2]The language proficiency test is available, in Dutch, on request (please contact the first author).

style questionnaire measures reported degrees of planning and revising styles and consisted of 36 items: 13 items reported planning-type behavior, 12 items reported revising-type behavior and the remaining 11 items were fillers. 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 **Appendix I** (taken from Tillema, 2012). The items in the actual questionnaire were presented in Dutch and were in random order. The items on planning were summarized into one planning score (Cronbach's alpha = 0.65) and the items on revising into one revising score (Cronbach's alpha = 0.60). Even though these reliabilities are relatively low, they are comparable to those in previous research [e.g., Tillema (2012) respectively 0.72 and 0.64, and De Smet et al. (2014) respectively 0.71 and 0.63]. Based on their responses, participants received a mean score for both planning and revising. Since the correlation between the scores was only moderate (Pearson's r = 0.40), we included both dimensions separately in the design. No differences were found between conditions on planning score and revising score.

Academic Writing Performance

To measure academic writing performance, we scored the introduction of the first paper participants had to write for the academic writing course. For this writing task, participants were provided with three index cards similar to the index cards used in the sessions. The studies on index card 1 and 3 showed similarities in their results, while the study on index card 2 displayed an opposing viewpoint. Participants were instructed to write an attractive and suitable opening for their introduction, to include all three 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. The participants wrote their assignments at home, and handed in the assignment 1 week after the second experimental session. They had to indicate how much time they spent on the assignments (M = 98.5 min). We found no differences between conditions in the amount of time they spent on the assignment (all p's > 0.71). The texts were scored on six dimensions: (1) opening paragraph (2) similarity between index card 1 and index card 3 (3) contradiction between index card 1/3 and index card 2 (4) mentioning of scientific relevance (5) mentioning of social relevance (6) structure in general (e.g., connective words). For each item zero to two or zero to three points could be assigned which resulted in a possible maximal score of fifteen points. The scoring scheme was derived from to the scoring in Van der Loo et al. (2018). The texts were scored using a codebook that included three examples of each of the scores per category possible. All texts have been re-scored by a trained student-assistant (inter-rater reliability Pearson's r = 0.86).

Self-Efficacy

Before writing the introduction that was used to measure academic writing performance, participants had to complete a self-efficacy questionnaire. Self-efficacy was measured with ten items. The items were closely linked to the tasks performed in the videos and exercises, in line with Zimmerman and Kitsantas (2002), and were identical to the items used in Van der Loo et al. (2018). Five items were related to writing conventions, which refers to "accepted standards for expressing ideas in a given language" (Bruning et al., 2013, p. 28). An example of such an item is: "I am able to write grammatically correct sentences." The other five items were related to ideation, which refers to the participants" beliefs about their ability to generate ideas (Bruning et al., 2013). An example item is: "I am able to paraphrase information from the index cards." Participants had to indicate on a scale from 0 (not confident at all) to 100 (very confident) with ten-point intervals how confident they felt that they were able to write the introduction. The average score (max. 100 points) of the ten items (Cronbach's Alpha = 0.89) was used as the participants' self-efficacy score.

Satisfaction

After handing in the self-efficacy questionnaire and the academic writing performance assignment, participants received a questionnaire in which we measured the participants' satisfaction with the instructional method, with or without reflection. Participants had to indicate on a scale from 1 to 5 (1 = not at all, 5 = very much) to what extent they agreed with five items. Examples of items are: "The videos/exercises were useful" and "The videos/exercises helped me in writing the introduction." The average score of the five items (Cronbach's Alpha = 0.83) was used as the participants' satisfaction score.

Statistical Analysis

The scores on the post-test have been evaluated with three separate ANCOVA's with Instructional Method (learning-by-doing, observational learning) and Reflection (yes, no) as the independent factors and Academic Writing Performance, Self-Efficacy and Satisfaction as the dependent factors[3]. We included the mean scores on Planning and Revising Preference as covariates to control for possible effects of writing preference[4].

[3]We performed separate ANCOVA's rather than one MANCOVA, because of missing data in the dependent variable Satisfaction. 71 participants of the 111 participants who handed in the academic writing performance assignments, responded to the satisfaction questionnaire. These 71 participants were equally distributed over conditions.

[4]By adding two covariates the model becomes more complicated. To check whether this did not negatively affect the results, we performed a *post-hoc* analysis without Planning and Revising Preference as covariates. This did not affect the results. We also, after suggestions from a reviewer, performed a *post-hoc* analysis including pre-test scores, initial language proficiency and grade final examination Dutch Language as covariates. This did not affect the results.

TABLE 4 | Mean Scores (SD) on Initial Writing Performance (min. score 0, max. score 12).

	Observational learning	Learning by doing	Total
Reflection	8.35 (2.09)	7.64 (2.13)	7.88 (2.13)
No reflection	7.68 (2.11)	7.88 (1.59)	7.80 (1.81)
Total	8.00 (2.10)	7.74 (1.91)	

TABLE 5 | Mean Scores (SD) on Language Proficiency Test (min. score 0, max. score 75) per condition.

	Observational learning	Learning by doing	Total
Reflection	59.44 (4.02)	59.65 (5.14)	59.6 (4.71)
No reflection	60.85 (5.09)	59.92 (5.06)	60.3 (5.04)
Total	60.2 (4.61)	59.8 (5.06)	

TABLE 6 | Average Academic Writing Performance (SD) in relation to Instructional Method and Reflection (min. score 0, max. score 15).

	Observational learning	Learning by doing	Total
Reflection	7.88 (3.37)	8.58 (3.21)	8.33 (3.25)
No reflection	7.66 (3.74)	7.00 (2.81)	7.26 (3.20)
Total	7.76 (3.53)	7.83 (3.11)	

TABLE 7 | Self-efficacy Scores (SD) in relation to Instructional Method and Reflection (min. score 0, max. score 100).

	Observational learning	Learning by doing	Total
Reflection	70.31 (8.62)	67.73 (10.68)	68.66 (9.99)
No reflection	66.32 (15.08)	66.46 (10.95)	66.40.26 (12.63)
Total	68.27 (12.37)	67.57 (11.34)	

RESULTS

Initial Writing Performance and Language Proficiency

To check for initial differences between conditions we performed an ANOVA on initial writing performance and language proficiency.

Initial writing performance was benchmarked by scoring an argumentative text participants wrote before the experiment started. We found no differences between the instructional method conditions, $F_{(1, 90)} = 0.38$, $p = 0.54$, and the reflection conditions, $F_{(1, 90)} = 0.25$, $p = 0.62$. There was no significant interaction either, $F_{(1, 90)} = 1.16$, $p = 0.29$. An overview of the mean scores can be found in **Table 4**.

For initial language proficiency, there were no significant differences between the instructional method conditions, $F_{(1,89)} = 0.12$, $p = 0.73$ and the reflection conditions, $F_{(1, 89)} = 0.65$, $p = 0.42$. There was no significant interaction either, $F_{(1, 89)} = 0.30$, $p = 0.59$. **Table 5** displays the mean scores on this test.

Based on the pretests there is no reason to assume there were *a priori* differences between experimental groups.

Academic Writing Performance

A 2 (instructional method) × 2 (reflection) ANCOVA was calculated on participants' academic writing performance, with planning and revising preference as covariates. An overview of the mean scores for academic writing performance in all conditions is presented in **Table 6**.

We found no main effects for instructional method, $F_{(1, 105)} = 0.000$, $p = 0.98$. Participants who learned by doing scored equally well as those who learned by observing models. Also no main effect for reflection was found, $F_{(1, 105)} = 1.85$, $p = 0.18$. Reflecting on the models' activities or participants' own activities did not affect academic writing performance. No interaction was found either, $F_{(1, 105)} = 1.58$, $p = 0.21$. Further inspection of the table shows that the mean scores are relatively close to each other, while the standard deviations are relatively large. This implies large variations between participants within conditions. The covariates, Planning Preference, $F_{(1, 105)} = 1.83$, $p = 0.18$, and Revising Preference, $F_{(1, 105)} = 0.062$, $p = 0.80$, were not significantly related to academic writing performance.

Self-Efficacy

The ANCOVA revealed no main effects for instructional method, $F_{(1, 102)} = 0.309$, $p = 0.58$, or reflection, $F_{(1, 102)} = 1.227$, $p = 0.27$. Participants who learned by observing models did not have more confidence in the writing task than those who learned by doing. Reflection did not yield higher scores either. No interaction was found either, $F_{(1, 102)} = 0.265$, $p = 0.61$. As can be seen in **Table 7**, there is limited range in the mean scores. All scores are relatively high. Again, there appear to be large variations within conditions. No interaction was found either, $F_{(1, 102)} = 0.265$, $p = 0.61$. The covariates, Planning Preference, $F_{(1, 102)} = 0.409$, $p = 0.52$, and Revising Preference, $F_{(1, 102)} = 0.008$, $p = 0.93$, were not significantly related to self-efficacy.

Instruction Evaluation

To evaluate the instructional activities (learning by doing or observational learning, and reflection or no reflection) we asked participants how satisfied they were with the activities. The covariates, Planning Preference, $F_{(1, 65)} = 0.206$, $p = 0.65$, and Revising Preference, $F_{(1, 65)} = 0.034$, $p = 0.85$, were not significantly related to the satisfaction score.

The ANCOVA showed significant main effects of instructional method, $F_{(1, 65)} = 31.63$, $p = 0.000$, $\eta_p^2 = 0.33$ and reflection, $F_{(1, 65)} = 6.58$, $p = 0.01$, $\eta_p^2 = 0.092$. Participants who learned by doing were significantly more satisfied with the learning activities than participants who learned by observing, and participants who reflected were more satisfied than participants who did not reflect. A significant interaction was found between instructional method and reflection, $F_{(1, 65)} = 6.52$, $p = 0.01$ $\eta_p^2 = 0.091$.

Simple effects analyses revealed that participants who learned by observing and did not reflect were the least satisfied with the

TABLE 8 | Satisfaction scores (SD) in relation to Instructional Method and Reflection (min. score 0, max. score 5).

	Observational learning	Learning by doing	Total
Reflection	$3.51^{b,c}$ (0.38)	3.93^{b} (0.48)	3.71 (0.48)
No reflection	$2.83^{a,c}$ (0.74)	3.92^{a} (0.46)	3.32 (0.83)
Total	3.13 (0.69)	3.92 (0.47)	

[a,c]Significant at the 0.00 level; [b]Significant at the 0.05-level.

TABLE 9 | Correlations among dependent measures.

	1	2	3
Academic writing performance	–		
Self-efficacy beliefs	0.161*	–	
Instruction evaluation	0.090	0.091	–

**Correlation is significant at the 0.05 level (1-tailed).*

TABLE 10 | Correlations among dependent measures in observational learning and learning by doing conditions.

		1	2	3
Observational learning	Academic writing performance	–		
	Self-efficacy beliefs	0.108	–	
	Instruction evaluation	0.128	0.022	–
Learning by doing	Academic writing performance	–		
	Self-efficacy beliefs	0.204*	–	
	Instruction evaluation	0.028	0.133	–

**Correlation is significant at the 0.05 level (1-tailed).*

TABLE 11 | Correlations among dependent measures in the reflection and no reflection conditions.

		1	2	3
Reflection	Academic writing performance	–		
	Self-efficacy beliefs	0.241*	–	
	Instruction evaluation	−0.055	0.114	–
No reflection	Academic writing performance	–		
	Self-efficacy beliefs	0.072	–	
	Instruction evaluation	0.145	0.051	–

**Correlation is significant at the 0.05 level (1-tailed).*

instructional activities. They were significantly less satisfied than participants who learned by doing and did not reflect, $F_{(1, 67)} = 36.84$, $p = 0.00$, $\eta_p^2 = 0.36$. For the participants who did reflect, the ones who learned by observation were significantly less satisfied than the ones who learned by doing, $F_{(1, 67)} = 4.79$, $p = 0.032$, $\eta_p^2 = 0.067$. Simple effects analyses also showed that participants who learned by observing and reflected were significantly more satisfied than those who learned by observing and did not reflect, $F_{(1, 67)} = 14.248$, $p = 0.00$, $\eta_p^2 = 0.18$. For participants who learned by doing no differences were found between those who reflected and those who did not reflect, $F_{(1, 67)} = 0.001$, $p = 0.97$. **Table 8** displays the mean satisfaction scores per condition.

Correlational Analyses

To examine relations among the dependent measures, we performed Pearson correlation analyses. **Table 9** displays the obtained correlation coefficients. Self-efficacy beliefs appeared to be related to academic writing performance. None of the other relations were statistically significant.

We also explored the correlations within the different instructional methods condition (**Table 10**) and reflection conditions (**Table 11**). For learning by doing, and for reflection, there are small but significant correlations between writing performance and self-efficacy.

DISCUSSION

Writing an academic synthesis text is a complex and demanding task for students, since it involves different cognitive activities, such as thinking about content, planning the text, and translating ideas into sentences, that have to be executed simultaneously. In this study, we investigated what would be the most effective way for students to learn to write such an academic synthesis text. We focused on the effect of reflection on two different instructional methods, systematically comparing observational learning and learning by doing, since it is not clear from previous studies what the exact role of reflection entails. Our goal was to investigate how reflection and instructional method affect academic writing performance, self-efficacy beliefs and students' satisfaction with the learning activities. The main findings indicate that instructional method and reflection did not seem to affect academic writing performance or self-efficacy beliefs. Students, however, preferred learning by doing over observational learning, and reflecting over not reflecting.

Observational Learning vs. Learning by Doing

With regard to instructional method (observational learning and learning by doing) our results are in line with our previous study (Van der Loo et al., 2018). In these two studies, students who learn by doing and students who learn by observing produce academic texts of equal quality. The texts do not differ in structure or in the coherence of the different sources used in the text. This seems to suggest that it does not matter which method is used to teach students how to write an academic text: as long as they are actively engaged in their classes, they learn. We did find large individual differences within conditions, suggesting that individual characteristics might have an influence on possible effects of instructional method.

Students in both instructional methods also have equal confidence in their performance of the task. In line with

Zimmerman and Kitsantas (2002) no direct effects of observational learning were found. Closer inspection of the correlations even revealed a higher correlation between self-efficacy and writing performance in learning by doing than in observational learning, even though the correlation was only small. This is in contrast to Raedts et al. (2007) who found a better calibration for self-efficacy in observational learning. In the current study, all self-efficacy scores were relatively high. Since the task was new to all students and they had not received teacher or peer feedback at that point, it is possible that there was a tendency for students to overestimate their ability, irrespective of instructional method.

An interesting finding is that students prefer learning by doing over observational learning. It is possible that they experienced the learning by doing exercises as more "active" and therefore more useful than merely watching someone else perform a task. Learning by doing is probably also more closely linked to what they expect from a writing course which could have affected motivation for the writing task.

Reflection in Learning to Write

In the current study, contrary to what we expected, reflection did not affect academic writing performance and did not lead to higher self-efficacy beliefs. Students who reflected did not write better texts than those who did not reflect, while in previous studies in which reflection was embedded in self-regulated-learning curricula, reflection did appear to enhance learning. Similar to instructional method, we found large individual differences within conditions.

It is worth noting that reflection in the different learning conditions was of necessity subtly different: in observational learning the students reflected on the models' performances while in learning by doing they reflected on their own performance, and this difference might conceivably influence the effectiveness of reflection. However, in earlier research (e.g., Zimmerman and Kitsantas, 1999; MacArthur et al., 2015) both types of reflection yielded higher learning performances. We did find some indications that reflection affected self-efficacy. There was a higher correlation between self-efficacy and academic writing performance scores for the students who reflected than for those who did not reflect. This suggests that reflection might lead to more accurate self-efficacy beliefs. It should be noted, however, that these correlations were only small. Importantly, we did find that students preferred reflecting over not reflecting, which implies that students do consider reflection to be a useful learning activity.

How can we explain the differences between our findings and those of previous self-regulated learning research? In MacArthur et al. (2015), the reflective activities were part of a larger curriculum directed at self-regulated learning. Within the curriculum students received other kinds of treatments, such as direct instruction, teacher modeling and group practice over a complete semester in nine classes. These students were therefore exposed more often and for a longer period of time to multiple types of self-regulating strategies, allowing them to accommodate new information or strategies within their mental models several times, which could explain the differences with our study.

In our study, by contrast, we systematically compared reflecting to not reflecting in both observational learning and learning by doing. Since we found no effects of reflection, it could be argued that reflection by itself does not suffice for helping students to learn a complex writing task.

Limitations and Further Research

The study was conducted in an ecologically valid situation which did allow us to examine the effects of the experimental sessions in real life: the sessions were part of an existing course in academic writing and the task we used to measure academic writing performance was part of the regular assessment for the course. However, this makes it difficult to control for other factors. There was substantial variation in scores within conditions, implying that individual differences between the learners might have mitigated the effects of instructional method and reflection, which complicates establishing an overall effect of learning strategy. For example, Kellogg (2008) argues that domain-specific knowledge on the topic allows writers to focus more executive attention to the writing process, which in turn could yield higher quality texts. The topic of the post-test in the current study was presumably new to all students, but it is possible that some students comprehended the content better than others.

It could also be argued that other learner characteristics have influenced the effects of the learning activities. Affective-motivational constructs, such as academic self-concept, academic interest, and academic anxiety could determine academic effort, such as motivation for the task, and time and effort spent on the task (Schunk et al., 2010; Gogol et al., 2017). Even though we did not find differences between experimental groups in time spent on writing the task, it is possible that some students spent more time on preparing for the task.

We also cannot determine with certainty which writing strategies the students used since we did not measure their actual writing process. To determine the actual strategies used, it might be relevant, however, in future studies to include keystroke logging in the design, to gain more insight in how instructional method and reflection influence the use of writing strategies and how this relates to writing performance.

With regards to reflection, it should be noted that the reflection questions in our study were solely focused on the writing process, and not on affective constructs or on the product, which does seem to be the case in self-regulated learning curricula. Interestingly, Braaksma et al. (2001) also found no effect of reflection on the writing process, even though they suggest this was due to the low number of students actually reflecting on the process.

Theoretical Implications

The findings of this study contribute to existing research on observational learning and reflection. Several issues are worth noting. First, even though students preferred learning by doing over observational learning, and reflecting over not reflecting, this did not positively affect writing performance. This seems to imply that preference for a specific learning activity does not enhance learning. This is in line with the findings of Clark's review (1982). Learner preferences are typically not correlated or even negatively correlated with learning and learning outcomes,

which implies that there is a difference between the way in which someone prefers to learn and that which actually leads to effective and efficient learning (Clark, 1982; Kirschner and van Merriënboer, 2013).

Secondly, this study implies that reflection does not necessarily increase self-efficacy, but that it might affect the accuracy of self-efficacy beliefs. According to Bandura (1997) self-efficacy can be promoted by modeling. By watching someone else succeed in a task, learners might feel more confident that they can succeed as well, which could lead learners to participate more readily in a task, work harder, persist longer when they encounter difficulties, and achieve at higher levels (Schunk and Zimmerman, 2007). In our study however, modeling did not raise self-efficacy beliefs. We did find indications that identifying, evaluating and elaborating on the writing processes of models, and interestingly, also on one's own writing processes, might lead to more accurate self-efficacy beliefs.

Another issue worth mentioning is that in both this study and our previous one (Van der Loo et al., 2018), we found no differences between learning activities and the effect they have on academic writing performance. This seems to imply that being active in class is sufficient, independent of the learning activities. This is supported by Credé et al. (2010) who conclude from a meta-analysis of the relationship between class attendance in college and college grades that mere class attendance is strongly correlated with academic performance. According to Credé et al. class attendance is a stronger predictor of academic performance than any other known predictors, including study skills.

It could also be argued that the former issue is related to the large variation in scores we found within conditions. This variation implies that there are considerable individual differences between students when it comes to writing. How to adapt instructional methods in such a way as to meet these differences and to improve learning, is challenging. For instance, Kirschner and van Merriënboer (2013) suggest that cognitive abilities and prior knowledge should be taken into account when instructional methods are applied, since there is evidence that, for instance, learners with high prior knowledge benefit from other instructional methods than learners with lower prior knowledge.

CONCLUSION

In this study, we focused on the effect of reflection on different instructional methods, comparing observational learning and learning by doing, in the context of an academic writing task. Our goal was to investigate how reflection and instructional method affect academic writing performance, self-efficacy beliefs and students' satisfaction with the learning activities. In our study, reflection did not affect academic writing performance and it did not increase self-efficacy beliefs, and neither did instructional method. There were some indications that reflection leads to more accurate self-efficacy beliefs. Both reflection and instructional method did influence students' satisfaction with the learning activities. Students preferred learning by doing over observational learning, and reflecting over not reflecting. From this study, we can conclude that in academic synthesis writing the interplay between reflection, observational learning and learning by doing is not evident yet: students seem to perform equally well in all conditions, even though they prefer learning by doing over observational learning, and reflecting over not reflecting.

DATA AVAILABILITY

The raw data supporting the conclusions of this manuscript are available through the following link: https://hdl.handle.net/10411/4UJVRP.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of Tilburg School of Humanities and Digital Sciences Research Ethics and Data Management Committee, with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Tilburg School of Humanities and Digital Sciences Research Ethics and Data Management Committee.

AUTHOR CONTRIBUTIONS

JvdL, EK and MvA designed the study. JvdL conducted the experiment, analyzed the data and wrote the first draft of the manuscript, in close collaboration with EK and MvA. JvdL, EK, and MvA revised the final manuscript.

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REFERENCES

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York, NY: Freeman.

Bandura, A. (2016). "The power of observational learning through social modeling," in *Scientists Making a Difference: One Hundred Eminent Behavioral and Brain Scientists Talk About Their Most Important Contributions,* eds R. J. Sternberg, S. T. Fiske, and D. J. Foss (Cambridge: Cambridge University Press), 235–239.

Boud, D., Keogh, R., and Walker, D. (2005). *Reflection: Turning Experience into Learning*. London: RoutledgeFalmer.

Braaksma, M. A., Rijlaarsdam, G., and Van den Bergh, H. (2002). Observational learning and the effects of model-observer similarity. *J. Educ. Psychol.* 94:405. doi: 10.1037/0022-0663.94.2.405

Braaksma, M. A., Rijlaarsdam, G., Van den Bergh, H., and van Hout-Wolters, B. H. M. (2004). Observational learning and its effects on the orchestration of writing processes. *Cogn. Instr.* 22, 1–36. doi: 10.1207/s1532690Xci2201_1

Braaksma, M. A., van den Bergh, H., Rijlaarsdam, G., and Couzijn, M. (2001). Effective learning activities in observation taks when learning to write and read argumentative texts. *Eur. J. Psychol. Educ.* 16:33. doi: 10.1007/BF03172993

Broadbent, J., and Poon, W. L. (2015). Self-regulated learning strategies and academic achievement in online higher education learning

environments: a systematic review. *Internet High. Educ.* 27, 1–13. doi: 10.1016/j.iheduc.2015.04.007

Bruning, R., Dempsey, M., Kauffman, D. F., McKim, C., and Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *J. Educ. Psychol.* 105, 25–38. doi: 10.1037/a0029692

Bruning, R., and Kauffman, D. F. (2016). "Self-efficacy beliefs and motivation in writing development," in *Handbook of Writing Research, 2nd Edn*, eds C. MacArthur, S. Graham, and J. Fitzgerald (New York, NY: Guilford Press), 96–114.

Chang, M. M. (2007). Enhancing web-based language learning through self-monitoring. *J. Comput. Assist. Learn.* 23, 187–196. doi: 10.1111/j.1365-2729.2006.00203.x

Clark, R. E. (1982). Antagonism between achievement and enjoyment in ATI studies. *Educ. Psychol.* 17, 92–101. doi: 10.1080/00461528209529247

Couzijn, M. (1999). Learning to write by observation of writing and reading processes: effects on learning and transfer. *Learn. Instr.* 9, 109–142. doi: 10.1016/S0959-4752(98)00040-1

Credé, M., Roch, S. G., and Kieszczynka, U. M. (2010). Class attendance in college: a meta-analytic review of the relationship of class attendance with grades and student characteristics. *Rev. Educ. Res.* 80, 272–295. doi: 10.3102/0034654310362998

De Smet, M. J., Brand-Gruwel, S., Leijten, M., and Kirschner, P. A. (2014). Electronic outlining as a writing strategy: effects on students' writing products, mental effort and writing process. *Comput. Educ.* 78, 352–366. doi: 10.1016/j.compedu.2014.06.010

Fidalgo, R., Torrance, M., Rijlaarsdam, G., van den Bergh, H., and Álvarez, M. L. (2015). Strategy-focused writing instruction: just observing and reflecting on a model benefits 6th grade students. *Contemp. Educ. Psychol.* 41, 37–50. doi: 10.1016/j.cedpsych.2014.11.004

Gogol, K., Brunner, M., Martin, R., Preckel, F., and Götz, T. (2017). Affect and motivation within and between school subjects: development and validation of an integrative structural model of academic self-concept, interest, and anxiety. *Contemp. Educ. Psychol.* 49, 46–65. doi: 10.1016/j.cedpsych.2016.11.003

Graham, S., Harris, K. R., and Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: the effects of self-regulated strategy development. *Contemp. Educ. Psychol.* 30, 207–241. doi: 10.1016/j.cedpsych.2004.08.001

Graham, S., McKeown, D., Kiuhara, S., and Harris, K. R. (2012). A meta-analysis of writing instruction for students in the elementary grades. *J. Educ. Psychol.* 104:879. doi: 10.1037/a0029185

Graham, S., and Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *J. Educ. Psychol.* 99:445. doi: 10.1037/0022-0663.99.3.445

Groenendijk, T., Janssen, T., Rijlaarsdam, G., and van den Bergh, H. (2013). Learning to be creative. The effects of observational learning on students' design products and processes. *Learn. Instr.* 28, 35–47. doi: 10.1016/j.learninstruc.2013.05.001

Kellogg, R. T. (2008). Training writing skills: a cognitive developmental perspective. *J. Writing Res.* 1, 1–26. doi: 10.17239/jowr-2008.01.01.1

Kieft, M., Rijlaarsdam, G., and van den Bergh, H. (2006). Writing as a learning tool: testing the role of students' writing strategies. *Eur. J. Psychol. Educ.* 21, 17–34. doi: 10.1007/BF03173567

Kieft, M., Rijlaarsdam, G., and van den Bergh, H. (2008). An aptitude–treatment interaction approach to writing-to-learn. *Learn. Instr.* 18, 379–390. doi: 10.1016/j.learninstruc.2007.07.004

Kirschner, P. A. (2017). Stop propagating the learning styles myth. *Comput. Educ.* 106, 166–171. doi: 10.1016/j.compedu.2016.12.006

Kirschner, P. A., and van Merriënboer, J. J. (2013). Do learners really know best? Urban legends in education. *Educ. Psychol.* 48, 169–183. doi: 10.1080/00461520.2013.804395

Koster, M. P., and Bouwer, I. R. (2016). *Bringing Writing Research into the Classroom: The Effectiveness of Tekster, a Newly Developed Writing Program for Elementary Students*. Doctoral dissertation, Interuniversity Centre for Educational Research, University Utrecht, Utrecht.

MacArthur, C. A., Philippakos, Z. A., and Ianetta, M. (2015). Self-regulated strategy instruction in college developmental writing. *J. Educ. Psychol.* 107, 855–867. doi: 10.1037/edu0000011

Mateos, M., and Solé, I. (2009). Synthesising information from various texts: a study of procedures and products at different educational levels. *Eur. J. Psychol. Educ.* 24:435. doi: 10.1007/BF03178760

Raedts, M., Rijlaarsdam, G., Van Waes, L., and Daems, F. (2007). "Observational learning through video-based models: impact on student's accuracy of self-efficacy beliefs, task knowledge and writing performances," in *Studies in Writing, Vol. 19, Writing and Motivation*, eds G. Rijlaarsdam, P. Boscolo, and S. Hidi (Oxford: Elsevier), 219–238.

Raedts, M., Van Steendam, E., De Grez, L., Hendrickx, J., and Masui, C. (2017). The effect of different types of video modelling on undergraduate students' motivation and learning in an academic writing course. *J. Writing Res.* 8, 399–435. doi: 10.17239/jowr-2017.08.03.01

Rijlaarsdam, G., Braaksma, M., Couzijn, M., Janssen, T., Raedts, M., Van Steendam, E., et al. (2008). Observation of peers in learning to write, practice and research. *J. Writing Res.* 1, 53–83. doi: 10.17239/jowr-2008.01.01.3

Rijlaarsdam, G., and Couzijn, M. (2000). "Writing and learning to write: a double challenge," in *New Learning*, eds R. Simons, J. Van der Linden, and T. Duffy (Dordrecht: Kluwer), 157–189.

Schunk, D. H. (1983). Ability versus effort attributional feedback: differential effects on self-efficacy and achievement. *J. Educ. Psychol.* 75, 848–856. doi: 10.1037/0022-0663.75.6.848

Schunk, D. H. (1987). Peer models and children's behavioral change. *Rev. Educ. Res.* 57, 149–174. doi: 10.3102/00346543057002149

Schunk, D. H., Pintrich, P., and Meece, J. (2010). *Motivation in Education: Theory, Research, and Application, 3rd Edn*. Upper Saddle River, NJ: Pearson Education, Inc.

Schunk, D. H., and Zimmerman, B. J. (2007). Influencing children's self-efficacy and self-regulation of reading and writing through modeling. *Read. Writ. Quart.* 23, 7–25. doi: 10.1080/10573560600837578

Sitzmann, T., and Ely, K. (2011). A meta-analysis of self-regulated learning in work-related training and educational attainment: what we know and where we need to go. *Psychol. Bull.* 137, 421–442. doi: 10.1037/a0022777

Tillema, M. (2012). *Writing in First and Second Language: Empirical Studies on Text Quality and Writing Processes.* Doctoral dissertation, Netherlands Graduate School of Linguistics, Utrecht.

Van der Loo, J., Krahmer, E., and van Amelsvoort, M. (2018). Learning how to write an academic text: the effect of instructional method and writing preference on academic writing performance. *J. Writing Res.* 9, 233–258. doi: 10.17239/jowr-2018.09.03.01

Van Steendam, E., Rijlaarsdam, G., Sercu, L., and Van den Bergh, H. (2010). The effect of instruction type and dyadic or individual emulation on the quality of higher-order peer feedback in EFL. *Learn. Instr.* 20, 316–327. doi: 10.1016/j.learninstruc.2009.08.009

Van Weijen, D. (2009). *Writing Processes, Text Quality, and Task Effects: Empirical Studies in First and Second Language Writing.* Doctoral dissertation, Netherlands Graduate School of Linguistics, Utrecht.

Wouters, P., Paas, F., and van Merriënboer, J. J. (2009). Observational learning from animated models: effects of modality and reflection on transfer. *Contemp. Educ. Psychol.* 34, 1–8. doi: 10.1016/j.cedpsych.2008.03.001

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *J. Educ. Psychol.* 81, 329–339. doi: 10.1037/0022-0663.81.3.329

Zimmerman, B. J. (2008). Investigating self-regulation and motivation: historical background, methodological developments, and future prospects. *Am. Educ. Res. J.* 45, 166–183. doi: 10.3102/0002831207312909

Zimmerman, B. J., and Kitsantas, A. (1999). Acquiring writing revision skill: Shifting from process to outcome self-regulatory goals. *J. Educ. Psychol.* 91, 241–250. doi: 10.1037/0022-0663.91.2.241

Zimmerman, B. J., and Kitsantas, A. (2002). Acquiring writing revision and self-regulatory skill through observation and emulation. *J. Educ. Psychol.* 94, 660–668. doi: 10.1037/0022-0663.94.4.660

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APPENDIX I

TABLE A1 | Items in the Writing Style Questionnaire (Kieft et al., 2006, 2008), sorted according to which dimension they measure.

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.

**item is negatively formulated.*