

Self-Regulated Learning and Academic Achievement: An Overview

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Educational researchers have begun recently to identify and study key processes through which students self-regulate their academic learning. In this overview, I present a general definition of self-regulated academic learning and identify the distinctive features of this capability for acquiring knowledge and skill. Drawing on subsequent articles in this journal issue as well as my research with colleagues, I discuss how the study of component processes contributes to our growing understanding of the distinctive features of students' self-regulated learning. Finally, the implications of self-regulated learning perspective on students' learning and achievement are considered.

Since the founding of the republic, American educational leaders have stressed the importance of individuals assuming personal responsibility and control for their own acquisition of knowledge and skill. Benjamin Franklin wrote extensively in his "Autobiography" about techniques he used to improve his learning, erudition, and self-control (*Benjamin Franklin Writings*, 1868/1987). He described in detail how he set learning goals for himself, recording his daily progress in a ledger. He sought to improve his writing by selecting exemplary written models and attempting to emulate the authors' prose. In addition to teaching himself to write, Franklin felt this procedure improved his memory and his "arrangement of thoughts," two cognitive benefits that research on observational learning has verified (Rosenthal & Zimmerman, 1978; Zimmerman & Rosenthal, 1974). Recognition of the importance of personal initiative in learning has been reaffirmed by contemporary national leaders such as Gardner (1963), former Secretary of Health, Education, and Welfare, who suggested that

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“the ultimate goal of the education system is shift to the individual the burden of pursuing his own education” (p. 21).

Until recently, there has been very little empirical evidence regarding how students become masters of their own learning, a topic that has become known as *self-regulated learning* (Zimmerman & Schunk, 1989). Within the last few years, however, researchers have begun to identify and study some of the key processes by which students direct their acquisition of academic knowledge. A self-regulated learning perspective on students' learning and achievement is not only distinctive, but it has profound implications for the way teachers should interact with students and the manner in which schools should be organized. This perspective shifts the focus of educational analyses from students' learning ability and environments as “fixed” entities to their personally initiated processes and responses designed to improve their ability and their environments for learning.

In this overview, I present a general definition of self-regulated academic learning first and then identify the distinctive features of this capability for acquiring knowledge and skill. Finally, I describe how key component processes, which are discussed in subsequent articles in this journal issue, contribute to these distinctive features of students' self-regulated learning.

DEFINITIONS OF SELF-REGULATED LEARNING

At one time or another, we have all observed self-regulated learners. They approach educational tasks with confidence, diligence, and resourcefulness. Perhaps most importantly, self-regulated learners are aware when they know a fact or possess a skill and when they do not. Unlike their passive classmates, self-regulated students proactively seek out information when needed and take the necessary steps to master it. When they encounter obstacles such as poor study conditions, confusing teachers, or abstruse text books, they find a way to succeed. Self-regulated learners view acquisition as a systematic and controllable process, and they accept greater responsibility for their achievement outcomes (see Borkowski, Carr, Rellinger, & Pressley, in press; Zimmerman & Martinez-Pons, 1986, 1990).

As familiar as this description may be, it is not helpful pedagogically unless it leads eventually to operational definitions of the component processes by which students self-regulate their learning. Although definitions of self-regulated learning involving specific processes often differ on the basis of researchers' theoretical orientations, a common conceptualization of these students has emerged as metacognitively, motivationally, and behaviorally active participants in their own learning (Zimmerman, 1986). In terms of metacognitive processes, self-regulated learners plan, set goals, organize, self-monitor, and self-evaluate at various points during the

process of acquisition (Corno, 1986, 1989; Ghatala, 1986; Pressley, Borkowski, & Schneider, 1987). These processes enable them to be self-aware, knowledgeable, and decisive in their approach to learning. In terms of motivational processes, these learners report high self-efficacy, self-attributions, and intrinsic task interest (Borkowski et al., in press; Schunk, 1986; Zimmerman, 1985). To observers, they are self-starters who display extraordinary effort and persistence during learning. In their behavioral processes, self-regulated learners select, structure, and create environments that optimize learning (Henderson, 1986; Wang & Peverly, 1986; Zimmerman & Martinez-Pons, 1986). They seek out advice, information, and places where they are most likely to learn; they self-instruct during acquisition and self-reinforce during performance enactments (Diaz & Neal, in press; Rohrkemper, 1989).

When defining self-regulated learning, it is important to distinguish between self-regulation processes, such as perceptions of self-efficacy, and strategies designed to optimize these processes, such as intermediate goal-setting (Zimmerman, in press). Self-regulated learning strategies refer to actions and processes directed at acquisition of information or skills that involve agency, purpose, and instrumentality perceptions by learners. Undoubtedly, all learners use regulatory processes to some degree, but self-regulated learners are distinguished by (a) their awareness of strategic relations between regulatory processes or responses and learning outcomes and (b) their use of these strategies to achieve their academic goals. Systematic use of metacognitive, motivational, and/or behavioral strategies is a key feature of most definitions of self-regulated learners (Zimmerman, 1989a).

A second feature of most definitions of self-regulated learning is a "self-oriented feedback" loop (Carver & Scheier, 1981; Zimmerman, 1989b). This loop entails a cyclic process in which students monitor the effectiveness of their learning methods or strategies and react to this feedback in a variety of ways, ranging from covert changes in self-perception to overt changes in behavior such as altering the use of a learning strategy. Phenomenological theories of self-regulated learning (e.g., McCombs, 1986, 1989) depict this feedback loop in terms of covert perceptual processes such as self-esteem and self-concepts, whereas operant theories (e.g., Mace, Belfiore, & Shea, 1989) favor overt descriptions in terms of self-recording, self-instruction, and self-reinforcement responses. Social cognitive theorists (e.g., Bandura, 1989) caution against viewing this control loop in terms of only negative feedback (i.e., seeking to reduce differences between one's goals and observed outcomes); they report a positive feedback effect as well (i.e., seeking to raise one's goals based on observed outcomes). Regardless of theoretical differences in what is monitored and how outcomes are interpreted, virtually all researchers assume

that self-regulation depends on continuing feedback of learning effectiveness.

A third feature of definitions of self-regulated learning is an indication of how and why students choose to use a particular strategy or response. Because self-regulated learning involves temporally delimited strategies or responses, students' efforts to initiate and regulate them proactively require preparation time, vigilance, and effort. Unless the outcomes of these efforts are sufficiently attractive, students will not be motivated to self-regulate. They may choose not to self-regulate their learning when the opportunity arises—an outcome that requires a comprehensive accounting of their academic motivational processes. Operant theorists (e.g., Mace et al., 1989) claim that all self-regulated learning responses are ultimately determined by contingent external rewards or punishment such as social approval, enhanced status, or material gain, whereas phenomenological theorists (e.g., McCombs, 1989) view students as motivated by a global sense of self-esteem or self-actualization. Between these two ends of the continuum, other theorists favor motives such as self-efficacy, achievement success, and cognitive equilibrium.

An important aspect of theories of self-regulated learning is that student learning and motivation are treated as interdependent processes that cannot be fully understood apart from each other. For example, student perceptions of self-efficacy are both a motive to learn and a subsequent outcome of attempts to learn (Schunk, 1984, 1989). Self-regulated learners are not merely reactive to their learning outcomes; rather, they proactively seek out opportunities to learn (Zimmerman, 1989a). They self-initiate activities designed to promote self-observation, self-evaluation, and self-improvement such as practice sessions, specialized training, and competitive events (Zimmerman & Martinez-Pons, 1986). Their heightened motivation is evident in their continuing tendency to set higher learning goals for themselves when they achieve earlier goals, a quality that Bandura (1989) called self-motivation. Thus, self-regulated learning involves more than a capability to execute a learning response by oneself (i.e., self-control) and more than a capability to adjust learning responses to new or changing conditions from negative feedback. It involves proactive efforts to seek out and profit from learning activities. At this level, learners are not only self-directed in a metacognitive sense but are self-motivated as well. Their skill and will are integrated components of self-regulation (see McCombs and Marzano, this issue).

In summary, definitions of students' self-regulated learning involve three features: their use of self-regulated learning strategies, their responsiveness to self-oriented feedback about learning effectiveness, and their interdependent motivational processes. Self-regulated students select and use self-

regulated learning strategies to achieve desired academic outcomes on the basis of feedback about learning effectiveness and skill.

STUDENTS' SELF-REGULATED LEARNING STRATEGIES

There is a growing body of laboratory and field research indicating the important role that students' use of self-regulated learning strategies plays in their academic achievement. A variety of metacognitive, motivational, and behavioral strategies have been studied at a number of universities and laboratories throughout the world (see reviews by Pressley et al., 1987; Simons & Beukhof, 1987; Weinstein & Mayer, 1986; Zimmerman, 1989b). Contributors to this journal issue have been extensively involved in research on strategy training, including such strategies as self-instruction, verbal elaboration, text comprehension monitoring, goal setting, and self-recording, and describe their research and its implications in their respective articles. Their research illustrates that teaching students to self-regulate their academic learning is more complex than was initially envisioned. Before considering the results of their training studies, I discuss several descriptive studies in which a colleague and I sought to determine whether students' use of these strategies was related to their academic performance and achievement in school.

Several years ago, Martinez-Pons and I (see Zimmerman & Martinez-Pons, 1988) developed a structured interview procedure that involved a number of contexts or descriptions of instructional problems that students often encounter, particularly during studying and class preparation such as:

Many times students have difficulty completing homework assignments because there are other, more interesting things they would rather do such as watching TV, daydreaming, or talking to friends. Do you have any particular method for motivating yourself to complete your homework under these circumstances? (p. 285)

Regardless of whether a student's response was scoreable or not, the respondent was systematically probed for other "methods." His or her responses were recorded and later scored for the presence of 1 or more of 14 self-regulated learning strategies, namely, self-evaluation, organization and transformation, goal setting and planning, information seeking, record keeping, self-monitoring, environmental structuring, giving self-consequences, rehearsing and memorizing, seeking social assistance (peers, teacher, or other adults), and reviewing (notes, books, or tests). This list of

strategies was drawn from available research, and definitions were refined during pilot testing. We decided to use an open-ended interview format instead of a questionnaire format because we felt constructed answers more closely simulated naturalistic conditions of students' self-regulated learning than multiple-choice answers.

In our first investigation (Zimmerman & Martinez-Pons, 1986), we correlated high school students' strategy reports with their achievement track placement in school. Forty of the students were drawn from the advanced academic track in their school, and the remaining 40 were drawn from lower tracks. Compared to students in lower tracks, youngsters from the advanced track reported significantly greater use of all strategies but one, self-evaluation. Even the use of that strategy was numerically greater for the advanced students; however, the difference did not reach statistical significance. Discriminant function analyses reveal that the students' achievement track could be predicted with 93% accuracy using their weighted strategy totals across the learning contexts. Clearly, students' use of these self-regulated learning strategies was strongly associated with superior academic functioning.

An unexpected but interesting finding is that students in the lower achievement tracks tended to give several common non-self-regulated responses with greater frequency than students from the advanced track. These included "reactive" statements that indicated a lack of personal initiative such as "I just do what my teacher tells me," and "will power" statements that indicated simple resolve (without using strategies) such as "If I'm having difficulty motivating myself to complete my homework, I just work harder." These data suggest that less frequent mention of strategies by students in the lower achievement tracks was not due to their lack of verbal expressiveness but rather to their lack of self-regulatory initiative.

In an effort to further establish the validity of student reports of self-regulated strategy use, we asked high school teachers to rate their students for their use of strategies in a second study (Zimmerman & Martinez-Pons, 1988) using Likert scales. These items focused on learning strategies that are observable directly in school (e.g., asking for further information or being self-evaluative about test results) or are deducible from their observable effects (e.g., completing assignments on time or being prepared for class). In addition to these direct and indirect measures of strategy use, we developed several items designed to assess the students' intrinsic motivation displayed during class and homework.

These teacher ratings were submitted to multivariate analyses along with the students' mathematics and verbal scores on a standardized achievement test. By combining the teachers' ratings factorially with standardized achievement tests scores, it was possible to separate the students' achieve-

ment outcomes associated with their use of self-regulated learning strategies from their general ability. Factor analyses of these two sets of scores reveal a single, Self-Regulated Learning factor that accounts for nearly 80% of the variance. All the items of the teacher rating scale loaded highly on this Self-Regulated Learning factor, and the students' verbal and mathematical achievement scores loaded partly on this factor and partly on a second General-Ability factor as expected. Students' reports of using self-regulated learning strategies as assessed by our structured interview procedure correlated .70 with the derived Self-Regulated Learning factor. The latter results suggest that students' use of self-regulated learning strategies made a distinctive contribution to their academic achievement apart from their General Ability.

MONITORING SELF-ORIENTED FEEDBACK AND RELATED DECISION MAKING

Initial optimism that teaching students' various learning strategies would lead to improved self-regulated learning has cooled with mounting evidence that strategy use involves more than mere knowledge of a strategy (Schneider, 1985). Pressley, Ghatala, and their colleagues have been at the forefront of research on monitoring learning strategies; they have summarized this research in a number of articles (see Ghatala, 1986; Pressley & Ghatala, this issue). Based on studies of both spontaneous and trained use of monitoring, they conclude that student awareness of learning outcomes is critical to continued strategy use. For example, when students were offered information regarding the relative effectiveness of two strategies (one of which was chosen for its greater effectiveness), not even mature learners monitored differences as they actually executed the strategies (Pressley, Levin, & Ghatala, 1984; Pressley, Ross, Levin, & Ghatala, 1984). However, adults were able to derive and use strategy effectiveness information when prompted to monitor their performance on a recall test following study with differentially effective strategies. Older grade school children could derive but not use strategy effectiveness information, and young children could not even derive strategy effectiveness information (e.g., Moynahan, 1978). These developmental data suggest that monitoring learning outcomes is a complex metacognitive activity that involves directed attention and sophisticated reasoning processes. This conclusion is borne out by subsequent training research. Ghatala, Levin, Pressley, and Goodwin (1986) found that young children not only need to be shown how to monitor the outcomes of their recall efforts, but that they also need training in attributing recall outcomes to strategy use and in using this information to make appropriate decisions.

In her article on self-instruction (see Harris, this issue), Harris also discusses the key role of self-monitoring and related decision making in self-regulating learning. Self-instruction training has been used to assist learners in regulating a wide variety of personal processes such as attention, problem solving, response guidance, and motivation. Harris reviews research indicating that conveying knowledge of reading and writing strategies does not improve acquisition unless self-monitoring and related decision-making procedures are taught specifically. For example, Elliott-Faust and Pressley (1986) taught third-grade students to verbally instruct themselves when using a reading comprehension strategy and to self-monitor its effectiveness. When compared to simply teaching the children the reading strategy, this self-instruction training not only enhanced these youngsters' reading comprehension, but it fostered their continued use of the comprehension strategy as well.

However, Harris cautions that identifying the key self-monitoring and related decision-making components in self-regulated learning may be difficult. For example, Sawyer, Graham, and Harris (1989) gave fifth- and sixth-grade children with learning disabilities explicit training in self-verbalizing a writing composition strategy, in making strategy attributions, and in self-regulating (i.e., goal setting, self-assessment, and self-recording). They found this multicomponent self-regulation training was more effective than writing composition training alone on posttest and generalization measures of composition quality and self-efficacy. Although the self-regulation component added numerically to the impact of training in self-instruction and strategy attributions, this increase did not attain statistical significance.

Together these studies suggest that multicomponent training involving self-monitoring and related decision making is necessary in order to teach students to interpret feedback from their academic learning optimally; however, it is not yet clear in this research which specific components of self-regulation are most essential. Finally, it should be noted that Harris and her colleagues found that self-regulation training not only improved students' learning, but it also improved their perceptions of efficacy, a widely studied measure of students' motivation to self-regulate.

MOTIVATING SELF-REGULATED LEARNING

Because theories of self-regulated learning seek to explain students' personal initiative in acquiring knowledge and skill, they all treat students' motivational processes as interdependent with learning processes. How these processes are described and how they are hypothesized to interact, however, varies from theory to theory. All theories of self-regulation assume that

students interpret learning outcomes as having tangible or intangible personal (i.e., self) implications. Behaviorally oriented approaches (e.g., Mace et al., 1989) focus on tangible outcomes such as material or social gains, whereas cognitively oriented approaches emphasize intangible outcomes such as self-actualization, self-efficacy, or reduced cognitive dissonance (Zimmerman, 1989a).

In their article in this journal issue, McCombs and Marzano present an elaborate conceptualization of students' self-system processes. Their formulation rests on the phenomenological premise that student perceptions of academic tasks are filtered through a system of self-structures composed of self-beliefs, self-goals, and self-evaluations. When a student is aware of self as agent, a sense of self-efficacy, internalized goals for learning, and an experience of competency are produced. In their view, self-regulated learning requires more than cognitive skill; it requires a will or motivational component as well. When students understand that they are creative agents, responsible for and capable of self-development and self-determination of their goals, their self as an agent will provide the motivation necessary for self-regulation. Like other theories of self-regulated learning, McCombs and Marzano assume that students' continued motivation is dependent on monitoring their performance. However, they stress that innate capabilities for self-regulation are best realized through metacognitive self-awareness that deepens students' understanding of self as agent.

In contrast to this phenomenological emphasis on global self-system structures as the source of personal agency, social cognitive approaches to self-regulated learning (e.g., Bandura, 1986; Schunk, 1989; Zimmerman, 1989b) have focused on perceptions of self-efficacy as the ultimate source of students' motivation. Self-efficacy differs from other self-system processes by focusing on personal ratings of performance success in task domains. These measures are also distinctive because they depend primarily on mastery criteria (i.e., a percentage scale) rather than comparative criteria (i.e., the performance of other students). For example, students have been asked to estimate their likelihood of solving particular mathematics problems (see Schunk, 1981). The domain-specific property of self-efficacy measures has been credited with producing their high correlation with students' actual performance during self-regulated learning (Zimmerman, *in press*), and the mastery-based property has been shown recently (Zimmerman & Martinez-Pons, 1990) to produce an incremental developmental profile from elementary school to high school that contrasts markedly with a decremental profile characteristic of self-competence ratings involving social comparisons with other students (see Paris & Byrnes, 1989).

In this journal issue, Schunk reviews research linking students' perceptions of self-efficacy to their goal-setting activities. According to the

aforementioned definition, all self-regulated learners have the option of not self-regulating. Those who are not sufficiently desirous of a particular learning outcome are not generally assumed to self-regulate. Thoresen and Mahoney (1974) noted that problems in self-regulation typically arise when discrepancies occur between short-term outcomes and long-term outcomes. For example, during academic studying, students must sacrifice immediate recreational time for the possible eventual rewards of high marks. Their willingness to make this sacrifice demands both self-confidence in one's ability to learn and the personal resolve to delay gratification—two self-regulative capabilities that are often lacking in young children (Mischel & Mischel, 1983). Cognitive views of self-regulation describe and assess this futuristic orientation in terms of goals and have sought to increase it through a variety of methods such as intermediate goal setting, self-instruction, and self-evaluation (e.g., Bandura & Schunk, 1981). Behaviorist researchers have used these same procedures as well but prefer to interpret them as forms of interresponse control leading eventually to external reinforcement (e.g., Bijou & Baer, 1961).

Schunk argues convincingly that a reciprocal relationship exists between students' goal setting and their perceptions of self-efficacy. When students set intermediate goals for themselves that are specific and proximal in time, they can perceive their learning progress more readily, and this in turn enhances their self-efficacy. Increased self-efficacy can lead students reciprocally to set even more challenging ultimate goals for themselves. Schunk surveys research from a number of training studies of student goal setting and self-efficacy and reports considerable support for their reciprocal relationship.

STUDENTS' DEVELOPMENT OF SELF-REGULATED LEARNING

Although the proposed definition focuses on explaining students' metacognition, motivation, and behavior during academic learning episodes, it is important to consider how children acquire a capacity or capability to self-regulate their learning. Most theorists assume that young children cannot self-regulate their learning in any formal manner (Zimmerman, 1989a). I have mentioned several reports of interesting developmental patterns in young children's display of various self-regulated learning processes such as their inability to effectively self-monitor and respond to their learning outcomes (Ghatala, 1986) and an incremental growth in their verbal and mathematical self-efficacy (Zimmerman & Martinez-Pons, 1990). In addition to the developmental growth in these two forms of academic self-efficacy, Zimmerman and Martinez-Pons (1990)

found a cross-sectional increase in students' combined use of the 14 strategies assessed by our structured interview procedure from the 5th to the 8th grades and from the 8th to the 11th grades. Gifted students in this study displayed precocious development of both verbal and mathematical self-efficacy in comparison to nongifted students. This finding is interesting because gifted youngsters have been described as highly self-motivated (e.g., Cox, 1976).

In their article in this journal issue, Paris and Newman summarize research on developmental changes underlying children's capability to regulate their own learning. For example, before the age of 7, children appear naive and overly optimistic about their ability to learn (e.g., Flavell, Friedrichs, & Hoyt, 1970; Stipek & Tannatt, 1984). They begin school with only a vague understanding of what is involved in academic tasks (e.g., Meyers & Paris, 1978), and their strategic knowledge is fragmentary and intuitive (e.g., Paris, Lipson, & Wixon, 1983). Young children rarely reflect on their performance (Skinner, Chapman, & Baltes, 1988), and they believe that trying hard is sufficient to ensure success (Dweck & Elliott, 1983). However, as children approach adolescence, their academic self-perceptions become more accurate (Harter, 1985). They develop an increasingly differentiated understanding of academic tasks (e.g., Brown & Smiley, 1977), and their monitoring of the differential effectiveness of cognitive strategies for learning grows with age (e.g., Pressley et al., 1984). They gradually realize effort alone will not guarantee success (Nicholls, 1978, 1984).

Paris and Newman hypothesize that these changes depend on children's building personal theories of self-competence, academic tasks, cognitive strategies, motivation, and social cognition in the classroom. Young children construct a coherent set of beliefs about themselves, their confidence, the nature of tasks, the usefulness and availability of cognitive strategies, and the social dispositions of other people in the classroom. With young children, these beliefs are often implicit and imprecise; nevertheless, they are used to mediate efforts to self-regulate their learning. With age, children can reflect on their beliefs and can articulate them more accurately. Paris and Newman offer a number of suggestions concerning how teaching and peer interaction processes can promote children's development of effective personal theories to self-regulate learning.

CONCLUSION

Self-regulated learning theories of academic achievement are distinctive from other accounts of learning and instruction by their emphasis (a) on how students select, organize, or create advantageous learning environments for themselves and (b) on how they plan and control the form and

amount of their own instruction. Undoubtedly, all learners are responsive to some degree during instruction; however, students who display initiative, intrinsic motivation and personal responsibility achieve particular academic success (Zimmerman & Martinez-Pons, 1988). These self-regulated students are distinguished by their systematic use of metacognitive, motivational, and behavioral strategies; by their responsiveness to feedback regarding the effectiveness of their learning; and by their self-perceptions of academic accomplishment.

Contributors to this issue of the *Educational Psychologist* review and analyze recent research and theory on key self-regulatory processes students use to learn and achieve academically. Our understanding of the interdependence of these processes has now reached the point where systematic efforts can be launched to teach self-regulation to students who approach learning passively, and a number of notable efforts have been undertaken already (see Graham & Harris, 1989; Weinstein & Mayer, 1986). Existing laboratory training studies caution, however, that limited attempts at instruction that focus on only one or two processes are unlikely to promote long-term effects. Instead, attention must be directed toward developing all three dimensions of self-regulated learning in students: metacognitive, motivational, and behavioral. At a time when students often appear to lack both the will and skill to achieve academically, educators need instructional approaches that can offer direction and insight into the processes of self-regulated learning.

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