

Writing learning journals: Instructional support to overcome learning-strategy deficits

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Abstract

Although writing learning journals is a powerful learning tool, instructional support is needed to overcome deficits in the use of self-regulated learning strategies. In a 2×2 experimental design with high-school students ($N = 70$), we analysed the effects of two modes of instruction (namely, informed prompting and learning-journal example) along with prompts. Informed prompting that provided background information on the prompted strategies enhanced learning in the training and transfer session. A learning-journal example that modelled the application of the strategies primarily fostered the strategy used in the training session and learning in the transfer session. Theoretically, the results provide support for the self-regulation view of writing-to-learn.

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1. Introduction

Writing is a very common follow-up course-work activity. Frequently, students are required to perform writing assignments such as note taking, essays, term papers, summaries, scientific reports, learning journals, etc. In these cases, teachers are acting (implicitly) on the assumption that writing automatically fosters learning. This is, however, not always true. Research on writing-to-learn has revealed that writing does not automatically contribute to learning. Rather, writing affects learning positively if specific cognitive and meta-cognitive strategies of self-regulated learning are explicitly supported by the writing task. The present study is concerned with the instructional supports that render writing a productive learning activity, especially when high-school students write learning journals.

1.1. Writing-to-learn

In education, there exists the long-lasting belief that writing automatically contributes to learning, the *strong-text-view* of writing-to-learn (see Emig, 1977). However, current research in writing-to-learn has not provided such a clear relationship between writing and learning (Ackerman, 1993; Bangert-Drowns, Hurley, & Wilkinson, 2004; Klein, 1999). On the one hand, studies in writing-to-learn provide evidence that writing can contribute to learning (Applebee, 1984; Tynjälä, Mason, & Lonka, 2001). For example, Mason (2001) found that writing served as a tool to reason on, monitor, and communicate conceptions and understandings of science topics. Similarly, Gunel, Hand, and McDermott (2009) showed that writing-to-learn supported students' understanding of science concepts, especially when students wrote for peers or younger students as compared to writing for teachers or parents. With respect to learning scientific principles through analogies, writing conditions produced greater learning gains compared to a speaking-only condition (Klein, Piacente-Cimini, & Williams, 2007). On the other hand, recent research reviews and meta-analytic studies

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revealed that writing-to-learn effects are often inconsistent and typically rather small (see Ackerman, 1993; Klein, 1999). According to a meta-analysis by Bangert-Drowns et al. (2004), writing did not inherently enhance learning. Rather, most writing assignments yielded small effects, with an average effect size of 0.20.

These results raise the question of which variables moderate the effects of writing-to-learn. To answer this question, Bangert-Drowns et al. (2004) considered the impact of writing on discrete learning processes. The authors argued that writing contributes to learning by supporting beneficial cognitive and metacognitive strategies of self-regulated learning, the *self-regulation view* of writing-to-learn (see also Nückles, Hübner, & Renkl, 2009). Actually, Bangert-Drowns et al. (2004) identified metacognitive prompts that stimulated metacognitive processing (e.g., monitoring, self-regulatory processes) as a significant predictor of the learning effects of writing. In a similar vein, Berthold, Nückles, and Renkl (2007) found that cognitive learning strategies mediated learning outcomes while writing learning journals. Additionally, in a recent study by Nückles et al. (2009), knowledge acquisition while writing learning journals was highest when students received cognitive and metacognitive prompts for their writing. Hence, according to the self-regulation view, writing enhances learning if beneficial cognitive and metacognitive learning strategies are triggered by the writing task.

1.2. Learning journals

Following the self-regulation view of writing-to-learn, learning journals can be considered as a writing task that fosters beneficial cognitive and metacognitive learning strategies. A learning journal is a writing assignment, typically to be performed as a follow-up course-work activity. After attending a lecture or a course, students are asked to write down their reflections on the previously encountered materials. Research revealed that students who wrote learning journals gained significantly more knowledge compared with students who did not write learning journals (Connor-Greene, 2000; Wong, Kuperis, Jamieson, Keller, & Cull-Hewitt, 2002). Furthermore, learning journals proved to be superior over other writing tasks, such as writing a summary (Cantrell, Fusaro, & Dougherty, 2000) or writing a scientific report (McCrinkle & Christensen, 1995). In comparison to other writing tasks (e.g., summary and scientific report), learning journals are explicitly intended to induce productive cognitive and metacognitive strategies of self-regulated learning.

On the cognitive level, students should employ strategies such as the organisation and elaboration of the learning material. Organisational strategies (e.g., identifying main points and structuring the learning material) help to establish so-called *internal links*, that is, finding a meaningful structure of the learning contents (Mayer, 1984; Weinstein & Mayer, 1986). Elaboration strategies (e.g., generating examples and using analogies) serve to build *external links* that relate the new material to the learner's prior knowledge (Mayer, 1984). Additionally, on the metacognitive level, students should

continuously monitor their learning in order to prevent illusions of understanding (Chi, Bassok, Lewis, Reimann, & Glaser, 1989) and strive to bridge gaps in understanding by accomplishing remedial organisation and elaboration strategies. In summary, according to the self-regulation view of writing-to-learn, the application of cognitive and metacognitive learning strategies while writing a learning journal is crucial for learning success.

1.3. Strategy use and age

The use of learning strategies is strongly linked to the learners' age. Research on strategy development revealed that preschool children are often acting passively and rather non-strategically in memory tasks (Flavell, Beach, & Chinsky, 1966). By the end of elementary school, spontaneous and effective uses of memory strategies such as rehearsal and categorisation can be observed (Schneider & Bjorklund, 1998). In order to cope with increased study requirements, high-school students from the ages of 10 to 16 years are developing more sophisticated cognitive and metacognitive learning strategies (Nolen & Haladyna, 1990; Pintrich & De Groot, 1990; Zimmerman & Martinez-Pons, 1990). The developmental patterns found with regard to high-school students on sophisticated learning strategies are very similar to those found for primary-school students with regard to simple recall strategies (Brown, Bransford, Ferrara, & Campione, 1983). Typically, there is a sporadic emergence of beneficial strategies in an early stage of development, resulting in an increased and stable tendency to use the strategy. For example, with regard to elaborative strategies, Beuhring and Kee (1987) found that 5th graders use elaborations less frequently than 12th graders. In a similar vein, Zimmerman and Martinez-Pons (1990) revealed that 5th graders reported significantly less self-regulated learning strategies compared to 8th graders. In turn, 11th graders surpassed 8th graders in different measures of self-regulated learning.

However, faced with complex academic tasks such as writing, studying texts, or scientific reasoning, even older learners typically demonstrate strategy deficits (Brown et al., 1983; Winne, 2005). For example, Rachal, Daigle, and Rachal (2007) came to the conclusion that students are often not prepared to consistently use effective learning strategies once they begin college. Similar results were found for writing learning journals. Although learning journals allow for the application of cognitive and metacognitive strategies, university students typically do not show such strategies to a satisfactory degree without instructional support (Nückles, Schwonke, Berthold, & Renkl, 2004). Hence, research revealed that instructional support is needed in order to enhance self-regulated learning strategies. Furthermore, empirical evidence suggests that the younger the students are, the more important instructional support is in order to overcome strategy deficits.

Work on strategy development identified different reasons for deficiencies in strategy use (Flavell et al., 1966). A *mediation deficiency* implies that students are not able to use a strategy to improve their task performance, because they do not possess

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