



TEACHING
FOR
STRATEGIC
LEARNING

Participant
Packet

November 13, 2003

1:30 - 3:00 PM CT

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*This essay has been taken from Wilbert J. McKeachie, *Teaching Tips: Strategies, Research, and Theory for College and University Teachers*, 11th ed. Boston: Houghton Mifflin Company, 2002. The Hofer essay is Chapter 9 and the McKeachie is Chapter 15. Used by permission.

AGENDA

Introduction and Overview	Leticia Magana Moderator
Panel and Audience Discussion	Panel and Audience
Strategic Learning	Claire Ellen Weinstein
• Model of Strategic Learning	
• Strategies for Adopting the Model	
Motivation Theory	Wilbert McKeachie
Goal Theory	Wilbert McKeachie
Metacognition	Claire Ellen Weinstein and Wilbert McKeachie
Self-Regulation	Claire Ellen Weinstein and Wilbert McKeachie
Deep Processing	Claire Ellen Weinstein and Wilbert McKeachie
Close	Leticia Magana

Questions and comments will be taken throughout the teleconference. Please feel free to submit them at any time.

EMAIL/FAX/CALL-IN INSTRUCTIONS

There are three ways in which you can interact with the panelists:



E-MAIL: Before the program, you may e-mail your questions for the panelists to hartman@dccd.edu and they will address them during the teleconference.



FAX: Before November 13, fax to 972.669.6699

On November 13, fax to 972.669.6633



CALL: You are encouraged at any time during the program to call in your questions and comments.

The toll-free telephone number for call-in questions is:

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When prompted or introduced by the program host, give your name and site location, and state your questions as clearly and succinctly as you can. Please be aware that while you are asking your question and while it is being answered you will be “on the air.” Please remain on the line until your question has been answered and your call has been disconnected.

BETTER AUDIO: To minimize the possibility of any technical or program difficulties that may be caused by audio feedback, we suggest you locate the telephone away from the audio speaker at your site.

PRESENTERS:



Wilbert J. McKeachie is Professor Emeritus of Psychology and former Director of the Center for Research on Learning and Teaching at the University of Michigan. He is Past President of the American Psychological Association; the American Association of Higher Education; and the American Psychological Foundation. Dr. McKeachie has written a number of research articles and books, the best known of which is *Teaching Tips, Strategies, Research and Theory for College and University Teachers*. 11th ed., 2002 Houghton Mifflin. Among other honors, he has received eight honorary degrees and the American Psychological Foundation Gold Medal for Lifetime Contributions to Psychology.



Claire Ellen Weinstein, Professor of Educational Psychology and Chair of the Doctoral Concentration in Learning, Cognition, and Instruction at the University of Texas at Austin. She is also the Director of the Cognitive Learning Strategies Research Project. Author, *The Learning and Study Strategies Inventory (LASSI) 2nd Edition*.

MODERATOR:



Leticia "Lety" Magana has an extensive background as a television moderator and host for national and regional clients. She has served as moderator for several Starlink network teleconferences, including "Does Your Online Course Need Extra Credit To Pass?" and "Are We Testing What We are Teaching?"

HELPING STUDENTS TO BECOME STRATEGIC LEARNERS: THE ROLES OF ASSESSMENT, TEACHERS, INSTRUCTION AND STUDENTS

by Claire Ellen Weinstein et al.

These are exciting times for researchers and teachers interested in helping students become more strategic, motivated and self-regulated learners. The days of the hegemony of mechanistic and piecemeal study skills are ending and being replaced by models based on our deepening understanding of how we learn and how we learn to learn. The focus of this chapter is on one such model, the Model of Strategic Learning, and its application in areas of student assessment, instruction, and teacher training.

What Are the Characteristics of Strategic Learners?

Most teachers can easily identify examples of strategic learners they have seen in their own classrooms. These learners approach educational activities and tasks with a high degree of confidence that they can succeed, as well as a good idea of how to try to complete them. Strategic learners are diligent and resourceful in pursuit of a learning goal and do not give up easily, even in the face of difficulty. They understand that learning and studying are active processes and that they are largely under their own control. Strategic learners know when they understand new information and, perhaps even more importantly, when they do not. When they do encounter problems studying or learning, they use help-seeking strategies such as getting help from the teacher, their classmates, or their family. They also understand that studying and learning are systematic processes, again, largely under their own control (Paris, Lipson, & Wixson, 1983; Pintrich & De Groot, 1990; Pressley & McCormick, 1995; Weinstein, 1994; Zimmerman, 1990, 1994, 1998, 2001).

Although we are all familiar with students who are strategic learners, it is still helpful to take a systematic look at characteristics of these students. Understanding these characteristics is essential deriving instructional strategies to help students be more strategic in pursuing their academic goals. The specific definitions researchers use to explain strategic and self-regulated learning vary, but there are common threads and conclusions that we will focus on in our discussion. Research and theoretical frameworks developed by Pat Alexander, John Biggs, Monique Boekaerts, Agnes Chang, Erik De Corte, Noel Entwistle, Willy Lens, Barbara McCombs, Bill McKeachie, Scott Paris, Paul Pintrich, Mike Pressley, Dale Schunk, David Watkins, Merl Wittrock, and Barry Zimmerman, among others, has clarified and refined our understanding of these students. Building upon this work, Weinstein and her associates has developed a model of strategic learning that captures much of the current thinking, research results, and application data in this area (Weinstein, 1994; Weinstein, Dierking, Husman, Roska, Powdrill, 1999) (see Figure 1).

The Model of Strategic Learning has four major components: Skill, Will, Self-Regulation and the Academic Environment. Fundamentally, strategic learners have the Skills to learn successfully. For example, they know a lot about how to study and they use study, learning, and thinking strategies and skills. But knowing what to do is not enough. Students must also have the Will or desire to want to use these skills and processes. For example, they must value using learning skills and processes. They must also be motivated to want to use them and they must believe that they can use these skills and processes successfully. Students must also be Self-Regulated so they can take

much of the responsibility for managing their own studying and learning. For example, they know how to allocate time for completing different academic tasks and they can create plans to reach their learning goals. Self-regulated students also know how to monitor themselves to see how they are progressing and they evaluate the results based on their goals and the feedback they receive from the teacher or instructional materials. Finally, strategic learners need to know about the Academic Environment in which their studies are taking place. For example, they need to understand their teachers' expectations for successful performance in their classes and the types of resources available to help them succeed (e.g., tutoring, study groups, teacher help lines).

The Model of Strategic Learning

Educational psychologists and others interested in exploring ways we can help students to achieve at all educational levels have moved away from conceptual models of learning based on simple main effects or individual instructional components (e.g., Boekarts; Entwistle; Pintrich; Weinstein; Zimmerman). We know that it is the interaction among a number of different variables that leads students to become more strategic learners. As such, these students can manage and take responsibility for much of their own learning.

The Model of Strategic Learning contains the four broad components described above that, in interaction, can facilitate motivation, the acquisition, retention and application of knowledge, the development and enhancement of cognitive and behavioral processes, and the development of study and thinking skills (Weinstein, 1994; Weinstein, Dierking, Husman, Roska, & Powdrill, 1999). The model depicts the four major components (Skill, Will, Self-Regulation, and the Academic Environment) and their associated elements but it emphasizes the interactions among these components in specific academic environments and learning contexts. It is the interactions among these components that result in effective and efficient learning. 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. As in most interactionist models, the effects of using the model can usually not be traced to the direct effects of individual component elements; these types of systems evidence generative effects. Like the Gestalt, the whole is often greater than the simple sum of the parts.

Given that the Will and Self-Regulation Components are discussed in several other chapters in this volume, the emphasis in this discussion will be on the Skill Component, particularly the nature, acquisition and use of learning and study strategies. After presenting a discussion of the model, the next sections will focus on assessment of strategic learning and further implications for teachers and instruction.

Skill Component

For students to reach their academic goals they must learn about the constituent elements in the Skill Component and how they interact with each other as well as the elements in the other three

components of the Model of Strategic Learning. For purposes of description, however, a number of these elements will be individually described.

Within the Skill component there are five types of knowledge, strategies, and tactical skills that students need to possess in order to become expert learners. The first is knowledge of self as a learner that includes personal characteristics that can impact the difficulty or ease of learning. This element is important because it is a key step toward metacognitive awareness (a critical feature of strategic learning) and the ability to think strategically about learning. It also helps the student with both internal and external resource allocation for different academic tasks. Knowing about yourself as a learner 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 anticipate difficulties in a given learning context so that they may plan to avoid or minimize potential problems. For example, knowing that they do not like science courses and that they have had difficulty doing well on science exams can alert students to the potential benefits of participating in a study group. Additionally, they can allow more time for reading science textbooks, or find out about the availability of science tutors.

To help develop their knowledge of self, students need to reflect and think about their answers to a number of questions, such as: What are their learning preferences or styles? What are their strengths? What are their weaknesses? What is the best time of day for them, the worst time? What are their interests and talents? What are their favorite activities or subjects? What are their least favorite activities or subjects? What do they know about how to study and what are their current study habits and practices? Can they adapt their strategies for different types of tasks? Knowing about themselves as learners helps students to orchestrate the resources they need to accomplish the studying and learning activities necessary for academic success. Management of resources refers not only to external resources such as the amount of reading they must do, but also how they orchestrate their personal resources, such as their allocation of study time and use of cognitive strategies, as well as their emotions, feelings, and study habits.

Knowledge of academic tasks, the second category, includes understanding what is required to successfully complete a given academic task (e.g., taking an essay test, listening in class, completing math problems, giving an oral presentation), including the steps to be taken and how much time is required to reach their task goal. This type of knowledge helps to clarify what the learner needs to think about and do in order to reach a desired outcome. For example, it is difficult to successfully complete a puzzle if you do not know that success means putting all of the pieces where they belong. Similarly, if you do not know how to identify important information for further study (main ideas), it can be difficult to successfully complete reading assignments.

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 primary 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. Basically, a learning strategy is any thought, behavior or action a student engages in during studying and learning that is intended to influence the acquisition, storage in memory, integration, or availability of for future use of new knowledge, processes and skills. Learning strategies can take a variety of forms ranging from simple paraphrasing to complex content analysis. 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 to them so that they can generate strategies to help them reach different achievement goals, or have alternative approaches available 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 they can use and adapt to a variety of academic as well as everyday learning situations. 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. Part of the reason for this is that we already have an existing knowledge base or schema that we can use to help us acquire the new information, to help us understand it, and to help us integrate it.

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. In order to set realistic, yet challenging, learning goals students need to identify the importance or utility value of what they are trying to learn to help them meet their personal, social, academic, or occupational goals (Lens & Rand, submitted manuscript). Students must value the outcomes of learning enough to translate their motivation into action (McCombs and Marzano, 1990).

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 is a result of things we do or think, and things we do not do or think. Motivation has many elements, which

interacts with and results from many factors (McCombs & Marzano, 1990; Pintrich & DeGroot, 1990; Pintrich, Marx, & Boyle, 1993; Pintrich & Schunk, 1996; Schunk, 1989). 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, behaviors, attitudes and beliefs necessary to accomplish these goals. Strategic learners set realistic, yet challenging, goals for their study and learning activities (Locke & Latham, 1990). Learning goals are both a standard to be met and, for older students, a way to relate immediate task completion to long-term life and occupational goals. It is the usefulness, or utility value, of the learning goals for accomplishing present and future educational, personal, social, and occupational goals that helps keep students on track (Raynor, 1981). Unrealistically high goals (often a symptom of students experiencing academic difficulty) can lead to frustration, feelings of helplessness, avoidance, and failure.

Motivation is also related to self-efficacy beliefs. Self-efficacy is defined as the degree to which students believe they can accomplish a task (Bandura, 1977, 1986). Self-efficacy beliefs affect both effort and persistence at a task: If a student does not believe he or she can accomplish the task, then why should they try? Attributions, or causal inferences, about learning also help to determine if students will perceive that their actions or efforts can have an impact on the outcome of study activities (Weiner, 1986). To what do students attribute their successes? To what do they attribute their failures? If students do not attribute what happens to them in academic situations at least in part to their own efforts and developed abilities, rather than to the instructor or the difficulty of the task, why would they ever try again? Students must have a sense of empowerment to believe that their efforts will make a difference.

Positive (or negative) emotions associated with learning goals and actions will also impact the approach behaviors students exhibit toward a task. Motivation is also related to a number of other variables such as interest, valuing, instrumentality and a positive mindset. Similar to the skill component elements, it is the interactive effects of these and other elements that ultimately result in what is called motivation.

Self-Regulation Component

The self-regulation of thoughts, beliefs and actions in the model focuses on the self-management aspects of learning. Strategic learners manage their skill and will factors in light of their learning environment through self-regulation. Essentially, self-regulation involves awareness and control of relevant factors in order to achieve a desired outcome. Strategic learners regulate on a macro level, such as using time management and a systematic approach to studying, and on a micro level, such as concentration focusing, comprehension monitoring, and coping strategies for managing academic stress.

Time management is one of the major macro elements of self-regulation and refers to the learner's use of time resources in the pursuit of learning tasks and goals. Self-regulation of time use involves the monitoring and control of time management to help attain a desired learning outcome (Zimmerman, Greenberg & Weinstein, 1994). Students need to balance the many demands on their time to help them meet their goals.

Another macro level 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, 1988, 1994). 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 completion date. 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 that includes the brainstorming of several potential strategies for achieving the desired outcome in the given situation. In the fourth step the learner selects from the 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. This includes conducting an on-going evaluation of the effectiveness of each strategy as it is being implemented. 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 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.

On the micro level, strategic learners 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 more complex activities such as trying to reason through a problem-solving method, going to a tutor for help, or teaming with someone else who is taking the same

course to study difficult sections together. Each of these activities is designed to help solve a learning problem. It is important that students have a repertoire of fix-up strategies so that they can deal with a variety of possible academic problems.

Academic Environment Component

The Model of Strategic Learning also includes elements in the learning environment, which 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 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 school resources such as labs, tutors, teacher help lines, homework help lines, and access to the World Wide Web.

Teacher expectations refers to the expectations held by the 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 expectations match or do not match the learner's abilities/needs can have a major impact on the acquisition and retention of information and the subsequent transfer of newly learned material. 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.

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. This might include listening in class, taking notes, role-playing, demonstrating proficiency, or taking a timed test. The nature of a specific task assigned in a class will interact with the learner's level of skill and will to help determine the degree of learning success. 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 class material is delivered, or other time constraints that may be impacting the learner (e.g., responsibilities outside of school), affect learning outcomes. If the class time is limited, students may not be able to practice using their new knowledge. 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, and family. This might include other students with whom the learner could study and share class experiences and advice from siblings or parents. Beliefs of peers and family members, supportive or antagonistic 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.

The Model of Strategic Learning provides a conceptual framework that can be used to develop assessment tools and instruction designed to help identify students' current level of strategic learning and the areas where they may need help. The next section focuses on assessment issues and examples of currently available instruments.

Assessment of Strategic and Self-Regulated Learning

Purposes for Assessment

Measures of strategic and self-regulated learning can serve several purposes. One major purpose is to obtain a diagnosis of students' strengths and weaknesses in order to create individualized prescriptions for enhancement. Teachers (and older students) can use this diagnostic information to improve awareness, development and use of learning strategies by taking advantage of the academic resources available to them. A second purpose is that this information can be used to guide the development of curriculum materials for a learning-to-learn course or another treatment intervention, such as the embedding of learning-to-learn lessons into regular course curriculums. As part of a pre- and post-assessment a third purpose for this type of assessment measures the gains made over the duration of a learning-to-learn course or intervention and identifies those areas which require further development. A fourth purpose for assessing strategic learning assesses how prepared students will benefit from formal educational experiences. Early identification of students with deficits allows for remediation and can avoid later coursework difficulties.

Approaches and Instruments to Assess Strategic and Self-Regulated Learning

There are a number of experimental or published measures to assess students' knowledge about and use of strategic and self-regulated learning. Some of these measures are more domain-specific and focus on a limited number of variables, often in just one component area of the Model of Strategic Learning, while others are more generic and sample from the Skill, Will and Self-Regulation Components. For example, the Test Anxiety Inventory (Spielberger, 1980) focuses on the domain-specific area of test anxiety while the Test Anxiety Profile (Oetting & Deffenbacher, 1980) examines students' anxiety in a broad range of areas, such as thought interference, taking different types of tests, and giving a class presentation. However, although this measure assesses more variables than the Test Anxiety Inventory, it still focuses on the area of anxiety, an element in the Will Component. The Approaches and Study Skills Inventory for Students (Entwistle, Tate, & McCune) measures students' conceptions of learning and their typical approaches to studying and learning (the Skill Component).

Some instruments do not sample across all of the components of the model but they do include at least two of the components. For example, the Learning Process Questionnaire (Biggs, 1987) measures motives (Will Component) and strategies for different types of student approaches to learning (Skill Component). The Revised Approaches to Study Inventory (Entwistle & Tait, 1994) also measures students' learning methods preferences (Skill Component) and includes a measure of self-confidence (part of the Will Component). The Study Attitudes and Methods Survey (Michael, Michael, & Zimmerman, 1985) examines students study methods and their anxiety about studying. The ACT Study Power Assessment and Inventory (American College Testing, 1989) examines

students' learning strategies, test-taking skills and their management of time and their study environment. The Survey of Study Habits and Attitudes, Form C (Brown & Holtzman, 1984) assesses students methods for studying as well as their attitudes about approaching and completing academic tasks.

There are several instruments that do sample across the Skill, Will and Self-Regulation Components. For example, the Study Behavior Inventory (Bliss & Mueller, 1987) measures students' attitudes toward studying, their study behaviors and use of note-taking, reading and writing strategies, and their coping mechanisms for taking examinations. The Cornell Learning and Study Skills Inventory (Paul & Cassel, 1974) examines students' study skills, goal orientation, and self-mastery (control). The two most commonly used measures of strategic and self-regulated learning are the Learning and Study Strategies Inventory, 2nd Edition (LASSI) (Weinstein, Schulte, & Palmer, 2002) and the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991). A more detailed description of the high school version of the LASSI (LASSI-HS) is discussed in the next section.

The Learning and Study Strategies Inventory – High School Edition

The Learning and Study Strategies Inventory – High School Edition (LASSI-HS) (Weinstein, Palmer, & Schulte) is a 10-scale, 76-item assessment of students' awareness about and use of learning and study strategies related to skill, will and self-regulation components of strategic learning for high school students. Separate norms are provided for 9th, 10th, 11th and 12th grades. The focus is on both covert and overt thoughts, behaviors, attitudes, motivations and beliefs that relate to successful learning in post-secondary educational and training settings and that can be altered through educational interventions. Research has repeatedly demonstrated that these factors contribute significantly to success in college and that they can be learned or enhanced through educational interventions such as learning strategies and study skills courses. The LASSI is both diagnostic and prescriptive. The LASSI-HS provides standardized scores (percentile score equivalents) and national norms for ten different scales (there is no total score reported because this is a diagnostic instrument). It provides students with a diagnosis of their strengths and weaknesses, compared to other college students, in the areas covered by the 10 scales and it is prescriptive in that it provides feedback about areas where students may be weak and need to improve their knowledge, skills, attitudes, motivations and beliefs.

The LASSI-HS is designed to be used as: (a) A screening measure to help students develop greater awareness of their learning and studying strengths and weaknesses, (b) A diagnostic measure to help identify areas in which students could benefit most from educational interventions, (c) A basis for planning individual prescriptions for both remediation and enrichment, (d) A means for instructors to use for examining individual students' scores and class trends to help them decide where to place the greatest emphasis for assignments, projects, individual logs, journals, portfolios and other class activities, (e) A pre-post achievement measure for students participating in programs or courses focusing on learning strategies and study skills, (f) An evaluation tool to assess the degree of success of intervention courses or programs, and (g) An advising/counseling tool for advisors, developmental education programs, learning assistance programs, and student learning centers.

Introduction to the LASSI SCALES

There are ten scales on the LASSI-HS: Anxiety, Attitude, Concentration, Information Processing, Motivation, Selecting Main Ideas, Self Testing, Study Aids, Test Strategies, and Time Management. Each of these scales is primarily related to one of the three components of strategic learning under the student's control: Skill, Will and Self-Regulation. The conceptual framework of strategic learning underlies each of these components, so there is some overlap and interaction among and within the components and individual scales.

Scales Related to the skill component of strategic learning.

The LASSI-HS scales related to the Skill Component of strategic learning are: Information Processing, Selecting Main Ideas, and Test Strategies. 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 elaboration, organization strategies, and reasoning skills as learning strategies to help learn new information and skills as well as 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 or experiences? 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 class presentation? 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?

Scales related to the will component of strategic learning.

The LASSI-HS scales related to the will component of strategic learning are: Anxiety Attitude, and Motivation. These scales measure the degree to which they worry about their academic performance, their receptivity to learning new information, their attitudes and interest in college, their diligence, self-discipline, and their 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?

Scales related to the self-regulation component of strategic learning.

The LASSI-HS 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' 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 for academic tasks. Are students well organized? Do they anticipate scheduling problems?

Because the *LASSI-HS* is a diagnostic/prescriptive instrument, it is important to consider what can be done to help students who score poorly on one or more of the scales. In the next sections we will address issues related to helping students become more strategic and self-regulated learners.

Transfer

The ultimate goal of any learning strategies or study skills class is to facilitate transfer to other coursework and future learning. Salomon and Perkins' (1989) concept of high-road transfer, particularly forward-reaching high-road transfer and their concept of "mindful abstraction," seem to fit quite well within the tenets of Weinstein's Model of Strategic Learning as well as other conceptions of self-regulated learning. In each of these conceptions the learner is metacognitively aware that the information which is being learned has potential current and future applications outside of the original learning context. The strategic learner goes forward from the learning-to-learn course in search of new contexts in which to apply what has been learned. Salomon and Perkins (1989) state, "the main distinction of the high-road to transfer is the mindful generation of an abstraction during learning and its later application to a new problem or situation from which basic elements are similarly abstracted."

The Model of Strategic Learning and a college transition course derived from it also seem compatible with Sternberg and Frensch's (1993) four mechanisms of transfer. The first mechanism is encoding specificity in which the retrieval of information from memory is dependent upon the manner in which the information was encoded. Information that is encoded as context-specific or self-contained is likely to be accessed within that context. Weinstein's model is not context bound but applies to most academic contexts. Students in the learning-to-learn course based on the model complete assignments that require them to apply components of the

model to a variety of contexts. Stahl, Simpson and Hayes (1994) suggest that having students practice the strategies being learned on real coursework from other classes will result in more natural strategy transfer.

The second mechanism is organization, which refers to how the information is organized in memory. Information that is organized within a clear framework and connected to prior knowledge is likely to facilitate retrieval of that information. The use of knowledge acquisition strategies and the ability to identify important information are parts of the Model of Strategic Learning that directly apply to this mechanism. Learning strategies and skills involve actively seeking to organize information into a format that is meaningful to the learner and to link new information to the learner's prior knowledge.

Sternberg and Frensch's third mechanism is discrimination, which refers to the tagging of information as relevant or irrelevant to a novel situation. This is related directly to the model and the context knowledge element as well as the ability to identify important information. If the student perceives the course or material studied to be useful in their current or future coursework or occupation, they are likely to tag the information as relevant and plan for ways in which they could apply the new information. The ability to identify important information is also a factor in that the potential usefulness of the information that the learner perceives will determine what information is tagged as important or relevant, and subsequently what information will be available to be accessed in a transfer situation.

The fourth mechanism is set, which is how the learner mentally approaches a problem or learning task; i.e., whether or not the learner is planning to transfer or use what they are learning. This mechanism is also addressed in the Model of Strategic Learning in several areas. From the Will component, motivation and attitude towards learning apply to set. If the learner does not value the course or is not interested in actively participating, then they are not likely to have a set towards learning the material presented that is conducive to transfer of the course content to their subsequent coursework. From the self-regulation component, set would be affected by using the systematic approach to learning, especially the monitoring step. By monitoring, the strategic learner is checking to see if the material is being understood and can be applied at the desired level of performance.

In many cases, transfer of learning strategies cannot be directly observed, but must be inferred from other measures. In a school setting there are two primary sources of information that are commonly used to indicate transfer of learning from learning-to-learn programs to future academic situations. These are: (a) achievement (in class, school, or on standardized or nationalized tests; and, (b) promotion to the next grade level (retention) (adapted from Simpson, et al., 1997).

The Roles of Teachers and Instruction in Helping Students Become More Strategic Learners

In the last 15 years there has been an explosion in our understanding of how students learn and study, and how we can help them to be more motivated, strategic and self-regulated learners. One result of this has been the development of powerful instructional strategies that can help teachers assist students in developing the knowledge and skills needed to be effective learners who can play a more active role in their education (e.g., Chan, 1994; Dart, Burnett, Purdie, BoultonLewis,

Campbell & Smith, 2000; Day, 2002; Gall, Gall, Jacobsen, & Bullock, 1990; Dembo & Eaton, 2000; Guthrie, Van Meter, McCann, Wigfield, Bennett, Poundstone, Rice, Faibisch, Hunt, & Mitchell, 1996; Hoek, van den Eeden, & Terwel; Manning, 1995; Miller & Byrnes, 2001; Muthukrishma & Borkowski, 1995; Newman, Myers, Newman, Lohman & Smith (2000); Pintrich & DeGroot, 1990; Plucker & McIntire, 1996; Puntambekar, 1995; Rosenshine, 1995; Shapley, 1995; Taylor & Everly, 1995; Weinstein & Hume, 1998; Wilson & Weinstein; 1989; Wolters & Pintrich, 1998). Teachers have always recognized the critical role played by students' learning and studying strategies and they have always tried to adapt to or help students who are experiencing difficulties in school. The following discussion will focus on some suggestions about ideas and tools teachers can use to enhance their teaching of these strategies (see Weinstein & Hume, 1998 for a more detailed discussion of teaching methods and sample exercises for teaching learning strategies).

There are four basic categories of instructional interventions for teaching strategic learning: direct instruction, embedded instruction (metacurriculum), combined instruction, and online instruction. Direct instruction involves interventions that are designed to teach students how to study and learn academic material. This category includes everything from a single class lesson on how to find main ideas to an entire course designed to teach the elements in each of the components of the Model of Strategic Learning. Embedded instruction, sometimes referred to as the metacurriculum approach, is designed to teach learning-to-learn in the context of a content course. For example, when assigning a class presentation project, the teacher could explain how the students could manage their time when completing the project. Explaining at the beginning of a course how to find the main ideas or how to use the study aids provided in the textbook would be another example of a metacurriculum. Combined instruction integrates the first two categories and is often used for students who have significant deficits. Direct instruction is used to help students develop their understanding and use of learning-to-learn strategies and skills and the embedded approach is used to reinforce this learning and provide opportunities for further practice with guided feedback. Online instruction, the fourth category, refers to the use of online materials either in-class or outside of class to teach learning-to-learn and to provide opportunities for practice. Because this method does not allow for interaction or guided practice with feedback, it is usually combined with one of the other categories. Examples of online instruction or resources include *Becoming a Strategic Learner: LASSI Instructional Modules* (Weinstein, Woodruff, & Awalt, 2002), the Big Chalk web site (<http://www.bigchalk.com/>), and the Geocities "Study Skills for High School" web site (<http://www.geocities.com/Heartland/9120/>).

A Case Study – EDP310

In 1977, a course in individual learning skills was introduced for students transitioning from high school to the University of Texas in the United States. Over time, as a result of research conducted as part of the Cognitive Learning Strategies Project, as well as other research in this area, this course has evolved into a three-credit class in strategic learning for students who either enter the university under special circumstances or who experience academic difficulty after entry. Taught by advanced graduate students who receive extensive and on-going training, the course is based on the Model of Strategic Learning.

Through learning about and using the Model of Strategic Learning, students in this course develop not only declarative and procedural knowledge about strategic and self-regulated learning, they

also develop conditional knowledge which enables them to determine when and under what conditions to apply a given strategy. The course uses direct instruction, modeling, and guided practice with feedback to help the students learn the material. To help facilitate transfer, a variety of tasks from many content areas are used and students must apply what they are learning to other classes they are taking. The first three days of the course focus on pre-testing and an introduction to the course. The pre-test data, such as their scores on the LASSI and a reading comprehension measure, are used not only to help the students begin to think about their own strengths and weaknesses but to also help individualize the class assignments and priorities over the course of the semester. The measures are used only for diagnostic purposes and do not affect students' course grades. After the initial orientation to the course, instructors present and discuss the model of strategic learning and its various components; this model is the chief organizer for the course and the instructors continually refer to it throughout the semester. As a part of this instruction, it is explained that strategic learners are goal-directed and use strategies in pursuit of their goals. To help guide their development of useful goals, the next topic is setting, using, and analyzing goals. Being able to establish and use realistic, yet challenging, academic goals is a central theme in the course. The discussion about establishing and using goals leads nicely into other topics related to motivation and positive affect toward learning. For example, instructors discuss efficacy expectations, valuing, attributions as components of motivation that are under the students' control.

The topics covered in the rest of the course include, but are not limited to, the following areas: knowledge acquisition strategies; pre-, during-, and post-reading strategies; time management and dealing with procrastination; attention and concentration; note-taking and listening skills; preparing for and taking tests; the relationship between understanding and long-term memory; and dealing with academic stress. During the final week of the class, students complete the post-assessment measures so that they can see where they have improved. Students also receive feedback about areas they might want to continue working on through the university's learning skills center or other special help programs in some of the individual colleges at the university.

Much of the current discussion among developmental educators focuses on the long-term effects of developmental education. On the semester evaluations of the pre- and post-data students generally evidence highly significant gains. To address what impact the course had on students' grade point averages (GPAs) and retention at the university we conducted a longitudinal study of students who entered the university in the Fall Semester, 1990. We followed these students for five years. The most dramatic data appears in the fifth-year follow-up statistics. Approximately 55% of the students who entered in 1990 and did not take our course graduated after 5 years; this statistic had remained the same for a number of years. However, despite significantly lower entry scores on standardized measure such as the Scholastic Aptitude Tests (The College Board, 1999) approximately 71% of the students who successfully completed our course (primarily those who did not drop out or fail due to excessive absences) graduated after 5 years (Weinstein, Dierking, Husman, Roska, & Powdrill, 1999). This sixteen-point difference is a dramatic finding that supports the long-term achievement and retention effects of an intervention in strategic learning.

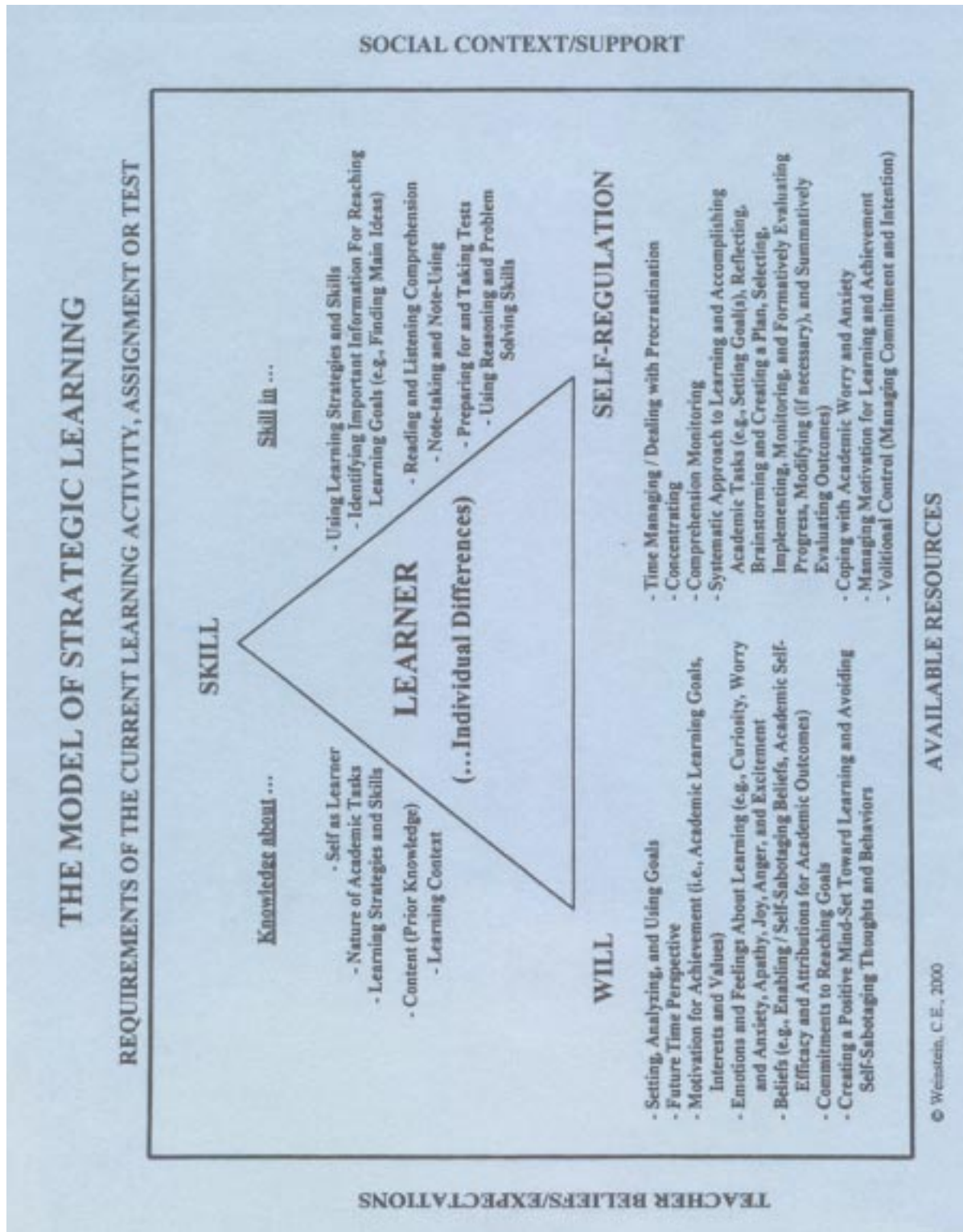


Figure 1

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MOTIVATION IN THE COLLEGE CLASSROOM

By Barbara Hofer, Middlebury College

Few topics concern teachers at all levels as much as the motivation of students. We worry over any who appear disengaged and may disparage students who appear to care only about grades. We delight in the students eager to ask intelligent questions, whose hands fly into the air, who not only prepare for class but also seek us out to learn more. We marvel when we learn that these behaviors sometimes describe the same student—but in different courses. How can we better understand the motivational patterns of our students and shape courses that foster the motivation to learn? The research and knowledge base on student motivation is strong and can provide a framework for fostering student motivation in the college classroom.

We all want students who are motivated to learn. These are the students who choose to attend class regularly, participate constructively, persist when learning is difficult, make the effort to prepare for class and study effectively, solicit help when they need it, and translate all this into academic success. Knowing more about how students are motivated and what you can do to structure a class that positively affects student motivation can make a significant difference in student engagement and learning. A classroom of motivated learners affects *our* motivation as well and can make teaching a more satisfying experience for the instructor.

Motivation Theory

Researchers typically consider three indices of motivation: choice, effort, and persistence. Students who are motivated to learn will choose tasks that enhance their learning, will work hard at those tasks, and will persist in the face of difficulty in order to attain their goals. Why students vary in their motivation is a persistent question, and there are several theoretical frameworks that help us interpret this. Some students may be driven by a high *need for achievement* (McClelland et al., 1953). This may be characterized as an individual trait or disposition, and it is likely to be the outcome of early environments in which parents set high standards and rewarded achievement. In general, students differ from one another in the degree to which achievement for its own sake is meaningful to them. Motivation is also contextual, however. A particular student may exhibit a striving for achievement on the soccer field but not in your class, or perhaps it is more motivated to achieve in some disciplines than in others. Classroom context can foster certain types of motivation over others, as can the overall climate of an educational institution.

Autonomy and Self-Determination

Many psychologists believe that human beings have a fundamental need for autonomy and self-determination (Deci & Ryan, 1985). Most individuals want to be in charge of their own behavior and value a sense of control over their own environment. We can enhance students' sense of control by offering choices and supporting their autonomy, which in turn enhances motivation. The importance of "stage-environment fit" in motivation (Eccles et al., 1993) might well be applied to the needs of late adolescents and adults in colleges and universities. We can provide educational environments that meet developmental needs by giving students meaningful opportunities for choice, accompanied by accountability for their actions. Quite often these can be relatively small steps on the part of the faculty member, such as offering a choice of paper topics or reading assignments, yet they go a long way in acknowledging a student perspective.

Intrinsic and Extrinsic Motivation

Instructors at the college level often complain of student preoccupation with grades, typified by the perceptual classroom question: Will that be on the test? These extrinsically motivated are likely to engage in the course for reasons of external rewards, such as grades, recognition, or the approval of others (notably, instructors and parents). Individuals who are *intrinsically motivated* are those who engage in an activity for the value of the activity itself, rather than for an external reward. Can a student be both intrinsically and extrinsically motivated? The answer is a resounding “yes,” so it is useful to understand how both motives operate and to know something about the relationship between them in order to maximize student motivation.

Students who are intrinsically motivated are those who learn for the pleasure of learning and who have a sense of self-determination about their educational path. Intrinsic motivation has been shown to foster conceptual understanding, creativity, involvement, and a preference for challenge. Research on college student learning indicates that students with intrinsic orientation are more likely to use cognitive strategies such as elaboration and organization, resulting in a deeper processing of the material (Pintrich & Garcia, 1991).

Although the image of a classroom of intrinsically motivated learners might sound ideal, students are also driven by the desire for grades, approval, and other rewards, and understandably so. Intrinsic and extrinsic motivation exist not on a single continuum, but on two separate ones, and students may often have multiple goals for the same course. A student enrolled in a required course, for example, may be deeply interested in the material, but may also see it as a step in her professional development and may desire to earn an A so that she will be likely to gain admission to graduate or professional school. Even students who initially appear only extrinsically motivated to take a course, perhaps viewing it merely as a requirement toward graduation, can become more intrinsically motivated by your arousing their curiosity, providing appropriate levels of challenge, and offering them choices that enhance their control (Lepper & Hodell, 1989).

Although studies have indicated that external rewards may diminish intrinsic motivation by undermining self-determination (Deci & Ryan, 1985) recent research seems to support the judicious use of external rewards as a complement to other motivational approaches. Extrinsic rewards may be particularly useful when intrinsic motivation is lacking-and it is reasonable to assume that students are not always going to be intrinsically motivated to learn everything they are expected to learn during the college years. Students may also find extrinsic rewards to be productive during the early stages of learning a new subject, before they feel they can begin to master it and when the necessary nature of the tasks (such as memorizing vocabulary in a foreign language or learning a large number of terms in the sciences) may not be intrinsically interesting. There is also some evidence from a study of intrinsic motivation in college undergraduates that the pursuit of grades may not be incompatible with subject matter appreciation (Covington, 1999). In particular, those students who attain their grade goals and whose achievement is not driven by the desire to avoid failure may increase their interest in the subject.

Furthermore, extrinsic rewards are most beneficial when they contain informative feedback and enable students to focus on improvement. Thus grades alone are less helpful than those accompanied by narrative feedback that addresses specific directions for change.

Expectancy x Value Theory

Students typically direct their behavior toward activities that they value and in which they have some expectancy of success. From this social cognitive perspective, motivation is viewed as the outcome of multiplying these two forces; if either one is absent, the resulting product is zero. Instructors can benefit by knowing that they need to foster both. Students need to feel that there is a reasonable possibility of success and that the work is of value. Thus even students who believe that they can do well in an introductory course might not continue with the subject if they do not see that the material is of value. Likewise, even those who entered with professional ambitions dependent on the course may not persist in the field if they think they cannot expect success.

Mastery Versus Performance Goals

Motivated behavior is directed toward goals, and goals related to learning tend to reflect two broad types of purposes. Although there have been different terms used to categorize the two types of goal orientations, a useful distinction is *mastery goals* vs. *performance goals*. Students who adopt mastery goals are those whose primary desire is to understand and master the material. By contrast, students with performance goals are more likely to focus on their own achievement relative to that of others. The classrooms we create may implicitly foster a particular type of goal, depending on grading practices, classroom climate, and other such factors.

In a classroom that is mastery focused, instructors generally use criterion-referenced grading rather than normative (grading on a curve); foster a supportive climate where students can take intellectual risks; and provide opportunities for students to demonstrate improvement. A mastery orientation may be visible in classroom discussions when students ask genuine questions which they do not already know the answers, driven by a desire to better understand the material, rather than to impress their peers and instructor. Mistakes are viewed as an opportunity for learning. In a class that is focused on performance, instructors often use normative grading practices (which imply that only a percentage of students are likely to succeed) and provide no opportunities for revising and improving written work. Student questions may be formulated to present the inquirer in the best light and to gain recognition and reward. In contrast to students with mastery goals, students who are ego involved with their performance may compare grades with one another and take academic shortcuts, such as avoiding more effort than is necessary to acquire the desired grade. Fostering a mastery orientation in the classroom begins with syllabus construction and can be considered throughout a course.

Attribution Theory

When individuals need to seek an explanation for unexpected outcomes, they make attributions about the probable causes. In academic motivation, this often arises when students fail to perform well on a test or get a grade that differs from what they might have expected. Typical attributions are effort (“I didn’t study hard enough”), ability (“I’m just not good at this subject”), or luck (“The test emphasized the material I actually studied!”). Attributions can be categorized along three dimensions—locus, stability, and responsibility—which refer, respectively, to whether the cause is internal or external, stable or unstable, and controllable or not (Weiner, 1986). Students who explain their disappointments with internal, controllable attributions (“I know I didn’t prepare adequately for the test”) are likely to do better next time, because they believe that they can affect the outcome.

Students who attribute failure to stable, uncontrollable causes (“The teacher is biased against me” or “I will never understand statistics”) are less likely to be motivated for improvement and may be pessimistic about future outcomes. Instructors can assist students in making adaptive attributions, particularly by helping them attribute failure to effort rather than ability, as well as by communicating their own positive attributions about students’ capabilities for learning.

Social Goals and Social Motivation

Students are obviously motivated by more than academic achievement. For example, they also have social goals that are operative in the classroom; they want to be socially responsible and to form intimate social relationships with peers (Patrick et al., 1997). Although most studies of the relationship between social goals and academic motivation and achievement have been conducted with younger adolescents, certainly no college instructor would doubt that social goals are operative in the college classroom. Enabling students to meet some of those goals in conjunction with academic goals in your classroom may enhance student motivation to attend class and participate in academic work. For example, brief opportunities to discuss a question with a partner work well from a cognitive perspective because they foster elaboration and retention and provide opportunities for clarification. But they also give students an opportunity to get to know one another.

Putting Motivation Theory into Practice

Although there are many ways you can structure classes that foster student motivation to learn, here are a few suggestions:

1. In planning assignments, consider issues of choice and control. If you would like students to write three papers during the term, provide assignments during four time periods and let them choose which three to complete. This enables students to take charge of when to complete their work in the context of requirements from other courses and allows them to select issues of greatest interest. (This also has the advantage of spreading out the grading that you will need to do.) Similarly, provide a choice of topics for each assignment and consider a range of options that engages interest. Foster initiative by allowing students to propose alternative topics that meet the intent of the assignment.
2. Foster mastery by encouraging students to revise their writing. Although it might not be reasonable for you to read drafts of every paper, you might do this for the first written assignment and then create peer review groups for additional papers. Or you can vary this process by responding to outlines for one paper and then reading drafts of opening paragraphs for the second. You can further foster mastery by uncoupling feedback and grading, so that early drafts receive written comments but not grades.
3. Adopt a criterion-referenced approach to grading rather than a normative one. Outline course requirements so that the point value for each assignment is clear from the beginning and students know what they need to do to succeed—and know that they can succeed without worrying about their standing relative to others in the course. This fosters a sense of control, creates a cooperative rather than a competitive climate, and appeals to both intrinsically and extrinsically motivated students.
4. Test frequently enough that students become accustomed to the format and have opportunities to learn from their mistakes; at the very least, consider a similar format for the midterm and final.

Allow students to justify and elaborate on their multiple-choice answers, which enhances control, and give partial or full credit for acceptable and reasonable justifications of alternative answers. Provide choices of essay questions to answer (“Answer five out of the following six questions”). Consider providing one of the essay questions in advance, particularly one that might require more thoughtfulness and preparation.

5. When grading tests, create a frequency distribution of responses and consider dropping questions missed by a large number of students—and then reteach the material after you return the tests. This sense of shared responsibility for the learning process heightens student awareness that you are committed more to their mastery of the material than to penalizing them for what they do not yet know.
6. Consider scheduling two test-taking periods for each test, with immediate feedback after the first test and two or three days to study before the next one (an alternative version), and award students the higher of the two grades. This fosters a mastery orientation to learning but also appeals to those students who are externally motivated by grades; the net effect in either case is further studying.
7. Provide feedback to students that is constructive, noncontrolling (for instance, avoid words like *should*), and informative, thus enhancing student desire to improve and continue to learn. View problems as something that can be addressed, not statements about an individual’s worth.
8. Learn more about the motivation of your particular students. You might wish to administer the Motivated Strategies for Learning Questionnaire, a research questionnaire that assesses both motivation and learning strategies, and is designed to be course-specific (Pintrich et al., 1991).
9. Project your own motivation—for the subject matter and for the students. Take opportunities to describe your own intrinsic motivation for both research and teaching and your mastery orientation to learning. Too much of the literature on faculty “rewards” has focused on the extrinsic reinforcement for teaching, neglecting our own intrinsic motivation for academic work. You are a powerful role model for your students as they develop their own passion and motivation for learning as well as for their future professions.
10. In your supervision of teaching assistants, make the motivational implications of your instructional decisions explicit. I am indebted to Paul Pintrich, Bill McKeachie, and Scott Paris, who were extraordinary role models in their design of graduate seminars that fostered student motivation but who also provided me with opportunities as a TA to understand the motivational structure of their undergraduate courses, which I have happily put into practice in my own teaching.

In Conclusion

In review, several key principles about student motivation may be useful to keep in mind as you design your course, think about your instructional methods, and interact with your students.

1. Recognize students’ needs for self-determination and autonomy, and provide opportunities for choice and control.

2. Foster intrinsic motivation by arousing curiosity, providing challenge, and offering choices, and provide extrinsic rewards that contain informative feedback and focus on improvement.
3. Make the value of your course explicit, and take time to help students understand why what they are learning matters.
4. Create conditions that enable students to expect to succeed.
5. Create a classroom environment that promotes a mastery orientation, focused on the development of understanding and mastery of material and skills, rather than on performance relative to that of others.
6. Foster adaptive attributions: help students value the application of effort and learning strategies, and communicate your belief in their capability.
7. Provide opportunities for students to meet social goals in ways that are compatible with academic goals.

Supplementary Reading

Although the following are directed more toward the motivational issues of K-12 schooling, the theories and many of the suggestions are useful to those who are interested in the use of motivation in the college classroom.

J. Brophy, *Motivating Students to Learn* (Boston:McGraw-Hill, 1998)

P.R. Pintrich and D.H. Schunk, *Motivation in Education: Theory, Research, and Applications* (Englewood Cliffs, NJ: Prentice Hall, 1996).

D.J. Stipek, "Motivation and Instruction," in D.C. Berliner and R.J. Calfee (eds.), *Handbook of Educational Psychology* (New York: Macmillan, 1996).

ACTIVE LEARNING:

COOPERATIVE, COLLABORATIVE, AND PEER LEARNING¹

by Wilbert McKeachie

One of the recurring criticisms of higher education is that it hasn't increased its productivity at the same rate as industry. By "productivity" critics typically mean that colleges should turn out more students using fewer teachers—as if colleges were factories producing shoes, automobiles, or soap.

The bottleneck in educational efficiency is that learning to think requires thinking and communicating the thinking through talking, writing, or doing so that others can react to it. Unfortunately a professor can read only one paper at a time, can listen to only one student's comments at a time, and can respond with only one voice.

The problem is not one of communicating knowledge from professors to students more efficiently. Printed materials have done this very well for years, and for most educational purposes are still superior to any of the modern alternatives. The problem is rather one of interaction between the learner and teacher. Fortunately, interactions that facilitate learning need not be limited to those with teachers. Often those with peers are more productive.

Peer Learning and Teaching

The best answer to the question: What is the most effective method of teaching? Is that it depends on the goal, the student, the content, and the teacher. But the next best answer may be: Students teaching other students. There is a wealth of evidence that peer learning and teaching is extremely effective for a wide range of goals, content, and students of different levels and personalities (Johnson & Johnson, 1975; Johnson et al., 1981). Moreover, skill in working cooperatively is essential for most vocations. Miller and Groccia (1997) found that cooperative learning produced positive results in ability to work with others as well as better cognitive outcomes.

Here are some tips that may be helpful in initiating a variety of types of cooperative learning methods:

1. Have students discuss what contributes to effective group functioning. Explain why working together is important and valuable.
2. Make students know what their task is; for example, if it involves out-of-class work, give teams a few minutes before the end of the class period to make plans. At this time they should also report to you what they plan to do and when and where they will meet.
3. For in-class group work, move around and listen in to be sure students are not lost and confused. Use this time to get and keep them on the right track.
4. Help students develop the skills they need for working together effectively.

¹ I use the term peer learning to include "collaborative" and "cooperative" learning. Some authors distinguish collaborative from cooperative learning, but both involve peer learning in which there is interdependence of students working toward a common goal. Similarities in and differences between collaborative and cooperative learning are discussed in Matthews, Cooper, Davidson, and Hawkes (1995).

Suggestions for Students: How to Be an Effective Group

1. Be sure everyone contributes to discussion and to tasks.
2. Don't jump to conclusions too quickly. Be sure that minority ideas are considered.
3. Don't assume consensus because no one has opposed an idea or offered an alternative. Check agreement with each group member verbally, not just by a vote.
4. Set goals—immediate, intermediate, and long term—but don't be afraid to change them as you progress.
5. Allocate tasks to be done. Be sure that each person knows what he or she is to do and what the deadline is. Check this before adjourning.
6. Be sure that there is agreement on the time and place of the next meeting and on what you hope to accomplish.
7. Before ending a meeting, evaluate your group process. What might you try to do differently next time?

Student-Led Discussions

In pioneering experiments in educational psychology and general psychology, Gruber and Weitman (1962) Found that students taught in small, student-led discussion groups without a teacher not only did at least as well on a final examination as students who heard the teacher lecture, but also were superior in curiosity (as measured by question-asking behavior) and in interest in educational psychology. Similar results have been found in many more recent studies. Webb and Grib (1967) found in their research that students report that the same sense of freedom to ask questions and express their own opinions is a major advantage of the student led discussions.

How to Use Student-led Discussions

Do you just assign students to lead discussions with their peers when you don't have time to prepare? No. Student-led discussions don't give you a lot more free time. If the groups are to achieve the good results reported by the researchers, you need to meet with the leaders to discuss issues that may arise, suggest possible discussion eliciting questions, and make it clear that their status as leaders does not mean that they have to play the role of experts. Questions that are not resolved can be referred back to you, to reading, or to World Wide Web resources.

Peer Tutoring

"Pay to be a tutor, not to be tutored" is the message from studies of peer tutoring. For example, Annis (1983a) compared learning of students who read a passage and were taught by a peer and students who read the passage and taught it to another student.

The results demonstrated that teaching resulted in better learning than being taught. A similar study by Bargh and Schul (1980) also found positive results, with the largest part of the gain in retention being attributable to deeper studying of material when preparing to teach. These results fit well with contemporary theories of learning and memory. Preparing to teach and teaching involve active thought about the material, analysis and selection of main ideas, and processing the concepts into one's own thoughts and words. However, this does not mean that those being tutored fail to learn. Peer tutoring also helps those being tutored (Cohen, Kulik, & Kulik, 1982; Liden, Meier, & Brigham, 1991). Hartman (1990) provides useful suggestions for training tutors. Peer tutoring need not be one on one. Group tutoring is also effective.

The Learning Cell

One of the best developed systems for helping pairs of students learn more effectively is the "learning cell" developed by Marcel Goldschmid of the Swiss Federal Institution of Technology in Lausanne (Goldschmid, 1971). The learning cell, or student dyad, refers to a cooperative form of learning in pairs, in which students alternate asking and answering questions on commonly read materials.

1. To prepare for the learning cell, students read an assignment and write questions dealing with the major points raised in the reading or other related materials.
2. At the beginning of each class meeting, students are randomly assigned to pairs, and one partner, A, Begins by asking the first question.
3. After having answered and perhaps having been corrected or given additional information, the second student, B, puts a question to A, and so on.
4. During this time, the instructor goes from dyad to dyad, giving feedback and asking and answering questions.¹

A variation of this procedure has each student read (or prepare) different materials. In this case, A "teaches" B the essentials of his or her readings, then asks B prepared questions, where upon they switch roles. Research by Goldschmid and his colleagues demonstrated that the learning cell is effective in a variety of disciplines (Goldschmid, 1975; Goldschmid & Shore, 1974). Training students to generate thought-provoking questions enhances learning (King, 1990; Pressley et al., 1992). To recapture student attention and stimulate deeper processing, I often ask students to think about a problem for a minute, write for a minute, and then share their thoughts with a neighbor (Think-Pair-Share). Students then feel more free to participate in a general discussion of the problem. Pairing can also be effectively used for interviews, discussion of an issue or questions, analyzing a case or problem, or summarizing a lecture or assigned reading.

Team Learning: Syndicate and Jigsaw

The term *syndicate* has a faintly evil connotation in the United States, but in Great Britain and other countries, *syndicate* is used to describe a team based system of learning that has proved to be effective. In syndicate-based peer learning, the class is divided into teams (or syndicates) of four to eight

¹ Students can also use the learning cell technique outside of class. My students use it in preparing for tests. A similarly structured method is "Ask to Think—Tell Why" (King, 1997)

students. Each syndicate is given assignments (perhaps three or four questions). References are suggested, and members of the syndicate may divide up the readings. The findings may then be discussed by the various syndicates as they meet in small groups during the regular class period. The syndicate may then make a written or oral report to the class as a whole.

I have found that I get more interesting reports when I remind students that they have probably sometimes been bored by student reports. Hence, they need to plan not only the content of the report, but also how to make it interesting. I'm impressed by the student creativity; my students have developed graphic and audio aids, skits, class participation, and other devices for motivating their classmates.

Hartman (1989) reports increased student motivation and student perceptions of deeper understanding as a result of the use of this method.

The *jigsaw* method, first developed by Elliot Aronson, begins like the syndicate by dividing a class into groups which are given assignments. Members of each group report back to their group, which agrees on what and how to present to the rest of the class. However, instead of a presentation to the entire class, each member of the group next meets in a new task group with one member from each of the other groups. In this new task group each student is responsible for teaching students from the other groups what his group has learned. Since every student is thus in a group in which every group is represented, all students have the opportunity to learn the essence of all the assignments.

Student Characteristics and Peer Learning

Peer learning works better for some students than others, but learning is increased for most students and does not hurt the learning of others.

When dealing with ability differences, heterogeneity may be better than homogeneity. Larson and colleagues (1984) found that cooperative learners with partners with dissimilar vocabulary scores recalled more main ideas after studying a textbook passage not only on the passage studied cooperatively but on a passage studied individually.

Why Does Peer Learning Work?

Motivationally, peer learning has the advantages of interaction with a peer—an opportunity for mutual support and stimulation. (One piece of evidence for the motivational value of peer learning [Schomberg, 1986] is that it reduces absenteeism.) Knowing that your teammates are depending on you increases the likelihood of your doing your work. Cognitively it provides an opportunity for elaboration—putting material into one's own words—as well as a chance to begin using the language of the discipline. It communicates that the locus of learning is in the students' heads. An effective partner can act as a model of useful strategies as well as a teacher.

Several of the effective peer learning techniques involve alternating between listening and summarizing or explaining structures of peer learning such as the learning cell that reduce the chance that one participant is simply a passive recipient seem likely to be better for both motivation and learning.

The task of the successful student in peer learning is to question, explain, express opinions, admit confusion, and reveal misconceptions; but at the same time the student must listen to peers, respond

to their questions, question their opinions, and share information or concepts that will clear up their confusion. Accomplishing these tasks requires interpersonal as well as cognitive skills—being able to give feedback in nonthreatening, supportive ways, maintaining a focus on group goals, developing orderly task-oriented procedures, and developing and sustaining mutual tasks. It is little wonder that peer learning sometimes fails; the wonder is that it so frequently works. And it does.

Students are more likely to talk in small groups than in large ones; students who are confused are more likely to ask other students questions about their difficulties or failure to understand than to reveal these problems with a faculty member present. Students who are not confused must actively organize and reorganize their own learning in order to explain it. Thus both the confused and the unconfused benefit.

In Conclusion

1. Students may learn more from interacting with other students than from listening to us. One of the best methods of gaining clearer, long lasting understanding is explaining to someone else.
2. This does not mean that we can be eliminated or have time to loaf. More of our time will be spent in helping students work together effectively, less time in preparing lectures.

Supplementary Reading

Two comprehensive books on cooperative learning are D.W. Johnson, R.T. Johnson, and K.A. Smith, *Active Learning: Cooperation in the College Classroom* (Edina, MN: Interactive Book Co., 1991), and B. Millis and P. Cottell, *Cooperative Learning for Higher Education Faculty* (Phoenix: ACE & Oryx Press, 1998).

One of the prominent scholars of cooperative learning in higher education is Jim Cooper, who in 1991 initiated the newsletter *Cooperative Learning and College Teaching*, an excellent source of ideas for different ways of using cooperative learning. You can subscribe by writing: Network for Cooperative Learning in Higher Education, Dr. Jim Cooper, HFA-B-316, CSU Dominguez Hills, 1000 E. Victoria St., Carson, CA 90747

A goldmine of helpful information is found in Philip Abrami's book *Classroom Connections: Understanding and Using Cooperative Learning* (Toronto: Harcourt Brace, 1995).

In his book, *Collaborative Learning: Higher Education, Interdependence and the Authority of Knowledge* (Baltimore: Johns Hopkins Press, 1993), Kenneth Bruffee takes the position that knowledge is socially constructed. Whether or not you accept the social constructivist view, Bruffee's book is worth reading.

Cooperative learning does not imply absence of controversy. D.W. Johnson, R.T. Johnson, and K.A. Smith describe the use and value of controversy in their book *Academic controversy; Enriching College Instruction Through Intellectual Conflict* (Washington, DC: ASHE/ERIC, 1997).

THE LASSI

All participants in the teleconference will receive a FREE copy of the LASSI. Just fill out the evaluation on the last page of this packet and return it to STARLINK.

What is the LASSI assessment and what does it measure? Nine years of research, development, and testing led to the creation of this statistically valid and reliable tool for the diagnosis of study skills. The LASSI is a 10-scale, 80-item assessment of students' awareness about and use of learning and study strategies related to skill, will and self-regulation components of strategic learning. The focus is on both covert and overt thoughts, behaviors, attitudes and beliefs that relate to successful learning and that can be altered through educational interventions. Research has repeatedly demonstrated that these factors contribute significantly to success in college and that they can be learned or enhanced through educational interventions such as learning and study skills courses.

The LASSI provides standardized scores (percentile score equivalents) and national norms for ten different scales (there is no total score since this is a diagnostic measure). The LASSI is both diagnostic and prescriptive. It provides students with a diagnosis of their strengths and weaknesses, compared to other college students, in the areas covered by the 10 scales and it is prescriptive in that it provides feedback about areas where students may be weak and need to improve their knowledge, attitudes, beliefs and skills.

The LASSI can be used as:

- A basis for improving all student's learning and study strategies;
- A diagnostic measure to help identify areas in which students could benefit most from educational interventions;
- A counseling tool for college orientation programs, developmental education programs, learning assistance programs, and learning centers;
- A pre-post achievement measure for students participating in programs or courses focusing on learning strategies and study skills;
- An evaluation tool to assess the degree of success of intervention programs or courses. The LASSI is easily administered in 30 minutes and is self-scored. Each LASSI packet includes the instrument and score interpretation information.
- A detailed user's manual is available to those administering the inventory. It includes a history of the instrument's development, a complete description of the ten scales included in the LASSI, a section on administration and scoring, results of pilot and field testing, and the process used in scale construction.

For more information: http://www.hhpublishing.com/_assessments/LASSI/index.html

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NOV. 20, 2003	A BROADER SENSE OF ARTICULATION
JAN. 29, 2004	EDUCATING THE "NET-GEN": STRATEGIES THAT WORK
FEB. 20, 2004	THE VALUES OF TEACHING (1:00 - 2:15 PM CT)
FEB. 26, 2004	THE REAL COST OF ONLINE COURSES
MAR. 3, 2004	ANNUAL CARL D. PERKINS RFQ TELECONFERENCE
MAR. 25, 2004	COLLABORATIVE LEARNING TECHNIQUES (COLTS)
APR. 8, 2004	CYBER INSECURITY? PREVENTION AND PROTECTION SOLUTIONS

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JANUARY 2004	SMALL TEACHING CHANGE = BIG LEARNING GAINS
FEBRUARY 2004	COOPERATION, COMPASSION AND CIVILITY IN THE CLASSROOM
MARCH 2004	CHANGE YOUR MIND AND CHANGE YOUR LIFE (WELLNESS)
APRIL 2004	CRITICAL THINKING: REQUIRED LEARNING FOR THE 21ST CENTURY
MAY 2004	CHEATING AND PLAGIARISM USING THE INTERNET
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