



A comparison of high and low achieving students on self-regulated learning variables



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ABSTRACT

Prior research has established the importance of self-regulated learning (SRL) skills for academic achievement. However, efforts to identify and subsequently remediate students' SRL in classroom contexts are still in the early stages of development. This study sought to examine individual differences in low and high achieving college students ($N = 41$) in a classroom-based context in order to begin to inform remediation and intervention efforts. Results indicated no initial differences between high and low achieving students on prior knowledge, general ability, or self-efficacy. However, important differences emerged on metacognitive monitoring, reported use of low-level study strategies, and self-efficacy over the duration of the course. Test performance measured early in the course, but not baseline measures of SRL components or prior knowledge, was predictive of summative course achievement. Self-report measures of SRL did not align with measures of achievement, monitoring judgments, or interview data, indicating that these measures should be used with caution when examining SRL skills in college classroom contexts. Implications related to the development SRL skills are discussed.

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1. Introduction

An emphasis on passive memorization and the recitation of factual information is no longer accepted within instructional contexts. Instead, the focus has shifted to equipping students to become self-regulated, lifelong learners (Cohen, 2012; Luftenegger et al., 2012; Winne, 2013). Contemporary learners encounter greater volumes of information in shorter time frames, increasing their need to efficiently and effectively take in new information (Bembenutty, Cleary, & Kitsantas, 2013; Cohen, 2012; Winne, 2013). Individuals who are self-regulated have the skills necessary to monitor and control their learning, adjusting to the changing demands in their learning environment (Cohen, 2012; Wolters, 2003, 2004; Wolters & Pintrich, 2001; Zimmerman, 2008). Although research efforts have confirmed the importance of self-regulated learning (SRL), more clarification is needed with regard to individual differences in SRL between students who are more versus less successful in classroom contexts. Moreover, an understanding of the alignment of various measurement approaches and the ability of such approaches to predict achievement is also still needed. As researchers attempt to define and facilitate the processes that encourage effective self-regulation, it is important to determine where to focus these efforts.

The current study tracked students through a semester long college course with embedded SRL activities that were intended to simultaneously encourage and assess SRL. These activities included the setting, tracking, and revising of course goals, performance monitoring judgments, as well as the reporting of cognitive strategy use and self-efficacy. The goal of this process was to identify important differences and changes in SRL between high- and low-performing students in order to better understand the dynamics of SRL skills in a classroom context.

2. Relevant literature

2.1. Research in self-regulated learning

SRL can be described as the effective regulation of one's own learning in the pursuit of personal goals (Nietfeld, Shores, & Hoffmann, 2014). According to Zimmerman and Campillo's (2003) social cognitive model, metacognition, motivation, and learner behaviors are the three key components of SRL that influence achievement (Zimmerman & Moylan, 2009). Winne and Hadwin's (1998) information-processing based model of self-regulation relies heavily on metacognitive monitoring and control as the hub of SRL processes. The current study is theoretically situated as a combination of both the social-cognitive and information-processing perspectives as it focuses on the interplay between the metacognitive regulation strategies and motivational variables, i.e., beliefs, goals, and interests (Pintrich, 2000; Winne & Hadwin, 1998; Zimmerman, 2000). Research shows that students who

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can self-regulate their learning processes have higher levels of achievement (Pintrich & De Groot, 1990; Zimmerman, 1990, 2008). Students, however, vary greatly in their ability to regulate their own learning.

Over the past three decades, understanding and improving SRL has emerged as an important area in the study of learning (Bembenutty, 2011; Dinsmore, Alexander, & Loughlin, 2008; Hacker, Dunlosky, & Graesser, 2009; Schunk & Zimmerman, 2008; Winne & Perry, 2000; Zimmerman & Schunk, 2011). Numerous research studies have focused on improving SRL through classroom based interventions (e.g., Ames & Archer, 1988; Bembenutty et al., 2013; Pintrich & De Groot, 1990; Sinkavich, 1991; Waters & Schneider, 2010; Wolters & Pintrich, 2001). For instance, one college-based intervention was aimed at improving struggling students' metacognitive calibration and motivation by assisting students to interpret grades as feedback for improvement, rather than signs of failure (Zimmerman & Moylan, 2009). This intervention employed frequent short quizzes to provide feedback and allowed participants to make corrections, guiding them in self-reflection. Participants in the experimental group outperformed control participants and were more calibrated on pre-task judgments. In another classroom intervention study, Cao and Nietfeld (2007a) reported that college students' awareness of the difficulties in learning the class content, poor test performance, and exposure to various study strategies did not influence their subsequent strategy use, as students continued to implement ineffective study strategies. Students' habitual use of ineffective strategies presents challenges to interventions designed to improve SRL. This finding suggests that self-report metacognitive awareness does not automatically lead to utilization of metacognitive strategies.

One potential approach to better understand how to improve SRL is to compare the relevant characteristics of high and low achieving students (Nandagopal & Ericsson, 2012). Following this approach, Proctor, Prevatt, Adams, and Reaser (2006) compared normal-achieving and academically struggling college students on self-reported study skills. Using the Learning and Study Strategies Inventory (LASSI; Weinstein & Palmer, 2002), Proctor et al., found that students with low GPAs struggled with study skills and scored lower than those with high GPAs on several sub-scales including anxiety, attitude, concentration, information processing, motivation, selecting main ideas, time management, and test strategies. Similar results were found in several other comparisons of different student groups (e.g., learning disabled vs. non-learning disabled, clinic referred vs. not referred), indicating that remediation in these areas could be advantageous for low performing students. Yip (2007, 2009) also compared high and low achieving college students in their use of study strategies. In one study (Yip, 2007) students from Hong Kong were administered a reduced version of the LASSI to identify differences between the high and low achieving students. Results showed a significant difference between the two groups on nine of the ten sub-scales (anxiety was not significantly different). Yip (2009) repeated this study using distance education students and found significant differences between high and low achieving students on all ten sub-scales. Finally, Nandagopal and Ericsson (2012) examined college students majoring in bioscience and found that those with higher pre-existing grade-point averages did not spend more time studying but rather reported using a wider variety of study strategies including high-level approaches that emphasized the organization and transformation of knowledge while learning.

While these studies increased our understanding of the motivation and strategy use between the high and low achieving students, both Proctor et al.'s and Yip's studies were limited in the use of a single self-report measure of SRL at a single time point. Additionally, the LASSI was administered in the Proctor et al. (2006) study as part of an external study that was seemingly unrelated to the courses or programs in which students were enrolled. Nandagopal and Ericsson (2012) used a more longitudinal approach having students record daily study journals, however their reference point for achievement was prior coursework and their focus did not include

motivational or metacognitive variables. It is promising to find significant differences between high and low achieving students of various groups in multiple studies. Yet, these studies lacked the direct comparison of achievement and SRL variables over time within an ongoing classroom context. A variety of measures taken within the context of one specific course could help to more clearly identify the SRL-related differences between these groups and inform future interventions. The present study addressed these issues by examining the differences between high and low achieving students on several class content specific measures related to the course in which their achievement groupings are determined. Additionally, a variety of SRL components (e.g. metacognition, motivation, cognitive strategies, goal setting) were measured repeatedly to create a broad picture of learners in the classroom.

2.2. The role of metacognition in SRL

Originally described by Flavell (1979), metacognition, or knowledge of one's own thinking processes, is a vital component of learning and an important characteristic of SRL. Metacognition is a higher order cognitive process that is generally divided into one's knowledge of cognition and regulation of cognition (Baker & Brown, 1984; Schraw & Moshman, 1995). Having knowledge of cognition means learners understand "their own memories and the way they learn," while regulating cognition describes "how well learners can regulate their own memory and learning" (Sperling, Howard, Staley, & DuBois, 2004, p. 118). Research has shown that learners with high levels of metacognitive skills have advantages in reading comprehension (Bouffard-Bouchard, 1994), writing (Graham, Harris, & Olinghouse, 2007), and problem solving (McCormick, 2003), and obtain higher levels of achievement (Cleary & Zimmerman, 2001; Dembo & Seli, 2012; Tobias & Everson, 2009; Zimmerman, 1990; Zimmerman & Schunk, 2011).

Metacognition is pervasive throughout models of SRL (Butler & Winne, 1995; Pintrich, 2000). During the forethought, performance, and self-reflection phases of SRL, metacognitive processes control learner choices and manage learning outcomes (Zimmerman & Moylan, 2009). This higher order process coordinates learning by planning, monitoring, and evaluating cognitive processes (Schraw & Moshman, 1995). Metacognition is difficult to "capture," and is measured through a variety of approaches including but not limited to self-reports, observational methods, think alouds, eye-tracking methods, trace data, and monitoring judgments. Monitoring judgments collected by means of confidence judgments were utilized in the current study. These judgments can be taken in real-time during a test or task and can then be transformed into calibration scores that measure the match between one's perception of performance and their actual level of performance (Dunlosky & Metcalfe, 2009; Nietfeld, Cao, & Osborne, 2006). Generally, research has shown that individuals who can accurately judge their learning are more effective learners (Zimmerman & Moylan, 2009) and this is reflected in relationships between academic performance and accuracy in judgments (Nietfeld & Cao, 2005).

2.3. The role of self-efficacy in SRL

In addition to metacognition, students' SRL is profoundly affected by various motivational factors. One of those factors, self-efficacy, can be described as the belief in the ability to organize and execute actions necessary to attain specific goals (Bandura, 1997). Students who believe they will be successful are more likely to be motivated and to achieve success. However, students with low self-efficacy may not only succumb to temptation, but they may let disruptive thoughts interfere with performance (Boekaerts, 1995; Bong & Skaalvik, 2003; Pintrich, 2003; Schunk, Meece, & Pintrich, 2013). Learners' self-efficacy beliefs are developed mainly through prior experiences, but can also be influenced by vicarious experiences, verbal persuasion, and physiological

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