

**Exhibit Materials for Taylor W. Acee:
Book Chapter**

Weinstein & Acee (2013). Helping college students become more strategic and self-regulated learners. In H. Bembenutty, T. J. Cleary, & A. Kitsantas (Eds.) *Applications of self-regulated learning across diverse disciplines: A tribute to Barry J. Zimmerman* (pp. 197-236). Charlotte, NC: Information Age Publishing.

Summary: This scholarly publication on strategic and self-regulated learning is an example of my continued scholarly activities as Co-Principal Investigator on a number of research and developmental projects with my mentor from graduate school, and research partner, Dr. Claire Ellen Weinstein. This manuscript was published in a respectable book honoring one of the most prolific scholars in the field of self-regulation and educational psychology, Dr. Barry J. Zimmerman. I have not yet received my copy of the book, but I included an e-mail from the primary editor indicating that the book was indeed published. I also included the full manuscript.

From: Hefer Bembenutty [bembenuttyseys@yahoo.com]
Sent: Thursday, March 21, 2013 2:19 PM
To: Acee, Taylor W.; claire weinstein
Subject: Re: Letter of Recommendation

Hi Claire and Taylor,

This past Monday, my graduate students and I discussed your chapter. The students understood your chapter and they liked it. The good thing is that they could use your ideas to develop a classroom intervention. In sum, they liked it a lot, but not so much as my chapter (ha, ha, ha).

The citation of your chapter is (you should have received a copy of it from the publisher):

Weinstein, C. E., & Acee, T. A. (2013). Helping college students become more strategic and self-regulated learners. In H. Bembenutty, T. J. Cleary, & A. Kitsantas (Eds.), *Applications of self-regulated learning across diverse disciplines: A tribute to Barry J. Zimmerman* (pp. 197-236). Charlotte, NC: Information Age Publishing.

Regards, Hefer

Helping College Students Become More Strategic and Self-Regulated Learners

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Theory and research on learning strategies within cognitive educational psychology and both strategic and self-regulated learning have suggested that humans can improve their learning and create more meaningful and retrievable memories by using learning strategies to actively process the information they are trying to learn (Mayer & Alexander, 2011; Paris & Paris, 2001; Weinstein & Mayer, 1986; Woolfolk, 2009). The American Psychological Association (VandenBos, 2007) defined a learning strategy as “a mental or behavioral strategy used to facilitate learning, such as forming a mental image, organizing items, searching for existing associations, or practicing retrieval (p. 530).” Researchers and educators who focus on strategic and self-regulated learning (two highly related but distinct conceptions) also generally agree that learning strategies involve the proactive and planful use of cognition, metacognition, motivation, affect, and behavior to facilitate learning and the successful performance of complex cognitive tasks, such as critical thinking and problem solving (see Zimmerman & Schunk, 2011). Contemporary theory and research place learning strategies within interactive and dynamic models of strategic and self-regulated learning that emphasize the importance of students taking more responsibility for their own learning (Pintrich, 2000, 2004; Weinstein, Acee, & Jung, 2010; Weinstein, Husman, & Dierking, 2000; Zimmerman, 2000, 2011). Fostering both strategic and self-regulated learning is essential for developing lifelong learners who can survive and thrive in diverse educational settings and workplace training environments.

The exploding enrollments in higher education in the United States, as well as the large percent of new and continuing students who are not academically ready to succeed and thrive in college-level classes (Aud, et al., 2011), has led to broader definitions of what it means to be “college ready” (Conley, 2007) and an increasing focus on strategic and self-regulation interventions to help students succeed in their studies (Weinstein, Acee, & Jung, 2011). A recent national report on the high school graduating class of 2010 suggested that, based on ACT score benchmarks, only 43% of the students were prepared to take college algebra, and only 66% were prepared to take college English composition (ACT, 2010).

In order to help students develop basic skills necessary to succeed in college, institutions often require them to take developmental education (DE) courses in reading, writing, and/or mathematics before they can enroll in credit-bearing college courses (Arendale, 2010). Although teaching students basic content knowledge and skills in reading, writing, and math is necessary, research shows that these courses alone are insufficient to help students who are underprepared for college-level work succeed academically (Bailey, 2009; Conely, 2007). National data indicate that 36% of entering college students enroll in at least one DE course (Aud, et al., 2011), and the passing rates in these courses are dismal (Parsad, Lewis, & Greene, 2003; Russell, 2008). Consequently, policymakers in Washington have identified the improvement of DE as a major national challenge, especially for 2-year colleges because they have much higher enrollments of students who are underprepared for college-level work (Russell, 2008). One method for helping these students that has been gaining popularity in higher education is to integrate study skills, learning strategies, and other areas within strategic and self-regulated learning content into various facets of post-secondary institutions (e.g., learning assistance centers, tutoring and mentoring programs, and faculty development).

Among the many areas his work has influenced, Barry Zimmerman has had a profound effect on theory, research, and applications related to the self-directed use of learning strategies among college students. His model of self-regulated learning (SRL) (Zimmerman, 2000, 2011) highlights cyclical phases and self-regulatory processes that underlie students' intentional selection, implementation, and evaluation of learning strategies. Barry's early research in this area helped to define SRL processes related to learners' motivation, metacognition, and behavior, and established relationships between SRL processes and academic performance (Zimmerman, 1986b, 1989, 2008, 2011; Zimmerman & Bandura, 1994; Zimmerman & Martinez-Pons, 1986, 1988). His pioneering work on SRL has helped to lay a solid foundation for current research on college students' intentional use of learning strategies and the development of applications for teaching students to use learning strategies. Zimmerman's model of SRL has also greatly influenced Weinstein's Model of Strategic Learning (Weinstein et al., 2010; Weinstein et al., 2000) and many of the applications she uses in her strategic learning course to teach college students how to choose and use a wide range of learning and self-regulation strategies effectively. The genealogy of her model began in the mid 1970s (Weinstein 1975; 1978) and has undergone a number of transformations. In the more recent versions of the model, part of the added emphasis on the self-regulation component was clearly influenced by Zimmerman's model (2000, 2011).

In this chapter we discuss the progression of learning strategies research in educational psychology and the development of interactive dynamic models of strategic and self-regulated learning. We describe Weinstein's Model of Strategic Learning, compare it to Zimmerman's model of self-regulated learning, and discuss the utility of these models for helping students survive and thrive in postsecondary educational settings. We also overview types of

interventions and initiatives designed to help foster college students' strategic and self-regulated learning and describe Weinstein's strategic learning course and several of the applications developed by Weinstein and her colleagues to help students become more strategic learners. Finally, we end on a personal note from the senior author about a dear and wonderful friend, colleague, mentor and teacher...Barry Zimmerman.

Linking Strategic and Self-Regulation Interventions with Zimmerman's Theory and Research

Reflecting on Zimmerman's work and its importance to incredibly diverse fields in education, psychology and medicine, it is astounding in its conceptual, empirical and applied scholarship. In addition, this work has had profound influences on the work of so many researchers and practitioners, expanding his impact geometrically. This is no less true for the work I and my colleagues and many of my graduate students have completed over the years. Although the development of the Model of Strategic Learning predates the development of Zimmerman's work in self-regulation, it is an evolving model and has incorporated a number of his ideas about self-regulatory processes and strategies.

Our specific research focus related to Zimmerman's work has been in the area of learning strategies and the continuing development of the self-regulation component of the Model of Strategic Learning (MSL; Weinstein et al., 2010; Weinstein et al., 2000), an assessment of strategic learning, the Learning and Study Strategies Inventory (LASSI; Weinstein, Schulte & Palmer, 1987, 2002), and the development of models for implementing strategic learning interventions in college contexts. A description of Zimmerman's (2000, 2011) model of self-regulation is beyond the scope of this chapter, however, we will briefly compare Weinstein's MSL and Zimmerman's model of self-regulation and discuss how learning strategies fits within

Zimmerman's model. Then, we will go on to describe Weinstein's MSL, assessment instruments, and interventions in more detail.

Weinstein's Model of Strategic Learning (see Figure 1 as well as Weinstein et al., 2010; Weinstein et al., 2000) and Zimmerman's Model of Self-regulation (2000, 2011) are complementary, they just differ in scope and emphasis. Both models emphasize factors that learners can intentionally use or modify to improve their learning such as students' attitudes, beliefs, goals, and their use of strategies related to information processing, comprehension monitoring, motivation regulation, goal-setting, self-observation, and self-reflection. Zimmerman's model is centered on the cyclical process of self-regulation and the various self-regulatory processes and strategies learners can use to manage their motivation, metacognition, and behavior. Weinstein's model emphasizes interactions among the skill, will, and self-regulation, and academic environment components of strategic learning and the importance of developing and using a repertoire of strategies related to each component. Weinstein's model is an emergent model of strategic learning (successful learning is what emerges in the interaction of skill, will, and self-regulation elements within an academic and classroom environment much like a gestalt), and Zimmerman's model is a cyclical process model of self-regulation that is situated within a social-cognitive perspective that emphasizes reciprocal interactions among personal, environmental, and behavioral factors.

Students' use of cognitive learning strategies is an important aspect of both strategic and self-regulated learning. The skill component of the MSL is strongly focused on cognitive learning strategies and differentiates the following forms of strategy knowledge:

- declarative knowledge - knowing about a variety of learning strategies,

- procedural knowledge - knowing how to effectively and efficiently use a variety of learning strategies
- conditional knowledge - knowing when and under what circumstances it may be useful to use particular learning strategies

Zimmerman's model of self-regulation addresses students' use of cognitive learning strategies to successfully complete learning tasks. Zimmerman's (2000, 2011) model of self-regulation highlights three cyclical phases of self-regulation (forethought, performance, and self-reflection) and subprocesses of self-regulation that fall under each phase. The forethought phase involves subprocesses related to task analysis and self-motivation beliefs; the performance phase concerns subprocesses related to self-control and self-observation; and the self-reflection phase addresses subprocesses related to self-judgment and self-reaction.

Strategic planning is an important subprocess of the forethought phase in Zimmerman's model. Strategic planning involves learners setting intentions for using specific study methods and learning strategies to help reach their goals. For example, a college student studying for a quiz covering material in a textbook chapter in her history course may generate a strategic plan to use the following learning strategies: (a) generate a written summary of each section of the chapter, (b) create a concept map of the important information discussed in the chapter, and (c) generate and answer possible quiz questions. According to Weinstein's MSL, students' declarative knowledge of different types of learning strategies, in addition to their conditional knowledge about which learning strategies would be particularly effective on the task at hand, play important roles in generating a successful strategic plan. Students' actual use of learning strategies comes into play during the performance phase of self-regulation.

Task strategies, imagery, self-instruction, and attention focusing are types of self-control subprocesses identified in the performance phase of Zimmerman's model. Some of these subprocesses, particularly task strategies and imagery, correspond to learning strategies that are discussed under the skill component of Weinstein's MSL (e.g., information processing strategies, selecting main ideas, note-taking, and test-taking strategies). During the performance phase, students' procedural knowledge and skill at effectively and efficiently implementing learning strategies and other task strategies is particularly important. For example, most college students know that note-taking is an important strategy to incorporate into their strategic plans to learn and remember information for their courses. However, students do not necessarily know how to take useful notes that include active processes such as generating examples, relating new information to prior knowledge, and summarizing. Knowing what to do is particularly important in the forethought phase whereas knowing how to do it is essential in the performance phase. Zimmerman's model suggests that through self-observation (e.g., metacognitive monitoring and self-recording), students can become aware of their needs and refine their procedural knowledge of learning strategies as they implement them on a task. Similarly, Weinstein's model highlights comprehension monitoring and self-testing as important metacognitive strategies that involve setting up check points to assess the extent to which successful learning occurred and, if necessary, making modifications to improve students' strategic approaches.

The self-evaluation sub-process of the self-reflection phase involves students' reflecting on their performance and learning from their successes and mistakes. Students can generate new knowledge and modify their existing knowledge about the effectiveness of different study methods and learning strategies for different content areas and different academic tasks. This information can then be used during future strategic planning, hence the cyclical nature of self-

regulation. Research on self-regulation and learning strategies has suggested strong associations among motivation, self-regulation, use of learning strategies, and performance (Pintrich & De Groot, 1990). For example, there is evidence that using learning strategies mediates the relationships among motivational constructs, such as self-efficacy and goal orientations, and performance (Al-Harthy, Was, & Isaacson, 2010; Diseth, 2011; Fenollar, Roman, Cuestas, 2007; Sins, van Jolingen, Savelsberg, & van Hout-Volters, 2008).

Learning Strategies

Progression of learning strategies research

Human's desire to understand the world around them, remember information important for their survival, and teach this information to their children can be traced back to prehistoric times. For instance, some anthropologists believe that cave drawings were in part used to keep track of animal migrations, seasonal weather patterns, and to teach culture and safety to children. However, it was not until the 1970s that researchers began systematically investigating strategies that humans could use to more effectively learn and remember information. Early research on cognitive learning strategies showed that learning and memory could be enhanced through the use of rehearsal, elaboration, and organizational strategies on basic and complex tasks (Weinstein & Mayer, 1986). For example, Weinstein (1975; 1978) found that students could be trained to use general learning strategies that were not tied to a specific subject area, and that the use of these strategies could enhance learning on free-recall, paired-associate, and reading comprehension tasks. Groundbreaking work, such as Wittrock's (1974) theory of generative learning, which suggested that active cognitive processing could lead to more meaningful learning and Flavell's (1979) work on metacognition that highlighted the importance of thinking about and regulating one's own thinking, challenged mainstream views within psychology at the

time that posited that learners were passive receptacles of knowledge, and that academic ability was a developmental phenomenon that could not be modified through the active use of strategies. As research on cognitive learning strategies grew, findings showed that students were not likely to use learning strategies on their own in non-experimental learning contexts (Pressley & McCormick, 1995; Zimmerman, 2008). It became clear that teaching students to use cognitive learning strategies was necessary but not sufficient to make lasting impacts on learning and performance. Researchers and practitioners had to also take into account the interaction of cognitive, metacognitive, motivational, affective, and behavioral factors (Weinstein et al., 2010). As Zimmerman (2008) pointed out, “an early defining moment in research on self-regulation was a symposium at the American Educational Research Association annual meeting in 1986 that was published in a special issue of *Contemporary Educational Psychology* (Zimmerman, 1986a). It sought to integrate under a single rubric research on such processes as learning strategies, metacognitive monitoring, self-concept perceptions, volitional strategies, and self-control... (p. 167).” Current models of strategic and self-regulated learning highlight how these factors reciprocally interact to influence learning and performance over time. Cognitive learning strategies are thus one important component within both strategic and self-regulated learning. In the next section we discuss Weinstein’s Model of Strategic Learning.

Model of Strategic Learning

The Model of Strategic Learning (Weinstein et al., 2010; Weinstein et al., 2000) includes four major components with a number of elements in each one (see Figure 1). The four major categories, or components, are: skill (e.g., cognitive learning strategies and study skills, and reasoning skills), will (e.g., achievement motivation, positive affect toward learning, and self-efficacy for learning), self-regulation (e.g., time management, comprehension monitoring,

strategic planning, and help-seeking), and the academic environment (e.g., nature of the academic task, teachers' expectations and beliefs, and available resources). The model emphasizes both direct effects and interactions among these components and their individual elements in specific academic environments and learning contexts.

An underlying concept of the Model of Strategic Learning is that learners need to be aware of elements from all four major components of the model: skill, will, self-regulation, and the academic environment. It is the interactions among elements from all four areas that are crucial to strategic learning, transfer of learning, and ultimately, students' academic success, retention and graduation.

Skill Component

There are a number of different elements within the skill component. All of these elements are important in and of themselves but for students to be able to reach their academic goals they must also be aware of how these elements interact. For purposes of description, some of these elements will be individually highlighted. For a complete listing of the elements in all four categories refer to Figure 1.

There are five types of knowledge within the Skill Component that can help students become more effective and efficient learners. Knowledge of self as a learner is important because it is a key step toward developing self awareness as a learner and metacognitive awareness (a critical feature of strategic and self-regulated learning) and the ability to think strategically about learning (Weinstein et al., 2000; Winne, 2011; Zimmerman, & Moylan, 2009). This includes knowing one's strengths and weaknesses as a learner and one's attitude, motivation and anxiety level towards learning. Knowledge of self as a learner provides crucial information to learners about areas where they may not need to improve as well as areas where

they might anticipate difficulties in a given learning context so that they can work to avoid or minimize potential problems. For example, knowing that he does not like science courses and has had difficulty taking science exams in the past can alert a student to the potential benefits of participating in a study group or finding out about the availability of science tutors at a college learning center. Students need to reflect and think about their answers to a number of questions, such as: What are their preferences? What are their strengths? What are their weaknesses? What are their interests and talents? What are their current study habits and practices? Knowing about themselves as learners helps students orchestrate the resources they need to accomplish the studying and learning activities necessary for academic success. It is important to note that management of resources refers not only to external resources such as how often a student goes to see a tutor, or the amount of reading they must complete, but also how they orchestrate their personal resources, such as their cognitive strategies, emotions, feelings, and time management. The management of external and internal resources is even more important in online learning environments because students must take even more responsibility for scheduling and doing the work (Bol & Garner, 2011; Winters, Greene, & Costich, 2008).

Knowledge of academic tasks, the second category, includes understanding what is required to successfully complete a given academic task (e.g., reading text on a computer, writing a term paper, taking an essay test, taking notes, participating in online chats, and giving an oral presentation), including the steps to be taken and how much time will be required to complete the task (Weinstein et al., 2000; Winne, 2011). This type of knowledge helps to clarify what learners need to think about and do in order to reach a desired outcome.

Knowledge about strategies and skills for acquiring, integrating, thinking about, and applying new learning is the third category. Learning and thinking strategies and skills are the

tools we use to meet our learning goals. They help us to generate meaning, monitor our learning progress, and store new information in ways that facilitate future recall or application (Paris & Paris, 2001).

Learning strategies can take a variety of forms ranging from simple paraphrasing to complex content analysis (Pintrich, 1999; Weinstein & Mayer, 1986). The common factor underlying each of these forms is the active involvement of the student. Active cognitive involvement is crucial for meaningful learning. Students cannot be passive and expect to reach their learning goals. We build meaning and memories by actively engaging the material we are trying to learn and by using learning strategies to help guide this active engagement. Strategic learners have a variety of different strategies available so that they can generate strategies for different learning goals, or to use when a learning problem occurs.

The simplest forms of learning strategies involve repetition or review, such as reading over a difficult section of text, or repeating an equation or rule. A bit more complexity is added when we try to paraphrase or summarize in our own words the material we are studying. Other strategies focus on organizing the information we are trying to learn by creating some type of scheme for the material. For example, creating an outline of the main events and characters in a story, making a time line for historical occurrences, classifying scientific phenomena, or separating foreign vocabulary into parts of speech are all organizational strategies. Some learning strategies involve elaborating on, or analyzing, what we are trying to learn to make it more meaningful and memorable. For example, using analogies to access relevant prior knowledge, comparing and contrasting the explanations offered by two competing scientific theories, and thinking about the implications of a policy proposal are examples of elaboration strategies.

Students need a repertoire of learning approaches, strategies, and methods that they can use and adapt to a variety of academic as well as everyday learning situations (Weinstein et al., 2010). There are two major reasons why students need to develop a repertoire of studying and learning strategies and skills: First, learners need to know about a variety of strategies and methods for learning before they can make mindful decisions about their preferences or the methods that seem to be most effective for them; and, second, when students encounter academic difficulties, it is important for them to have a set of tools that they can use to resolve the problems.

The fourth area of knowledge necessary for the development of learning expertise is knowledge about content, often referred to as prior knowledge. It is easier for individuals to learn something new about a subject when they already know something about it (Hailikari & Nevgi, 2010). Part of the reason for this is that we already have an existing knowledge base that we can use to help us acquire the new information, to help us understand it, and to help us integrate it. Activating prior knowledge and integrating it with new information can help to increase learning and make the new knowledge more memorable (Acuna, Rodicio, & Sanchez, 2011; Wetzels, Kester, & van Merriënboer, 2011).

Knowledge about the learning context is the last knowledge element under the skill component. Students need to know about present or future contexts in which they could use what they are trying to learn now (Husman, Derryberry, Crowson, & Lomax, 2004; Husman, & Hilpert, 2007). Students can improve their learning and motivation by identifying and internalizing the importance or utility value of what they are trying to learn for helping them to meet their personal, social, academic, or occupational goals (Acee & Weinstein, 2010). Students must value the outcomes of learning enough to translate their motivation into action.

Will Component

The second major component in the model is the Will Component. It is not enough for students to know how to study and learn new material; they must also want to do it. Motivation has been defined as “the process whereby goal-directed activity is instigated and sustained (Schunk, Pintrich, & Meece, 2008, pg. 378); and as “a person’s willingness to exert physical or mental effort in pursuit of a goal or outcome (VandenBos, 2006, pg. 594).” Motivation has many elements and interacts with and results from many factors (see Eccles & Wigfield, 2002; Schunk, Pintrich, & Meece, 2008) such as value perceptions and expectancy beliefs (Eccles et al., 1983; Wigfield & Eccles, 2000), attribution beliefs (Weiner, 1985, 2000), goal orientations (Dweck & Leggett, 1988; Elliot, 1999; Elliot & Murayama, 2008), goal properties (Acee, Cho, Kim, & Weinstein, 2011; Austin & Vancouver, 1996; Locke & Latham, 2002), and future time perspective (Husman et al., 2004; Husman, & Hilpert, 2007). Setting, analyzing, and using goals are central elements of motivation. Wanting to reach learning goals becomes a driving force that can be used to help generate and maintain motivation as well as the thoughts and behaviors necessary to accomplish the goals. The specific topics listed under the Will Component in Figure 1 are discussed in more detail in a number of the chapters in this volume.

Self-Regulation Component

The self-regulation of thoughts, beliefs and actions in the model focuses on the self-management aspects of learning (Pintrich, 2000, 2004; Zimmerman, 2000, 2011; Zimmerman & Schunk, 2011). Strategic learners manage their skill and will factors in light of the demands and resources in their learning environment through self-regulation (Weinstein et al., 2010). Essentially, self-regulation involves awareness, reflection and control of relevant factors in order to achieve a desired outcome (Winne, 2011).

Strategic learners regulate on a macro level and on a micro level. Regulation on a macro level involves broad, often multistep, processes that have a wide domain of applicability. For example, learning about what time management is, how to do it and when to use it is a macro-level of self-regulation. It can be applied in a wide variety of settings and for a wide variety of academic tasks. A micro level of self-regulation involves using specific processes or methods related to a specific task such as monitoring your use of time during a chemistry exam. The macro level of regulation, when combined with other categories and elements from the MSL helps students to select or create the specific self-regulation strategies they will use to accomplish a specific goal associated with a specific task. Thus, micro-level strategies have a narrower domain of applicability. Micro-level strategies are the real-time applications of macro-level broad strategies from all of the components of the MSL.

The Self-regulation Component of the Model of Strategic Learning has many commonalities with Zimmerman's Model of Self-regulation. There are many macro-level processes related to planning, implementing, and evaluating that correspond to Zimmerman's phases of forethought, performance, and self-regulation. There are also micro-level processes, related to generating awareness, reflecting, and exercising control for specific academic tasks that correspond with processes involved in the performance phase of Zimmerman's model.

Time management is one of the major elements of self-regulation and refers to the learner's use of time resources in the pursuit of learning tasks and goals (Weinstein et al., 2000). Self-regulation of time use involves the monitoring and control of time management to help attain a desired learning outcome, is amenable to training, and has been found to correlate positively with academic behaviors and success (Ramdass & Zimmerman, 2011; Stoeger & Ziegler, 2008).

Another major element of self-regulation is the use of a systematic approach to learning and accomplishing academic tasks. This systematic approach to learning involves eight steps that are essential for self-regulated learning (Weinstein et al., 2000) and corresponds to the cyclical phases of self-regulation outlined in Zimmerman's (2000, 2011) model of self-regulation. The first step is to set a goal for the desired outcome, such as a specific grade in a course, performance on an assessment instrument or proficiency in performing a specific academic task. To be most effective, the goal needs to correspond to the generally accepted characteristics of a useful goal, i.e., specific, measurable, challenging, realistic, and with a specific start and completion date (Acee et al., 2011; Locke & Latham, 2002).

The second step is to reflect on the learning task at hand to clearly identify the specific task requirements, consider these requirements in terms of the learner's level of skill and will, and determine how the task relates to the learner's goals. The strategic learner also reflects on other relevant external contextual factors, such as the resources available to help them achieve the desired outcome, the expectations of the instructor and the social support upon which they can draw.

Having reflected on all these factors, the strategic learner moves to the third step by developing a plan, which includes brainstorming several potential strategies for achieving the desired outcome in the given situation. In the fourth step the learner selects from potential strategies those that appear to be most effective and efficient in achieving the outcome desired. The learner then actively implements (fifth step) the chosen strategies and monitors and formatively evaluates (sixth step) how well the strategies have been implemented by conducting an on-going evaluation of the effectiveness of each strategy as it is being used. If the results are satisfactory, the learner continues following the plan. If they are not, the strategic learner

modifies or replaces the strategies (seventh step) and then monitors and evaluates the results of the changes. If necessary, the learner may even decide to modify the learning goal, itself. Finally, when the learning task has been completed, successfully or unsuccessfully, the self-regulated learner performs the eighth and last step which is a summative evaluation of the effectiveness and efficiency of the learning strategies applied and the outcome achieved for use as a future reference when similar learning tasks arise. This step contributes to both avoiding unsuccessful approaches in the future and to increasing cognitive efficiency by helping the learner build up a set of useful approaches for similar learning tasks in the future. Strategic learners also know ways to monitor and manage their level of stress, motivation, concentration and their own comprehension. To monitor and manage their comprehension students need to know how to use self-assessment or self-testing to determine whether they are meeting their learning goals. There are many forms of self-assessment. It can be as simple as paraphrasing while reading or as complex as trying to teach new information or skills to someone else. Other forms of monitoring include trying to apply new knowledge, transforming it into another form such as a diagram or outline, and summarizing it. Each of these activities is designed to help students see if they really understand what they are studying and learning. Often, students believe that they understand but they do not test themselves to confirm or deny this belief. When they are wrong, that is, when they have only the "illusion of knowing," students think that they have reached their achievement goals and do not realize that they have not.

An expert learner can also generate fix-up strategies when problems in their comprehension arise. Fix-up strategies are the approaches and methods that students use to help remedy a learning problem. These methods can range from very simple activities such as rereading a confusing text section, to trying to reason through a problem-solving method, to

going to a tutor for help, to teaming with someone else who is taking the same course in order to study difficult sections together. Each of these activities is designed to help solve a learning or comprehension problem. It is important that students have a repertoire of fix-up strategies so that they can deal with a variety of academic problems that might occur.

Academic Environment Component

The Model of Strategic Learning also includes elements in the learning or academic environment that are external to the learner. These are represented in the outside boundaries of the model and include: the resources available to the learner; instructor expectations; nature of the learning activity, assignment, project or test, and time constraints; and the nature of the social context and the level of social support available to them.

Available resources refers to any materials or learning aids which the learner can use in acquiring knowledge, such as workbooks, reading materials, computers, reference materials, diagrams, examples and case studies. Available resources also includes campus resources such as instructors' office hours, labs, tutors, learning skills centers, teaching assistants and advisors.

The teacher expectations element refers to the expectations held by an instructor (and/or course developer). These expectations could include the skill level of students, what tasks the students should be able to perform, and what teaching methods are appropriate for the students. The extent to which the teacher's or course developer's expectations match or do not match the learner's abilities/needs can have a major impact on the acquisition and retention of information and subsequent transfer. If the teacher's expectations exceed the learner's ability, the learner may not be able to acquire the information and may be less motivated to put forth the effort to learn or utilize the subject matter. If the teacher's expectations are below the learner's ability, the learner may become bored or place less value on the subject matter and subsequently experience less

motivation to learn or utilize the subject matter (Tsiplakides & Keramida, 2010; Woolley, Strutchens, Gilbert, & Martin, 2010).

The nature of the learning activity, assignment, project, or test, and time constraints, refers to the specific tasks and task requirements the learner must do in order to acquire the new information and use their new knowledge and skills. This might include listening to a lecture, taking notes, role-playing, demonstrating proficiency, writing a paper or taking a timed test. The nature of a specific task assigned in a class will interact with the learner's levels of skill, will and self-regulation to help determine the degree of learning success (Weinstein et al., 2010; Winne, 2011). If the task calls for an activity for which a learner lacks skill or motivation, he or she may have difficulty in performing that activity or may seek to avoid it altogether. In addition, the time constraints within which the course material is delivered, or other time constraints that may be impacting the learner (e.g., outside deadlines not related to the course), affect the learning outcomes. If the class time is limited, students may not be able to practice using the knowledge acquired in the program. The learner might also be overwhelmed if a large amount of information is presented in a short period of time, especially if their learning strategies and skills are limited.

Social context/support refers to the support learners receive from peers, fellow students, family and student support personnel at their institution. This might include roommates and other students with whom the learner could study and share class experiences and advice from siblings or parents. Modeling, beliefs of peers and family members, and supportive or antagonistic views towards school or a particular course, can also affect participants' motivation to accept or reject course content and the level of participation in the class exhibited by the learner (Rosenthal, & Bandura, 1978; Schunk, 1987; Schunk et al., 2008).

All of these external factors interact with the internal factors associated with the skill, will and self-regulation components of the model. The concept of strategic learning comes out of systems theory and Gestalt psychology (Blunden, 2011; Humphrey, 1924). In this sense, the model is a dynamic system where change in one factor can produce changes in other factors. As in all systems, it is important to consider all factors. Strategic learners try to be aware of and control as many of these factors as possible so that new knowledge can be acquired, retained, integrated with existing knowledge and ultimately transferred as needed. This model helps students examine the impact of changes in one factor on other strategic learning factors. For example, students' knowledge about themselves as learners helps them to identify task characteristics that may be particularly problematic for them. Identifying these potential problems helps them to think about the learning strategies and study skills they know which might help address these particular problems. When students can think about what they have already studied in an area it may help them to create more meaning for the new material so that they can successfully complete the task.

Using the MSL Weinstein and her associates developed a diagnostic/prescriptive self-report measure of strategic learning. The Learning and Study Strategies Inventory (LASSI) was designed to assess students' awareness and use of elements from the skill, will and self-regulation components of the MSL (academic environment elements were not addressed because they are not directly under students' control). LASSI has been used in varying contexts at approximately 70% of colleges and universities in the United States and has been translated into more than 25 languages. There is also a high school version that is used in many summer transition programs as well as high schools. After discussing the LASSI in the next section, we

will discuss a strategic learning course that was also developed using the MSL and which incorporates the LASSI into the pre and post course assessment measures.

Assessment of Strategic and Self-Regulated Learning in College Contexts

Three widely used and highly related assessments of strategic and self-regulated learning have been developed – Zimmerman and Martinez-Pons' (1986, 1988) Self-Regulated Learning Interview Scale (SRLIS), Weinstein et al.'s (1987, 2002) Learning and Study Strategies Inventory (LASSI) 2nd Edition, and Pintrich, Smith, Garcia, & McKeachie's (1991) Motivated Strategies for Learning Questionnaire (MSLQ). Each of these instruments was originally developed in the 1980s and overlap in their content domains. All of them use a classification system that fits well with the three defining self-regulated learning criteria related to motivational, metacognitive, and behavioral factors (Zimmerman, 2008). The differences are more in nomenclature, processes that are emphasized and the nature of the self-report procedures used. For example, the SRLIS interview is a prospective self-report measure and both the LASSI and MSLQ are retrospective instruments. Motivation is a critical component in each assessment but it is broken down into a number of subscales on the MSLQ and only one global scale on the LASSI. The SRLIS interview codes anxiety responses as a form of self-evaluations reactions while on the LASSI there is a separate scale for anxiety. The MSLQ includes anxiety as a subscale under motivation. Although all of these assessments offer important information about college students' strengths and vulnerabilities as strategic self-regulated learners, the LASSI has been used in the intervention to be described in detail in the next section so a more detailed account of it will be presented next.

The Learning and Study Strategies Inventory (LASSI; Weinstein et al., 2002) is a 10-scale, 80-item assessment of students' use of learning and study strategies related to skill, will

and self-regulation components of the Model of Strategic Learning (Weinstein & Palmer, 2002). Students respond to each item using a Likert-type scale from 1 to 5 where 1 is not at all typical of me, 2 is not very typical of me, 3 is somewhat typical of me, 4 is fairly typical of me, and 5 is very much typical of me. The 10 scales are: Anxiety, Attitude, Concentration, Information Processing, Motivation, Selecting Main Ideas, Self Testing, Study Aids, Test Strategies, and Time Management. Research has repeatedly demonstrated that these factors contribute significantly to success in college and can be learned or enhanced through educational interventions (Albaili, 1997; Cano, 2006; DeRoma, Bell, Zaremba, & Abee, 2005; Mireles, 2010, 2011; Proctor, Prevatt, Adams, Hurst, & Petscher, 2006). The Cronbach's alpha coefficients for all ten scales range from a low of .73 to a high of .89 (Weinstein & Palmer, 2002). Weinstein and her colleagues developed a metacognition scale for the LASSI but it correlated at .7 and above with every other LASSI scale suggesting that metacognition is foundational to many elements of strategic and self-regulated learning.

The LASSI can be used as: (a) a diagnostic measure to help identify areas in which students could benefit most from educational interventions; (b) a basis for planning individual prescriptions for both remediation and enrichment; (c) a means for instructors to use for examining individual students' scores and class trends to help make decisions about instruction, assignments, etc.; (d) an evaluation tool to assess the degree of success of strategic learning intervention courses or programs; and, (e) an advising/counseling tool.

Strategic learners can benefit from declarative, procedural and conditional knowledge and skills in each of the categories of the LASSI scales. They also need to know how to pick and choose among the various elements within and across categories to help them reach specific learning goals and objectives. For example, a student experiencing high anxiety about an

upcoming essay test will need to use anxiety-coping or reduction strategies before even creating a study plan or selecting learning strategies to use when reading the assigned chapters in his textbook. The next section will highlight the individual LASSI scales and the component of the MSL that they are most related to conceptually.

LASSI Scales Most Related to the Skill Component of Strategic Learning

The LASSI scales most related to the skill component of strategic learning are: Information Processing, Selecting Main Ideas, and Test Strategies (Weinstein & Palmer, 2002). These scales examine students' learning strategies, skills and thought processes related to identifying, acquiring and constructing meaning for important new information, ideas and procedures, and how they prepare for and demonstrate their new knowledge on tests or other evaluative procedures.

The Information Processing Scale assesses how well students' can use imagery, verbal and visual elaboration, organization strategies, and reasoning processes as learning strategies to help learn new information and skills and to build bridges between what they already know and what they are trying to learn and remember. Do students try to summarize or paraphrase their class reading assignments? Do they try to relate what is being presented in class to their prior knowledge? The Selecting Main Ideas Scale assesses students' skill at identifying important information for further study from less important information and supporting details. Can students identify the key points in a lecture? Can they decide what is important to underline in a textbook? The Test Strategies Scale assesses students' use of both test preparation and test taking strategies. Do they know how to study for tests in different types of courses? Do students review their answers to essay questions?

LASSI Scales Most Related to the Will Component of Strategic Learning

The LASSI scales related to the will component of strategic learning are: Anxiety Attitude, and Motivation. These scales measure the degree to which students worry about their academic performance, their receptivity to learning new information, their attitudes and interest in college, their diligence, self-discipline, and willingness to exert the effort necessary to successfully complete academic requirements. The Anxiety Scale assesses the degree to which students worry about school and their academic performance. Do students worry so much that it is hard for them to concentrate? Are they easily discouraged by low grades? The Attitude Scale assesses students' attitudes and interests in college and achieving academic success. How clear are students about their own educational goals? Is school really important or worthwhile to them? The Motivation Scale assesses students' diligence, self-discipline, and willingness to exert the effort necessary to successfully complete academic requirements. Do they stay up-to-date in class assignments? Do students easily "give up" in difficult classes?

LASSI Scales Most Related to the Self-Regulation Component of Strategic Learning

The LASSI scales related to the self-regulation component of strategic learning are: Concentration, Self-Testing, Study Aids, and Time Management. These scales measure how students manage, or self-regulate and control, the whole learning process through using their time effectively, focusing their attention and maintaining their concentration over time, checking to see if they have met the learning demands for a class, an assignment or a test, and using study supports such as review sessions, tutors or special features of a textbook. The Concentration Scale assesses students' ability to direct and maintain their attention on academic tasks. Are students easily distracted? Can they direct their attention to school tasks? The Self-Testing Scale assesses students' use of reviewing and comprehension monitoring techniques to determine their level of understanding of the information or task to be learned. Do the students review before a

test? Do they stop periodically while reading to review the content? The Study Aids Scale assesses students' creation and use of support techniques, materials or resources to help them learn and remember new information. Do students complete practice exercises? Do they create or use organizational aids? The Time Management Scale assesses students' use of time management principles and tactics for academic tasks. Are students well organized? Do they anticipate scheduling problems?

Strategic and Self-Regulated Learning Interventions

Strategic and Self-regulated Learning interventions come in many different forms, can be more or less intensive, and may serve various student populations within postsecondary institutions (e.g., students underprepared in mathematics and/or literacy, students who are on academic probation, students who are not experiencing extreme difficulty but need additional learning support). Learning centers sometimes offer voluntary workshops and/or provide handouts on strategic and self-regulated learning. Academic advisors, tutors, and supplemental instructors may incorporate formal and informal instruction on strategic learning. The metacurriculum approach involves teaching strategic and self-regulated learning within a credit-bearing college course (e.g., economics, chemistry) or a developmental education course in mathematics, reading, or writing. For example, Mireles (2010, 2011) designed and evaluated an intensive 5-week summer bridge program that was focused on a developmental education mathematics course that incorporated strategic learning workshops, problem solving strategies, mandatory tutoring, collaborative learning, and an algorithmic instructional technique that uses modeling, practice, transition, and independence. Results from this study showed significant improvements on all ten of the LASSI scales from the beginning to the end of the program. In another study, DeCorte & Masui (2004) integrated ten 90-minute sessions focusing on

metacognitive and self-regulatory skills training into an undergraduate economics course and found that, compared to students in the control and comparison groups, students in the intervention group were more likely to use metacognitive and self-regulatory strategies in their economics course, had higher exam scores and course success rates, and were more likely to transfer their learning to a statistics course that was not tied to the intervention.

There are also online self-regulated learning resources for college students such as gStudy (Winne et al., 2006) which is a shell that provides students with tools (e.g., highlighting, annotation, questioning, explaining, planning, goal setting, making connections, and reviewing) and an adaptable artificial intelligence system to facilitate self-regulatory processes. Weinstein's online set of modules, *Becoming a Strategic Learner: LASSI Instruction Modules* (Weinstein, Woodruff, & Awalt, 2002) uses text, graphics, and activities to teach students important concepts, strategies, and applications aligned with the 10 scales of the LASSI. These modules are used in the learning strategies course we discuss in this section.

Courses in strategic and self-regulated learning, often referred to as learning-to-learn or learning frameworks courses, tend to be one of the more intensive, comprehensive, and powerful methods for fostering strategic and self-regulated learning, particularly when paired with a content course that incorporates a metacurriculum. Unlike basic study skills courses that teach students isolated learning skills, courses in strategic and self-regulated learning teach students theory related to learning, cognition, motivation, and self-regulation; applications of learning strategies and self-regulatory processes on authentic academic tasks; and strategies for transferring their learning across academic domains. Although postsecondary institutions have offered courses to help students study and learn since the 1920s, courses in strategic and self-regulated learning, or learning frameworks courses, did not emerge until the 1970s (Hodges &

Agee, 2009; Maxwell, 1997). Based on her Model of Strategic Learning, Claire Ellen Weinstein was among the first developers of a successful postsecondary credit-bearing strategic learning course which was established in 1977 (this course and research on its effectiveness will be described below).

Description of a Strategic Learning Course at the University of Texas at Austin

As we stated in the introduction, the specific applied focus of this chapter is on an example of a semester-long course in strategic learning. Implementing strategic and self-regulated learning courses, can be a powerful way to help students become more strategic and self-regulated learners (e.g., Hodges et al., 2001; Hofer & Yu 2003; McKeachie et al., 1985; Weinstein, Hanson, Powdrill, Roska, Dierking, & Husman, 1997).

Based on the MSL and incorporating the use of the LASSI as a diagnostic/prescriptive measure, the course at the University of Texas at Austin (UT) called EDP310 has been found to be extremely successful at helping students become more strategic and self-regulated learners who persist to graduation at higher levels than their peers. For example, in one study (Weinstein et al., 1997), UT first-year students were tracked for five years in order to compare graduation rates of students who took the course to those students who did not (the general student population). Students who did not take the course had a five-year graduation rate of 55%, which was typical for UT students at that time. Students who took the course, in either the first or second semester of their first year and did not drop out or fail the course due to excessive absences, had a graduation rate of 71%. This was true, despite these students having significantly lower verbal and math SAT scores than students who did not take the EDP310 course. These results are even more marked because most students who took the course were required to take it by advisors or counselors because they were on academic probation, and many students reported

having low motivation for the course. We have repeated this with statistical control groups and waiting-list control groups and found similar results. In addition, unpublished internal evaluations of our course have shown that students improve an average of 24-28 percentile points on Brown, Fishco, & Hanna's (1993) Nelson-Denney reading test. What follows is a description of the course including an overview of the course structure, course content and the instructional methods used in this course.

EDP310 (Individual Learning Skills) is a graded, 3-credit course offered through the Department of Educational Psychology at UT that meets 50 minutes a day, 3 days a week, for 15 weeks. This is a multi-section course with 9-16 sections of the course offered each semester, depending on the academic budget. EDP310 is a coordinated course with a common curriculum and common assessments across all sections. Claire Ellen Weinstein coordinates the course with the help of two graduate assistant coordinators and multiple instructors. The co-coordinators and instructors are all advanced doctoral students and are typically in the Learning, Cognition, Motivation and Instruction concentration in the Department of Educational Psychology at UT-Austin. The students who are selected to teach the sections undergo a rigorous interview process and must have completed a doctoral-level course in college teaching methods as well as a graduate course in college student learning and retention. In addition, all new instructors undergo six full days of training prior to each semester (one day for experienced instructors). Additional training takes place during the weekly 2-hour staff meetings and after two separate teaching observations during each semester.

This course is technically a voluntary elective and so is not required for any major or degree plan at UT. However, as noted above, a large proportion of the students in the course are required to take it because they are either predicted to be at-risk for low achievement or are

already on academic probation. Consequently, many of these students do not want to be in the course and have low motivation for participation. Although many places are reserved for first-year students, other students may take EDP310 because they have been placed on academic probation after their first year of school, want to improve their college performance, or, rarely, are preparing for graduate school. Course enrollment data from 2005 show the following demographic breakdown: female (58%), male (42%); first year (29%), sophomore (42%), junior (20%), and senior (9%); African American (5%), Asian (20%), Caucasian (48%), Hispanic (23%), and Native American (3%). These figures were representative of the UT population at that time. There are currently nine sections of the EDP310 course with a maximum of 28 students in each section. The faculty coordinator and two graduate student assistant coordinators together develop course content and structure, as well as determine which assessments to use each semester in the course. They also help with course administration and the training of new teachers. Assistant coordinators must have served for at least two semesters as an instructor in the course.

The MSL is used to select and organize the course content. Topics are selected from all four components but the emphasis is on the skill, will and self-regulation components. In addition to the elements from the model, several traditional study skills topics are included such as academic note-taking. A recent version of the EDP310 schedule of course topics and assignments can be found in the Appendix. Students are taught about the MSL and the core theoretical ideas behind each variable in the model. Students are also taught skills, strategies and approaches that they can use to improve in each area. They are guided in using these strategies in a variety of academic situations that they encounter in their other classes. EDP310 is a blended delivery course, with much content being delivered through the *Becoming a Strategic Learner*

Online modules (Weinstein, Woodruff, & Awalt, 2007) in addition to in-class instruction that emphasizes application, modeling, small-group work and whole-class discussions. A set of readings and handouts are also used.

The MSL is used as the organizing framework for the entire course. Students receive a highly abbreviated version at the beginning of the course. As the course progresses, new concepts and strategies are integrated into the MSL so by the last quarter of the semester students are using the entire model and the constellation of components to address learning tasks and problems. Instruction is based on a metacognitive model of awareness, reflection and taking control or action. The assessments, instructional materials, instructional practices and the teachers help students become aware of the different topic areas that foster strategic learning, help them reflect on their strengths and weaknesses in these areas, and then teach them ways they can help themselves to improve and be more effective and efficient in reaching their academic and occupational goals. There are clear relationships between this approach and Zimmerman's model of self-regulation. Although EDP310 was created in 1975, prior to the publication of Zimmerman's model and his early work on self-regulation (Zimmerman, 1986b; Zimmerman & Martinez-Pons, 1986), it is an evolving course and a number of the changes in processes, instruction, and content have been greatly influenced by his work. We have also used Zimmerman's work to improve our emphasis on pre-, -during, and post-task processes and strategies.

There are a number of different types of classes that are taught in EDP310. Please refer to Table 1 for a summary of the types of classes taught, the metacognitive processes emphasized in each class type, and the categories of strategy knowledge emphasized in each type of class. The three types of classes are: context classes, content classes without an associated online module

and content classes with an associated online instructional module. Context classes provide declarative (what) and procedural (how) knowledge about the frame of reference, structure, scaffolding, classroom climate, course objectives, instructor expectations and student/instructor contracts for EDP310. Examples of context classes include introducing and analyzing the syllabus, using ice breakers to build community, using structured discussions to provide autonomy support and providing students with decision-making opportunities on the course process and assignments. Content classes with no associated instructional modules are those classes that must rely solely on readings and in-class instruction for learning the content. For example, note-taking strategies are not included at the present time in any of the on-line modules. Therefore, during class, instructors must provide instruction on: the rationale for this topic, basic information on potentially useful note-taking strategies (declarative knowledge), how to use them and develop one's own strategies (procedural knowledge) and conditional knowledge of when a particular strategy may or may not be useful for a given task. In contrast to this, the third category of types of classes is content classes with an online instructional module component.

EDP310 is a blended course. Part of the instruction takes place in class and part of it takes place via a series of ten online modules that correspond to the ten scales of the LASSI but also have extensive additional material. These interactive online instructional modules also use a metacognitive model and emphasize awareness, reflection and control using informative presentation and an extensive series of reflections and activities designed to provide declarative, procedural and conditional knowledge about the types of control strategies students can use across a variety of content areas and learning/performance tasks. Each module is designed to help students reflect on their knowledge relating to one area and to understand why they may

need to improve in that area. The modules also provide material for students to study, and activities that guide them in applying the material they are learning and practicing using new or enhanced learning strategies. For each module, students are required to take notes on the content, complete selected activities and write one or two paragraphs that integrate the module topic with material they learned in other modules and the Model of Strategic Learning. Each module takes approximately 2.5-4 hours to complete, depending on the topic and a student's prior knowledge and experience with the topic content. Students' responses to the reflections and activities can be captured online or printed so they are available to the instructor in whichever form they prefer. We also save some of the activities for in-class small group work, pair-and-share work and discussions. Classes with an associated online instructional module do not have to focus on declarative knowledge, although it is reviewed through teacher and student-led discussions (and evaluated through short-answer quizzes at the beginning of any class on a new topic). This allows class time to focus more on honing procedural knowledge and conditional knowledge.

Although a variety of teaching methods are used in EDP310, perhaps the most important method for learning effective strategy use is guided practice with feedback. It is critical that students are able to practice using strategic learning methods across a variety of academic tasks and contexts. It is also important that they receive feedback from their instructor and classmates that can help them improve both their understanding and use of these methods. For this reason, students taking EDP310 are required to take at least one other course at the same time so they can apply the strategies they are learning in the EDP310 course.

Pre-assessments given to students at the beginning of the semester are used in EDP310 to help build student and instructor awareness of students' strengths and weaknesses related to strategic and self-regulated learning. This can help students and their instructors identify where

students most need to concentrate their efforts. EDP sections have up to 28 students in each class and this makes it difficult to individualize instruction. The assessments help to identify areas where students can individualize the curriculum to focus on the material that will be most helpful for them. This is also accomplished through learning logs, small papers, reflections, progress analyses and other assignments and activities. The pre-assessments and post-assessments (same instruments) also provide feedback for evaluating and modifying the course. The post-assessments help students to evaluate their progress and develop actions plans for what they are going to do to keep developing their strategies and skills in the future. For example, the pre-LASSI helps students to become aware of their strengths, as well as those areas in which they need to improve in order to help foster academic success during the current semester while they are taking EDP310. The post-LASSI helps them to assess areas in which they still need to improve. The LASSI is used in conjunction with measures of goal orientation, help seeking and reading comprehension. Additional measures are often added to help develop curriculum or evaluate the coordinators' and instructors' success in reaching course goals. The course also includes three exams that are used to assess and provide feedback on students' learning of course content. Finally, students complete other assignments such as writing a learning biography, a series of short papers on their progress or problems impeding their progress, and a capstone project based on the application of what they are learning to another course.

Future Research Directions in Strategic Learning

As the definitions of academic preparedness for higher education and training continue to evolve so will the need for further research into the cognitive, metacognitive, motivational, emotional and behavioral variables that both contribute to (e.g., positive motivation for learning) and detract from (e.g., high anxiety) strategic and self-regulated learning. A more in-depth

understanding of these variables, individually and in combination, will also lead to more accurate and useful conceptual models that can be used as the basis for both broad (e.g., generalizable learning strategies such as the use of elaboration) and content-specific (e.g., elaboration strategies for learning algebra equations) strategies and skills interventions at all levels of education. In addition, future research also needs to focus on adapting these interventions to individual student strengths and problem areas. Current applications attempt to account for these individual differences but more systematic and effective guidelines are needed.

Further work is also needed in the area of assessment of strategic and self-regulated learning. The continued development of generic assessments like Zimmerman & Martinez-Pons's (1986, 1988) SRLIS, Pintrich et al.'s (1991) MSLQ and Weinstein, Palmer, & Schulte's (2002) LASSI will help us to more accurately screen college students to help identify areas of strengths and weaknesses so that general prescriptions can be derived. However, in addition to broad-level diagnostic/prescriptive measures we will also need further development of measures for content-specific learning and online measures of self-regulation such as computer traces, think-aloud protocols, diaries of studying, direct observation, and microanalyses (Zimmerman, 2008). While it is true that any generalizable strategy becomes content-specific when applied to a topic area, there are still subsets and special cases of generalizable strategies that are useful for learning in specific content areas such as math, foreign language learning or history. This area has not yet been systematically explored.

Another area that needs systematic study and expansion is the duration and evaluation of interventions. Currently, most research interventions take place in laboratory settings rather than actual courses or programs in colleges and universities. One primary underlying problem is the lack of cooperation between and among researchers and higher education institutions. More

elaborate interventions are needed and extended time for follow-ups to gauge both the success and endurance of the results of higher education interventions. We have been fortunate to be able to do 5-year follow-ups on students for several semesters of our EDP310 course but there are few studies of this duration.

Educational Implications of Current and Future Work in Strategic Learning

The educational implications of work in strategic learning for college access, success and attainment of individual and societal educational goals are enormous. Programs are being developed or expanded for high school students and summer transition, or bridge, programs for graduating seniors and/or for students who are considered to be underprepared for college-level work. These programs not only facilitate student access to higher education but they also enhance student success and retention. For example, in Texas the Higher Education Coordinating Board (THECB) has been funding a number of different approaches to summer transition programs and evaluating the effects of various components and their contributions to success in college-level coursework for students with low entry scores on measures such as ACT's Compass assessment, the College Board's Accuplacer assessment, and Pearson Education's Texas Higher Education Assessment (THEA; see the THECB website, www.thecb.state.tx.us, for more information on these efforts and the reports documenting the outcomes of these on-going projects). In addition, many colleges and most community colleges have some form of developmental education focusing on math, reading, writing, personal development and learning strategies. The characteristics of these programs vary greatly and a more comprehensive view of strategic and self-regulated learning is still needed.

Strategic and self-regulated learning can also be taught in a number of different contexts in higher education. For example, as part of the Cognitive Learning Strategies Project at the

University of Texas at Austin, college faculty are trained in the use of a metacurriculum – teaching students how to learn the content in their courses as well as what to learn. Workshops are also conducted for student support personnel, tutors, counselors, mentors and advisors. Most college learning centers have more modern versions of study skills classes and workshops, often targeting specific courses with higher than average drop-out or failure rates. There are also a number of textbooks and self-help books available for students to use to improve their strategic and self-regulated learning (e.g., Nist-Olenjnik & Holschuh, 2011; Sellers, Dochen & Hodges, 2011; VanderStoep, & Pintrich, 2007). Online materials, such as the Lucy Macdonald's HowToStudy.org and *Becoming a Strategic Learner: The LASSI Online Instructional Modules* (Weinstein, Woodruff, & Awalt, 2002) are also available for individual or academic contexts.

In the future it will be even more important to not only have online materials available for students but to also develop materials specifically for elearning. As more and more colleges are turning to elearning and blended courses (including both online and face-to-face components) like the EDP310 strategic learning course we described earlier, it will be more and more important to address the additional self-regulation needs of these students. The number of students who take one or more online classes that drop out or fail to achieve a passing grade is very high (Mooney, 2011). At least part of this can be attributed to the additional need for well-developed self-regulation processes and skills in a population that is often lacking effective strategies and skills. Results using a version of the LASSI for online learning contexts have supported these needs.

There is also a need for greater cooperation among researchers, practitioners, college administrators, and college institutional researchers. Much of the applied research in our field is proprietary and cannot be published. Particularly in community college contexts, there is little

pressure to publish and often the results are not readily available in a published form or even presented at conferences (Simpson, 2002). This makes it difficult to cite studies that fall under institutional research but which have important implications for strategic and self-regulated learning (a difficulty we had in citing references for many of our own findings). A partnering of these different stakeholders could enrich theory, research and application further helping numerous students gain access to higher education, thrive in academic environments and reach their educational and occupational goals.

Conclusion

As the need for some type of postsecondary education is increasing, the preparation of many students transitioning into higher education is often inadequate. Projections of American workforce needs now and in the future emphasize the need for highly skilled employees and employers who can adjust to the rapidly changing technological world and global economy. Mastering one content area or skill set is rarely sufficient for today's jobs and careers and on-the-job learning and continuing education will become even more necessary over time. Staying on the forefront of innovation will involve educating people to become life-long strategic and self-regulated learners who can self-manage their own learning and skill development and generate motivation to reach their goals. It is therefore critical that postsecondary education institutions implement a variety of initiatives aimed at helping students to become more strategic and self-regulated learners. The theories, research and applied work in strategic and self-regulated learning provide promising foundations for the further development of effective interventions to meet these needs because they provide evidence that students can proactively improve how they study and learn making academic success more likely. Models of strategic and self-regulated learning, like the two discussed in this chapter, provide conceptual frameworks for researchers,

educators, and students to use to organize many factors that influence learning and performance, and target those factors that students can modify to exercise control over how and what they learn to enhance their chance of academic success.

Zimmerman's model of self-regulation offers a framework of cyclical phases and key processes involved in self-regulating one's use of learning strategies, motivation, metacognition, affect, and behaviors in the pursuit of learning and achievement goals. Similarly, Weinstein's Model of Strategic Learning organizes a constellation of factors that impact students' learning and provides a framework for guiding students in developing and using a repertoire of learning strategies related to their skill, will, and self-regulation that they can use to improve their learning and achievement across diverse learning environments. As we reviewed in this chapter, many successful postsecondary interventions have been derived from or influenced by Zimmerman's model of self-regulation and Weinstein's MSL. Opportunities to expand applied work in this area are growing rapidly with increased national and local attention and funding from policy-makers, professional organizations, and foundations to better serve students who are academically underprepared. The success of this movement will partly depend on the effective implementation of strategic and self-regulated learning content and instruction across various facets of an institution including: learning support centers and programs; course-based and non-course-based interventions; online and hybrid interventions; advising and counseling programs; and professional development for faculty and staff. Although a number of interventions currently exist, from short workshops to intensive three-credit courses, more research and development is needed in this area and the best is yet to come!

Finally, we want to emphasize that more research and development work needs to address the needs of elementary, middle school, and high school students. It is projected that 25% of today's ninth graders will not complete high school...we must do better!

Final Comment – A Personal Note from Claire Ellen Weinstein

We all know that Barry's work has had a profound influence on research and applied efforts in so many fields but not everyone is aware of the profound effects he has had on his students, colleagues, friends and generations of students and medical patients who have benefited from his insightful theories, creative research and constant efforts to positively impact their success and the quality of their lives. His awards are legendary, ranging from an outstanding contributions award from the American Lung Association for his work in medicine compliance for patients with long-term chronic diseases such as asthma (first non-physician to win the award) to his Thorndike Award for career achievement in educational psychology from the Division of Educational Psychology of the American Psychological Association. However, perhaps Barry's greatest achievement is the warmth, concern, assistance and support he offers to emerging colleagues, colleagues and friends. Barry is a great mentor who genuinely cares about his students and colleagues. For Barry, his work has been and is a magnificent obsession and I am honored, proud and delighted to call him my friend. L'chaim Barry!

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Table 1
Types of Classes in Weinstein’s Strategic Learning Course (EDP310)

	Context Classes	Content Classes Without an Online Module	Content Classes With an Online Module	
			Will Topics	Skill and Self-Regulation Topics
Topics	For example: Completing Pre- and Post-assessments Course Overview Course Syllabus and Expectations Community Building Autonomy Support Academic Environment	For example: Model of Strategic Learning The Systematic Approach Assessment Feedback and Reflection Student Reflections Content Overviews and Band-aid Strategies	Anxiety Attitude Motivation	Concentration Information Processing Selecting Main Ideas Self-Testing Study Aids Test Taking Time Management
Metacognitive Processes Emphasized				
Awareness	E.g., Taking Pre-assessments	E.g., Content Overview Days	✓	
Reflection	E.g., Learning Autobiography	E.g., Feedback and Reflection on Pre-test Scores	✓	
Control	E.g., Using Course Syllabus and Expectations	E.g., Using the Systematic Approach		✓
Types of Strategy Knowledge Emphasized				
Declarative Knowledge	✓	✓		
Procedural Knowledge	✓	✓	✓	✓
Conditional Knowledge		✓	✓	✓

✓ Emphasized metacognitive process or emphasized type of strategy knowledge.

Appendix

Course Topic Outline for EDP310 Course, Fall Semester 2011

<u>Date</u>	<u>Preparation</u>	<u>Topic(s)</u>	<u>To Be Handed in at the Start of Class</u>	<u>Assigned in Class</u>
Aug. 24, Wed.		Course Introduction		
Aug. 26, Fri.	Read: <i>"Top Ten List for Longhorn Success"</i>	Pre-Assessments: LASSI and Goal Orientation Top Ten List for Longhorn Success		
Aug. 29, Mon.	Read: Syllabus, Course Schedule, Assignment Descriptions	Course Expectations: Blackboard & Online Modules Assignment Descriptions Quality of Assignments Participation Communication with Instructor		Learning Autobiography
Aug. 31, Wed.		Pre-Assessments: Nelson Denny Help Seeking		
Sept. 2, Fri.		Community Building		
Sept. 5, Mon.		NO CLASS: Labor Day		
Sept. 7, Wed.	Read: <i>"Model of Strategic Learning"</i>	Model of Strategic Learning Why is the model important? What are the components?		Information Processing & Self-Testing Integrative Assignment
Sept. 9, Fri.		"Content Overview" Day 1 Information Processing Self-Testing Motivation Attitude	Learning Autobiography	
Sept. 12, Mon.		"Content Overview" Day 2		
Sept. 14, Wed.		"Content Overview" Day 3		
Sept. 16, Fri.		Model of Strategic Learning Recap		

Sept. 19, Mon.	Read: <i>"Information Processing Reading"</i>	Information Processing for Acquiring Knowledge	Information Processing & Self-Testing Integrative Assignment	
Sept. 21, Wed.		Information Processing for Acquiring Knowledge		
Sept. 23, Fri.	Read: <i>"Self-Testing Reading"</i>	Information Processing for Acquiring Knowledge Self-Testing		Motivation & Attitude Integrative Assignment
Sept. 26, Mon.		Self-Testing		
Sept. 28, Wed.	Read: <i>"Systematic Approach"</i>	Systematic Approach		
Sept. 30, Fri.	Read: <i>"Types of Knowledge"</i>	Types of Knowledge		
Oct. 3, Mon.		Systematic Approach		
Oct. 5, Wed.	Read: <i>"Goals, Goal Orientation Reading"</i>	Motivation	Motivation & Attitude Integrative Assignment	
Oct. 7, Fri.	Read: <i>"Attitude Reading"</i>	Motivation Attitude		Time Management & Anxiety Integrative Assignment
Oct. 10, Mon.		Attitude		
Oct. 12, Wed.		Exam 1 Review		
Oct. 14, Fri.		Exam 1		
Oct. 17, Mon.	Read: <i>"Academic Environment Reading"</i>	Academic Environment Components Strategies		
Oct. 19, Wed.	Read: <i>"Academic Help-Seeking Reading"</i>	Academic Help-Seeking Types of Help-Seeking Situational Analyses Exam 1 Feedback		Study Aids & Test-Taking Strategies Integrative Assignment

Oct. 21, Fri.		Time Management	Time Management & Anxiety Integrative Assignment	
Oct. 24, Mon.		Procrastination		
Oct. 26, Wed.	Read: "Anxiety Reading"	Anxiety		Concentration & Selecting Main Ideas Integrative Assignment
Oct. 28, Fri.		Coping with Anxiety		
Oct. 31, Mon.		Study Aids	Study Aids & Test-Taking Strategies Integrative Assignment	
Nov. 2, Wed.		Study Aids Test-Taking Strategies		
Nov. 4, Fri.		Test-Taking Strategies		
Nov. 7, Mon.		Concentration	Concentration & Selecting Main Ideas Integrative Assignment	
Nov. 9, Wed.	Read: "Reading Strategies Reading" "Note-taking Reading"	Reading, Listening & Note-Taking Strategies		
Nov. 11, Fri.		Selecting Main Ideas		
Nov. 14, Mon.		Exam 2 Review		
Nov. 16, Wed.		Exam 2		
Nov. 18, Fri.		Post-Assessments: LASSI and Goal Orientation		Capstone Assignment
Nov. 21, Mon.		Post-Assessments: Nelson Denny Help Seeking Exam 2 Feedback		

Nov. 23, Wed.		Individual Projects Day		
Nov. 25, Fri.		NO CLASS: Thanksgiving Break		
Nov. 28, Mon.		Integration Day		
Nov. 30, Wed.		Integration Day		
Dec. 2, Fri.		Where will you go from here? Also discuss other online resources	Capstone Assignment	