
WHAT WORKS

Evidence-based strategies for youth practitioners

Study Skills

Edited by Sandra Kerka



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2007

**LearningWork Connection
The Ohio State University
1900 Kenny Rd.
Columbus, OH 43210
614/292-8665
www.learningworkconnection.org**

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Introduction

Sandra Kerka, Writer, LearningWork Connection

About What Works

What Works is intended to provide Workforce Investment Act (WIA) youth-serving professionals with evidence-based information to support positive outcomes for youth. Each What Works contains a brief introduction that defines a topic of interest to WIA youth programs and a selection of reprinted resources that describe strategies known to increase the likelihood of youth success in the area.

Why Are Study Skills Important?

Study skills are learning strategies that help students organize, process, and use information effectively. Because youth might need help not just with *what* they learn but also with *how* they learn it, WIA makes study skills instruction, together with tutoring and dropout prevention, one of the 10 required elements of youth programs. These skills are important not just for academic learning, but also for everyday life. They can help individuals be organized and successful lifelong learners and manage their jobs, households, and finances (EMSTAC, 2001). Study skills can be especially critical for youth with learning disabilities, who may have difficulty staying focused and become discouraged by lack of success (Beckman, 2002). When students attribute failure to internal factors, such as lack of ability, or external factors, such as bad luck, their self-confidence suffers and they see effort as futile (Peirce, 2004). Mastering the skills for studying and learning increases their self-efficacy and empowers them to change their approach and try different strategies if one fails.

Signs that students need help developing study skills include spending too much time studying, taking class notes that are difficult to understand or contain the wrong information, procrastinating about large projects or tasks, being unable to identify what is important in a text, or being unable to remember what they have read (Cook Counseling Center, 2006; EMSTAC, 2001). Students and teachers can use the checklist provided by EMSTAC to identify where students need the most help and how teachers can prepare them to learn.

Learning How to Learn

Study skills are processes of metacognition, which is self-awareness of one's thinking and learning. Learners who are able to step back and monitor their thinking and learning are able to use strategies for finding out or figuring out what they need to do (Anderson, 2002, p. 1). Research shows that students who are strategic learners—

- Know there are multiple ways to do things
- Have increased self-esteem
- Become more responsible
- Improve completion and accuracy of their work
- Are more engaged in learning

- Improve performance

(Beckman, 2002)

Strategic learners find appropriate strategies to apply to specific subjects. Werger (2002) gives examples for the study of math and Cohen (2005) for second language learning.

Types of Study Skills

Components of metacognition include (1) preparing to learn; (2) acquiring, processing, and retaining information; (3) applying what has been learned; and (4) monitoring and evaluating strategy use and learning (Anderson, 2002; EMSTAC, 2001). Each of these categories involves study skills that can be explicitly taught.

Preparing to Learn

Preparing and planning for learning encompasses both physical (environment, tools) and mental (attitudes, goals, priorities) aspects. Skills that help students prepare to learn include:

- Organizing one's work by using agenda books, homework planners, and notebooks. EMSTAC (2001) and Ito (2005) provide tips for using these tools.
- Managing time by developing schedules, prioritizing tasks, and using checklists. EMSTAC (2001), Ito (2005), and the National College Transition Network (NCTN, n.d.) offer ideas for scheduling.
- Arranging the physical environment, including finding a place that is free of distractions, and choosing a time of day that works best for the individual (NCTN, n.d.). Ito (2005) suggests ways students can organize their personal space for studying.

Acquiring, Processing, and Retaining Information

Effective learners systematically obtain, organize, and retain information, beginning with good library and Internet search skills (EMSTAC, 2001). Because individuals have different learning styles, teachers should offer a variety of the following strategies for students to explore and discover which work best for them.

- Effective reading is critical to acquiring information. The Word Identification Strategy (Bremer et al., 2002) is a technique that helps readers decode and identify unfamiliar words. The SQ3R (Survey, Question, Read, Recite, Review) method described by NCTN (n.d.) is a systematic approach that helps students discover and retain the important ideas in texts.
- Effective listening in class is equally important. NCTN reviews good and bad listening habits that influence learning.
- Taking good notes enables review and retention of material covered in class. NCTN's note-taking tips begin with active listening and describe the use of keywords and graphic symbols to make notes personally meaningful.
- Outlining and summarizing help learners see relationships between concepts. Graphic organizers such as concept maps, story maps, and relationship charts are strategies that visual learners might prefer to remember content. EMSTAC (2001) defines and gives examples of graphic organizers.

- Memory aids such as mnemonics and acronyms can assist verbal learners (Beckman, 2002; EMSTAC, 2001). EMSTAC outlines mnemonic strategies such as LISTS and FIRST. The National Center on Secondary Education and Transition (2005) elaborates on DISSECT, a mnemonic that is part of the Strategic Instruction Model designed for students with disabilities.

Applying Learning

Students demonstrate and apply what they have learned in writing assignments, oral presentations, and tests. Successful test-taking requires both content knowledge (understanding of the material being covered) and procedural knowledge (how to take tests).

- The test-taking strategies known as PIRATES and ANSWER are described by EMSTAC (2001). NCTN (n.d.) gives tips for taking different kinds of exams, such as essay and multiple choice.
- Learning is also demonstrated through problem solving. Solve It! is an example of a strategic approach to mathematical problem solving (Warger, 2002).

Monitoring and Evaluating

A key metacognitive process is self-monitoring. Anderson (2002) suggests that, while using study strategies, students periodically ask themselves: What am I trying to accomplish? How well am I using this strategy? and What else could I do to accomplish this task?

- MARKER, MURDER, and LEARN are monitoring and planning strategies described in EMSTAC (2001).

How to Teach Study Skills

The National Center on Secondary Education and Transition (2005) describes an eight-step instructional sequence: Pretest, Describe, Model, Verbal Practice, Controlled Practice, Grade-appropriate Practice, Posttest, and Generalization. Boudah and O'Neill (1999) and Bremer et al. (2002) assist teachers in using the Strategic Instruction Model with students who have learning disabilities.

Beckman (2002) and Anderson (2002) offer the following suggestions:

1. Explain the strategy and its purpose: why it is important, when and how to use it.
2. Model its use, showing how to perform it and when it has the best chance of success.
3. Provide time for assisted practice.
4. Promote self-monitoring so that students become aware of how a strategy is or is not working for them.

Additional References

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The Role of Metacognition in Second Language Teaching and Learning

Anderson, Neil J. (2002). *The Role of Metacognition in Second Language Teaching and Learning*. Washington, DC: ERIC Clearinghouse on Languages and Linguistics, Center for Applied Linguistics. Retrieved January 11, 2007, from <http://www.cal.org/resources/digest/0110anderson.html>.

During a National Public Radio broadcast in the United States in March 1999, a sixth grader explained what she was learning from playing the Stock Market Game, an activity designed to help children become familiar with how the stock market functions. She said, “This game makes me think how to think” (Prakash, 1999). What this statement reveals is that this young learner was beginning to understand the real key to learning; she was engaged in metacognition.

Metacognition can be defined simply as thinking about thinking. Learners who are metacognitively aware know what to do when they don’t know what to do; that is, they have strategies for finding out or figuring out what they need to do. The use of metacognitive strategies ignites one’s thinking and can lead to more profound learning and improved performance, especially among learners who are struggling. Understanding and controlling cognitive processes may be one of the most essential skills that classroom teachers can help second language learners develop. It is important that they teach their students metacognitive skills in addition to cognitive skills.

The distinctions between cognitive and metacognitive strategies are important, partly because they give some indication of which strategies are the most crucial in determining the effectiveness of learning. It seems that metacognitive strategies, that allow students to plan, control, and evaluate their learning, have the most central role to play in this respect, rather than those that merely maximize interaction and input... Thus the ability to choose and evaluate one’s strategies is of central importance. (Graham, 1997, pp. 42-43)

Rather than focus students’ attention solely on learning the language, second language teachers can help students learn to think about what happens during the language learning process, which will lead them to develop stronger learning skills.

A Model of Metacognition

Metacognition combines various attended thinking and reflective processes. It can be divided into five primary components: (1) preparing and planning for learning, (2) selecting and using learning strategies, (3) monitoring strategy use, (4) orchestrating various strategies, and (5) evaluating strategy use and learning. Teachers should model strategies for learners to follow in all five areas, which are discussed below.

Preparing and Planning for Learning

Preparation and planning are important metacognitive skills that can improve student learning. By engaging in preparation and planning in relation to a learning goal, students are thinking about what they need or want to accomplish and how they intend to go about accomplishing it. Teachers can promote this reflection by being explicit about the particular learning goals they have set for the class and guiding the students in setting their own learning goals. The more clearly articulated the goal, the easier it will be for the learners to measure their progress.

The teacher might set a goal for the students of mastering the vocabulary from a particular chapter in the textbook. A student might set a goal for himself of being able to answer the comprehension questions at the end of the chapter.

Selecting and Using Learning Strategies

Researchers have suggested that teaching readers how to use specific reading strategies is a prime consideration in the reading classroom (Anderson, 1999; Cohen, 1998; Oxford, 1990). The metacognitive ability to select and use particular strategies in a given context for a specific purpose means that the learner can think and make conscious decisions about the learning process.

To be effective, metacognitive instruction should explicitly teach students a variety of learning strategies and also when to use them. For example, second language readers have a variety of strategies from which to choose when they encounter vocabulary that they do not know and that they have determined they need to know to understand the main idea of a text. One possible strategy is word analysis: for example, dividing the word into its prefix and stem. Another possible strategy is the use of context clues to help guess the meaning of a word. But students must receive explicit instruction in how to use these strategies, and they need to know that no single strategy will work in every instance. Teachers need to show them how to choose the strategy that has the best chance of success in a given situation. For example, unfamiliar words that include prefixes or suffixes that the student knows (e.g., *anti-*, *-ment*) are good candidates for the use of a word analysis strategy.

Monitoring Strategy Use

By monitoring their use of learning strategies, students are better able to keep themselves on track to meet their learning goals. Once they have selected and begun to implement specific strategies, they need to ask themselves periodically whether or not they are still using those strategies as intended. For example, students may be taught that an effective writing strategy involves thinking about their audience and their purpose in writing (e.g., to explain, to persuade). Students can be taught that to monitor their use of this strategy, they should pause occasionally while writing to ask themselves questions about what they are doing, such as whether or not they are providing the right amount of background information for their intended audience and whether the examples they are using are effective in supporting their purpose.

Orchestrating Various Strategies

Knowing how to orchestrate the use of more than one strategy is an important metacognitive skill. The ability to coordinate, organize, and make associations among the various strategies available is a major distinction between strong and weak second language learners. Teachers can assist students by making them aware of multiple strategies available to them—for example, by teaching them how to use both word analysis and context clues to determine the meaning of an unfamiliar word. The teacher also needs to show students how to recognize when one strategy isn't working and how to move on to another. For example, a student may try to use word analysis to determine the meaning of the word *antimony*, having recognized *anti* as a prefix meaning against. But that strategy won't work in this instance. *Anti* is not a prefix here; antimony is a metallic chemical element that has nothing to do with being against or opposed to something. When the student finds that word analysis does not help her figure out what this

word means, she needs to know how to turn to other strategies, such as context clues, to help her understand the word.

Evaluating Strategy Use and Learning

Second language learners are actively involved in metacognition when they attempt to evaluate whether what they are doing is effective. Teachers can help students evaluate their strategy use by asking them to respond thoughtfully to the following questions: (1) What am I trying to accomplish? (2) What strategies am I using? (3) How well am I using them? (4) What else could I do? Responding to these four questions integrates all of the previous aspects of metacognition, allowing the second language learner to reflect through the cycle of learning. Preparing and planning relates to identifying what is to be accomplished, while selecting and using particular strategies relates to the question of which strategies are being used. The third question corresponds to monitoring strategy use, while the fourth relates to the orchestration of strategies. The whole cycle is evaluated during this stage of metacognition.

For example, while teaching the specific reading skill of main idea comprehension, the teacher can help students evaluate their strategy use by using the four questions:

1. *What am I trying to accomplish?* The teacher wants students to be able to articulate that they are trying to identify the main idea in the text they are reading and that they are doing so because understanding the main idea is key to understanding the rest of the text.
2. *What strategies am I using?* The teacher wants the readers to know which strategies are available to them and to recognize which one(s) they are using to identify the main idea.
3. *How well am I using the strategies?* The teacher wants the students to be able to judge how well they are using the strategies they have chosen, that is, whether they are implementing them as intended and whether the strategies are helping them achieve their goal.
4. *What else could I do?* If the strategies that students are using are not helping them to accomplish their goal (i.e., identifying the main idea), the teacher wants them to be able to identify and use alternate strategies. Teachers need to make students aware of the full range of strategies available to them.

Research shows that learners whose skills or knowledge bases are weak in a particular area tend to overestimate their ability in that area (Kruger & Dunning, 1999). In other words, they don't know enough to recognize that they lack sufficient knowledge for accurate self-assessment. In contrast, learners whose knowledge or skills are strong may underestimate their ability. These high-ability learners don't recognize the extent of their knowledge or skills. Kruger and Dunning's research also shows that it is possible to teach learners at all ability levels to assess their own performance more accurately. In addition, their research showed that for tasks involving logic and grammar, improved self-assessment corresponded with improvement in the skills being assessed.

The Interaction of Metacognitive Skills

Each of the five metacognitive skills described in this digest interacts with the others. Metacognition is not a linear process that moves from preparing and planning to evaluating. More than one metacognitive process may be occurring at a time during a second language learning task. This highlights once again how the orchestration of various strategies is a vital

component of second language learning. Allowing learners opportunities to think about how they combine various strategies facilitates the improvement of strategy use.

Conclusion

The teaching of metacognitive skills is a valuable use of instructional time for a second language teacher. When learners reflect upon their learning strategies, they become better prepared to make conscious decisions about what they can do to improve their learning. Strong metacognitive skills empower second language learners.

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Student Learning Strategies

National Center on Secondary Education and Transition. (2005). *Student Learning Strategies*. Minneapolis, MN: National Center on Secondary Education and Transition, Institute on Community Integration. Retrieved January 20, 2007, from <http://www.ncset.org/topics/learning/default.asp?topic=17>

A learning strategy is a tool or technique used by students to enable them to successfully approach new learning situations and to complete school assignments independently. Learning strategies can be used to enhance learning and comprehension of skills or text; to integrate new information with previous knowledge; and to recall information or skills for application in both familiar and new situations. Learning strategies can help students complete tasks successfully despite their disabilities by utilizing the strengths they bring to the learning process.

Frequently Asked Questions

What types of learning strategies are there?

Learning strategies have been categorized in various ways. One way is to divide them into cognitive and metacognitive strategies. Cognitive strategies are those strategies that can be applied to learning problems, such as paraphrasing, rereading, estimating, outlining, or guessing from context.

Metacognition (Flavell, 1976) refers to the knowledge and regulation of the act or process of knowing. This can include knowledge about oneself, knowledge about the cognitive demands of tasks, and knowledge about both cognitive and metacognitive learning strategies. Metacognitive learning strategies include recognizing when a strategy is needed, selecting strategies, memorizing or rehearsing strategies, and assessing the helpfulness of strategies. Borkowski, Estrada, Milstead, and Hale (1989) suggest that, for students with learning disabilities, two aspects of metacognition are key: executive processes (such as selection of appropriate strategies) and attributional beliefs (such as the belief that effort will improve performance).

How does one go about selecting learning strategies to teach?

First, note the process of implementation described by the developers of the strategy. Do students need certain prerequisite skills to benefit from the strategy? What do the developers recommend telling students about the strategy before they learn it? What benefits should the teacher tell students to expect? How should materials be selected for use with the strategy? For example, is a reading strategy designed to work best with expository or with narrative text?

Is there a “best practice” approach to teaching learning strategies?

Schumaker and Deshler (1992) developed and validated an instructional sequence of steps for teachers to use in teaching various learning strategies to students. These are:

1. **Pretest:** Measure students' skills prior to training and get their commitment to learning.
2. **Describe:** Explain the steps of the strategy, where the strategy can be applied, and how the strategy will be beneficial to students.

3. **Model:** Demonstrate how to use the strategy by “thinking aloud” while applying the strategy to content material.
4. **Verbal practice:** Students memorize the strategy steps and key usage requirements.
5. **Controlled practice:** Ensure student mastery of the strategy using simplified materials in controlled settings.
6. **Grade-appropriate practice:** Ensure student mastery of the strategy in situations similar to those in the student’s general education classrooms.
7. **Posttest:** Measure students’ skills following training.
8. **Generalization:** Help students apply strategies in general education and nonacademic settings.

(Boudah & O’Neill, 1999; Ellis, Deshler, Lenz, Schumaker, & Clark, 1991).

It is also important to teach prerequisite skills in advance, and to check the mastery of these skills periodically during strategy instruction. In addition, mnemonics (strategies that aid memory and recall) are also useful in helping students remember strategies. (See section below, “What memory aids are helpful to students?”)

What about teaching learning strategies at the postsecondary level?

Authors of the website Writing@CSU (<http://writing.colostate.edu/guides/teaching/ldteach/app8.cfm>) (Colorado State University) discuss the teaching of reading and writing strategies for students with learning disabilities at the college level, and suggest an eight-step process for introducing a new strategy in an individualized instructional setting. This sequence is similar in many ways to the eight-step process described by Schumaker and Deshler (1992), which is described above. The Writing @CSU process includes the following steps:

1. Introducing strategies and setting goals
2. Preskill development (helping students learn prerequisite skills)
3. Discussion of the strategy
4. Modeling the strategy
5. Providing scaffolding (support while learning, such as memory aids)
6. Practice
7. Feedback
8. Implementation

For further information, visit the website referenced above.

What memory aids are helpful to students?

Strategies designed to aid memory and recall are called mnemonics (nee-MON-iks). Many mnemonics rely on making a word or phrase out of the first letters of items in a list, for example, some people remember the order of the planets in the solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto) by using the following mnemonic: “My Very Educated Mother Just Served Us Nine Pizzas.” Other mnemonics use rhymes, music, or other

devices to help students access information. Many mnemonics are relatively familiar, such as SQ3R (Study, Question, Read, Recite, Review), originally developed by Robinson (1946). A good description of SQ3R is available on the Virginia Tech Web site, at <http://www.ucc.vt.edu/> (Click on “Increasing Textbook Reading Comprehension by Using SQ3R” in the “Online Study Skills Workshops” box in the middle of the right hand side of the page).

Some educators and researchers have developed mnemonics specifically to help students with disabilities. One example is the Word Identification Strategy that is part of the Strategic Instruction Model (Lenz & Hughes, 1990). In this learning strategy, there are seven steps to identifying an unknown word. The steps are remembered using the first-letter mnemonic, DISSECT:

- D**iscover the context;
- I**solate the prefix;
- S**eparate the suffix;
- S**ay the stem;
- E**xamine the stem;
- C**heck with someone; and
- T**ry the dictionary.

This strategy is described in detail in the NCSET Research-to-Practice Brief, *Improving Word Identification Skills Using Strategic Instruction Model (SIM) Strategies* available on this website at <http://www.ncset.org/publications/viewdesc.asp?id=720>.

There are several resources that provide tips on making up new mnemonics. These include Mastropieri & Scruggs, 1991, and Willoughby & Wood, 1995 (see references below).

Some strategies have not been validated by research. How can I tell if a new or emerging strategy is likely to be effective?

Not all strategies are effective, and some that are effective are not very efficient in terms of the time and effort required. Ellis and Lenz (1987) identified a number of critical features of strategies that work well for students with disabilities. These features fall into three categories: content (the steps in the strategy and their role in the learning process); design (how the steps are put together as a package); and usefulness (transferability of the strategy to other settings and needs). The article by Ellis and Lenz, “Features of Good Learning Strategies,” (see link in references below) details the characteristics of effective and efficient strategies.

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- National Center on Secondary Education and Transition, Institute on Community Integration, University of Minnesota, 6 Pattee Hall, 150 Pillsbury Drive SE, Minneapolis MN 55455; ncset@umn.edu; 612-624-2097 (phone); 612-624-9344 (fax)*

Strategy Instruction

Beckman, Pat. (2002). *Strategy Instruction*. ERIC Digest. Reston, CA: ERIC Clearinghouse on Disabilities and Gifted Education, Council for Exceptional Children. Retrieved January 10, 2007, from <http://www.ericdigests.org/2003-5/strategy.htm>

For more than two decades there has been an abundance of research regarding strategy instruction. Originally, most of this research focused on the effects of strategy instruction on students with learning disabilities. Researchers are currently looking at how strategy instruction affects all learners.

What Is a Strategy?

In general, a strategy is a tool, plan, or method used for accomplishing a task. Below are other terms associated with strategy instruction, some of which will be discussed in this digest:

Cognitive Strategy: a strategy or group of strategies or procedures that the learner uses to perform academic tasks or to improve social skills. Often, more than one cognitive strategy is used with others, depending on the learner and his/her schema for learning. In fact, research indicates that successful learners use numerous strategies. Some of these strategies include visualization, verbalization, making associations, chunking, questioning, scanning, underlining, accessing cues, using mnemonics, sounding out words, and self-checking and monitoring.

Cues: visual or verbal prompts to either remind the student what has already been learned or provide an opportunity to learn something new. Cues can also be employed to prompt student use of a strategy.

Independent, Strategic Learner: the student who uses cues and strategies within his/her learning schema, asks clarifying questions, listens, checks and monitors his/her work and behavior, and sets personal goals. A strategic learner knows the value of using particular strategies through experience, and is eager to learn others that might prove beneficial.

Learning Strategy: a set of steps to accomplish a particular task, such as taking a test, comprehending text, and writing a story. A first-letter mnemonic is often used to help the learner follow the steps of the strategy.

Metacognition and Self-regulation: the understanding a person has about how he/she learns (personal learning schema), including the strategies used to accomplish tasks and the process by which the learner oversees and monitors his/her use of strategies.

Mnemonic: a device for remembering, such as a first-letter mnemonic for writing: PLAN (Pay attention to the prompt, List main ideas, Add supporting ideas, Number your ideas) (DeLaPaz, Owen, Harris, & Graham, 2000). Rhyme, rhythm, music, and key-word mnemonics are also useful memory tools.

Strategy Instruction: teaching students about strategies, teaching them how and when to use strategies, helping students identify personally effective strategies, and encouraging them to make strategic behaviors part of their learning schema.

Learning Schema: the sets, or mixes, of strategies that the individual learner uses automatically to perform, produce, communicate, or learn. It can take years to develop a personal learning schema.

What Has Been Learned about the Effectiveness of Strategy Instruction?

Many students' ability to learn has been increased through the deliberate teaching of cognitive and metacognitive strategies. This is especially true for students with significant learning problems—strategy instruction is crucial for them. It has been demonstrated that when struggling students are taught strategies and are given ample encouragement, feedback, and opportunities to use them, students improve in their ability to process information, which, in turn, leads to improved learning. Because not all students will find it easy to imbed strategy use in their learning schema, differentiation of strategies instruction is required, with some students needing more scaffolding and individualized, intensive instruction than others.

Why Is It Important to Teach Children to Be Strategic?

The Individuals with Disabilities Education Act (IDEA) of 1997 and the No Child Left Behind (NCLB) Act of 2001 focus on improved achievement by all students. IDEA mandates that all students access and progress in the general education curriculum. This includes students with disabilities, English language learners, and gifted students. NCLB has established performance goals that drive the efforts of public schools, especially in establishing proficiency in reading/ language arts and mathematics by all students by the year 2013-2014. The outcomes listed below help ensure student progress. Additionally, when students become strategic, independent learners, they also become literate and productive lifelong learners.

What Happens to Students When They Become Strategic?

The following outcomes can be expected:

- Students trust their minds.
- Students know there's more than one right way to do things.
- They acknowledge their mistakes and try to rectify them. They evaluate their products and behavior.
- Memories are enhanced.
- Learning increases.
- Self-esteem increases.
- Students feel a sense of power.
- Students become more responsible.
- Work completion and accuracy improve.
- Students develop and use a personal study process.
- They know how to “try.”
- On-task time increases; students are more “engaged.”

What Are the Most Essential Strategies to Teach?

This is determined, in large part, by assessing what successful, efficient learners do. It has been found that they use numerous strategies across subjects and tasks, such as those listed above under “cognitive strategies.” They know when to use strategies and for what purposes. An attempt to identify the most essential strategies students should learn is an impossible task; it depends on the needs of the learner and the requirements of the curriculum. However, student use of the following strategies often leads to improved student performance (lists are not inclusive):

- **Computation and problem-solving:** Verbalization, visualization, chunking, making associations, use of cues.
- **Memory:** Visualization, verbalization, mnemonics, making associations, chunking, and writing. These are usually more effective when used in combinations.
- **Productivity:** Verbalization, self-monitoring, visualization, use of cues.
- **Reading accuracy and fluency:** Finger pointing or tracking, sounding out unknown words, self-questioning for accuracy, chunking, and using contextual clues.
- **Reading comprehension:** Visualization, questioning, rereading, predicting.
- **Writing:** Planning, revising, questioning, use of cues, verbalization, visualization, checking and monitoring.

How Are Students Taught to Use Strategies?

Effective strategy instruction is an integral part of classroom instruction, regardless of the content being taught; it is not an additional subject. In the transactional strategies instruction (TSI) model, strategies instruction takes place all year long with the teacher giving explanations and modeling. Teachers continually praise students for using strategies and use teachable moments to discuss them. Students are encouraged to help their peers become more strategic.

What Are the Basic Steps in Teaching Strategy Use?

The following order of steps should be followed:

- **Describe the strategy.** Students obtain an understanding of the strategy and its purpose—why it is important, when it can be used, and how to use it.
- **Model its use.** The teacher models the strategy, explaining to the students how to perform it.
- **Provide ample assisted practice time.** The teacher monitors, provides cues, and gives feedback. Practice results in automaticity so the student doesn’t have to “think” about using the strategy.
- **Promote student self-monitoring and evaluation of personal strategy use.** Students will likely use the strategy if they see how it works for them; it will become part of their learning schema.
- **Encourage continued use and generalization of the strategy.** Students are encouraged to try the strategy in other learning situations.

To What Extent Is Strategy Instruction Taking Place in Classrooms?

Currently, there are few data available to determine how many teachers teach strategic learning skills, how many are even aware of their existence, or if they are aware, have the skills to teach them. Few teachers demonstrate to their students their own personal strategy use. In general, teachers are not aware of the importance of these skills. The fact that there is such little data leads to the assumption that strategy instruction is not a general classroom practice. Following are a few possible explanations for this:

- Early strategy instruction research was done specifically with learning disabled populations. General education preservice and inservice programs have not generalized these research findings to all learners.
- How students learn takes a back seat to what is learned. Teachers assume students will “get it” on their own, or with more teacher-directed instruction or practice.
- The idea of focusing on the learner is still in its infancy.
- “Educator overload” is a factor. Teachers, experiencing the pressures of accountability for student progress, feel they don’t have time to “learn one more thing,” especially something they are not convinced will improve student learning.
- Numerous researchers are assisting educators in turning strategies research into practice. An increasing number of strategies instruction curricula are available, especially in reading and writing.

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Study Skills: An Overview

EMSTAC (2001). *Study Skills: An Overview*. Washington, DC: Elementary and Middle Schools Technical Assistance Center, American Institutes for Research. Retrieved December 10, 2006, from <http://www.emstac.org/registered/topics/studyskills/studyskillsoverview.htm>

Getting Kids to Think about How They Learn

Between the ages of 7 and 11, children begin to organize their thoughts into classes and systems. These classes and systems help them develop problem-solving strategies. Teachers and parents can support this process by helping children develop learning strategies or, more informally, study skills. Research has shown us that just as confidence in one's ability to learn promotes learning, lack of such confidence inhibits learning. Students who use study skills effectively are more likely to believe that they can learn. Therefore, they are more likely to be successful.

There is still a lot we don't know about the human brain. As research continues to reveal how our brains process and retain information, we may find that some learning strategies are, in fact, more effective than we previously thought while others are less effective. New findings will probably foster the development of new learning strategies. Currently, there are many different research-based learning strategies in common use. This overview will attempt to present information on the best and most widely used research-based learning strategies to date.

What Are Study Skills?

Study skills are learning strategies that facilitate the processing of information. Study skills help us organize and process information. They help us remember what we have learned. Study skills work best when we are conscious of our own learning processes. For example, when we want to reinforce our memory of a history lesson we had in class, we might read over our notes to help us recall the lesson and to make us aware of where we need to focus. This awareness of our own thinking and learning is known as metacognition.

Study skills encompass a wide range of behaviors that students can perform before, during, and after learning to help them retain and apply information presented in the classroom or at home. It is important for teachers and parents to promote and monitor the development of these skills, because study skills are most effective when students use them to come up with their own ways of organizing their studying.

Preparing to learn: Personal discipline, self-management, organizational skills, positive attitude toward studying, and the ability to self-monitor are study skills that help students with preparing to learn.

Processing and retaining what has been learned: Note-taking, outlining, listening, learning information from a text, and library reference skills are study skills that help students with how do learners acquire knowledge.

Demonstrating and applying what has been learned: Remembering or retrieving information from memory, test-taking skills, and demonstrating understanding orally or through writing are study skills that help students with applying knowledge.

Some well-known memory aids include story or concept maps and mnemonics. A concept or story map organizes the information in a story or text—such as character, setting, major events and theme—to help students focus on the important elements. If students write a concept map for every story they read, they are more likely to remember those stories. Eventually, most students will be able to identify the elements of a story while they read, without much reflection.

Mnemonics, or memory aids, can help students remember difficult terms. Take *ranidae*, the Latin name for the frog family. If you think of what the word sounds like, you might think of “rainy day.” If you attach this association to an appropriate visual aid, you might come up with a picture of a frog in the rain. Together, the word association and the visual image will probably help you remember that *ranidae* represents the frog family.

Why Should We Teach Study Skills?

Study skills can be applied to any learning situation—their usefulness is not limited to the classroom. As adults, we use our organizational and listening skills every day to manage our jobs, households, and finances. Our ability to retain information is tapped just as often. This ability helps us remember deadlines at work so we can meet them; it reminds us to put fuel in our cars so we don’t run out of gas.

Most researchers agree that study skills are necessary for success in school, but teachers, under pressure to meet curriculum standards and requirements, tend to focus on content rather than on teaching students skills to help them absorb that content. Teachers may assume parents are teaching their children study skills while parents may assume that study skills are taught as part of classroom instruction. As a result, many students fail to develop effective learning strategies, especially students with mild disabilities or learning or behavior problems. These students, who often have trouble self-monitoring and staying organized, can perhaps benefit the most from study skills instruction.

Research Highlights

What Is Study Skills Instruction?

Study skills instruction involves teaching students to utilize a process for thinking about thinking, usually in steps. It requires students to “recognize, recall, and execute” the particular steps in the study skill or strategy. By mastering these skills, students are equipped with the tools to “learn how to learn.” This is called metacognition.

- Study skills encompass the capabilities for acquiring, recording, organizing, synthesizing, remembering and using information and ideas.
- Study skills include many behaviors that pertain to various school- and home-related situations. These include preparing to learn (e.g., personal discipline, organizational skills, attitude, ability to self-monitor), how learners acquire knowledge (e.g., listening, note taking, outlining, and organizing), and applying knowledge (e.g., test-taking, writing, remembering, and self-monitoring).

Why Is Study Skills Instruction Important?

Education researchers such as Gordon Alley, Candace S. Bos, and Donald Deshler, have found that in order for students to achieve in the classroom, they must use effective strategies for learning and retaining information.

- Not surprisingly, students with learning and behavior problems have difficulty developing these skills. They often use a limited range of strategies, are inflexible in their approach to studying, and fail to make the connection between using effective study skills and academic achievement.
- Too often students reach high school with very limited internal resources; often they lack the ability to learn how to learn.
- Students with effective study skills are more likely to feel competent and confident about their ability to learn. This leads to better attitudes about schoolwork.
- Study skills help prepare students for lifelong learning—not just academic learning. Specific skills such as organizing, listening, and retaining information can be applied in a variety of settings and situations, such as when applying for a job or planning errands. It is therefore important for teachers to make students aware of the various types of study skills and their benefits.

What Type of Student Can Benefit from Study Skills Instruction?

- Those students who are most in need of study skills are typically those with mild disabilities or learning problems. These students often have difficulty monitoring their study habits and staying organized.
- Students who are transitioning into middle or high school, and must adjust to a new workload. They may find that their previously-used skills are not sufficient for their new learning tasks.
- Students can be encouraged to use self-assessment techniques such as the Students' Self-Analysis of Study Skills Checklist (see next page).

What Obstacles Have Kept Study Skills from Being Taught Explicitly?

- Ironically, middle school teachers face their own time management challenges when they wish to fit instruction regarding study skills or learning strategies into their already busy schedules. Often teachers are pressed to meet state and district curriculum standards and objectives, which may not include study skills instruction. Understandably, many focus on teaching content rather than strategies, hoping or believing that their students have either already acquired such skills, or that they will somehow learn them as they go along. This is rarely the case.
- Many teachers and parents assume that students acquire effective study skills either on their own, or through schooling. Unfortunately, while most researchers agree that study skills are prerequisites to school success, they are incorporated into a formalized, structured curriculum infrequently.

Student's Self-Analysis of Study Skills Checklist

This checklist helps students to evaluate how they study most efficiently. Teachers should administer this checklist to their students so that they can help their students to determine how they can improve their current method of studying.

	Almost Always	Sometimes	Very Seldom
1. Do I understand directions provided in class?			
2. Do I take notes that are helpful?			
3. Do I ask questions when I don't understand?			
4. Do I understand lectures and discussions?			
5. Do I keep up with assigned work?			
6. Do I feel disorganized most of the time?			
7. Do I participate in class discussions?			
8. Do I find it difficult to complete assignments?			
9. Do I feel adequately prepared most of the time?			
10. Do I find vocabulary in reading too difficult?			
11. Do I have a regular place where I study?			
12. Do I have a regular place to study?			
13. Do I outline or summarize what I read?			
14. Do I keep a calendar of tests and assignments?			
15. Do I review class and reading notes often?			

What Does Research Tell Us about Effective Study Skills Instruction?

Researchers have developed a number of strategies to help students improve their study skills. These strategies can be applied at three stages of learning: preparing to learn, acquiring knowledge, and applying knowledge.

In addition, teachers can use the principles and tips outlined in this document to help students assess their skills, plan and monitor goals, and develop a system for improving study habits.

It is important for teachers to provide explicit instruction regarding learning strategies and study skills to students with learning and behavioral disorders. Such instruction may be woven into content-based lessons. The most effective strategies for these students are general, can apply to a relatively broad spectrum of learning contexts, and are straightforward.

What Are the Goals for Teaching Study Skills and Other Strategy Instruction?

Strategic study skills training will help students process information. There are four desired goals teachers should keep in mind when teaching and using these interventions.

To improve background knowledge

This will help students because a key component in the learning process is connecting new ideas to what one already knows. The more familiarity a student has with a subject or concept, the larger is the foundation for building new knowledge. Also, the better students become at reflecting on their prior knowledge, the more active they become in the learning process.

To develop or enhance schemata

This will help students by assisting them in building frameworks and structures for learning. These organized learning methods help students obtain knowledge by empowering them to create space for new information that connects with previous concept and a student's experience. This way, information is clearer and easier to process.

To increase metacognition

This will help students become actively and consistently involved in their own learning, by engaging in planning, monitoring, and controlling the learning process. Learning is very personal, and students must reflect on their own strengths and weaknesses as learners in order to develop effective ways to improve the process (Wood, Woloshyn, & Willoughby, 1995).

To implement learning strategies

Students will benefit most from study skills and strategy instruction methods when they have opportunities to apply them in their learning at school and at home. Learners must generalize the use of learning strategies across a variety of environments and situations if they are to become active and independent learners.

Models and Classroom Instruction

This section focuses on how teachers can help students learn more effectively by presenting various techniques for use in the classroom. For better understanding, these techniques can be organized into those that are most useful when students are:

1. preparing to learn,
2. in the process of acquiring new knowledge, and
3. asked to apply what they know.

Preparing to learn requires students to develop a positive attitude toward learning and to become skilled in personal discipline, planning, organization, self-monitoring and self-evaluation. By gaining skills to plan, organize and manage knowledge, students can take responsibility for and pride in their learning.

Once students are ready to acquire new knowledge, they must use other skills to understand and retain what has been learned. Through scaffolded instruction, cooperative learning, and collaborative teaching, the students gain studying and learning techniques to increase their capability to learn.

The student then uses another set of "expression skills" to apply the new knowledge. These skills include remembering, test-taking strategies, and written and oral expression skills." At this stage, the student focuses on how to apply and demonstrate understanding of what has been learned. Building on the skills he used in preparing to learn and acquiring new knowledge, the student should now be able to (1) demonstrate understanding of what has been learned; and (2) apply this learning process across a range of settings and situations.

Although these techniques are grouped in this way, it is very possible for some of these techniques to be used for all three purposes.

Some important points to remember:

- Students with LD generally experience problems with processing information and must develop/improve skills in these areas; however, the learning/studying strategies provided are not exclusively helpful to students with LD; they may also greatly benefit students without LD.
- Students who have effective studying and learning strategies are active learners who are aware of and in control of their learning. Often, students with LD are accustomed to learning passively, and may lack the skills to monitor their own learning processes. The goal of study skills instruction is for students to become better equipped with effective learning strategies, that will enhance change from passive to active learners.

Preparing to Learn

Through the development of skills in planning, organizing and managing time, students may better prepare themselves to learn. This section includes examples of strategies and tools that may be useful for students at this stage in the learning process.

Time Management

It is important for students to develop routines and to take control of their time. Schedules, to-do lists, contracts and self-monitoring are all useful tools in the development of self-discipline.

Scheduling. Students can create a time budget accounting for how time should be spent. Bos & Vaughn (1998) provide suggestions students may use for managing a schedule. Teachers may need to help students learn to pace themselves in order to maximize quality learning. Appropriate pacing may involve learning material in “chunks,” as opposed to tackling everything at one time, and incorporating breaks with studying to prevent burnout. Pacing may be a natural by-product of proper scheduling.

Time Management (Bos & Vaughn, 1998)

1. Plan regular study times.
2. Plan at least one-hour blocks of time in which to study.
3. Plan which assignments you are going to work on during the study time.
4. Take the first five minutes of each study activity to review what you have done already and what you have already learned, and to plan what you are going to accomplish today. This helps promote long-term learning and a sense of accomplishment.
5. When studying longer than one hour, plan breaks and stick to the time allowed for the breaks.
6. Use daytime or early evening for study if possible. Most people are less efficient at night.
7. Work on your most difficult subjects when you are most alert.
8. Distribute your studying for a test rather than cram (e.g. begin studying for a test two weeks earlier).
9. Balance your time between studying and other activities. Allow time for recreational activities.
10. Reward yourself by marking through your schedule each time you meet a scheduled commitment and by crossing off items you complete on your “to do” list.

To-do lists, check lists, contracts

Check list: A daily/weekly planner for day-to-day scheduling, and a calendar or monthly planner for long-term scheduling. These tools provide a natural structure for creating “to-do” lists, checklists, and scheduling of homework assignments, projects, tests, and papers, and other school-related assignments. Such time management tools need not be purchased; they can also be personally created. In using these tools, however, it is important for the student to use them routinely; that is, the student should use her planner, for example, for all her assignments in all her classes (not just in her English class), and should refer to it daily to monitor work progress, update new assignments, and check off completed assignments.

Contracts. A study/learning contract is a physical prompt for self-monitoring and goal planning. When a student enters into a contract, s/he agrees to meet a goal within a certain period of time and will be rewarded for meeting that goal by the due date, as well as consequences for not meeting the goal. Building in specific features and processes for meeting the goal outlined in the contract, such as the steps that need to be taken in order to meet the goal (analyzing the tasks that need to occur that lead up to the finished product), the materials/tools needed to meet the goal, a schedule of mini-deadlines leading up to the final deadline, would better enhance the contract and serve as a more comprehensive “game plan” for the student. The contract should be created between the student and teacher and would be greatly fortified with input from the student’s parents.

Some specific features and processes for a comprehensive contract, a “game plan” for the student, include:

1. steps that need to be taken in order to meet the goal (analyzing the tasks that need to occur that lead up to the finished product);
2. the materials/tools needed to meet the goal; and,
3. a schedule of mini-deadlines leading up to the final deadline.

Self-monitoring and reinforcement. MARKER, MURDER, and LEARN are useful tools for helping students to learn how to plan their time and monitor themselves.

MARKER

- M = Make a list of goals, set the order, set the date.
- A = Arrange a plan for each goal and predict your success.
- R = Run your plan for each goal and adjust if necessary.
- K = Keep records of your progress.
- E = Evaluate your progress toward each goal.
- R = Reward yourself when you reach a goal, and set a new goal.

(Bos & Vaughn, 1998, taken from Van Reusen & Bos, 1992)

MURDER

- **Mood:** Set a positive mood for yourself to study in. Select the appropriate time, environment, and attitude.
- **Understand:** Mark any information you don’t understand in a particular unit; Keep a focus on one unit or a manageable group of exercises.
- **Recall:** After studying the unit, stop and put what you have learned into your own words.

- **Digest:** Go back to what you did not understand and reconsider the information. Contact external expert sources (e.g., other books or an instructor) if you still cannot understand it.
- **Expand:** In this step, ask three kinds of questions concerning the studied material:
 - o If I could speak to the author, what questions would I ask or what criticism would I offer?
 - o How could I apply this material to what I am interested in?
 - o How could I make this information interesting and understandable to other students?
- **Review:** Go over the material you've covered. Review what strategies helped you understand and/or retain information in the past and apply these to your current studies.

LEARN

L = Listen for hints, clues, and important information.

E = Examine your notes, books, and papers.

A = Apply study and memory strategies.

R = Review every night.

N = Nail the test!

(Day & Hackett, 1996)

Material/Information Organization

Notebook Organization. It is important for the student to organize his/her learning materials and notebook so that s/he may retrieve and use information efficiently and easily. The following is an example of how teachers can help students to organize their notes:

Teaching Procedures:

- Alert parents that their child's notebooks will be reviewed for organization, and send home a list of recommended materials, including the following:
 - o three-ring notebook, so that pages can be added easily
 - o supply pouch and school supplies such as pens, pencils, erasers, computer disks, calculator, hole punch, package of file cards, ruler
 - o labeled dividers—one for each class, plus others labeled “Schedules and Calendar,” “Reference Information,” “Notebook Dictionary,” “Personal Word List,” “Notebook Paper,” “Graph Paper,” “Computer Paper.”
- Have the students look at their notebooks to determine how they have organized information for each class, their assignments, schedules, and materials. Work with students to organize their notebooks, using the following suggestions:
- Include a semester calendar, weekly schedules, and to-do lists in the section on schedules and calendars.
- After the divider for each class, organize materials for that class (starting with class outline or syllabus).
- Date notes and place them in order.
- In the personal word list, alphabetically list frequently misspelled words.

(Vaughn, Bos, & Schumm, 1997, p. 494)

- *Advance organizers* create a structure that incorporates what the student already knows with what the teacher intends for the student to learn. Examples of advance organizers include but are not limited to graphic organizers, study guides, and chapter outlines. (See examples at <http://www.emstac.org/registered/topics/studyskills/definitions/advanceorganizers.htm>.)
- *Graphic organizers* are a kind of advance organizer. A graphic organizer displays what the student already knows about the learning topic prior to the lesson, indicates what the student is expected to learn, and captures what the student has learned at the end of the lesson. Examples of graphic organizers include but are not limited to story maps, discussion webs, and relationship charts. (See examples at <http://www.emstac.org/registered/topics/studyskills/definitions/graphicorganizers.htm>.)
- *Concept maps*, also referred to as concept diagrams, content maps, story maps, semantic diagrams, or semantic maps, are often first used as a prelearning tool. A concept map visually captures what the student already knows about the learning topic (see examples provided), and by brainstorming further ideas about the topic with the student, the map begins to provide a context in which the student may think about the topic. The map may then serve as an ongoing activity and a “living” visual aid for the student to continue learning about and studying the topic, and finally as a review tool for the student to ensure that s/he has gained understanding of the topic. (See examples at <http://www.emstac.org/registered/topics/studyskills/definitions/conceptmaps.htm>.)
- *Relationship charts*. A tool of the semantic feature analysis teaching strategy, the relationship chart works in a similar way as the concept map does; it provides an organized visual display of concepts, related vocabulary and the student’s background knowledge of the learning content in a given chapter, lecture, or unit (Bos & Vaughn, 1998). Featured in relationship charts are examples (that feature what students should know about a concept) and nonexamples (example that feature what students commonly misunderstand about a concept) of the learning topic, highlighting whether positive, negative, or nonexistent relationships exist among concepts and related vocabulary. Bos & Vaughn (1998) provide a detailed explanation of how a relationship chart is used in a classroom. (See examples: <http://www.emstac.org/registered/topics/studyskills/definitions/relationshipmaps.htm>.)

How Do Learners Acquire Knowledge?

In order to acquire new knowledge, students need to be able to make sense of new information. Often, students need specific skills that can help them do this. These skills or learning strategies (e.g., note-taking, outlining, learning information from a text, library reference skills) are “technical methods of studying” that help us process, and ultimately retain, information (Bos & Vaughn, 1998, taken from Lock, 1981, p. 305).

Students also benefit from teacher intervention and instruction that models the use of learning strategies and helps make new information more accessible to all students. Teachers can use instructional techniques that will complement the strategies students are learning to use on their own. This combined approach will reinforce concepts and foster the confidence all students need to continue meeting the learning challenges they face.

How can I adapt my instruction to help students acquire knowledge more effectively?

There are several ways that teachers can adapt or modify instruction to accommodate students with disabilities or other learners who need assistance “learning how to learn.” Often, these

techniques are extensions of or variations on good instructional practice teacher routinely employ. Other techniques may require more planning and deliberate actions on the part of the teacher, but the result is more structured and accessible curricula for all students.

A general approach for teaching a learning strategy to students includes the following steps:

1. Pretest students on the strategy and gain their interest in learning the strategy;
2. Describe the strategy;
3. Model the strategy;
4. Practice the strategy;
5. Provide feedback; and
6. Promote generalization (i.e., find many and various opportunities for students to use the strategy, across different classes and environments).

(Sturomski, 1997, pp. 7-10)

The following are general instructional methods that can be used together or in isolation. Remember it's helpful to combine these approaches with some of the learning strategies you are teaching students to use in the classroom or on their own.

- *Scaffolded instruction* (aka mediated scaffolding or cognitive scaffolding): Scaffolding is a structured method of instruction that uses procedures (i.e., sequence of steps), explicit tasks, and personal support. Scaffolding begins with intensive support and structure, then tapers off as the child becomes more adept at using the learning procedures. This means teachers should gradually remove instructional supports as students gain skills, grow to understand the complexities of the content, and become more active and self-directed learners. Prompts and guides (to remind students to use the techniques or learning tools they have been taught to use) are examples of scaffolding tools that a teacher can use after she removes other, multi-layered supports. Eventually, when learning becomes self-directed, the teacher relinquishes control.

Examples of scaffolded instruction include lessons that begin with simple ideas and concepts with which students can relate, and build on those ideas with more challenging content through individual or group questioning and graphic or other aides. Teachers who scaffold are careful to relate the new or compounding ideas to a student's prior experiences, or provide a chance for students to become familiar with a concept if he or she hasn't had the necessary experiences. Bos & Vaughn (1998) describe specific programs that involve scaffolded instruction, such as Cognitive Strategy Instruction in Writing (CSIW) (Englert, Raphael, Anderson, Anthony, & Stevens, 1991) and the Early Literacy Project (ELP) (Englert et al., 1994; 1995).

- *Cooperative learning*. Also known as collaborative learning, cooperative learning is more than just physically placing students in a group to accomplish an assignment. It is a method of instruction that calls for each student's direct and active participation in acquiring knowledge by working collaboratively and interactively within a group of 4-6 people. In some collaborative learning models, students can also work in pairs. Teachers instruct students in cooperative learning procedures and provide opportunities to acquire and practice skills that lead to successful group interactions as well as successful studying skills, such as taking notes, prioritizing, organizing information, communicating with peers, and sticking to timelines. Cooperative learning targets the development and refinement of at least the following five areas, according to Johnson & Johnson (1990a):

1. positive interdependence (individual success is dependent on group success);
2. face-to-face positive interaction (e.g., sharing, understanding, and developing group knowledge);
3. individual accountability;
4. interpersonal and small-group skills (e.g., communication, conflict-resolution, decision-making); and
5. reflection (both of academic and social processes).

(Taken from Wood, Woloshyn, & Willoughby, 1995)

Teachers should provide students with many opportunities to use cooperative learning before academic content can be successfully acquired. Furthermore, the skills level of students within the group should be assessed (are all students performing at the same level, or is this a heterogeneous group?). Another recommendation is to post or provide outcomes expected of the group. This helps to guide students and keep them on task. For specific activities to enhance the five Johnson & Johnson elements above, refer to other articles by Johnson & Johnson listed in *Models & Classroom Instruction References*.

- *Collaborative teaching*. Also known as cooperative teaching and co-teaching, collaborative teaching occurs when a special education teacher works collaboratively with a general education teacher to teach a diverse group of students in an inclusive classroom setting. For example, a special education teacher may work collaboratively to prepare and deliver lessons with a science teacher whose portion of a class is made up of students with learning disabilities. According to Bos & Vaughn (1998), cooperative teaching consists of the following:
 1. Special and general education teachers work together to broadly plan general goals and desired outcomes for the class as a whole and/or for specific students in the class.
 2. Students see the special and general education teachers as figures of equal authority during the same instruction period and don't label one teacher as "the teacher for the special students."
 3. Although one teacher may provide instruction to the class as a whole from time to time, usually instruction involves teachers working with small groups or individual students.
 4. In a heterogeneous classroom, the special education teacher works with many students, including those receiving special education and related services. It should be noted that this teacher should not be restricted to working with special education students only, but should also work with general education students as well.
 5. Co-teaching involves co-planning and instruction. Both special education and general education teachers determine complementary instruction and supportive learning activities, based on their strengths as instructors in specific content and process areas. For example, one teacher may bring expertise in a particular content area and the other may bring expertise in the organization or use of aids for delivering that content.

How can students gain skills that will help them acquire knowledge independently?

Students can learn study strategies and learning tools designed to promote learning and retaining knowledge. Examples of these strategies are listed below.

Applying Knowledge

Once students have acquired new knowledge, they are typically asked to apply it through assignments, projects and examinations. At this stage, two basic questions are addressed: (1) What effective strategies can a student use for information recall? and (2) How can a student take tests most effectively? In order to help improve student performance, teachers and practitioners can provide students with a “bag of tricks” including the following:

Note-taking	Index/flash cards (e.g., LISTS/ FIRST)	Knowledge management	Advance organizers
	Text highlighting		Graphic organizers
	Advance organizers	Self-questioning	SQ3R (survey, question, read, recite, review)
	Graphic organizers		Multipass
	Elaborative instruction		
Outlining	Advance organizers	Adaptive materials/ alternative reading materials	Simplified texts
	Graphic organizers		Aural reading
Summarizing	Big ideas/big picture	Memory aids	Mnemonics (acronyms, acrostics)
	Strategic integration		
	Elaborative instruction		
	Advance organizers		
	Graphic organizers		

Information Recall

Metamemory skills provide the student with awareness of strategies for recalling information as well as the ability to use their repertoire of strategies.

Mnemonics can be used to enhance memory. A simple mnemonic device consists of association and grouping. For example, it might be very difficult for students to remember a string of words such as panda, Mexico, ear, Canada, hair, and tiger without grouping the terms by category. The teacher may guide the students to observe that two of the terms are Asian animals, two are parts of the face, and two are North American countries. This not only helps them solve the immediate task of remembering the six terms, but, more importantly, adds a metamemory process to the students’ bag of tricks.

Acronyms are another metamemory “trick” that students can use to recall information.

A slightly more advanced trick is the use of **acrostics**.

In order to help students select mnemonics and to create appropriate acronyms and acrostics, the LISTS strategy and the FIRST substrategy are effective. These strategies help students to scan material for testable items, group the items, and transfer the material to easy-to-use index cards.

LISTS

LISTS is an overall strategy for grouping items and preparing mnemonic devices (Nagel, Schumaker, & Deshler, 1986).

- **Look** for clue. In the class notes and textbooks, look for lists of information that are important to learn. Name or give a heading to each list.
- **Investigate** the items. Decide which items should be included in the list.
- **Select** a mnemonic device using the FIRST substrategy to construct a mnemonic.
- **Transfer** the information to a card. Write the mnemonic and the list on one side of a card and the name of the list on the other side of the card.
- **Self-test.** Study by looking at the heading using the mnemonic to recall the list.

FIRST

Use this substrategy to design an acronym or acrostic.

- **Form** a word. Using uppercase letters, write the first letter of each word in the list; see whether an acronym—a recognizable or nonsense word—can be made.
- **Insert** letter(s). Insert a letter or many letters to see whether a word can be made. Be sure to use lowercase letters if the inserted letters do not represent an item on the list.
- **Rearrange** the letters to see whether a word can be made.
- **Shape** a sentence. Using the first letter of each word in the list, try to construct a sentence (an acrostic).
- **Try** combinations of these steps to generate the mnemonic.

Visualization is a good trick for helping students in spelling as well as other types of information recall. In this strategy, students close their eyes and remember what a word or a concept looks like. This memory strategy involves the students making a picture in his/her mind of what needs to be remembered. This strategy can include everything from making a visual image of the actual thing that needs to be remembered, or even what the word looks like.

The **keyword method** is a visualization strategy that incorporates pictures in order to acquire new vocabulary or other concepts. Students can construct a picture illustrating their definition. This memory strategy involves the students making a picture in his/her mind of what needs to be remembered. This strategy can include everything from making a visual image of the actual thing that needs to be remembered, or even what the word looks.

A simple short-term memory strategy is **verbal rehearsal**. This strategy simply has a student repeat information to him or herself. The strategy is most successful when there is a limited amount of time between the stages at which a student must acquire, recall, and apply information. It is difficult to use this strategy unless the number of items to be remembered is limited.

Test-taking Preparation

Current changes in accountability policy have resulted in ever greater numbers of special education students participating in assessments. Taking a test requires students to engage several levels of skills and knowledge: (1) they must have learned and understood the content to be

tested; (2) they must know how to apply their knowledge; and (3) they must have skills specific to test-taking itself.

Many students with disabilities need explicit instruction in test-taking skills. At the same time, such instruction cannot replace mastery of the material. An important part of test preparation, therefore, consists in helping students to study effectively and to achieve to their greatest potential throughout the years of schooling, college and beyond. These strategies are addressed in the sections on preparing to learn and acquiring knowledge.

Tips for teaching test-taking skills:

- Schedule regular periods of time for review. This sample schedule can provide a concrete example to students of how to allot time.
- Create study guides to facilitate the review. Students may create keyword pictures, flash cards (see Definitions), and other mnemonics to facilitate the study process.
- A student should also prepare him or herself by finding out as much as they can about the test from the teacher. While teachers will not always be able to share everything that will be on a test, students may find it worthwhile to ask about:
 - o format of test
 - o types of questions

Study Schedule

Name:				Week of:			
Time	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
6-7 am							
7-8 am							
8-9 am							
9-10 am							
10-11 am							
11-12							
12-1 pm							
1-2 pm							
2-3 pm							
3-4 pm							
4-5 pm							
5-6 pm							
6-7 pm							
7-8 pm							
8-9 pm							
9-10 pm							

- o how much the test is worth
 - o date of test
 - o time allotted for test
 - o whether or not books or notes are allowed (“open-” vs. “closed-” book tests)
 - o information covered
 - o teacher recommendations of how and what to study
- Encourage students during practice sessions to guess what might be asked on the test. This makes a good exercise for cooperative groups. Each group is asked to come up with a list of questions they think will be on the test. Groups may then trade questions and attempt to answer them.
 - Help students develop confidence. It is important to have students think positively about their abilities before and during the exam. Once a teacher has imparted a series of test-taking skills, the she or he should then make sure students are comfortable using the skills on the exam, and that each student has experienced success in applying the skills. One way to do this is to provide ample opportunities for students to be successful taking practice tests.
 - Emphasize to students that they should exhaust their entire repertoire of strategies before determining that they cannot solve a test question.

The PIRATES strategy has been shown to be particularly effective for objective tests. Bos and Vaughn found that students with learning disabilities who used this strategy increased their performance by 20 to 40 percentage points.

PIRATES

Prepare to succeed

- Put your name and PIRATES on the test
- Allot time and order the sections
- Say affirmations
- Start within 2 minutes

Inspect the instructions

- Read the instructions carefully
- Underline what to do and where to respond
- Notice special requirements

Read, remember, reduce

- Read the whole question
- Remember what you studied
- Reduce your choices

Answer or abandon

- Answer the question
- Abandon the question for the moment

Turn back

Estimate your answer

- Avoid absolutes
- Choose the longest or most detailed choice
- Eliminate similar choices

Survey

- Survey to ensure all questions are answered
- Switch an answer only if you're sure
- For less frequent essay tests, the ANSWER strategy can be employed.

ANSWER

Analyze the situation

- Read the question carefully
- Underline the key words
- Gauge the time you need

Notice requirements

- Scan for and mark the parts of the question
- Ask and say what is required
- Tell yourself you will write a quality answer

Set up an outline

- Set up main ideas
- Assess whether they match the question
- Make changes if necessary

Work in details

- Remember what you learned
- Add details to the main ideas using abbreviations
- Indicate order
- Decide if you are ready to write

Engineer your answer

- Write an introductory paragraph
- Refer to your outline
- Include topic sentences
- Tell about details for each topic sentence
- Employ examples

Review your answer

- Look to see if you answered all parts of the question
- Inspect to see if you included all main ideas and details
- Touch up your answer

Planning a Schedule: A Study Skills Activity for Students

When encouraging students to plan and use schedules, it is important for teachers to explain to students the importance of managing time. A teacher may also have students write down how long certain activities take and brainstorm ways a schedule could help the students complete the task. You may point out that schedules can help students because:

1. Parents may “get off your back” when you have regular study times.
2. Writing down what you have to do gives you less to remember and more cognitively energy to focus on the relevant task.
3. When you give yourself a set amount of time to do an assignment, you concentrate more.

4. With a schedule you are less likely to extend your breaks longer than scheduled.
5. You feel more satisfied when you are in control of your life and know what you plan to do and when.
6. Organizing your time helps you come to class prepared.
7. Scheduling your time is the smart way to operate if you want to have more time for fun and friends.
8. Scheduling helps distribute learning over time, and prevents cramming. Learning over time can help you master and retain more information.

Students can use the worksheet on page 26 to plan their weekly schedules and develop To-Do Lists. This activity is most appropriate for children who are middle school age or older, but may help younger students acquire metacognitive, on-task organizing, and problem-solving strategies.

The teacher should have students list due dates for assignments, tests, and other school activities. The teacher should also encourage the students to include extracurricular activities and responsibilities at home. The student may then be able to use the chart to plan study time in order to prepare for tests and assignments.

Study times should be scheduled in at least one-hour blocks. Study time should be planned in the daytime or early evening if possible, and difficult assignments should be scheduled when the student will be most alert. Students should plan review time and plan for breaks in large study blocks.

Students may gain a sense of accomplishment by crossing off completed items in the To-Do List. Students may initially jot down activities in the To-Do List and then put them in the schedule, or vice versa.

Frequently Asked Questions

Q: *Why is it important to teach study skills in the classroom?*

A: Study skills are often assumed to be intuitive processes for students. This is rarely the case. All students, especially those with disabilities, can benefit from systematic and formal instruction in study skills procedures and methods. In teaching study skills, a teacher makes his or her students aware of ways in which they can approach problem-solving as well as ways in which they can meet deadlines efficiently and effectively. Teaching students how they learn enables them to approach novel learning situations of all sorts. This is the principle of metacognition, an essential part of the learning process for students of all disciplines.

Q: *How do I know when my student needs a study skills intervention?*

A: Students with disabilities, including students who are gifted, often need help adopting study skills and other learning strategies. Signals that students need help in this area may include:

1. disorganization in one or more subject areas;
2. poor note-taking;
3. poor academic performance;

4. lack of motivation on projects requiring multiple steps, organization of complex ideas, and planning (such as research papers);
5. procrastination about large projects or tasks;
6. anxiety and perfectionist behaviors (i.e. preferring to not try something rather than attempting a task and then failing at it);
7. self-defeating behaviors such as avoidance of work in certain subjects, fear that becomes debilitating, and;
8. a lack of understanding of the relationships or linkages in a network of information, such as historical events.

Q: *Why do some students seem to be able to apply study skills and learning strategies automatically, while others don't?*

A: Many students, both with and without disabilities, need instruction in learning how to learn. Students with mild disabilities are often included in this group because students with learning disabilities and behavior disorders are often distracted or are passive learners, meaning they don't actively engage in school work in a way that allows them to self-monitor their understanding and progress.

Sometimes this “passivity” is due to lack of motivation, since students with disabilities often have negative experiences in school. Some difficulties may be attributable to the disability. For example, students with attention deficit disorder may have difficulty focusing for extended periods of time. Some difficulties may simply result from the lack of instruction many students with disabilities have received, or from being pulled in and out of various classes and often missing essential aspects of the curriculum, especially in-depth reading. Students with disabilities often struggle to understand concepts or accomplish tasks, and this struggle can serve as a disincentive to learning. The struggle to understand the task can also dissuade the learner from envisioning alternative ways to approach the material.

Most students can benefit from learning metacognitive strategies that require reflection and monitoring of learning, but students with mild disabilities may gain the most from these activities because they traditionally have trouble adopting proactive strategies and other skills that students without disabilities often develop on their own. Students having trouble with metacognition need strategies that enable them to better organize, structure, and complete their work. These strategies will foster better understanding of key concepts and facts.

Q: *How can I help parents and other teachers understand how these skills and strategies can be used at home and in other classes?*

A: The strategies and study skills recommended in this product can be applied to various subject areas and learning environments. The key is teaching a student to determine when she or he needs to apply them, and making sure she or he follows through. Meeting with parents in IEP (individualized education plan) meetings or other settings to review the strategies is essential, so that parents and teachers can encourage students to use them at home, with parental reinforcement and support. It's important that parents understand these techniques and when they are the most applicable, so that they can effectively monitor homework, projects, and paper writing.

Presenting ideas to staff can encourage other teachers to adopt similar methods. It might also be helpful to develop teams or relationships with general educators in the classroom. Modeling techniques for fellow staff can be an effective way to demonstrate the usefulness of study skills in inclusion environments. Also, techniques such as co-teaching allow special education teachers and regular education teachers to work together to facilitate access to the regular education curriculum, while also attending to necessary strategic instruction and individualized assistance.

Q: *How do I know when to apply the various strategies?*

A: Usually study skills techniques are most applicable when students are required to read for information, as they are in science and social studies classes. It's also important to be aware of a student's learning style, strengths, and weaknesses. For example, some students may benefit from the use of graphic organizers and concept mapping, and others from audio-taping of classroom lectures for review. Although multiple approaches may be useful, one may be more effective for some students than for others.

Several strategies can be used together to create a more focused and accessible learning environment for students. For example, a teacher may want to use several techniques to teach a new topic: focusing on big ideas; using scaffolding techniques that mediate the learning process as the concepts become more complex; providing temporary supports and slowly removing these supports as a student gains confidence; using memory techniques, association building, or analyzing techniques. Students process information in various ways. Some may find it difficult to organize ideas when speaking or writing and some may have trouble using formulas and applying them at appropriate times. Some may have difficulty listening to lectures and others may have a hard time taking notes while listening. It's important to understand the nature of a student's disability when applying the various strategies and to continuously monitor how well the student is progressing with the use of the strategy.

Q: *What if my student/s don't stick to a learning and study schedule?*

A: If a student is having a hard time implementing a study schedule that he or she has created, it's possible that he or she is trying to accomplish too much in a given period of time, or that the schedule doesn't provide the steps necessary to accomplish the task in question. Students with disabilities need not only a schedule for the work that is to be done, they also need a realistic, action-oriented plan that they can set in motion. Listing deadlines and materials can provide support for a student. Teachers may need to guide some students through the first few activities of a scheduled tasks to get the ball rolling, and then gradually reduce their support and involvement. The more specific the tasks on the schedule, the more helpful the schedule can be.

Study Skills Definitions

Relevant Study Skills Terminology

Advance organizers. A pre-learning tool that provides a context for the learning content. An advance organizer provides the learning content in a structure or framework that incorporates what the student already knows with what the teacher intends for the student to learn. Examples of advance organizers include but are not limited to graphic organizers, study guides, and chapter outlines.

Acronyms. Acronyms are invented letter combinations to cue memory. Each letter corresponds to one process in a chronological set of processes, such as the acronyms LISTEN (how to listen to a story) or HOW (how to neatly organize a paper), or to one idea in a set of related ideas, such as in NEAT (what to remember when you hand in a paper) or FRIENDS (ways to behave appropriately).

Acrostics. Acrostics are invented sentences where the first letter of each word in the sentence provides a clue as to what needs to be remembered. Two examples are EVERY GOOD BOY DESERVES FUDGE (for remembering the lines in the G-clef on sheet music) and MY VERY EAGER MOTHER JUST SERVED US NINE PIES (for remembering the order of the planets from the sun moving outwards).

Aural reading. One way a child with a learning disability may acquire knowledge from printed materials is by listening to the content being read to him/her. Here are some specific ways:

1. **Audiotaping.** Adults (e.g., parents and other family members, teachers) and students may volunteer to read chapters from books or other reading materials onto an audiotape. Students will then have access to the reading materials in audio format, which can be listened to at school and/or at home.
2. **Reading aloud to the child.** Teacher or parent can read aloud to the child and encourage him/her to follow along silently. Pause frequently to ask questions that will let you know whether the child is following what is being read.
3. **Pair a skilled reader with a less than skilled reader.** The skilled reader reads the content material aloud and both acquire knowledge together.

Big Ideas/Big Picture. Big ideas are the most essential information that the student must know at the end of the lesson, unit, or program. Kame’enui & Simmons (1999) describe “big ideas” as a curriculum design principle based on “concepts [or] principles...that facilitate the most efficient and broad acquisition of knowledge.”

Often, a student is expected to connect many separate pieces of information to form general knowledge of a concept. Capturing the big idea or big picture means that the student has grasped the most important details of a lesson, and can connect specific details acquired from that lesson to the general idea that the teacher wants the student to walk away with.

To use big ideas for designing curriculum and instruction, follow these guidelines:

- focus on essential learning outcomes;
- capture rich relationships among concepts;
- enable learners to apply what they learn in varied situations;
- involve ideas, concepts, principles, and rules central to higher-order thinking;
- form the basis for generalization and expansion.

(Kame’enui & Simmons, 1999)

An example of how big ideas/big pictures is used in a classroom may be as follows: a teacher shapes the curriculum and instruction in his science class so that the big ideas of each lesson connect to the big ideas of the unit, which in turn leads to a broad understanding of a concept

on which a student is expected to demonstrate knowledge in order to advance to the next grade.

Chapter Outlines. A skeleton of a chapter in a textbook. A chapter outline breaks the content of the chapter into parts and subparts, highlighting important general ideas and details that the student should learn. A chapter outline may serve as a kind of study guide and vice-versa.

Check Lists. A daily/weekly planner for day-to-day scheduling, and a calendar or monthly planner for long-term scheduling. These tools provide a natural structure for creating “to do” lists, checklists, and scheduling of homework assignments, projects, tests, and papers, and other school-related assignments. Such time management tools need not be purchased; they can also be personally created. In using these tools, however, it is important for the student to use them routinely; that is, the student should use her planner, for example, for all her assignments in all her classes (not just in her English class), and should refer to it daily to monitor work progress, update new assignments, and check off completed assignments.

Concept Maps. Concept maps, also referred to as concept diagrams, content maps, semantic diagrams, or semantic maps, are often first used as a prelearning tool. A concept map visually captures what the student already knows about the learning topic (see examples provided), and by brainstorming further ideas about the topic with the student, the map begins to provide a context in which the student may think about the topic. The map may then serve as an ongoing activity and a “living” visual aid for the student to continue learning about and studying the topic, and finally as a review tool for the student to ensure that s/he has gained understanding of the topic.

Contracts. A study/learning contract is a physical prompt for self-monitoring and goal planning. When a student enters into a contract, s/he agrees to meet a goal within a certain period of time and will be rewarded for meeting that goal by the due date. Building in specific features and processes for meeting the goal outlined in the contract, such as the steps that need to be taken in order to meet the goal (analyzing the tasks that need to occur that lead up to the finished product), the materials/tools needed to meet the goal, a schedule of mini-deadlines leading up to the final deadline, would better enhance the contract and serve as a more comprehensive “game plan” for the student. The contract should be created between the student and teacher, and would be greatly fortified with input from the student’s parents.

Discussion Webs. A discussion web (Bos & Vaughn, 1998, taken from Alvermann, 1991) taps into the student’s critical thinking skills and enhances those skills by organizing and visually displaying both sides of an argument. A discussion web may be useful when for example a student is learning the pros and cons of legalizing marijuana, whether the electoral college should be abolished, or ethical considerations involving cloning.

Elaborative Instruction. Similar to strategic integration, elaborative instruction (also called elaborative interrogation) also calls on the child’s background knowledge to learn new information. Unlike strategic integration, however, elaborative instruction is primarily used to learn sets of facts and paragraphs of factual information through a series of “why” questions (e.g., “Why does this statement make sense?” “Why is this statement true?”) (Wood, Woloshyn, & Willoughby, 1995). In order to utilize this learning strategy, the student must have prior knowledge relevant to the concept being learned. The student is reminded to use his/her prior knowledge to answer why a factual statement is true. Elaborative instruction has been

used in science (a study of plants, Woloshyn, Paivio, & Pressley, 1994), social studies (fact lists on geography and gender topics, (Pressley et al., 1988), and short, nonfiction reading passages (Wood, Willoughby, Kasper, & Idle, 1994).

Flash Cards. There are many ways of using flash cards (created from blank index cards) to learn and retain knowledge. The following are two related examples that involve the use of flash cards:

Graphic Organizers. A kind of advance organizer. A graphic organizer displays what the student already knows about the learning topic prior to the lesson, indicates what the student is expected to learn, and captures what the student has learned at the end of the lesson. Examples of graphic organizers include story maps, discussion webs, and relationship charts.

Information Processing. The way in which a person perceives, transforms, reduces, elaborates, stores, retrieves, and uses information (Bos & Vaughn, 1998, taken from Atkinson & Shiffrin, 1968; Neisser, 1976; Swanson, 1996). What a person does with information.

Metacognition. “Awareness and conscious regulation of one’s own thinking and learning” (Wood, Woloshyn, & Willoughby, 1995). The way in which a learner plans, monitors, and controls his/her thinking. Metacognitive strategies are used when a learner lays out plans to write a paper or study for a test, stops and asks him/herself “Do I understand what’s going on?” when reading, and figures out another way to problem solve if the strategy s/he is using does not appear to be working.

Mnemonics. Mnemonics are memory aids used to enhance recall of information. According to Bos & Vaughn (1998), mnemonic strategies “can be grouped into three types: organization and association, visualization or mental imagery, and rehearsal” (p. 318). Organization and association refers to how we categorize and place information in our minds. If we were given a random list of words, for example, we would chunk them into categories that would make sense to us so that we could accurately recall them. Acrostics and acronyms are other strategies that relate to the organization and association of information. Visualization and mental imagery are often used when learning vocabulary or memorizing specific dates or events. In the case of learning a new vocabulary word, a student pictures an interaction between the concept and the definition. In the case of memorizing the date of a specific event in history, the student pictures an image that triggers the event and then attaches another pictorial trigger that would recall the date of the event. Mnemonic examples: LEARN, MARKER, MURDER (see p. 19).

Relationship Charts. The relationship chart (also known as a relationship map) is similar to the story map; it provides an organized visual display of concepts, related vocabulary and the student’s background knowledge of the learning content in a given chapter, lecture, or unit (Bos & Vaughn, 1998). Featured in relationship charts are examples and nonexamples of the learning topic, highlighting whether positive, negative, or nonexistent relationships exist among concepts and related vocabulary. Bos & Vaughn (1998) provide a detailed explanation of how a relationship chart is used in a classroom.

Schemata. “Organized knowledge structures in memory” (Wood, Woloshyn, & Willoughby, 1995) that provide a context for processing information. Personal knowledge that helps organize new information. When a person reads a story, s/he frames the story in a context with which

s/he is familiar. For example, if one were reading about a person grocery shopping, the reader may conjure up his last grocery shopping experience.

Simplified Text. If a student is reading far below the level of the textbook or content material used in class, Schumm & Strickler (1991) recommend the following:

1. Construct abridged versions of the textbook content or use the publisher's abridged version.
2. Provide students with chapter outlines or summaries.
3. Use a multilevel, multimaterial approach.

SQ3R. The SQ3R method is survey, question, read, recite, review.

- **Survey.** Students can prepare their minds, or warm up for new knowledge by skimming the text, looking at bolded print, titles, and questions at the end of chapters. Survey the information to come by noticing headings, pictures, and charts.
- **Question.** Students should ask themselves what topics are covered as they read. What are the general ideas? How does this relate to what they already know about the subject? What's new?
- **Read.** Students should take note of main ideas. This may be hard, but they should try to imagine the most important point the author is trying to make. This takes practice and can sometimes be easier to do with a partner. Reread difficult to understand parts. Look up unfamiliar words and jot down their meanings as used in the passage.
- **Recite.** Without looking at the info, students should try to answer the questions they raised above.
- **Review.** Students should then check on the accuracy of their answers by going back over the material and focusing on parts they found difficult. Students should review the main ideas, how they relate to each other, and to things they already know.

SQ3R is a technique that can be used alone or very effectively in pairs or small groups. Using this technique in a cooperative group, for example, can enhance student's understanding because of the chance to gain multiple perspectives and discuss how the information relates to other ideas. It is important that students attend to each stage of SQ3R and document their thoughts and ideas.

Strategic Integration. Strategic integration is described as "the carefully controlled combination of what the student already knows with what he or she has to learn so that the relationship between these two elements is clear and results in new or more complete knowledge" (Kame'enui & Simmons, 1999). Proper use of strategic integration incorporates new information with the child's pre-existing knowledge, ensuring that critical connections are made between the preexisting and new information without confusing the child. Some of the critical features of this teaching principle include:

1. using thought processes with which the child is familiar in order to learn new information;
2. enhancing or refining the child's knowledge;

3. aligning new information with already known concepts and information in a meaningful, related, and natural way; and,
4. connecting key information (big ideas) across other lessons in a curriculum.

(Kame'enui & Simmons, 1999)

Study Guides. A learning and study tool used to highlight important ideas in a reading selection and to monitor the student's comprehension of the selection. A study guide often accompanies a chapter in a textbook and is frequently used for the student to prepare for a chapter or unit test. It may be a series of questions and/or activities that the student completes as s/he reads the selection. A study guide enhances the reading material, but does not replace it.

Text Highlighting. Some students have difficulty distinguishing important information from nonimportant information in a textbook or reading material. Underlining or highlighting key points may direct the student to focus on appropriate and pertinent details.

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Mind Tools. <http://www.mindtools.com/> Provides information (including specific strategies and commercial products) on how to optimize one's thinking.

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Study Skills

National College Transition Network. *Study Skills*. (n.d.) Boston, MA: National College Transition Network, New England Literacy Resource Center, World Education, Inc. Retrieved December 10, 2006, from <http://www.collegetransition.org/counseling/studyskills.html>. Reprinted with permission.

What separates successful college students from unsuccessful college students directly relates to their ability to take notes, identify main themes, retain information, manage time and much more. These abilities are commonly referred to as study skills. The following sections provide in-depth information on specific study skills:

Time Management Tips

1. Determine your best time of day to study and study then.
2. Do it now. Fight procrastination. Explore procrastination patterns and break them.
3. Set deadlines for yourself.
4. Write out your short-term and long-range goals.
5. Concentrate on one thing at a time.
6. Use TV time as a reward, after you have finished studying.
7. Plan to take a 10 minute break per study hour, 5 minutes every half hour.
8. Divide a big assignment into small pieces that can be done one at a time.
9. Have a central work list, and make a daily “things to do” list,
10. Be flexible—when you become bored with certain parts of studying, change topics.
11. Learn to discipline yourself and feel good about it.
12. Write down all assignments and due dates in your time management book.
13. Plan in the morning (or the night before) the priorities for that day.
14. Learn to say “NO” to interruptions when you study. Separate study time from play time.
15. Have an organized study area where you can concentrate.
16. Give yourself time off and special rewards when you have done important things.
17. Schedule study time before class and right after the lecture, if possible.
18. Beware of perfection. It may reduce your productivity rate. Always perform at your peak level to the best of your ability—be realistic.
19. Study smarter, not harder!
20. Build on success. Profit from failure. Learn from your mistakes.

SQ3R Method of Textbook Study

The SQ3R method is a definite outline or study procedure for use with almost any college textbook. It is useful because it helps you uncover the important facts and ideas in your reading assignment. It helps you master and retain that information so you are prepared for an examination. The title of this study skill, SQ3R, is abbreviated to make it easier to remember each of the steps involved.

> **Survey** > **Question** > **Read** > **Recite** > **Review**

Survey

Read the following items:

- Chapter titles
- Introductory and summary paragraphs
- All boldface headings
- All graphics and captions

This survey should take no more than 10 minutes. The purpose of the survey is to get a general idea about how subtopics are broken down and how much time it will take you to read the chapter.

Question

Turn each boldface heading into a question by using the following words: who, what, where, when, why or how. The purpose for creating a question out of each heading is to determine the reason for your reading. You will now be reading to answer the question you have asked yourself.

Read

Read the section of the text accompanying the heading for the answer to your question. The answer will usually be made up of the main idea(s) of the paragraph(s) and supporting details. Highlight or underline only this information. The purpose for reading then is simply to find the answer to the question.

Recite

Recite the answer to the question yourself. Try to put the answer in your own words or paraphrase the author's words. The purpose for doing this is to help you think about and understand what you have read. If you rewrite or rephrase what you have read it aids in comprehension.

Review

In reviewing, reread your questions and your answers. Then cover the answers and ask yourself the question. Once you are sure of the answer, check it off. The purpose for reviewing is to help you prepare for the eventual test.

REMEMBER that few people read textbooks for pleasure; we read them to acquire information and to remember it and apply it in testing situations. Reviewing aids in remembering the information.

Web Resource: *SQR3 Graphic Organizer*, http://www.freeology.com/graphicorgs/orgframes/sq3r_frame.html

Listening Effectively

Listening to lectures is a concentrated activity. Try to anticipate the instructor's comments and determine the structure of the lecture. To help improve your listening, here are some positive steps you can take:

Prepare to Listen

Go prepared to class—if the syllabus lists a reading assignment on the topic for the day, be sure you have completed the reading prior to the lecture. Students sometimes consider lectures supplementary to textbook study, but in reality, listening in class is really a form of studying! Also, your attitude in attending class is important. If you feel that a particular class is generally a waste of time, you will be in no mood to listen. Decide before class that the lecture period will be well spent; resolve to make it a learning experience.

Watch the Instructor

Don't take your eyes off the instructor—when you look away, you invite visual distractions that will compete for your attention. You need to listen with your eyes as well as your ears. Develop an awareness of the instructor's mannerisms. The instructor's gestures supplement their remarks. What the writer does with punctuation, bold print, headlines and italics, the instructor does with vocal inflection and bodily gesture. All instructors communicate physically as well as orally. Watch as you listen.

Listen for Format

Listen attentively for the topic, the main ideas, and details of support. Ask yourself: is this the topic? the main point? what details relate to this main idea? Listen for signal words that introduce a particular organizational pattern for the lecture. Look for visual cues and listen for auditory cues (what the instructor puts on the board, and when his/her tone of voice changes).

Note Questions

A questioning attitude facilitates learning. Listen well to questions asked in class. When the instructor asks a question, pay close attention—he/she is discussing something of importance and they want you to understand and remember this point. Also, notice the questions asked by others in the class—they provide the instructor with valuable feedback, and allow him/her to further clarify important issues. Often these are your questions too! The instructor's responses to student comments may provide you with feedback on your level of understanding of the topic.

Listen Creatively

During the lecture, you need to be actively involved in the subject matter. You should be evaluating and organizing the instructor's words. If you sit passively, like a sponge, expecting to soak up knowledge, you are only half listening. To listen totally, you have to react—you must put your mind to work. Try to anticipate the point to be made; in other words, think ahead and try to see the materials from the instructor's point of view. Get your mind running on a

parallel track. Also, do not allow your attention to wander—if you find yourself distracted or preoccupied by other issues (often these relate to nonschool situations), note the problem quickly in your notes, and mentally return to active participation in the class ASAP! Manage your distractions so you don't hinder your education.

Your success in college will depend in large measure on how well you listen in class. These suggestions can substantially improve your ability in this vital area.

Key Points:

- Be prepared for class.
- Be an active listener by anticipating the key points.
- Be an creative listener and try to connect the lecture content with what you already know.
- Set yourself up for success: sit in the front of the class and manage your distractions.
- Measure your understanding by being able to “picture” what is being discussed.
- Ask questions about anything in the lecture or readings that you don't understand.

Adapted from UM's New Student Program and Amarillo College's TASSL/Access Center materials. Maine Educational Opportunity Center 96/sd

A wise man once said that listening is the hardest thing in the world to do. Faulty listening leads to misunderstanding, and we all know from experience the problems misunderstanding can cause.

In industry, millions of dollars are lost annually as a result of poor listening. It has become standard practice at most major companies to “write it down.” And Xerox, a leading corporation, has developed and now markets to other industries its own listening improvement course.

In school, students fail to listen properly to directions and after every exam we hear about those who lost credit by not following these directions.

A popular parlor game a few years back involved the transfer of a story from one person to the next. The fun came when the last person in line recited his version, usually unrecognizable to those who first passed it along.

Listening Faults

Causes of faulty listening are many and mixed. For purposes of discussion we can classify them as follows:

I. Daydreaming

This is probably the most frequent listening fault because it affects everyone. Frequently, a speaker will mention same person or thing which triggers a memory in our minds and off we go. When we return to reality and start listening again, we discover that point three is being presented and that we have no recollection of points one and two.

Opportunities for daydreaming are abundant because the speed of talk is so much slower than the speed of thought. Thus, while a speaker is talking at 125 words a minute, your mind is free to race along.

There are ways to overcome the natural tendency to daydream, and we will discuss that later on.

2. Closed-mindedness

This fault occurs more often outside the classroom than within, and especially when we are arguing. We often refuse to listen to an opposing view when our minds are made up. We feel that we know all there is to know, so there's no use listening.

Actually, this is an intellectual fault rather than a listening problem. Anytime we fail to listen with an open mind, we do ourselves, as well as the speaker, a disservice. If our point of view is the correct one, opposing arguments will only serve to reinforce and confirm beliefs. If, on the other hand, our position is wrong, refusing to listen will not make our position right.

Closed-mindedness interferes with classroom learning, too. For example, you may have grown up in a family whose adult members were strongly pro-union or anti-union. As a result, when your economics class discusses collective bargaining, your first tendency may be to turn a deaf ear to facts which don't correspond with your traditional beliefs. A fair appraisal of actual events would probably lead to a more enlightened and more objective understanding of the whole concept.

3. False Attention

This is a protective device everyone resorts to from time to time. When we're not really interested in what someone has to say, we pretend to listen. We nod our heads and make occasional meaningless comments in order to give the impression that we are paying attention, when actually, our minds are thousands of miles away.

The fake-listener sometimes has no choice; a boring person may have his ear and he cannot get away. Perhaps he is at the table or in a room with relatives when a pressing matter comes to mind. Conveniently, he can go through the motions of listening, even make an occasional comment, while giving his real attention to something of higher priority. The danger occurs when we allow the occasional necessity to become a routine procedure: a technique to adopt whenever something which we find to be not very interesting comes our way. This will not do for school; don't let yourself form the habit.

4. Intellectual Despair

Listening can be difficult at times. In college, you have to sit through many lectures on subjects which are hard to understand. Expect it; that's why you're going to college: to learn what you don't know. Occasionally, you may feel the urge to throw in the towel, to give up. You say to yourself: "No matter how hard I try, I don't get it. I may as well face facts: I just can't learn this stuff." With this kind of thinking it is easy to stop trying.

Obviously, you'll never understand if you give up. The thing to do is to listen more carefully than ever; ask questions when practical; and, most important, discuss the material with a classmate. Attack the problem as soon as it appears; try not to let weeks go by before seeking help. Catch up right away and you'll feel less inclined to adopt an attitude of futility.

5. Memorizing

Some listeners try to memorize every word spoken by the lecturer. These are likely to be students who are uptight and overanxious. In their desire to listen well, they commit a listening fault and come out remembering less.

You cannot remember everything a speaker says; it is impossible. When you try, you miss the sense of the lecture and are worse off than ever. A student who displays this fault does so because he knows no other way. He has never been taught techniques for effective listening.

6. Personality Listening

It is only natural for listeners to appraise and evaluate a speaker; it is something we all do. Our impressions should not interfere with listening, however. The content must be judged on its own merit. For example, you might be tempted to tune out a speaker because of his appearance. If an instructor is sloppily dressed and careless about his appearance, you may conclude that what he says is not worth listening to. Avoid the temptation; don't let your personal feelings interfere. Even if you're convinced that he is a fool, keep in mind that he will be awarding the grades. Forget your feelings and listen to what he has to say.

This information was adapted from information distributed by TASSL/Access Center, Amarillo College, Amarillo, Texas.

Note-Taking Tips

Much of what you need to learn to do well in any course will be covered in the class itself. One way to get the most out of each class is to take good notes. Taking brief notes will help you zero-in on the important points and concepts, or main ideas. Writing down the main ideas will help you learn and remember them, and starts the test preparation process.

Remember to Be an Active Listener

Sit in the front of the class so that you can hear and see what's going on; try to make sense out of what the instructor is saying; try to connect what the instructor is saying with what you already know; see if you can "picture" in your mind what is being said; spend most of your time listening, not writing; and listen for cue words, transitions, and points of emphasis. Actively participate in class and ask questions.

Class Notes

- Save a page at the beginning of your notebook to record daily topics and date each day's notes.
- Leave room to fill in areas that you might have missed in class.
- Do not try to write down every word the instructor says. Don't write paragraphs of information-only notes.
- Use abbreviations and graphic signs whenever possible.
- Look for key or new phrases used repeatedly by the instructor. Examples of things to write down:

- o What the instructor writes on the chalkboard or tells you to note.
- o Words the instructor uses over and over.
- o Anything that the instructor spends time emphasizing.
- Write notes to yourself in the margin and write “L” when you feel lost.
- Recopy notes following each lecture, write notes in outline form, and use only one side of the paper.
- Read assignments daily so that you know about the topic to be discussed.
- Review notes within 24 hr., and weekly conduct short reviews. Offer to swap notes with a classmate, it will benefit both of you.
- Studies have shown that 2 weeks after a lecture, you will have forgotten 80% of what you heard, and after 4 weeks 95%, so take, recopy, and review notes!

Adapted from UM's New Student Program and earlier Maine Educational Opportunity Center materials, 6/96sd

Tips for Reading

Full utilization of SQ3R usually leads to enhanced understanding and retention of textbook and supplemental reading assignments. Sometimes the assignment is unusually complex or unclear. Here are some suggestions:

- **Read it again, Sam.** Re-reading is not always a waste of time, especially with technical writings as found in the sciences. After reading, leave it alone—sleep on it. When you return to the assignment, look at it with fresh eyes.
- **Be a word detective—look for essential words.** Mentally cross out all adjectives and adverbs and read the sentence without them. Find the important words, which will usually be verbs and nouns.
- **Hold a mini-review.** Stop at the end of each paragraph and recite, in your own words, what you have read. (Or, write a summary in the margin of your text.)
- **Make some noise.** Read a passage aloud several times, each time emphasizing a different part of the sentence. (Imagine that you are the author talking.)
- **Change the channel.** See if you can find an alternate text in the library. Sometimes the same concept can be understood better if you find it expressed another way.
- **Become an expert.** Pretend it's as clear as a bell and explain it to yourself. Write out your explanation and be amazed at what you really do know.
- **Take a stand.** Try standing when you are reading an especially tough passage: hearing the words often makes them more understandable; pacing back and forth can help to focus concentration.
- **Use your instructor.** Remain up to date on your class readings so that the clarifications provided in the lectures can be fully realized. If the readings are not reviewed, or questions remain, ask the instructor for clarification. Odds are that you are not the only student with questions and your question provides the instructor with important feedback.

- **Join a study group, get a tutor, or see your advisor.**

Adapted from University of Maine's New Student Program materials and D.B. Ellis's "Becoming a Master Student, College Survival Inc."

Ten Study Tips to Live by...

1. Take Frequent Study Breaks.

Take a 3-5 minute break after a 20-30 minute study session. If you work for a long period without breaks it will not be an effective use of your study time: Energy decreases, boredom sets in, physical stress and tension accumulates, and your attention of the material wanes. Also, change study subjects every 45-55 minutes with breaks in-between.

2. Schedule Shorter Study Sessions Rather than a Single Long One.

30 minutes is a good length of time for your brain to process information. And take advantage of odd hours to catch up!

3. Find a Definite Distraction-Free Place to Study.

Study there regularly to increase comfortability in your environment. Concentration on the task at hand will produce better results.

4. Schedule Specific Times to Study.

This fights procrastination and your body will get used to it.

5. Take Notes as You Read.

Hand-eye coordination keeps you busy and stimulates your brain.

6. Jot Down Questions When You Read Assignments.

Ask your instructor—the only wrong questions are the ones not asked.

7. Recopy Your Lecture Notes Daily & Compress Them into Your Own Words.

You can relate to material better when you put your own personality into it

8. Review Class Notes Daily.

Keep them fresh in your mind.

9. Prepare in Advance for Exams.

Cramming may help you make the grade, but you won't remember the material in the long run.

10. Study Your Least Favorite or Most Difficult Classes First.

Manage your study time effectively by dealing with difficult materials first, when you are fresh and your attention is at its best. Schedule high-priority activities for peak energy times and save

your favorite or easier courses for later in your study period to serve as a “later motivator.” And don’t forget to reward yourself—schedule leisure and social activities after work periods

Adapted from UM’s New Student Program and METS “Dozen Study Tips,” Maine Educational Opportunity Center 6/96SD

Preparing for Tests

- Part of being a good test taker is preparing in advance for the test.
- Find out what type of exam it will be: essay, short answer, multiple choice, fill-in, the-blank, open book or take home.
- Review your notes, textbooks and notes from outside readings. Keep your notes in chronological order.
- Review unit summaries and answer all sample questions included.
- Ask the instructor to specify the areas requiring more concentration.
- Review earlier exams or sample exams on file in the library.
- Create your own exam questions and review them.
- Develop study tools: a study checklist, vocabulary lists, time lines, a set of flash cards and an outline of the materials covered.
- Form a discussion or study group.

Taking an Exam

- In general, arrive early, scan the entire exam before you start, read directions carefully; jot down your memory aids, diagrams, codes.
- Put your name on the exam.
- Take command of the test: read all questions before you start to answer and code the questions by (*) easy, (***) easy but time consuming, (x) hard, and (?) impossible, answering the questions in this order to boost confidence and to manage the test. You can often gain clues to answers from reading other parts of the test.
- Pace yourself and stay aware of your time. Keep in mind the point value of different questions, if this detail is provided and budget your time!
- Beware of “quicksand questions,” go on to the next question and mark it so you can easily return if time allows.
- Try to respond to all questions, a partial answer is better than no answer.
- Essay exams require all the above plus the need to dissect the question, make an outline, include facts, get to the point and to write legibly.
- Objective exams require all of the above and for you to read each question twice before responding so that you pick up essential wordings. Multiple choice questions you may have to eliminate responses to determine the best answer. True/false questions: if a question is partially false, mark it false. Watch out for key words such as always, often, or never; these words can help you decide if the statement is true or false.

- When you do not know the answer explore these techniques:

Multiple Choice Exams

Instructors are very careful with correct answers, mistakes are frequently made with other options. The correct answer will not have spelling, syntax, or grammatical errors. The questions tense will match the answers tense. The longest option, if it is grammatically correct, is frequently the correct answer. Only use these clues if you are making a guess.

- Try to allow 10 minutes at the end of the exam for you to check it over, but try not to change your response to a guess; your first impression is usually right!
- When the test is returned, read your instructor's comments carefully so you understand your mistakes and don't repeat them.

I Think I Did It, But I Can't Find It: Assisting Students Who Lack Organizational Skills.

Ito, Carolyn. (2005). *I Think I Did It, But I Can't Find It: Assisting Students Who Lack Organizational Skills*. Williamsburg, VA: Training and Technical Assistance Center, College of William and Mary. Retrieved December 22, 2006, from <http://www.wm.edu/ttac/articles/learning/orgskills.html>. Reprinted with permission.

Students need organizational skills for school success. Students who lack organizational skills are at a disadvantage because they often seem to be “two steps behind” the rest of the class. They are late and unprepared. While they are looking for needed materials they miss critical information like, “Today we are going to ...,” or “There will be a test on Friday,” or “I changed the date of your book report.” The following suggestions are for teachers and paraprofessionals who work with unorganized students of all ages and disabilities. Included is information on organizing students’ personal space, notebooks, planners, time, and an annotated bibliography of resources.

Organizing Personal Space

Desk

- Pyramid style: texts on left, spines out, largest book on bottom, notebooks/supplies on right
- Monitor work area: clear of unnecessary, distracting material
- Shared desks: turn opening away from student so items are less likely to be left
- Build in clean up time at end of each class and remind students to take personal belongings

Locker

- Arrange to have unorganized students’ lockers near special education teacher’s room
- Interior arrangement of locker
 - o top shelf: texts, horizontal, color-coded book cover spines
 - o hooks: use for hanging clothing, bookbag
 - o bottom shelf: notebooks vertical, in order of classes, supplies
 - o contents: daily schedule, pictures, decorations, mirror
- Clean-out schedule: weekly clean out for first month, monthly after that or whenever lockers are not well organized or necessary items cannot be found

Bookbag

- Weekly “dump” or clean out (Friday afternoon)
 - o remove, discard: outdated papers, wrappers, nonworking tools
 - o put in right place: all papers, tools, clothing, books, notes, etc.
 - o use checklist of criteria as a part of notebook check
 - o note needed repairs

- Team decision: teachers decide where book bags will be kept during class (in lockers, under desks, or hanging on back of chairs)

Pockets

Help students establish one designated pocket for money, one for notes

Purses

Encourage use of book bag for personal belonging

- Guys: deodorant, comb, keys (no cologne)
- Girls: lipstick, comb, deodorant, female necessities, keys (no nail polish, perfume, hair spray, etc.)

Organizing the Notebook

Teachers should provide list of materials needed for the year. The list should be distributed prior to the beginning of school, at open house, and again at mid-year. Be sure each newly enrolled student is given the list. Keep copies handy for parent conferences.

Notebook

- One large notebook (2") with dividers is better because it is easier to keep up with and students have everything needed when schedules change.
- Arrange subjects in order of class schedule.
- Use front pocket for homework assignments to do, completed assignments, and notes to parents.
- Monitor for needed replacement when rings are bent or cover is mutilated (write or phone parents).
- Include plastic pencil pouch for 2 or 3 pencils, 2 pens, reinforces.
- Label notebook with student's name, team, etc.

Teacher support for maintaining organized notebooks:

- Keep a folder of worksheets for absent students and so that students can get a replacement sheet for those lost.
- Keep a master notebook containing all the work, notes, etc. for student reference.
- Appoint someone to take notes for absent students-work out buddy system.
- Write the Table of Contents for each notebook on the board in a consistent area, adding to it daily.
- Consistency across teams is helpful.

Checking Notebooks

- Collect notebook contents periodically—at least every 3 weeks or when units are complete.
- Grade the notebooks for completeness and organization (can give a notebook quiz instead) team decision as to percent of grade earned through notebooks refuse to grade notebooks without a complete table of contents, name, class students can assist with grading own, partners.
- Allow class time for ordering pages 1 or 2 days prior to when notebook is due.
- Make notebook preparation a homework assignment.
- Save selected notebooks for portfolio, conferences, and exam study.

Assignment Recording: Using a Planner

Necessary Features of Planners

- Adequate space for:
 - the daily recording of class homework assignment(s) or work done
 - writing numbers to indicate the order in which the assignments will be done
 - checking off completed assignment(s)
 - parent comments
 - teacher comments
- Other desirable features of student planners
 - place to record long-term assignments
 - place to record test grades
 - motivational blurbs
 - place to record peers' telephone numbers
 - binding so all pages stay together for the year
 - pass system for documenting permission to leave class
 - school/team rules
- Commercially prepared planners
 - cost about \$6 per student
 - are personalized for the school
 - come with teacher's edition of lessons on organizational skills
 - last a year
 - ensure that all students have the same information

Organizing Time

Setting Goals, Making Choices and Establishing Priorities

When you manage time, you make the most out of life (Santeusanio, 1989, p. 53): lifetime goals, long-range goals (3-5 years), short-range goals (this week).

Daily schedule:

- Whole day = 24 hours, school = 6.5 hours, eating = 1, sleeping = 9, grooming <1, studying = 1
- Locker, notebook, team area, homeroom board
- Write on index card, move a paperclip down as each class is complete

Weekly schedule:

- 168 hours in a week, 30 = school, 56 = sleeping, 10 = eating, 72 = left over

Long-range planning-projects:

- Group and individual
- Choose project within 2 days of its assignment
- Discuss project with parents
- Check progress by using a sequential list of tasks with due dates

Social-time for friends:

- Phone
- School-sponsored activities: clubs, games, dances, sports
- Community sponsored: sports activities
- Done in groups-skating, movies, church

Work:

- Students are often one or two years older than peers
- Need to have work permit
- Have an interest in pocket money
- Experience seems to build the student in peers' eyes
- Work on weekends in bussing tables, cutting lawns, newspaper route, child care
- Paid under table so learning poor things about the world of work when work
- During the week, it is too much, tired, not doing homework usually school work suffers
- Monitor closely, advise parent(s) when work begins to interfere with school

Annotated Bibliography: Resources for Teaching Organizational Skills

Curie, P., deBrueys, M., Exnicios, J., & Prejean, M. (1987). *125 ways to be a better student*. East Moline, IL: Lingui Systems.

Best suited to middle and high school students, this is a compilation of study skills units including background information for the teacher, lesson plans, and reproducible student worksheets.

Teachers may choose individual units or use the book as a whole to enhance organization and independence. The units included are Organizing Yourself and Your Study Time, Organizing Your Materials, Organizing Your Work Area at Home, Using an Assignment Book, Surveying, Underlining or Highlighting, Skimming, Outlining, Taking Notes, Following Oral directions, Responsibility for Behavior, Test Preparation, Test-Taking, and Test-Proofing.

Florey, H. (1987). *Study orientation skills*. Tuscaloosa, AL: Henry E. Florey, Jr., 3714 Paver Drive, Tuscaloosa, AL 35405.

Designed for secondary and college students, this study skills program covers a number of topics. Terms are defined and illustrated with many examples. Many pages are provided for self-inventories and practice. Topics presented include Motivation, Goal Setting, Time Management, Listening, Note Taking, Textbook Reading, Concentration, Preparing for and Taking Tests, and Organizing and Writing Papers. This manual and the Student Manual (see McDonald, B., Dickerson-Young, L., & Florey, H.) are given to participants who attend the successful study skills workshop.

Heacoz, D. (1991). *Up from underachievement*. Minneapolis, MN: Free Spirit Publishing, Inc.

Irvin, J., & Rose, E. (1995) *Starting early with study skills: A week-by-week guide for elementary students*. Needham Heights, MA: Allyn and Bacon.

McDonald, B., Dickerson-Young, L., & Florey, H. (1986). *SSS: Successful Study Skills: The success program student manual*. Tuscaloosa, AL: Henry E. Florey, Jr., 3714 Paver Drive, Tuscaloosa, AL 35405.

Ten study skills chapters suited to secondary and college students contain definitions of terms, rating scales, and some practice activities. The 10 chapters are Motivation, Goal Setting, Time Management, Learning Styles, Listening, Note Taking, Textbook Analysis, Organization, Memory/ Concentration, and Test Taking. The manual is given to participants who attend the Successful Study Skills workshop sponsored by Henry Florey.

McMurchie, S. (1994). *Understanding LD-learning differences: A curriculum to promote LD awareness, self-esteem and coping skills in students ages 8-13*. Minneapolis, MN: Free Spirit Press.

Rooney, K. (1988). *Independent strategies for efficient study*. Richmond, VA: JR Enterprises, 2115 Willowick Lane, Richmond, VA 23233.

Karen Rooney presents many strategies to assist upper elementary through high school students with organization. Each strategy presented has some background information, visual examples, and limited practice. Among the included skill areas are Time Management, Notebook Organization, Textbook Reading, Flashcard Study, Wheels for Reading, Writing, Math, and Literature, Notetaking, Spelling, Vocabulary and Memorization, and Test-taking Strategies. Research on the development of the strategies concludes the book. Teachers will need to supplement what is presented in order to have enough relevant material for student practice.

Santeusanio, R. (1989). *Improving your study skills: Developing study skills*. Circle Pines, MN: American Guidance Service, Inc.

This student WorkText contains nine units including Locating Information, The Library, Taking Notes, Using Visuals, Managing Time, HEART: A Study System, Reading Rates, Taking Tests, and

What to Do When You Don't Understand. The material is suited to middle and high school students. Questions and exercises follow background information. Teachers may need to supplement the materials presented.

Santeusanio, R. (1988a). *Study skills and strategies: Student text*. Circle Pines, MN: American Guidance Service, Inc.

The student worktext contains practical suggestions and strategies. Each chapter explains what, why, and how the student will learn the material. Practice material follows. Topics presented are Getting Ready to Study, HEART-A System for Studying (seven chapters), Managing Your Time, Learning from Visuals, and Using Research to Learn. The program is suited to middle and high school students.

Santeusanio, R. (1988b). *Study skills and strategies: Teacher's manual*. Circle Pines, MN: American Guidance Service, Inc.

The Teacher's Manual contains background material for teachers including an extensive reference list. Materials for each chapter include objectives, Teaching Suggestions, and the answers to the questions in the Student Text.

Strichart, S., & Mangrum, C. (1993). *Teaching study strategies to students with learning disabilities: ready-to-use reproducibles, teaching plans, and resources for middle to high school*. Boston: Allyn and Bacon.

This teacher resource text contains background information, teaching plans, reproducible pages, and exercises to practice new skills in a variety of subject areas. Topics covered in the text are Remembering Information, Reading and Taking Notes from Textbooks, Solving math Word Problems, Taking Notes from Class Presentations, Using the Library, Using Reference Books, Interpreting Visual Aids, Writing a Research Paper, Taking Tests, and Using Time. The References and Bibliography section is extensive.

Training and Technical Assistance Center (T/TAC W&M), William and Mary School of Education, P.O. Box 8795, Williamsburg, VA 23187-8795, Phone: (800) 323-4489, TDD: (757) 221-2302, Fax: (757) 221-5053. T/TAC is funded by the Virginia Department of Education. Copyright 1996-2005 Training and Technical Assistance Center, College of William and Mary. All Rights Reserved.

Learning Strategies

Boudah, Daniel J., & O'Neill, Kevin J. (1999). *Learning Strategies*. ERIC/OSEP Digest E577. Reston VA: ERIC Clearinghouse on Disabilities and Gifted Education. Retrieved January 1, 2007, from <http://www.ericdigests.org/2000-2/learning.htm>.

As students shift from the skills emphasis of elementary grades to the content emphasis of secondary grades, they face greater demands to read information from textbooks, take notes from lectures, work independently, and express understanding in written compositions and on paper and pencil tests (Schumaker & Deshler, 1984). For students who haven't acquired such important academic skills, the task of mastering content often comes with failure, particularly in inclusive general education classes. In response to this challenge, many students with learning problems, including those with learning disabilities (LD), have acquired and use specific learning strategies to become successful despite their knowledge and skill deficits.

Simply put, a learning strategy is an individual's approach to complete a task. More specifically, a learning strategy is an individual's way of organizing and using a particular set of skills in order to learn content or accomplish other tasks more effectively and efficiently in school as well as in nonacademic settings (Schumaker & Deshler, 1992). Therefore, teachers who teach learning strategies teach students how to learn, rather than teaching them specific curriculum content or specific skills.

What Does the Research Say about Learning Strategies?

Much of the research and development of learning strategies for students with learning disabilities has come from researchers and educators affiliated with The University of Kansas, Center for Research on Learning. In general, their research suggests that use of learning strategies can improve student performance in inclusive settings or on grade appropriate tasks. In reading, for example, results from a study of the use of the Word Identification Strategy indicated that the number of oral reading errors decreased while reading comprehension scores increased for all students on ability level and grade level materials (Lenz & Hughes, 1990). Another study revealed that students using the Test Taking Strategy improved average test scores in inclusive classes from 57% to 71% (Hughes & Schumaker, 1991).

Other researchers in the area of learning strategies have also found positive results. For example, Graham, Harris, and colleagues (e.g., Graham, Harris, MacArthur, & Schwartz, 1991) have validated strategies for improving the quality of student compositions, planning processes, and revisions. In another line of research, Palincsar and Brown (e.g., Palincsar & Brown, 1986) successfully tested and replicated reciprocal teaching, a strategy to improve student reading performance. Scruggs and Mastropieri (e.g., Scruggs & Mastropieri, 1992) have validated several approaches to teach students how to construct and use mnemonics. Strategies tested by Miller and Mercer (e.g., Miller & Mercer, 1993) have resulted in improved student performance in math calculations as well as in solving word problems.

How Do Teachers Teach Learning Strategies?

Educators at the University of Kansas, Center for Research on Learning, have validated an instructional sequence in which students learn each strategy following these teacher-directed

steps: (a) pretest, (b) describe, (c) model, (d) verbal practice, (e) controlled practice, (f) grade-appropriate practice, (g) posttest, (h) generalization (Schumaker & Deshler, 1992). After a teacher assesses the current level of student performance on a strategy pretest, students commit to learning a new strategy. The teacher then describes the characteristics of the strategy and when, where, why, and how the strategy is used. Next, the teacher models how to use the strategy by “thinking aloud” as the strategy is applied to content material. During the verbal practice step, students memorize the strategy steps and other critical use requirements. Afterwards, controlled practice activities enable students to become proficient strategy users with ability level materials. Teachers provide specific feedback on performance, and then students use the strategy with grade-appropriate or increasingly more difficult materials. Finally, after a posttest, teachers facilitate student generalization of strategy use in other academic and nonacademic settings.

Each strategy has multiple parts that students remember with the aid of a mnemonic. For example, in the Paraphrasing Strategy (Schumaker, Denton, & Deshler, 1984) students learn a reading comprehension strategy that is remembered by the acronym RAP:

- Read a paragraph
- Ask yourself, “What were the main idea and details in this paragraph?”
- Put the main idea and details into your own words.

If students need to learn prerequisite skills, such as finding main ideas and details, teachers teach those before teaching the strategy, and reinforce student mastery of those skills during strategy instruction. Students typically learn to use a learning strategy in small groups, sometimes in a resource room, through short, intensive lessons over several weeks.

What Resources Are Available for Teachers?

The learning strategies curriculum developed at the University of Kansas is organized into three strands: (a) information acquisition, (b) information storage, and (c) expression and demonstration of understanding.

The information acquisition strand features the Word Identification Strategy, the Paraphrasing Strategy, and others. The Word Identification Strategy (Lenz & Hughes, 1990) enables students to decode multisyllabic words. Students use the Paraphrasing Strategy (Schumaker, Denton, & Deshler, 1984) to improve reading comprehension of main ideas and details through paraphrasing.

The information storage strand includes the FIRST-letter Mnemonic Strategy, the Paired Associates Strategy, as well as others. Students who master the FIRST-letter Mnemonic Strategy are able to scan textbooks to create lists of critical information and devise first letter mnemonics to remember the material (Nagel, Schumaker, & Deshler, 1986). To better study and recall content, the Paired Associates Strategy enables students to pair pieces of new information with existing knowledge by using a visual device (Bulgren, Hock, Schumaker, & Deshler, 1995).

The expression and demonstration of understanding strand includes the Sentence Writing Strategy, the Test Taking Strategy, and others. The Sentence Writing Strategy is designed to teach students how to write simple, compound, complex, and compound-complex sentences

(Schumaker & Sheldon, 1985). The Test Taking Strategy is an integrated strategy used by students to focus attention on critical aspects of test items, systematically answer questions, and improve test performance (Hughes & Schumaker, 1991).

In large measure, the learning strategies research conducted over the last 20 years at the University of Kansas, Center for Research on Learning, has been funded by the U.S. Office of Special Education Programs. Additional funding has come from sources including the State of Kansas, The Casey Family Foundation, and the National Council for Learning Disabilities. The content of this publication does not necessarily reflect the views or policies of the funding agencies, nor does the mention of trade names, commercial products, or organizations imply their endorsement.

For further information on the University of Kansas Learning Strategies Curriculum, teacher training, and how to implement strategies instruction throughout a school, contact: Center for Research on Learning, University of Kansas, 306 I Dole Center, Lawrence, KS 66045, (785)864-4780 (www.ku-crl.org).

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Improving Word Identification Skills Using Strategic Instruction Model (SIM) Strategies

Bremer, Christine D.; Clapper, Ann T.; and Deshler, Donald D. (2002). *Improving Word Identification Skills Using Strategic Instruction Model (SIM) Strategies*. Research to Practice Brief Vol. 1, Issue 4. *Improving Secondary Education and Transition Services through Research*. Minneapolis, MN: National Center on Secondary Education and Transition, Institute on Community Integration. Retrieved January 20, 2007, from <http://www.ncset.org/publications/printresource.asp?id=720>.

Students with learning disabilities often move into secondary education with elementary-level reading skills, including an inability to readily decode unfamiliar words. As a result, they have difficulty with content-area classes, such as history and science, in which grade-level reading is required. This brief focuses on the Word Identification Strategy component of the Strategic Instruction Model (SIM) (Deshler & Schumaker, 1988), and reviews recent research showing the effectiveness of this strategy for secondary students with disabilities.

The Strategic Instruction Model (SIM)

The Strategic Instruction Model (SIM), introduced by Deshler and Schumaker (1988) and further developed by several researchers at the University of Kansas, is an instructional system designed to help students with learning disabilities succeed in their general education courses. SIM includes curricular materials revised to accommodate different learning styles, routines for teachers to help them meet the needs of diverse learners, and strategies for students. Within SIM, there are learning strategies related to six areas: reading, storing and remembering information, expressing information, demonstrating competence, social interaction, and mathematics.

SIM Reading Strategies

There are four SIM strategies specifically related to reading:

1. Paraphrasing (students express main idea and details in their own words);
2. Self-questioning (students develop questions concerning reading passages and read to find answers);
3. Visual imagery (students visualize scenes in detail); and
4. Word identification (students decode unfamiliar words by using context clues and word analysis).

The Word Identification Strategy

The Word Identification Strategy used in SIM was developed by Lenz and Hughes (1990) and initially tested on 12 middle school students with learning disabilities. This strategy is intended to help struggling readers decode and identify unfamiliar words, and is based on the common underlying structure of most polysyllabic words in English. Most of these words can be pronounced by identifying the components of the words (prefixes, suffixes, and stems) and then

applying three syllabication rules to the stem word. In this approach, prefixes and suffixes are loosely defined as recognizable groups of letters that the student can pronounce.

As described by Lenz and Hughes (1990), there are seven steps to identifying an unknown word. The steps are remembered using the first-letter mnemonic, DISSECT:

Step 1: Discover the context. This step requires the student to skip over the unknown word and read to the end of the sentence. Then, the student uses the apparent meaning of the sentence to guess what word might best fit. If the guess does not match the unknown word, the student moves on to the next step.

Step 2: Isolate the prefix. In this step, students look for a pronounceable sequence of letters at the beginning of the word. Students are taught a list of prefixes to facilitate recognition. If a prefix is identified, the student draws a box around it to separate it visually from the rest of the word (for example, in the word inactivity, the “in” would be boxed; in underachievement, the “under” would be boxed).

Step 3: Separate the suffix. Using a procedure similar to Step 2, the student boxes off the suffix, if there is one (in the word inactivity, the “ity” would be boxed; in underachievement, the “ment” would be boxed).

Step 4: Say the stem. The student attempts to pronounce the stem (activ, achieve). If the stem cannot be named, the student moves on to Step 5.

Step 5: Examine the stem. In this step, the student divides the stem into small, pronounceable word parts, using “the Rules of Twos and Threes” (Lenz & Hughes, 1990, p. 151). The rules can be summarized as follows:

Rule 1: If the stem or part of the stem begins with a vowel, separate the first two letters; if it begins with a consonant, separate first three letters; continue to apply this rule until the end of the stem is reached (ac\tiv, ac\hieve).

Rule 2: If you can’t make sense of the stem after using Rule 1, take off the first letter of the stem and use Rule 1 for the remainder of the stem (a\chi\ev\le).

Rule 3: When two vowels are together, use what you know about pronunciation (for example, pronounce two adjacent vowels as a single sound, and remember that a final e following a consonant is usually silent) and try the different possibilities (a\chiv, a\chev).

Step 6: Check with someone. The student checks with a teacher, parent, or other person.

Step 7: Try the dictionary. The student looks up the word, uses pronunciation information to pronounce the word, and, if the word is unfamiliar, reads the definition.

Lenz & Hughes (1990) recommend that the strategy be fully employed only for those words that are most critical to understanding a passage of text, such as a word in a chapter heading. Bryant, Vaughn, Linan-Thompson, Ugel, Hamff, & Hougen (2000) note that this strategy works best when the word being analyzed is one that is already in the student’s listening vocabulary.

Instructional Methodology

The instructional methodology used in teaching SIM strategies involves eight stages, with the following goals: (a) obtain a pre-training measure of students' skills and gain the students' commitment for learning; (b) make the students aware of the strategy steps, where the strategy can be applied, and how the strategy will benefit them; (c) demonstrate for students how to use the strategy; (d) ensure that students understand and can name the strategy steps; (e) ensure that students master the use of the strategy in simplified materials or situations; (f) ensure that students master the use of the strategy in materials and situations similar to those encountered in general education classes; (g) obtain a post-training measure of students' skills; and (h) ensure that the students generalize the use of the strategy to general education classes (Ellis, Deshler, Lenz, Schumaker, & Clark, 1991).

The materials and procedures to be used by the learning specialist in these undertakings have been empirically validated in a series of studies (e.g., Hughes & Schumaker, 1991; Lenz & Hughes, 1990; Schmidt, Deshler, Schumaker, & Alley, 1989). Some of the materials have been published for teachers' use (e.g., Lenz, Schumaker, Deshler, & Beals, 1984; Schumaker, Deshler, & Denton, 1984; Van Reusen, Bos, Schumaker, & Deshler, 1987).

Recent Research on the Word Identification Strategy

Recent research by Woodruff, Schumaker, and Deshler (2002) has added to the evidence that the Word Identification Strategy helps struggling secondary readers improve their reading skills. In Michigan in 1998, teachers undertook a research project in which approximately 600 ninth grade students in one high school served as a treatment group and a group of ninth-grade students at another high school served as a comparison group. Both groups were pre-tested using the Slossen Diagnostic Screening Test for Reading using the Word Identification Subtest, Form A. Those students who scored at least two years below grade level at the targeted high school then received intensive reading instruction (50 minutes per day for three to eight weeks) on the Word Identification Strategy. The instruction was delivered in small groups of four or five students with one teacher. Students were pulled out of their regular English class, and then returned to their regular classes after reaching mastery. These students, and the students at the comparison high school, were then post-tested using Form B of the Slossen Diagnostic Screening Test for Reading Word Identification Subtest. Results were disaggregated for demographic subgroups. Figure 1 shows the students' pre- and post-test scores for three demographic subgroups: male African-Americans, male Hispanics, and students with disabilities. These demographic subgroups were of interest because of national data showing persistent gender and racial/ethnic gaps in reading performance (U.S. Department of Education, 2002). Comparison group scores for male African Americans and male Hispanics are also shown; students with disabilities were not tested at the comparison high school. Figure 1 shows that students who learned the Word Identification Strategy showed greater gains than demographically similar students at the comparison high school. The gains shown by students with disabilities were comparable.

Figure 1: 1998 Michigan Study, High School Reading (Decoding)

Demographic Subgroup		Treatment Group (Reading Level)	Comparison Group (Reading Level)
Male African Americans	pretest	5th-grade reading level	6th-grade reading level
	posttest	9th-grade reading level	6th-grade reading level
Male Hispanics	pretest	6th-grade reading level	7th-grade reading level
	posttest	9th-grade reading level	6th-grade reading level
Students with LD	pretest	5th-grade reading level	n/a
	posttest	9th-grade reading level	n/a

Table adapted from The effects of an intensive reading intervention on the decoding skills of high school students with reading deficits by S. Woodruff, J. B. Schumaker, and D. D. Deshler, 2002, Lawrence, KS: The University of Kansas Institute for Academic Access. Copyright 2002 by The University of Kansas Center for Research on Learning. Adapted with permission.

Personnel at an urban school district in Kansas became aware of the results of the Michigan study, and implemented instruction in the Word Identification Strategy with a group of sixth graders in the district in 1999. District wide, entering sixth graders were tested using the Metropolitan Achievement Test, and all those scoring below the 37th percentile received 47 minutes of intensive daily instruction on the Word Identification Strategy for seven to nine weeks. Students were pulled out of their regular reading or elective classes and taught in small groups. For the remainder of the school year, students participated in monthly review sessions.

Figure 2 shows the results for 78 participating students, using two measures. The first measure is the percent of students correctly decoding at least 98% of words in a text written at the sixth grade level (dark bars) and the percentage of questions answered correctly on the Woodcock-Johnson reading comprehension test (light bars). In the post-test, students had clearly improved in both decoding and comprehension.

Figure 2: Kansas Study, Sixth Grade (n=78)

	Students Correctly Decoding Words (%)	Questions Answered Correctly—Comprehension (%)
Pretest	14%	57%
Posttest	71%	79%

Table adapted from The effects of an intensive reading intervention on the decoding skills of high school students with reading deficits by S. Woodruff, J. B. Schumaker, and D. D. Deshler, 2002, Lawrence, KS: The University of Kansas Institute for Academic Access. Copyright 2002 by The University of Kansas Center for Research on Learning. Adapted with permission.

Conclusions

The Word Identification Strategy is effective in helping secondary students with learning disabilities to decode and identify difficult words encountered in text. By developing expertise in identifying words, students can improve their success in content-area classes and be better prepared for postsecondary education and the workplace. Teachers need additional training, however, in order to teach the strategy in the most effective manner. Training and materials for SIM are available through the Center for Research on Learning at the University of Kansas. The Word Identification Strategy manual is available only in conjunction with training by a certified

SIM instructor. Additional information is available from the University of Kansas Center for Research on Learning at <http://www.ku-crl.org>.

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Web Resources

Southwest Educational Development Laboratory, Reading Resources, <http://www.sedl.org/pubs/reading16/7.html>

This site includes resources on reading research and assessment, and a link to the document, "Building Reading Proficiency at the Secondary Level: A Guide to Resources," which includes a section on word analysis strategies.

Strategy Instruction for Problem-Solving Unknown Words, http://www.ldonline.org/ld_indepth/teaching_techniques/ellis_unknownwords.html

This 1996 book chapter by E. S. Ellis, was originally published in D. D. Deshler, E. S. Ellis, & B. K. Lenz (Eds.), *Teaching Adolescents with Learning Disabilities: Strategies and Methods*. Denver: Love

Publishing. It has been reprinted on the LD Online website, and provides a detailed description of the Word Identification Strategy.

University of Kansas Center for Research on Learning, <http://www.ku-crl.org>

Provides information about SIM, including a brochure, newsletters, resources, and websites for related topics and organizations.

Authors Christine D. Bremer and Ann T. Clapper are with NCSET. Donald D. Deshler is with the Center for Research in Learning, University of Kansas.

National Center on Secondary Education and Transition, Institute on Community Integration, University of Minnesota, 6 Pattee Hall, 150 Pillsbury Drive SE, Minneapolis MN 55455; ncset@umn.edu; 612-624-2097 (phone); 612-624-9344 (fax)

Helping Students with Disabilities Participate in Standards-Based Mathematics Curriculum

Warger, Cynthia. (2002). *Helping Students with Disabilities Participate in Standards-Based Mathematics Curriculum*. ERIC/OSEP Digest Number E628. Reston, VA: ERIC Clearinghouse on Disabilities and Gifted Education. Retrieved December 9, 2006, from <http://www.cec.sped.org/AM/Template.cfm?Section=Search&template=/CM/HTMLDisplay.cfm&ContentID=1796>.

The bar on what students with disabilities are expected to learn was raised by the 1997 Amendments to the Individuals with Disabilities Education Act (IDEA), which emphasize students' participation and progress in the general education curriculum. Navigating the general education math curriculum has become a key to student success.

The mathematics curriculum has changed over the last 20 years due to educational reforms driven by standards. A significant element driving this change is the National Council of Teachers of Mathematics (NCTM) Principles and Standards for School Mathematics (first published in 1989 and revised in 2000), which focus on conceptual understanding and problem solving rather than procedural knowledge or rule-driven computation. Most states and districts have used the NCTM Standards to some degree in revamping their mathematics curricula. (For more information, visit the NCTM website at <http://standards.nctm.org>.)

The challenge for teachers is to provide effective math instruction to students with disabilities so they can meet the high standards set for what all students must be able to know and do mathematically. Unfortunately, many students with disabilities experience difficulties with the reformed math curriculum. As University of Maryland researchers Paula Maccini and Joe Gagnon have found, students may have difficulty processing and distinguishing relevant information, have deficits in computational skills, or lack reasoning and problem-solving skills. But with the right support, students with disabilities can succeed in a higher level math curriculum.

For many years, the U.S. Department of Education, Office of Special Education Programs (OSEP) has supported research to improve mathematics achievement for students with disabilities. This ERIC/OSEP Digest examines how selected researchers are informing practice in four areas: enhancing students' understanding of mathematics, teaching students mathematical problem-solving strategies, using assistive technology in instruction and assessment, and making accommodations to support student participation in state and district-wide assessments.

Enhancing Students' Understanding of Mathematics

John Cawley, Professor Emeritus at the University of Connecticut, has found that for students with disabilities to do better in math, math must be meaningful for them. Both knowing and doing mathematics must be emphasized to enhance the quality of mathematics instruction and learning for students with disabilities.

Knowing about mathematics means that the student comprehends the basic principles of a mathematics problem, knows there is more than one way to explain the mathematics of the problem, and knows that there is frequently more than one acceptable answer. This is

in contrast to doing mathematics, which means the student can apply a number of different strategies and mathematics principles to complete an item. Cawley believes that many of the difficulties students face with math stem from educators' neglecting the "knowing" and overemphasizing the "doing".

Consider this example that highlights the distinction between knowing about subtraction and being able to do subtraction. Subtraction as a mathematical topic is much more meaningful than the rote computation take-away approach that has been advocated for students with disabilities since the 1920s. It is a process that allows the student to understand and find the difference between two numbers. The big idea for students to understand is that subtraction represents a difference. Knowing about subtraction involves reasoning in the form of proof and explanation. It also involves the ability to demonstrate the connectedness between one facet of mathematics (e.g., subtraction) and another (e.g., addition). Cawley has found that understanding subtraction in this way offers teachers numerous opportunities to stress number sense and skill development, which can result in improved student understanding and performance.

Teaching Students Strategies for Mathematical Problem Solving

According to University of Miami researcher Marjorie Montague, a major focus of the NCTM standards and of reformed math curriculum is problem solving. Her research has shown that effective mathematical problem solving depends on the ability to select and apply task-appropriate cognitive and metacognitive processes and strategies for understanding, representing, and solving problems. Montague describes cognitive processes as the "to do" strategies and metacognitive processes as the reflective strategies (e.g., "What am I doing?" and "What have I done?").

To help teachers understand the knowledge and skills needed for effective and efficient mathematical problem solving, Montague developed Solve It!, an approach that incorporates the cognitive processes critical to mathematical problem solving in each step of the strategy:

Reading the problem. Students are taught how to read mathematical problems, including using reading strategies to understand the problem (e.g., focusing on important information), developing mathematical vocabulary, and recognizing when they do not understand relationships among mathematical terms and quantitative concepts expressed in a problem.

Paraphrasing. Students are taught how to put the problem into their own words and convey meaning.

Visualizing. Students are taught to draw a representation on paper or to make a mental image of the problem.

Hypothesizing about problem solutions. Students are taught how to decide the number of operations that are needed to solve the problem, select and order the operations, and then to transform the information into correct equations and algorithms.

Estimating the answer. Students are taught how to stay focused on the type of outcome (e.g., number of yards rather than feet), and then how to predict the answer by using the information in the problem and their projected solution path.

Computing. Students are taught how to recall the correct procedures for working through the algorithms and the necessary math facts for accuracy.

Checking the problem. Students are taught how to check the mathematical problem solving process to ensure that they have understood the problem, accurately represented the problem, selected an appropriate solution path, and solved the problem correctly.

In the Solve It! approach, students also learn a metacognitive strategy that they apply at each step. The strategy includes the following steps:

- Say aloud or to themselves what the problem is asking them to do.
- Ask themselves if they understand the problem.
- Check their progress.

Using Assistive Technology for Instruction and Assessment

IDEA provides that assistive technology will be considered for students with disabilities as part of their individualized education program (IEP) planning. Researchers have made significant advancements in providing technology tools to support mathematics achievement. Examples include the following:

Interactive software for students who are blind. Many students who are blind are unable to read or write the symbols that comprise mathematics, and thus, must learn concepts and perform calculations entirely in their heads, limiting their ability to master the intricacies of mathematics. To address this need, Gaylen Kapperman and Jodi Sticken of Northern Illinois University developed an interactive software tutorial that helps them to study the Nemeth Code (the Braille code of mathematics). The software is installed in a Braille Lite—a small, portable Braille note taker that is equipped with synthetic speech and a refreshable Brailled display.

A CD-ROM for students who use American Sign Language (ASL) to communicate. Using multimedia, Jean Andrews and Donald Jordan at Lamar University developed the Meet the Math Wiz CD-ROM series that helps students focus on math word problems over six grades of math difficulty using multicultural names, stories, and themes. The program features Chris Kurtz, a math teacher who is deaf. He welcomes users to his castle, where he describes, among other things, a four-point plan for solving math word problems. He leads users into eight demonstrations per CD, giving them an ASL translation of the problem, an animation hint, and an explanation of how to solve the problem in ASL.

Making Accommodations to Support Student Participation in State and District Assessments

Most state and district-wide assessments tap mathematical knowledge and skills. Given the controversy surrounding the use of accommodations as evidenced by state policy analysis, it is important to know what the research currently indicates in order to help make appropriate accommodation decisions.

To help practitioners access emerging research that addresses accommodations for students with disabilities, Martha Thurlow at the National Center on Educational Outcomes has created an online, searchable data base of accommodations (<http://education.umn.edu/NCEO/AccomStudies.htm>). The database allows users to search empirical research studies on the effects of various testing accommodations for students with disabilities.

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Strategy Training for Second Language Learners

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Students of foreign language are being encouraged to learn and use a broad range of language learning strategies that can be tapped throughout the learning process. This approach is based on the belief that learning will be facilitated by making students aware of the range of strategies from which they can choose during language learning and use. The most efficient way to heighten learner awareness is to provide strategy training—explicit instruction in how to apply language learning strategies—as part of the foreign language curriculum. This digest discusses the goals of strategy training, highlights approaches to such training, and lists steps for designing strategy training programs.

Goals of Strategy Training

Strategy training aims to provide learners with the tools to do the following:

- Self-diagnose their strengths and weaknesses in language learning
- Become aware of what helps them to learn the target language most efficiently
- Develop a broad range of problem-solving skills
- Experiment with familiar and unfamiliar learning strategies
- Make decisions about how to approach a language task
- Monitor and self-evaluate their performance
- Transfer successful strategies to new learning contexts.

Strategies can be categorized as either language learning or language use strategies. Language learning strategies are conscious thoughts and behaviors used by learners with the explicit goal of improving their knowledge and understanding of a target language. They include cognitive strategies for memorizing and manipulating target language structures, metacognitive strategies for managing and supervising strategy use, affective strategies for gauging emotional reactions to learning and for lowering anxieties, and social strategies for enhancing learning, such as cooperating with other learners and seeking to interact with native speakers.

Language use strategies come into play once the language material is already accessible, even in some preliminary form. Their focus is to help students utilize the language they have already learned. Language use strategies include strategies for retrieving information about the language already stored in memory, rehearsing target language structures, and communicating in the language despite gaps in target language knowledge.

Frameworks for Strategy Training

Although no empirical evidence has yet been provided to determine a single best method for conducting strategy training, at least three different instructional frameworks have been

identified. Each has been designed to raise student awareness of the purpose and rationale of strategy use, give students opportunities to practice the strategies they are being taught, and help them use the strategies in new learning contexts.

One framework, proposed by Pearson and Dole (1987) with reference to first language learning but applicable to the study of a second language as well, targets isolated strategies by including explicit modeling and explanation of the benefits of applying a specific strategy, extensive functional practice with the strategy, and an opportunity to transfer the strategy to new learning contexts. The sequence includes the following steps:

- Initial modeling of the strategy by the teacher, with direct explanation of the strategy's use and importance
- Guided practice with the strategy
- Consolidation, where teachers help students identify the strategy and decide when it might be used
- Independent practice with the strategy
- Application of the strategy to new tasks

In the second framework, Oxford et al. (1990) outline a useful sequence for the introduction of strategies that emphasizes explicit strategy awareness, discussion of the benefits of strategy use, functional and contextualized practice with the strategies, self-evaluation and monitoring of language performance, and suggestions for or demonstrations of the transferability of the strategies to new tasks. This sequence is not prescriptive of strategies that the learners are supposed to use, but rather descriptive of the various strategies that they could use for a broad range of learning tasks.

The third framework, developed by Chamot and O'Malley (1994), is especially useful after students have already had practice in applying a broad range of strategies in a variety of contexts. Their approach to helping students complete language learning tasks can be described as a four-stage problem-solving process.

1. **Planning.** Students plan ways to approach a learning task.
2. **Monitoring.** Students self-monitor their performance by paying attention to their strategy use and checking comprehension.
3. **Problem Solving.** Students find solutions to problems they encounter.
4. **Evaluation.** Students learn to evaluate the effectiveness of a given strategy after it has been applied to a learning task.

Options for Providing Strategy Training

A variety of instructional models for foreign language strategy training have already been developed and implemented in a variety of educational settings. Seven of these are described below.

General Study Skills Courses

These courses are sometimes intended for students with academic difficulties but can also target successful students who want to improve their study habits. Many general academic skills can be transferred to the process of learning a foreign language, such as using flash cards, overcoming anxiety, and learning good note-taking skills. These courses sometimes include language learning as a specific topic to highlight how learning a foreign language may differ from learning other academic subjects. Foreign language students can be encouraged to participate in order to develop general learning strategies.

Awareness Training: Lectures and Discussion

Also known as consciousness-raising or familiarization training, this consists most often of isolated lectures and discussions and is usually separate from regular classroom instruction. This approach provides students with a general introduction to strategy applications. Oxford (1990) describes awareness training as “a program in which participants become aware of and familiar with the general idea of language learning strategies and the way such strategies can help them accomplish various language tasks” (p. 202).

Strategy Workshops

Short workshops are another, usually more intensive, approach to increasing learner awareness of strategies through various consciousness-raising and strategy-assessment activities. They may help to improve specific language skills or present ideas for learning certain aspects of a particular foreign language. These workshops may be offered as non-credit courses or required as part of a language or academic skills course. They often combine lectures, hands-on practice with specific strategies, and discussions about the effectiveness of strategy use.

Peer Tutoring

“Tandem” or peer tutoring programs began in the 1970s in Europe and are flourishing in many universities across the United States. Holec (1988) describes this system as “a direct language exchange” program that pairs students of different native language backgrounds for mutual tutoring sessions (e.g., an English-speaking student studying Italian and a native-Italian-speaking student learning English). Requirements of the tutoring sessions are that students have regular meetings, alternate roles of learner and teacher, practice the two languages separately, and devote equal amounts of time to each language. Often, students exchange suggestions about the language learning strategies they use, thus providing an ad hoc form of strategy training.

Another approach to peer sessions is to encourage students who are studying the same language to organize regular target-language study groups. Students who have already completed the language course may also be invited to these meetings. Less proficient students can benefit from the language skills of more proficient students, and more proficient students may yield better insights into the particular difficulties of the target language than a teacher.

Strategies in Language Textbooks

Many foreign language textbooks have begun to embed strategies into their curricula. However, unless the strategies are explained, modeled, or reinforced by the classroom teacher, students may not be aware that they are using strategies at all. A few language textbooks provide strategy-embedded activities and explicit explanations of the benefits and applications of the

strategies they address. Because the focus of the activities is contextualized language learning, learners can develop their learning strategy repertoires while learning the target language. One advantage of using textbooks with explicit strategy training is that students do not need extracurricular training; the textbooks reinforce strategy use across both tasks and skills, encouraging students to continue applying them on their own.

Videotaped Mini-Courses

Rubin (1996) developed an interactive videodisc program and accompanying instructional guide aimed at raising students' awareness of learning strategies and of the learning process in general, to show students how to transfer strategies to new tasks and to help them take charge of their own progress while learning the language. Using authentic language situations, the instructional program includes 20 foreign languages and offers the opportunity to select the language, topic, and difficulty level. Materials are structured to expose students to various strategies for use in many different contexts.

Strategies-Based Instruction (SBI)

SBI is a learner-centered approach to teaching that extends classroom strategy training to include both implicit and explicit integration of strategies into the course content. Students experience the advantages of systematically applying the strategies to the learning and use of the language they are studying. In addition, they have opportunities to share their preferred strategies with other students and to increase their strategy use in the typical language tasks they are asked to perform. Teachers can individualize strategy training, suggest language-specific strategies, and reinforce strategies while presenting the regular course content. In a typical SBI classroom, teachers do the following:

- Describe, model, and give examples of potentially useful strategies
- Elicit additional examples from students, based on students' own learning experiences
- Lead small-group and whole-class discussions about strategies
- Encourage students to experiment with a broad range of strategies
- Integrate strategies into everyday class materials, explicitly and implicitly embedding them into the language tasks to provide for contextualized strategy practice Teachers may conduct SBI instruction by starting with established course materials, then determining which strategies to insert and where; starting with a set of strategies they wish to focus on and design activities around them; or inserting strategies spontaneously into the lessons whenever it seems appropriate (e.g., to help students overcome problems with difficult material or to speed up the lesson).

Steps for Designing Strategy Training

The approaches outlined above offer options for providing strategy training to a large number of learners. Based on the needs, resources, and time available to an institution, the next step is to plan the instruction students will receive. The following seven steps are based largely on suggestions of strategy training by Oxford (1990). The model is especially useful because it can be adapted to the needs of various groups of learners, the resources available, and the length of the strategy training. See Cohen (1998) for a thorough description of these steps.

1. Determine learners' needs and the resources available for training.
2. Select the strategies to be taught.
3. Consider the benefits of integrated strategy training.
4. Consider motivational issues.
5. Prepare the materials and activities.
6. Conduct explicit strategy training.
7. Evaluate and revise the strategy training.

Conclusion

The guidelines for implementing strategy training programs provide a variety of options for tailoring the training to meet the needs of a large number of students, as well as to the needs of the individual institution or language program. The most important considerations in the design of a strategy training program are the students' needs, the available resources (e.g., time, money, materials, availability of teacher trainers), and the feasibility of providing this kind of instruction. When including strategies-based instruction in a foreign language curriculum, it is important to choose an instructional model that introduces the strategies to the students and raises awareness of their learning preferences; teaches them to identify, practice, evaluate, and transfer strategies to new learning situations; and promotes learner autonomy to enable students to continue their learning after they leave the language classroom.

Note: The information in this digest was drawn from chapter 4 of Cohen (1998).

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