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Self-Regulation of Academic Learning in Middle-Level Schools

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Abstract

We argue in this article that many educational reforms fail to give sufficient attention to improving student learning. An important component of academic success is students' motivation and ability to take responsibility for their own learning. One way to increase academic performance is to teach students how to become self-regulated learners. We use Zimmerman's model of academic self-regulation to identify 6 dimensions of behavior that influence learning—motivation, methods of learning, use of time, control of one's physical and social environment, and performance. This model is unique in that it uses non-subject-matter outcomes of schooling to influence academic performance. We discuss each self-regulatory dimension in terms of the research supporting its effect on academic performance, as well as the developmental concerns for students in middle-level schools. Finally, we offer suggestions for how teachers can help students acquire self-regulatory skills.

The report of the Carnegie Council on Adolescent Development (1989) helped to energize the dialogue regarding the improvement of education for young adolescents. One statement in the report has important implications for both academic and nonacademic outcomes during this developmental period: "Young adolescents face significant turning points. For many youth 10 to 15 years old, early adolescence offers opportunities to choose a path toward a productive and fulfilling life. For many others, it represents their last best chance to avoid a diminished future" (p. 8).

One of the major issues in the education of young adolescents pertains to the middle-grades school transition. For many individuals, this transition represents the beginning of a general deterioration in

academic performance, motivation, self-perceptions of ability, and relationships with peers and teachers (see Eccles & Midgley, 1989; Eccles, Midgley, & Adler, 1984). The future for many adolescents is bleak unless educational reforms influence their motivation and academic achievement.

To date, many school reform initiatives have focused on charter schools, vouchers, and other forms of school choice, as well as on changes in school governance, organization, and curriculum. The degree to which these reforms directly influence student learning varies greatly. We believe more attention needs to be given to learner-centered reforms (McCombs & Whisler, 1997). Our concern is best expressed by Zimmerman (1989), who reminds educators that "learning is not something that happens *to* students, it is something that happens *by* students" (p. 22).

Academic Self-Regulation

A major cause of underachievement is the inability of students to control their own behavior (Krouse & Krouse, 1981). Zimmerman and his colleagues (Zimmerman, 1989, 1994; Zimmerman, Bonner, & Kovach, 1996; Zimmerman & Risemberg, 1997) have been interested in learning how students become willing and able to assume responsibility for controlling or self-regulating their academic achievement. Research indicates that learning self-regulatory skills can lead to greater academic achievement and an increased sense of efficacy.

In a recent article in the *Elementary School Journal*, Yowell and Smylie (1999) discussed self-regulation from a Deweyan and Vygotskian perspective. They assessed the effectiveness of adolescent prevention programs such as sex education, character education, and drug prevention and argued that self-regulation cannot be promoted without attention to the social contexts in which it is developed and supported. The authors pointed out that change is based not only on individual or intrapsychologi-

cal processes but also on social or interpersonal processes.

In this article we discuss academic self-regulation from a social cognitive perspective whereby self-regulation pertains to students' self-generated thoughts, feelings, and actions used to achieve academic goals (Zimmerman, 1989). More specifically, we view academic self-regulation as the ability of students to control the factors or conditions affecting their learning.

Researchers have compared successful and less successful students of similar intellectual ability. When given a learning task, successful learners monitor and control their behavior by setting goals, using their prior knowledge, considering alternative strategies, developing a plan of attack, and considering contingency plans when they run into trouble. In contrast, less successful students have little awareness of the factors affecting learning and are less likely to take charge of their own learning (Zimmerman, 1989).

What follows is an example of how one eighth-grade student managed her academic learning:

It was Thursday night and Susan was completing her final preparation for the next day's science exam. On the previous Sunday evening she set goals and developed a plan for how she would prepare for the exam during the week. She identified what she had to learn, how she would study, and when she would accomplish each task. She began her study on Monday, attempting to gain a general understanding of the main ideas and to recall the most important facts. She reviewed each section of the readings and monitored her own progress during study by developing possible questions that might be asked on the exam. While studying Wednesday night, she realized that she had difficulty comparing and contrasting some of the different diseases discussed in class. Therefore, she decided to develop a chart listing the diseases on the top and their causes and cures down the side. When she filled in the information on the chart, she found she was bet-

ter able to answer the questions that might be asked regarding the material.

Around 8:00 p.m. Thursday, Susan's older sister came home with some friends from a school meeting and began talking loudly. Susan asked her sister to go downstairs with her friends. She closed her door and studied for another hour. When she realized she did not understand some information in her notes, she made a telephone call to a friend for clarification about the notes. Around 9:00 p.m. she found that she was getting tired and having difficulty concentrating on the material. She decided to take a 15-minute break and returned to finish her studying for the evening.

What actions did Susan take to ensure optimum learning? First, she established a goal and action plan for how she was going to prepare for the examination. Second, she used a variety of learning strategies such as developing and answering questions and making a chart to better compare and contrast the relevant information. When she found that she was not learning, she did something about it by changing her learning strategy. Third, she monitored her understanding of the material as she studied and asked for help when she failed to understand her notes. Fourth, when her sister returned from school with her friends, Susan asked her to go downstairs and closed her door so she would not be distracted by the noise. Fifth, when she got tired and less motivated to continue studying, she took a break and then completed her task.

Zimmerman and Risemberg (1997) have identified the dimensions of learning that Susan controlled as important self-regulatory skills that can help all students promote their own academic achievement. The dimensions include the following:

- motivation
- methods of learning
- use of time
- physical environment
- social environment
- performance

Academic self-regulation includes many of

the elements of the "informal curriculum" (e.g., sense of personal agency, valuing of self and the learning process) (McCaslin & Good, 1996) and "nonacademic" outcomes of education (e.g., motivation, metacognitive skills, and collaborative skills) (Battistich, Watson, Solomon, Lewis, & Schaps, 1999).

In the following sections of this article we discuss each of the six dimensions of academic self-regulation by providing examples of typical student behavior, identifying research supporting its link to academic performance focusing on the developmental concerns for students in middle-level schools, and, finally, offering suggestions for how teachers can help students acquire self-regulatory skills. In some situations, we describe the self-regulatory instruction we are presently using with students in middle-level schools.

Motivation

"Each year I write down goals that I want to attain." "When I feel down, I talk to myself to motivate me to keep on task."

We already mentioned that student motivation deteriorates during the transition to the middle grades. Much of the research on this issue attributes the problem to instructional practices and school environments (e.g., ability grouping, competition, emphasis on social comparison, and less personal contact with teachers) that are insensitive to the developmental needs of young adolescents (see Anderman & Maehr, 1994; Eccles & Midgley, 1989; Eccles, Midgley, & Adler, 1984, for a detailed discussion of this issue). Research indicates that significant structural changes have been made in many middle schools (i.e., dividing schools into smaller units and team teaching) that have contributed to improved interpersonal relations. Unfortunately, these reforms have not led to significant improvement in students' academic performance, especially in schools serving primarily low-income and

African-American students (Midgley & Edelin, 1998).

Although structural changes in school organizations can improve student motivation, we believe that much can be done to teach students self-regulatory strategies that enable them to control or modify their own motivation under different environmental conditions. One problem is that adolescents often believe that teachers and parents are responsible for their motivation. For example, during a presentation on motivation at a middle school, one student asked: "You mean that if you are bored, you can do something about it?" It was obvious that the student had not thought about the extent to which she had the ability to control her own motivation. Many students complain they are bored in school or in courses they must take. Boredom is a problem because it can diminish attention and interfere with academic performance. It can be related to both individual (i.e., personality) and situational factors (e.g., classes and instructors). Some individuals are more prone to boredom than others. In fact, one study showed that students who report a high frequency of boredom in school also experience high rates of boredom outside of school (Larson & Richard, 1991).

One of the major differences between successful and less successful individuals in any field is that successful individuals know how to motivate themselves even when they do not feel like performing a task, whereas less successful individuals have difficulty controlling their motivation. As a result, less successful individuals are less likely to complete a task and more likely to quit or to complete a task less proficiently. Although successful learners may not feel like completing required tasks, they learn how to motivate themselves to completion in order to maintain progress toward achieving their goals.

Students can use a number of important self-regulatory strategies to develop and maintain these important motivational beliefs and behaviors. The first is goal setting.

Educational research indicates that high achievers report using goal setting more frequently and more consistently than low achievers (Zimmerman & Martinez-Pons, 1986). When individuals establish and attempt to attain personal goals, they are more attentive to instruction, expend greater effort, and increase their confidence when they see themselves making progress. It is difficult to be motivated to achieve without having specific goals. Therefore, teachers need to help students set both long-range and intermediate goals for academic, personal, social, and occupational domains in their lives.

A second self-regulatory strategy for motivation is self-verbalization or self-talk. Some of their own speech motivates people to try new tasks and to persist in difficult situations; other self-talk is unproductive and inhibits our motivation to succeed. One of the most common forms of self-talk is verbal reinforcement or praise following desired behavior. Students can be taught responses like: "Great!, I did it!" or "I'm doing a good job concentrating on my readings!" For years, world-class athletes have been trained to use verbal reinforcement.

More elaborate self-talk training programs are available to help individuals control anxiety, mood, and other emotional responses (see Butler, 1981; Ottens, 1991). These programs are based on the belief that what one says to oneself is an important factor in determining attitudes, feelings, emotions, and behaviors.

Another motivational self-regulatory strategy is arranging or imagining rewards or punishments for success or failure at an academic task. Students who control their motivation by giving themselves rewards and punishments outperform students who do not use this control technique (Zimmerman & Martinez-Pons, 1986).

In summary, to control motivation, students need to set goals, develop positive beliefs about their ability to perform academic tasks, and maintain these beliefs while faced with the many disturbances, distract-

tions, occasional failures, and periodic interpersonal conflicts in their lives. When students realize they are responsible for their own motivation, they may be more willing to initiate strategies to control their motivation.

Methods of Learning

"While reading my textbook, I write important questions to answer." "I use a timeline to recall the dates of major battles in my social studies course."

Another term for methods of learning is learning strategies. Learning strategies are the methods students use to acquire information. Research indicates that higher-achieving students use more learning strategies than do lower-achieving students (Zimmerman & Martinez-Pons, 1988).

Different learning strategies serve different purposes. Think about the large array of tools a plumber brings to each job. If he arrived at jobs with only a few wrenches or pliers, he would not be able to complete many jobs. Just like there are different tools for different jobs, there are different learning strategies for different academic tasks (Levin, 1986). Successful learners also need a large number of "tools" to make schoolwork easier and must know where, when, and how to use them. For example, knowing how to use maps or representations to organize information and being able to generate and answer questions from notes and textbooks are important learning tools. Many students who have difficulty learning in school attribute their problem to a lack of ability when the problem actually may be that they have never been properly taught how to learn. Some students use one or two major learning strategies for all tasks in all courses. These students often do not have the necessary tools to learn the complex material they encounter in their courses. For example, on exams, many teachers ask questions relating to topics that they did not discuss in class. Students must be able to

organize and analyze notes so they are prepared to answer higher-level questions.

Children's thinking changes dramatically as they go through adolescence, particularly their ability to use more advanced information-processing skills and learning strategies (Keating, 1990). These newly acquired skills and learning strategies can allow students to deal with more complex material. Unfortunately, in some middle-level classrooms the intellectual level of content is lower than in elementary classrooms. In these situations, the adolescents' advanced thinking abilities do not help them achieve better in school (Wigfield, Eccles, & Pintrich, 1996). However, as curriculum reforms in middle-level schools take place, "learning how to learn" will become increasingly important.

A wide range of approaches can be taken to teach students how to learn more effectively. There are numerous domain-specific strategies for reading, writing, science, and other academic subjects (see Pressley & Woloshyn, 1995; Scheid, 1993; Wood, Woloshyn, & Willoughby, 1995). Also, a learning strategies curriculum can be developed and implemented throughout a school (see Gaskins & Elliot, 1991).

We have found that teaching students some basic information about the information-processing model of human memory helps them understand why it is important to consider different ways to learn. By pointing out that the purpose of learning is to get information into one's long-term memory, we can discuss the many ineffective study strategies students use and introduce different types of learning strategies such as rehearsal, elaboration, and organizational strategies (Weinstein & Mayer, 1986).

Rehearsal strategies can be effective in some types of learning. Copying material, taking verbatim notes, reciting words or definitions, and underlining material in handouts are all examples of rehearsal strategies. However, these strategies make few connections between the new information and

the knowledge one already has in long-term memory. If the information is not connected to anything when it is stored in long-term memory, it is difficult to retrieve.

Elaboration strategies for more complex learning from texts include paraphrasing, summarizing, and creating analogies and generating and answering questions. We find that most students do not know how to prepare for exams and do not generate and answer questions as part of studying.

Finally, psychologists have found that it is difficult, and sometimes impossible, for humans to learn unorganized bits and pieces of information (e.g., definitions, dates, names, ideas) without imposing patterns of organization on the information (Gaskins & Elliot, 1991). By organizing information, connections and interrelationships are made within a body of new information. Learning is facilitated when a learner becomes aware of the inherent organizational structure of new material or imposes an organizational structure on the material when no such structure initially exists. A body of new information to be learned is stored more effectively and remembered more completely when it is organized (Ormrod, 1998).

The primary organizational strategy we teach in our middle school learning strategies program is representation or mapping. Students are asked to identify material in their textbooks and then to develop four possible representations for the material—hierarchies, sequences, matrices, and diagrams (see Kiewra & DuBois, 1998, for a detailed explanation on teaching representations).

In summary, one of the most important purposes of education is to increase students' potential for learning both in and out of school. Learning how to learn can provide students with the critical tools for life-long learning.

Use of Time

"I keep a weekly calendar of my activities." "I start study-

ing at least 1 week before exams."

The term "time management" is somewhat misleading, because everyone has the same, unchangeable, 24 hours in a day. People can only manage how they use this time. Therefore, the key factor in time management actually is prioritizing activities each day. Our work developing programs to improve the self-regulatory behavior of middle school students has shown that time management and procrastination are among the major problems students, parents, and teachers identify. Unfortunately, little research on time management and procrastination has been conducted with adolescents.

In discussing the importance of time management, Smith (1994) states: "You control your life by controlling your time" (p. 19). This statement best explains why time management is an important component of self-regulation. The development of time management skills shows a strong correlation with higher secondary (Fulgini & Stevenson, 1995) and college academic achievement (Zimmerman, Greenberg, & Weinstein, 1994), increased self-esteem (Ferrari, 1991, 1994), lower levels of learned helplessness (Kleijn, Van der Ploeg, & Topman, 1994), increased sense of competence (Higbee & Dwinell, 1992), and an internal locus of control (Ferrari & Emmons, 1994).

As adolescents make the transition from childhood to adulthood, they begin to establish their own identity. With a more independent identity comes an increasing awareness and need to accept responsibility for one's own actions and their consequences. During this transition, students are expected to take more responsibility for managing their time. Most teachers give students greater autonomy in selecting and completing academic assignments and in using their classroom study time as they advance in grade level.

Erikson (1968) points out that most adolescents are provided with a psychosocial moratorium, a period of delay that society

grants to individuals who are not ready to meet obligations. This moratorium allows young people to try different identities and to fail or have difficulties but to have protection from many of the consequences of their actions. It may be a time of adventure, academic study, troublesome pranks, wandering, or social action.

The demands of school often provide a context for adolescents to develop their own moratorium at a time when greater productivity is called for. Adolescents who experience (whether real or imagined) little freedom of choice in their lives and feel controlled by their parents or teachers may resist adult demands by procrastinating. This form of passive resistance is used to define themselves as independent from others. Therefore, the extent to which adolescents desire more control over their lives (Lee, 1979) can influence the way they view and manage their time.

Another reason adolescents may directly or indirectly refuse to fulfill certain adult demands may reflect differences in goal orientations. Wentzel (1992) has pointed out that students have both academic and nonacademic goals (e.g., social approval, conformity, and interpersonal relationships) in school. Parents and teachers need to understand that, at different times, adolescents give nonacademic goals priority over academic goals.

It is important to indicate to adolescents that improved time management can help them complete school and personal tasks more efficiently so there is more time for the activities they enjoy most. We find that this approach enhances their motivation to deal with time management and procrastination issues. The improvement of time management skills can be organized around three questions: How do I currently use my time? How do I want to use my time? How can I improve my control of my time?

Improving student time management first involves getting students to develop greater awareness of their current time usage. We ask students to record their activi-

ties 24 hours a day for 1 week. After this, they are asked to organize their time use by category (e.g., eating, sleeping, sports, studying, watching television, speaking on the phone, and so on) and then to discuss differences in time usage with their peers. This activity initiates discussions about how much time is wasted and how students often underestimate the time they need to complete assignments. Most important, they realize how inefficient they are with their use of time.

We then ask students how they want to use their time. The purpose of this discussion is to help them understand the extent to which their use of time is related to their personal values and goals. Students are asked to write personal and academic goals for the year. The discussion during this phase also helps students gain greater insight into the choices they have over their time, especially when they are asked to estimate the time needed to complete various types of activities in and out of school.

Next, they are asked to plan their use of time for 1 week and to evaluate the plan at the end of this period. We ask students to list all the activities they must complete and to prioritize them into lists of A (most important), B (less important), and C (to be completed after activities in A and B are completed). The prioritized activities are then placed in each student's schedule for the week.

The final step in the process is to ask students to report on the success or failure of their new approach to time management. An important part of this process is to get students to modify their plans.

Teachers can help students use their time better by considering the nature and importance of assignments given to them. For example, excessive or irrelevant homework assignments require time usage that may not be helpful in attaining academic goals. Also, teachers can help students complete task analyses of assignments and help them estimate the amount of time needed for each task. Finally, individual assign-

ments or contracts may help certain students deal with the time demands required by the many responsibilities in their lives.

No matter how much attention is given to managing time, procrastination is still a way of life for many students. Ellis and Knaus (1977) estimate that nearly 95% of all students procrastinate. These students needlessly postpone tasks they are capable of doing. Research demonstrates the strong correlation between procrastination, deficient time management skills, and corresponding academic failure (Beswick, Rothblum, & Mann, 1988; Flores, Schloss, & Alper, 1995).

Ferrari (1991) posits that although procrastination may often be self-defeating, this behavior may also be in one's own self-interest and, therefore, logical. He divides procrastination into two categories, functional and dysfunctional, and suggests that it is only dysfunctional when penalties are imposed on the procrastinator. In fact, he suggests that procrastination is a way for students to protect their identity from failure. That is, if a student procrastinates and obtains a poor grade, he or she cannot attribute the poor grade to a lack of ability because the individual can reason that he or she did not have sufficient time to complete the assignment.

Two types of strategies can be used to deal with procrastination. The first type involves taking some action to reduce or eliminate the tendency to procrastinate. Ellis and Knaus (1977) provide some useful strategies including "the bits-and-pieces approach," that is, setting a goal to work on a task for a short time. For example, rather than ignore a paper assignment, a student can commit to completing one or two pages per day. Another useful strategy is "the 5-minute plan": agree to work on a task for 5 minutes. At the end of 5 minutes decide whether to work on it for another 5 minutes. Often momentum builds as one nears the end of the first 5 minutes so that one wants to maintain focus on the task.

The second strategy is an extension of

self-talk procedures whereby one attempts to challenge and change some of the misperceptions that lead to procrastination (Ferrari, Johnson, & McCown, 1995). Some misperceptions increase anxiety about a task and lead to a feeling of futility or hopelessness regarding the ability to complete the task, for example, "It's too late to complete this task." A challenge to this belief would be: "It is never too late to begin. If I get started now, I can make progress on the task."

Other misperceptions are characteristic of individuals who are not conscientious about completing tasks, for example, "I do my best work when I do it at the last minute." A challenge to that belief is: "I fool myself in thinking that I do a good job at the last minute, when the truth is, I never have any time to rewrite the paper. My concern is getting the assignment done, not determining how I can get a good grade."

In summary, time management and dealing with procrastination are critical self-regulatory skills that have important implications for determining both academic and nonacademic outcomes. As adolescents learn how to estimate the amount of time needed for different tasks and to plan the time to complete them, they learn important skills that will serve them well throughout their lives.

Control of the Social Environment

"When I find that I don't understand some material, I ask my teacher to explain it." "I organize a study group before an examination."

Self-regulatory learners, like any other students, often realize that they have difficulty learning or achieving their goals. When these conditions occur, they take charge of their learning by seeking assistance from others to remedy the situation. Self-regulation of the social environment relates to the ability of learners to determine when they need to work alone or with others, or when it is time to seek help from in-

structors, tutors, peers, or even nonsocial resources (such as reference books).

At one time, help seeking was viewed as an indication that students were incompetent, dependent, or immature. More recently, researchers have come to view help seeking as an adaptive strategy, especially when it is used to overcome difficulties in order to achieve mastery and autonomy in learning (Schunk & Zimmerman, 1994). The task for teachers and schools is to help students develop the necessary skills involved in seeking help. Knowing when and how to interact and work with others is an important lifelong skill that can affect an individual's academic, social, and occupational success.

Establishing a goal for developing social competencies in middle-level schools is not only important for learning how to seek help and work cooperatively to enhance academic performance but also for improving students' school adjustment and retention. Being rejected by one's peers, or having difficulty interacting appropriately with them, is a significant predictor of poor school adjustment and a factor in determining whether an adolescent will drop out of school (Parker & Asher, 1987). Furthermore, the nature of children's relationships with their peers also appears to be related to their emotional and motivational responses in school (Wentzel, 1991).

As students progress through elementary school, they acquire more positive attitudes about seeking help. However, with age and the transition to middle school, there also is an increased concern for evaluating one's own academic performance in relation to one's peers. Thus, thoughts, fears, and embarrassment about the potential costs of asking for help and looking dumb become more prominent in students' decisions about whether to seek help (Newman, 1990; Newman & Schwager, 1993). These concerns can be detrimental to academic success, especially in courses like science and mathematics where assistance frequently is needed. The issue for some

adolescents is not that they do not know they need help but that they do not choose to seek it!

The decision to seek help is influenced by both personal and environmental factors. Personal factors include students' perceptions of their academic and social competencies, the nature of their achievement goals (i.e., mastery vs. performance), and attitudes (i.e., perceived threats and benefits regarding help seeking) (Ryan & Pintrich, 1997). Environmental factors include teacher behaviors and classroom practices (Newman, 1998).

Students' self-perceptions are important factors in predicting help-seeking behaviors. Students who lack confidence in their social and cognitive abilities are more likely to feel threatened when asking their peers for help and more likely to avoid seeking help than students who are confident in their social and cognitive abilities. Also, high-achieving students are more likely than low-achieving students to seek help from instructors (Newman & Schwager, 1992). The research clearly indicates that students who need help the most are least likely to seek it (Karabenic, 1998; Zimmerman & Martinez-Pons, 1988).

Educators have found that different classroom goals (i.e., mastery and performance) are associated with different achievement-related behaviors such as persistence, effort, and the use of more advanced learning strategies. Students with a mastery orientation are more likely to view help seeking as a useful strategy that can help them learn more successfully. In contrast, students with a performance orientation, who are more concerned with achieving higher than others, are more likely to believe that help seeking may incur negative reactions from others. The important point to consider is that students' attitudes about help seeking are related to the achievement goals they pursue (Ryan & Pintrich, 1997).

Teacher behavior also is an important factor influencing students' help-seeking

behavior. For example, students' attitudes and behaviors are shaped by teachers who show that they value help seeking by encouraging questions and providing feedback, demonstrating that question-asking is beneficial, and modeling appropriate ways for students to ask for clues rather than answers (Arbreton, 1998).

The classroom environment can provide the structure and support to encourage (or impede) self-regulatory behaviors (Deci, Vallerand, Pelletier, & Ryan, 1991; McCaslin & Good, 1992). Therefore, middle schools that emphasize competition, social comparison of grades, and ability tracking (i.e., schools that establish performance goal orientations) often unintentionally reinforce the reluctance of many students to seek assistance in class (Newman & Schwager, 1992).

Many students may not benefit from help from peers because they lack what Sheridan and Walker (1999) call social skillfulness, the learned behaviors that allow them to interact and function successfully in a variety of social contexts. A number of strategies for training students in these skills can be implemented. The strategies are designed to teach students better interpersonal behavior and skills for functioning more successfully in the classroom:

- Having students model exemplary behavior such as self-control, sharing, and cooperation.
- Giving students the opportunity to practice or role-play appropriate behavior.
- Using positive reinforcement to teach new social skills and to maintain the frequency of previously acquired skills.
- Using cognitive behavior modification such as self-instructional training to emphasize the development of specific thinking skills (self-statements) to guide one's behavior in social situations.

Another cognitive technique teaches students to recognize problem situations and to stop and think before acting. In essence, students are taught to interrupt their habitual nonproductive, or self-defeating, thought patterns and instead engage in more positive and productive thought processes that will guide them through problem situations (Bash & Camp, 1980) (e.g., What is the problem? What is my plan? Am I using my plan? and How did I do?).

Small-group activities can also facilitate help seeking (Newman, 1998). However, it is not sufficient merely to use small-group activities; students must also be taught the necessary skills for working more effectively in groups. Cohen (1994) has identified conditions whereby the use of small groups in the classroom can be more productive. More specifically, she suggests how desirable kinds of interaction may be fostered.

Johnson, Johnson, and Holubec (1994) have identified four categories of important skills used in group settings—forming, functioning, formulating, and fermenting skills. Forming skills are needed for organizing the group and for establishing minimum norms of appropriate behavior. Functioning skills involve the managing and implementation of the group's efforts to complete tasks and to maintain effective working relationships among members. Formulating skills are directed at helping group members understand and remember the material being studied in the group. Finally, fermenting skills are used to stimulate academic controversy so that group members will rethink and challenge each other's positions, ideas, and reasoning.

In summary, learning social skills for different contexts is not merely a nonacademic outcome, because these skills have important implications for learning in classroom environments. For this reason, it is important that teachers begin this instruction in the elementary school and maintain it through high school.

Control of the Physical Environment

"I turn off the TV or stereo so I can concentrate on what I am doing." "I ask students not to talk to me when I am completing assignments in class."

Another important aspect of self-management is the ability of learners to restructure their physical environments to meet their needs. Zimmerman and Martinez-Pons (1986) found that high achievers reported greater use of environmental restructuring than did low-achieving students. For the most part, environmental restructuring refers to locating places to study that are quiet or not distracting. Although this task may not appear difficult to accomplish, it poses many problems for students who either initially select inappropriate environments or cannot control the distractions once they occur.

We ask students to rate different study environments and then compare their behaviors in these settings (e.g., library, kitchen table, bedroom, and studying alone and with others). Most importantly, we ask them to determine the best environment and to consider what they can do to change their study environments.

An important aspect of discussing changes in study environments with students focuses on identifying different types of distracters that interfere with attention and concentration (Ottens, 1991). One way of classifying distracters is to determine whether they are internal (e.g., personal concerns or anxiety) or external (e.g., noise or interruptions) and whether they tend to occur in certain situations (e.g., tests or lectures) or locations (e.g., studying at home or school or library). Students can then be taught strategies to improve concentration by learning how to deal with different types of distracters (Dembo, 2000).

Another approach to environmental self-regulation that needs attention is learning to function more effectively in the classroom physical environment. Rivlin and

Weinstein (1984) believe that "we need attention to the school as *place*, as a physical entity and continuing experience in children's lives" (p. 360). Weinstein (1979) studied how classroom environments influence student behavior, attitudes, and achievement by investigating such factors as seating position, classroom design, density, privacy, and noise. Over 30 years ago, Jackson (1968) described the difficulties of learning in a typical classroom by pointing out how a student must learn to live in crowded conditions and to wait for a significant portion of the day.

Control of one's physical environment also can be used as a strategy for regulating emotions and other self-perceptions (Korpela, 1989; Swann, 1983). For example, favorite places in childhood and adolescence may provide respite from daily pressures as well as feelings of well-being, peace, and comfort (Sommer, 1990). Korpela (1992) provided self-report data to indicate that adolescents use favorite places to regulate unpleasant and pleasant feelings. This research emphasizes the importance of considering the effects and design of the physical environments serving adolescents.

Finally, although educators are attempting to improve learning environments in middle-level schools (Midgley & Edelin, 1998), some environmental conditions that may not be conducive to effective learning will always exist. Students should be taught strategies for overcoming obstacles to learning that occur in a variety of classroom conditions and climates. For example, knowing how to seek help from teachers and peers and knowing how to work cooperatively can be important self-regulatory strategies for students who find themselves in competitive and/or nonsupportive environments.

Performance

"I know what I know and I know what I don't know." "I evaluate the results of each of my exams to determine how I

can better prepare for future exams."

If an important goal of education is to produce individuals who are capable of educating themselves, then students must learn to manage their lives by setting their own goals, evaluating their progress, and making the necessary changes to attain these goals. Whether writing a paper, completing a test, or reading a book, students can learn how to use self-regulatory processes to improve their performance. One important function of a goal is to provide an opportunity for students to detect a discrepancy between it and their present performance. This analysis enables them to make corrections in the learning process. When students learn to monitor their work under different learning conditions (e.g., test taking and studying), they are able to determine what changes are needed in their learning and studying behavior. The fact that successful students tend to be aware of how well they have done on a test, even before getting it back from an instructor, indicates the importance of monitoring performance (Zimmerman & Martinez-Pons, 1988).

In most classrooms the teacher assumes responsibility for monitoring students' performance. The task is to determine how to shift from a teacher-directed to a more student-managed learning environment. Academic independence occurs when students learn how to regulate their own behaviors so they can control the outcome of their performance.

Zimmerman et al. (1996) developed a cyclical approach to self-regulation that can help students control their behavior. The following discussion is an adaptation of their model that involves four interrelated processes. The first step is *self-observation and evaluation*. It occurs when students judge their personal effectiveness, often from observations and recordings of the results of prior performances. Encouraging students to identify errors on exam papers and to keep journals about their learning

and study behavior are examples of how students can be encouraged to self-observe and evaluate their performances.

Think about expert performers in a variety of fields. In sports, elite athletes begin observing their performances by viewing videotapes. After a short time, they are able to modify their performances from the feelings and feedback they obtain by viewing their own physical movements. Dance studios place handrails next to mirrors to enable students to self-observe as they practice their routines. Musicians learn to listen to their playing in order to critique their own performances (Glaser, 1996). The key point is that behavior cannot be managed unless individuals are aware of it.

Since self-awareness provides the basis for goal setting and behavior change, it is essential that students' observations and consequent evaluations be based on accurate appraisals of themselves. Zimmerman et al. (1996) point out that accurate self-knowledge enables individuals to select activities that are appropriate for their level of skill and provides a foundation on which to grow and change.

A common defense that interferes with accurate self-assessment is the need for self-enhancement or the need to maintain a positive sense of self (e.g., "I don't have any problems with time management") (Taylor & Brown, 1988). This behavior is particularly acute following failure or the threat of negative feedback when the student employs habitual self-enhancement strategies (Tesser, 1988). Another aspect of both adult and adolescent behavior is the tendency to use "downward comparison" in evaluating oneself (e.g., "Well, everyone else failed the quiz"). If the goal is self-improvement, downward social comparison can be detrimental to behavior change (Taylor, 1996).

Another factor interfering with accurate self-assessment is what Elkind (1984) identifies as the imaginary audience—the feeling by adolescents that every eye is on them. The imaginary audience may explain

why adolescents often have an exaggerated feeling of self-consciousness. Unfortunately, such intense introspection may cause adolescents to experience threats to their egos, causing them to make inaccurate appraisals of themselves. That is to say, accurate self-observations are masked by the concerns of how one is viewed by others.

Once students understand the nature of their deficiencies, they can then move to the second step in the cycle—*goal setting and strategic planning*. This is where students analyze the learning task, set goals, and develop a plan or strategy to help them attain their goals. Take the example of improving performance on writing a paper. When given the task of writing a paper, students should start by analyzing their strengths and weaknesses and then analyze the assignment to determine the nature of the paper and what needs to be done. Next, they should establish a goal for completion and a number of subgoals (e.g., locating necessary references and proofreading) for completing the sections of the paper. Once the subgoals are identified, they should develop a strategy for completing each of them.

The third step in the cycle is *strategy implementation and monitoring*. This step focuses on the effectiveness of the learning strategy. A student should ask the following types of questions: Is the strategy working? Am I attaining each of my goals in completing the paper? Am I learning the necessary content for my exam? If a strategy is working, the students should maintain their current behavior. If not, they must consider what needs to be done to change their behavior.

Sometimes during strategy implementation and monitoring, students recognize the need to change or modify a goal. For example, a student may realize that he or she is no longer interested in researching a topic and decide to renegotiate the assignment with the teacher. Often, goal modification leads to greater learning than at-

tempting to attain a goal that no longer makes sense.

When an individual learns anything new, there is a tendency to revert to familiar methods (even though they may be less successful). This happens to athletes, dancers, and students. Therefore, performers and learners need to monitor their behaviors closely and determine whether they are applying new strategies appropriately. This monitoring may indicate a need to adjust the learning strategy to improve progress toward attainment of the goal. A student may even decide that it is time to seek help.

All students need to learn “fix-up” strategies to remedy learning problems. That is, they need to learn what to do after they find that they do not understand certain content. Often, students need to use different study methods or learning strategies (e.g., asking and answering questions) instead of continuing with an ineffective strategy (e.g., simply rereading the textbook).

The final step in the cycle is *strategic-outcome monitoring*. This step involves expanding monitoring to include performance outcomes. Students must answer the following questions: Did the learning plan or strategy help me attain my goal? Did I have to make changes in my learning and study methods?

The cycle is repeated as self-observation is used to evaluate one’s performance. A self-regulated learner is constantly monitoring learning outcomes to determine whether different strategies are needed to attain goals and maintain a high level of academic success.

These four steps in the self-regulatory cycle can be used to help students solve their own academic problems. Students can be given assignments whereby they are asked to identify a learning problem and conduct their own self-management study to develop and implement a plan to solve their problems. In time, students can learn how to take responsibility for their own learning.

Issues in the Development of Self-Regulatory Behavior

Although we have focused on the responsibility of students in promoting their own learning, teachers must be aware of their responsibility in the teaching-learning process. Teachers must provide the context in which self-regulatory skills can be taught and developed. Therefore, the traditional guidelines for effective instruction such as concise goals and objectives, varied instructional methods, and valid and reliable assessment procedures are important in self-regulatory instruction. Most important, the notion of self-regulation should not be used to blame students for their poor performance when instruction is inadequate or when students are not taught how to become self-regulatory learners.

Despite teachers' good intentions, students vary greatly in their willingness to change their academic behavior and become more self-regulatory learners. Some students change their learning and study habits immediately, others take weeks, and still others never change. We have found that even though some students understand how to learn more successfully, they often fail to change their behavior. One of the most important research questions that needs to be answered is, What factors determine individual differences in the acquisition of self-regulatory behavior?

Prochaska, DiClemente, and Norcross (1992) have developed a model of change that applies to a variety of problematic areas such as substance abuse, anxiety, depression, and weight control. If one considers inappropriate or ineffective learning and study behavior as a form of addictive behavior, this change model may be worth exploring in educational settings.

The researchers identify six stages of change: precontemplation, contemplation, preparation, action, maintenance, and termination. Based on their research, individuals proceed through these stages at different rates and levels of success. The key to successful change is understanding the spe-

cific stage one is in and the tasks or processes that must be engaged in to move through it. Note that action is the *fourth* stage in the model. Prochaska, DiClemente, and Norcross (1994) state that "fewer than 20 percent of a problem population are prepared for action at any given time. And yet, more than 90 percent of the behavior change programs are designed with this 20 percent in mind" (p. 15).

The implication of the work by Prochaska and his colleagues for education is that more attention should be given to the first step in the cyclical model of self-regulation—self-observation and evaluation. Students must become aware of how their current learning and study strategies influence their learning. Therefore, before teachers attempt to change students' behavior, they should help them see the need for change and encourage them to attempt some new learning and study strategies.

A variety of study skills assessments can be used for observation and evaluation. We use the Learning and Study Strategies Inventory—High School Version (Weinstein & Palmer, 1990). Students assess themselves on 10 scales and compare their scores with a normative group of students in the same grade level. We then discuss the implications of, for example, high anxiety, poor time management, or test strategies for academic performance. These discussions encourage students to observe and evaluate their own behavior and motivate them to learn how to change their behavior.

Teachers also can devise their own checklists on study skills for self-observation and evaluation for both pre- and post-assessments (e.g., Do you attempt to control distractions around you? Do you set goals for what you plan to accomplish each time you study? Do you generate and answer questions as you read?). If students are provided with the criteria for academic self-regulation, they can be taught how to evaluate their own performance and progress.

Conclusion

Educational reforms in middle-level schools have focused primarily on structural changes in school organizations. These changes have led to improved learning climates where adolescents report more caring and better interpersonal relations with teachers and peers (Midgley & Edelin, 1998). However, many educators (e.g., Cuban, 1992; Mergendoller, 1993) have pointed out that more attention needs to be given to the quality of instruction if student learning is to be improved.

Of course, curriculum changes and improved teacher education are critical factors in the improvement of student learning. However, we have argued in this article that educators should not neglect the role of the student in promoting his or her own learning. Schools should communicate to both parents and students that no one has more control over a student's success than the student himself or herself.

No matter how successful educational reforms become, there always will be schools, classroom environments, and teachers who are not responsive to the needs of certain students. Therefore, educators must teach students how to take charge and attempt to overcome obstacles to their educational and personal goals.

We have discussed the academic self-regulatory dimensions identified by Zimmerman and his colleagues—motivation, methods of learning, use of time, control of one's physical and social environments, and performance. Each of these dimensions influences students' academic achievement. Therefore, when the editor of this journal (Good, 1999) asked contributors to present arguments for outcomes of schooling beyond subject-matter achievement, it was necessary for us to urge educators to consider the importance of academic self-regulation.

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