Quality Instruction and Intervention

Strategies for Secondary Educators

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For Luke

Brief Contents

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Good Study Strategies

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FOR THE PURPOSE OF THIS CHAPTER, studying is defined as the intentional effort one directs to understand, remember, and express understanding of information in order to learn and then demonstrate competence. Studying goes beyond having the skills required for initially acquiring information (i.e., word identification, identifying main idea and details, writing sentences and paragraphs, identifying a problem, etc.). Study is more focused on targeting information and then intentionally making a commitment to learn that information so that it can be used to complete a task. Such tasks might include taking a test, making a presentation, writing a response or report, or applying information to complete a task.

For example, you might have read the chapters in this book because you chose (or were assigned) those chapters to read, but the next step in using the information in them would be to intentionally engage in study activities that connect the newly acquired information to what you already know. Selecting strategies that assist you in meaningfully organizing information into categories will allow you to retrieve the information to demonstrate that you can recall, express, and apply it when you need it (i.e., at the request of your teacher and for personal use). Studying implies that you are motivated to intentionally devote energy that will increase the likelihood that you can retrieve what you have learned in the future.

Students who are asked to read a passage and answer a set of comprehension questions immediately (short-term memory) are more likely to answer the questions correctly than when they are asked the next day (longer-term memory); students are even less likely to answer the questions correctly after several weeks, months, or years have passed (long-term memory). A student's ability to answer the questions may be tied to the student's understanding of the recall expectations for the test and the types of remembering strategies that they choose to use. While the passage reading example may or may not have required students to study the passage in order to be ready for a test, the point of the example is to illustrate the importance of a learner understanding and assessing the task, assessing whether or not they considered using different strategies to get ready for the test, asking questions about the test they might have to take, and then deciding how they will approach the task and the test.

The level of understanding achieved from studying information is directly related to the level of intentional energy that is invested in using *good* study strategies.

Good is emphasized because some study strategies are not as effective and efficient as others. For example, if I gave you a list of five fruits to remember to bring to work tomorrow (e.g., apple, orange, banana, peach, pear), and you were not able to write them down, you might simply repeat (i.e., rehearse) the list a few times, because that is a simple strategy to use for most people for this task. Investing energy in creating a complex mnemonic device would be an inefficient strategy for this task for most people. However, if the list of fruits were longer and included more unfamiliar types of fruits, simply repeating that list over a few times might be both ineffective and inefficient.

WHAT SHOULD BE STUDIED?

The elephant in the room in any discussion of studying is that we cannot possibly learn and remember all the information about a topic, or even the information presented in the textbook/material/media, and remember it. To make the elephant even bigger, the task of studying is further complicated by what the teacher is asked/required to teach, what they choose to teach, how they teach it, how much time they have to teach it, and how they choose to assess it. A term that has long been associated with information technology that has also been applied to education is the GIGO (garbage in, garbage out) principle (Stenson, 2016). Originally, GIGO was used to convey the idea that if we put bad information into computer models, the information we get back will be bad. In education, the idea translates to the notion that if we teach and assign bad/not useful information for study and then assess bad/not useful or less-important information, the result will be that students will not learn what is culturally critical and, ultimately, learners will develop poor insights, make poor decisions, and be unprepared for life. Efforts to establish standards and to improve what and how we assess what is taught, as well as what we expose students to when we don't engage in direct instruction, are designed to avoid GIGO. However, the teacher is largely responsible for determining what students should study and how it will be assessed. So, the *quality* of what we want students to study is critical.

TEACHING STUDENTS WITH POOR STUDY STRATEGIES

The literature on students with disabilities and on other struggling learners has long pointed out the problems that these students have with studying. In addition, discussions of factors influencing studying and how to implement interventions designed to help students develop good study strategies represent an important consideration in the delivery of a multi-tiered system of support (e.g., Bryant et al., 2017; Hoover & Patton, 2007). There are two validated models that have been used to guide effective strategy instruction. The self-regulated strategy development (SRSD) instructional model was developed to improve written expression (Harris & Graham, 2018), and (b) the Strategic Instruction Model (SIM™; Schumaker & Deshler, 1988) was originally designed to address the instructional needs of adolescents with disabilities and other struggling learners.

It is striking that the instructional approaches used to teach learning strategies in both models are very similar. The instructional steps for both models are summarized in modules available from the IRIS Center at Peabody–Vanderbilt University (IRIS Center, 2013) and in *High Leverage Practices for Inclusive Classrooms* (McLeskey et al., 2022).

Another consideration in teaching study strategies is the nature of the student's disability. Therefore, decisions about teaching study strategies must be made in conjunction with other areas of strategy instruction (e.g., word identification, comprehension, written expression, test-taking, social skills, etc.), instructional accommodations, and curriculum modifications. If a student has a disability acquiring information from print, listening to presentations, or visually processing what they are shown, they will need supports and accommodations. Students must be able to gain information in a way that allows them to store that information in short-term memory in order for them to study the information for storage in long-term memory, and then be able to express what they know and demonstrate competence on tests. Study includes the strategies that learners use after the acquisition of knowledge and before they are asked to demonstrate/express that knowledge.

The shift from teaching acquisition strategies to teaching study strategies includes teaching *storage strategies* and *retrieval strategies*. Storage strategies involve teaching students how to: (a) distinguish important from less-important information, (b) note/write/record the differentiation of important from less-important information, (c) analyze and organize important information according to relationships between and among information and the learner's background knowledge (e.g., linear, hierarchical, comparative, causal, analogical, inferential, etc.), and finally (d) confirm the accuracy of what they have recorded. Retrieval strategies involve teaching students how to: (a) select appropriate remembering strategies and include the use of rehearsal, elaboration, and mnemonic devices; (b) transform information into remembering systems that are meaningful and accurate; and (c) select and use various forms of review, practice using remembering systems and using information (independently and with others), and self-testing. Retrieval strategies are used to build fluency and students' confidence in their ability to recall information to successfully meet testing demands. During this stage in the process, the teacher guides students in following the steps of good study strategies through the use of ongoing teaching routines that use direct, explicit instruction. As students gain knowledge of basic information-acquisition strategies, the teacher can shift the emphasis from guiding study to instructing students in how to study independently.

Finally, it can be argued that if a student uses poor acquisition, storage, and retrieval strategies to gain and remember information for personal use, there is little use in teaching test-taking strategies or providing accommodations for taking tests to demonstrate what has been learned. Although test-taking strategies and testing accommodations have received a lot of attention as part of the instructional plans for students with disabilities, this attention is only warranted if there is evidence that the student has both good acquisition and study strategies, or that there are supports in place that ensure that it is reasonable to expect that students know and can remember the information so that they can express what they know and demonstrate competence. These considerations must be reflected in the design of educational services, the provision of a multi-tiered system of supports, the implementation of progress monitoring, and the development of individual educational plans.

In addition to the instructional methodology used to teach study strategies, and considerations related to decisions made related to the nature of a student's disability, we also know that good study strategies:

1. teach students to be more *intentional,*
2. require *intensive* instruction,
3. provide *thorough* information about strategy knowledge and performance,
4. provide instruction in *contextually appropriate* information about strategy use when presented with different demands, and
5. promote generalization by the way they are designed and linked to other strategies.

Including these features in the instructional process will increase the likelihood that more students will be successful learning and using good strategies. The following section describes how these features should be incorporated into the design of study strategy instruction.

FEATURES OF GOOD STUDY STRATEGIES

Good learning strategies prompt learners to be *intentional* by including information in the steps of the strategy that inform the learner about the general and specific characteristics of situations that signal that a specific strategy or set of strategies should be considered to complete the task efficiently and effectively. In addition to specific learning situations, such as in a math or science class, intentionality is also characterized by language cues, such as "When you see this . . ." or "In situations where you are given an illustration along with the test, you should. . . ." Intentionality is also indicated by language cues of phrases that signal, for example, "do this first and, as you do this" or "consider two factors before you make a decision and move to the next step." Finally, teaching intentionality means observing when the student does not recognize that a strategy is needed, stopping the student and teaching them to see the cues associated with the need for a strategy, and teaching them to select an appropriate strategy for the situation.

Strategy instruction is *intensive* if it provides a sufficient level of detail about the new strategy that matches the level of strategic background knowledge possessed by the learner. For example, a general set of steps to guide the study of a topic may need to be either condensed or expanded if the learner already has some knowledge of the topic or is already using some successful tactics in the way they study. Likewise, if the study topic assumes background knowledge that the learner does not possess, the steps may need to be modified. Therefore, the strategies employed in study should be personalized for the appropriate level of intensity to maximize each individual student's success. This requires teachers to have knowledge of a variety of ways to study that might be suggested for different learners.

Good learning strategies should address features of the steps that relate to those areas of learning that both promote and inhibit learning. That is, the strategy should be *thorough.* In addition to the steps of a strategy being sufficiently detailed and personalized, they should address the behavioral, cognitive, social, emotional, and metacognitive elements associated with completing the task. Behavioral features address what the learner should be observed doing (e.g., "Start by looking at each page

of the chapter."). Cognitive features of the strategy address an unobserved process that should be used (e.g., "Identify each chapter subheading, paraphrase what you think that subheading is about, and turn the subheading into a question that you want to answer when you read that section."). Social features address appropriate interactions that may be needed or considered as part of study (e.g., "When you ask for help, remember . . ."). Emotional features address how to handle anxiety or fears that may emerge as you study (e.g., "Before you begin, remember to take three deep breaths and breathe out slowly."). Metacognitive features address the unobserved reflections related to your progress implementing the other features of a good strategy (e.g., "Ask yourself, 'Did taking three deep breaths work or do I need to take more deep breaths or find another way to relax?'").

Good study strategies are *contextually appropriate*. The way information should be studied varies across disciplines and conditions where information is obtained (e.g., academic versus recreational, face-to-face versus online, listening versus reading requirements, expository versus narrative text, etc.), and with the personalities/characteristics of both the people associated with learning and study conditions and the materials that they use. Elements in study strategies that must be changed to meet contextual demands should be identified and practiced.

While good study strategies should be contextually appropriate, instruction should forecast use of the strategy beyond the immediate context so that it is *generalizable*. To a large degree, the study strategy should be designed so that a good share of the steps build on, repeat, or are similar to other strategies that the learner already knows. Repeating appropriate features makes learning new ways to study at different stages of study easier. For example, repeatedly incorporating the prompt to self-test with flash cards, turn headings into questions, paraphrase what the passage was about, or create lists to remember as part of study will help a learner use these study habits across learning conditions. Study strategies that are applicable across disciplines, settings, people, materials, and performance tasks make them more *generalizable*.

APPROACHES TO TEACHING GOOD STUDY STRATEGIES

Study strategies are learned by what the teacher does both implicitly and explicitly. *Implicit* knowledge is implied, may be suggested, or may be hinted at but is not actually stated or explained. Individuals who are fluent with regard to a topic often have a lot of implicit knowledge but forget to "surface" the insights they subconsciously use as they present information to others. Experts may assume that this implicit knowledge is common knowledge.

Explicit knowledge is information that is described in a manner that leaves nothing in doubt and needs no further explanation or interpretation. When the goal is to be more explicit, the number of details provided in the explanation increases. When we are trying to be more explicit, we are intentionally trying to surface our implicit knowledge to provide critical insights about what we know.

One caution when providing very explicit instruction to struggling learners is that this type of instruction can become tedious and overwhelming if all the information is provided at once. To avoid this, two approaches to introducing study strategies should be considered.

The first approach is to take class time to lead students through the study process using evidence-based practices that are linked to successful independent study.

When students do not have the strategies to study independently (and there is no time to teach good study strategies), the teacher accommodates for this strategy deficit by leading students through the study process. This becomes an instructional accommodation which, when used as a classwide teaching routine, provides a group accommodation that is likely to be in the best interest of every student in the class due to varying levels of strategy knowledge related to studying. This moves the practice of supporting studying to instruction that is *universally designed for learning*. Surfacing "how to study" as an ongoing, classwide activity requires that the teacher establish effective teaching routines that model the use of steps related to good study as a way to provide guided study support. The following is an example of a teacher setting up information in science that needs to be learned for a test:

> The first thing we need to do is take a look at the information and organize or format it so that it is a form that is easy to learn. Let's see . . . This information can be put into the form of a list. The title of the list is "Vertebrates." *(The teacher displays "Vertebrates" on the board and underlines it.)* What items should we put in this list? *[Fishes; Amphibians; Reptiles; Birds; and Mammals.] (The teacher writes these words in list form under "Vertebrates.")* Great. This is how we're going to make lists in this class, with underlined heading and items underneath. Please write this list in your notes. The list format is one format we will use in this class. There are other formats that we will explore as well. (Schumacher et al., 1998, p. 15)

When the teacher routinely describes, models, prompts students to record the study device, and provides feedback related to how well students set up and record information as part of an ongoing instructional routine, they are making an implicit expectation about studying more explicit. When the process is repeated, students are taught that the study strategies that are being modeled are good practices to use in independent study. However, after students have been exposed to the study routine over time, the teacher should move to more explicit instruction in the strategy. The following example demonstrates a teacher doing this:

> We have just created a list with a heading to organize information that you will study. We have been doing this together, but you need to learn how to do this on your own. Let's stop and look at how we created a list and identified a heading. I want you to take notes about what I am going to describe for you. I will also display each step, so you copy them into your notes. I want you to know these steps so that you can create your own lists to study.
>
> Studying requires you to organize information, and one way to organize information is to identify lists of important information. Where do you think you can find the list that you need to remember? *[Display "Places to find lists," and write the students' responses under the heading. The list of places should include at least the following: textbooks, study guides, classroom displays, and student notes from presentations.]* These are all places you will find lists. You need to find lists of important information so that you can decide which ways are best to remember the different types of information in your lists.
>
> We're now going to learn a quick and simple strategy for making and remembering lists so that you can use that information. The remembering system, which is called a mnemonic device, is called "LISTS." (Nagel et al., 1986, p. 26)

The teacher's instructions begin to surface their own knowledge of how to create lists in order to prepare their students to use more specific study strategies (i.e., the

selection of appropriate remembering strategies). However, this approach assumes that the teacher is willing to surface the study strategy as they teach and is able to include the time necessary to teach students how to use it as part of the course content. In addition, this approach does not address the degree of success that students will have in generalizing the study strategies to other courses.

The second approach is to explicitly teach effective study strategies that students can use to meet the demands presented across a variety of disciplines, and then to teach them insights about how to adapt these strategies to meet the varying demands of different disciplines and classroom settings. This second approach is often used in special education, because it does not require close collaboration with general education teachers as to how instruction in study strategies might be integrated into their course instruction. However, regardless of who is teaching study strategies, it is important that the teacher inform students about how strategies apply to specific disciplinary content. For example, in the procedures developed for *strategic tutoring* (e.g., Hock et al., 2000), the goal of instruction is to directly link good strategies that the student is currently using to study to a set of additional good strategies that will improve study outcomes in a specific course.

While practices associated with *disciplinary literacy* (e.g., Shanahan & Shanahan, 2012) are aligned with integrating how to acquire disciplinary knowledge, disciplinary literacy practices often target students who are already fairly strategic in learning content; disciplinary literacy introduces thinking processes for deeper investigation of content-area knowledge. Students who are less strategic often do not have the foundational and intermediate strategies required for disciplinary literacy. As a result, opportunities for students with disabilities to learn good study strategies to apply in their content-area courses to access and master critical information are often required within a multi-tiered system of supports (Faggella-Luby et al., 2012). The steps for direct instruction in strategies are summarized in modules available from the IRIS Center at Peabody–Vanderbilt University (IRIS Center, 2013) and in *High Leverage Practices for Inclusive Classrooms* (McLeskey et al., 2022).

GOOD WAYS TO STUDY

Efforts to understand, remember, and express understanding of information and to demonstrate competence may involve different strategies at different stages of study. In addition, it is impossible to teach every way to study; there are a variety of effective study strategies appropriate for different stages of study. As we teach, we need to adopt a mindset that, at every stage of learning, we need to decide what information is most critical to know, how that information is best organized for understanding so that it can be processed and held in short-term memory, and how we can help students link that information to what they already know so that they can recall it later. This is when good study must become more intentional. The two groups of good study strategies that contribute to this intentionality include *storage strategies* and *retrieval strategies*.

Organizing Information to Structure Study

It's difficult to organize information that you don't understand. Organization requires a learner to identify patterns in information. The ability to identify patterns

is dependent on the learner's background knowledge and their capacity to make associations with what is already known, and then to link new information to prior knowledge in meaningful ways. As a result, how a teacher, media, or textbook initially presents, provides learning experiences, and makes assignments that engage students in learning information defines what and how a student studies. The first set of study strategies revolves around teaching students to recognize and compensate for how the information they receive is organized, so that they develop a set of information *storage strategies* that they can use to respond to the different ways information is presented.

Listening and Note-Taking

What is recorded in notes for study is influenced by the ability of a learner to use cues that signal: (a) level of importance (e.g., very important, moderately important, less important); (b) structure (e.g., hierarchical, linear); (c) relationships (e.g., causal, comparative, analogical, inferential); (d) links to background knowledge; and (e) links to the way information will be assessed (i.e., "What do I know about the way my knowledge will be assessed?"). In addition, *how* a learner records information for study (e.g., use of abbreviations, note-taking systems, completeness, efficiency, etc.) (Seigel, 2018) also influences the quality of what is studied.

Suggestions for teaching students different tactics for improving the quality of their notes can be found in the literature (e.g., Bryant et al., 2017; IRIS Center, 2013). Instruction in good listening and note-taking requires teaching students the prerequisites for note-taking, which includes how to listen for signals related to what to record in their notes. Berry, Deshler, and Schumaker (2011) demonstrated that teaching a set of integrated strategies to create a listening/note-taking system improved note-taking for college students with learning disabilities as well as students without learning disabilities. *The Listening and Note-Taking Strategy* (Berry et al., 2011) is comprised of four lessons. The first lesson teaches students a strategy for how to listen as class begins and includes teaching students how to recognize different types of cues that signal attention, importance, structure, and relationships to guide what information to note. These cues include identifying the mannerisms of the presenter, introductory cues, big idea questions, sequential cues, and summarizing cues, as well as verbal cues to show emphasis based on repeating, to draw attention to specific information, and to clarify.

The second and third lessons focus on teaching students what and how to note information. The steps include teaching students how to quickly record information by using key words, synonyms, abbreviations, and symbols. This process also includes reviewing notes to highlight key words and cross out mistakes. Students are then taught the "T" method for organizing how they note information; students are taught that all topics and main ideas identified in the presentation are placed on the left side of the "T" and all supporting information is placed on the right side.

Another dimension of collecting and organizing information for study is related to assignment completion. Beyond the information provided by teachers, in textbooks, and by the use of media, another source for identifying what should be important to study is represented in the assignments given by teachers. When teachers create high-quality assignments designed with the test in mind, successful completion of these can provide students with valuable materials to study when

preparing for tests. High-quality assignments should forecast the types of thinking and the types of relationships between and among content elements that teachers plan to evaluate on outcome measures. Assignments should provide opportunities for students to practice demonstrating their ability to see and show understanding of relationships. However, assignment completion has often been a challenge for many students who have difficulty organizing information.

Hughes, Ruhl, Deshler, and Schumaker (1995) developed and evaluated a system for teaching students how to record and track assignments, divide assignments into major parts, plan how and when to complete the parts of assignments, review assignments to ensure their completeness and quality, and turn assignments in on time. As part of evaluating the assignment completion process, Hughes et al., 1995) found that an important element of being prepared for academic tests was how students recorded information about assignments in planners. Noting the inconsistent way that typical school "planners" were structured to record assignment information from teachers, the authors designed a planner to allow students to record more detailed information about assignments with prompts for them to develop plans related to completing high-quality assignments, setting assignment completion goals, and turning assignments in on time. Hughes, Ruhl, Schumaker, and Deshler (2002) conducted research on students with learning disabilities who were completing half of their assignments in their general education classes. Student assignment completion increased from 58% during baseline to 70% completion during the maintenance phase of the intervention period. In addition, the grade point average in targeted general education classrooms improved.

Building on the importance of assignments, Rademacher, Deshler, Schumaker, and Lenz (2011) created and evaluated instructional guidelines for teachers to develop high-quality assignments, teach students how to record them, and model how to use an assignment completion quality checking system when working independently. Rademacher et al. (2011) also used the same planner designed by Hughes et al. to guide students in how to record more detailed assignments and to plan assignment completion. Student satisfaction with assignments increased compared to students who did not receive the intervention (Rademacher, 1993).

The ability to identify relationships within and between sets of information is a major prerequisite for organizing information for study. Scanlon, Schumaker, and Deshler (1996) investigated the effect of teaching both students with and without learning disabilities to develop a graphic organizer depicting the relationships (i.e., comparative, causal/sequential, descriptive, problem/solution), explain the organizer to others, and then use the organizer to study for tests. Both students with and without learning disabilities outperformed students on outcome tests compared to students who did not receive the intervention (Scanlon et al., 2004).

Structuring Good Study

Berry et al. (2011) added instruction in the fourth lesson of *The Listening and Note-Taking Strategy* in which students are taught a set of good study strategies, including: (a) how to gather information that they might have missed by asking for information, when to ask, and how to ask (i.e., the use of appropriate social skills); (b) a process for rereading and highlighting lists, important terms/relationships, definitions, and connections to supporting details; (c) a self-testing process that involves using topics, main ideas, and details in their notes to ask and answer questions; (d) a strategy for drawing diagrams to represent relationships (e.g., descriptive, causal/sequential,

comparative, etc.) signaled as important in their notes to leverage the effective use of visual organizers; and (e) using positive self-talk throughout the entire process of approaching learning in the class, taking notes, studying, and taking tests.

An important element of the self-test process involved in studying includes identifying and organizing information, creating good lists, and determining how to remember information for personal use, which includes performing well on tests. For example, teaching strategies for remembering information should be paired with instruction in targeting, organizing, preparing information that must be remembered, selecting the most effective and efficient approach for remembering, and then setting up both individual and group self-testing activities. Nagel, Schumaker, and Deshler (1986) developed and evaluated a systematic set of study strategies specifically designed to address the poor study habits of students with disabilities. In addition, this intervention included detailed instructions for teachers to implement a progress monitoring system to gauge student improvement in learning and implementing good study practices across classrooms.

Nagel et al. organized their approach to good study into five stages of instruction, including: (a) assessment of a student's ability to construct lists of information targeted for learning and their ability to recall the information in lists; (b) detailed instruction in five steps to create a mnemonic device using the first-letter mnemonic technique (see figure 12.1) and, keeping the knowledge of how to use the first-letter mnemonic device technique in mind, how to use cues in information to create lists of high-quality, appropriately chunked, to-be-remembered information; (c) demonstration of how to match the listed information to the best mnemonic device; (d) description of method for transferring the information packaged in the mnemonic device to an index card that can be used in study; and (e) explanation of how to use the index card to self-test knowledge of the information and what that information means.

STEPS FOR MAKING AND MASTERING LISTS

Step 1: Look for clues (i.e., use signals of importance/relationships to chunk types of information to create informative headings).

Step 2: Investigate the items (i.e., a process for chunking lists of information and checking the quality and format of list items so that they are suitable for creating mnemonics).

Step 3: Select a mnemonic device using "FIRST."

Step 4: Transfer the information to a card (i.e., create and organize study cards for study).

Step 5: Self-test (i.e., a process for self- and partner-testing with flash cards).

STEPS FOR MAKING AND MASTERING LISTS USING "FIRST"

Step 1: Form a word (with the first letters of the words).

Step 2: Insert a letter (when inserting a letter will create a memorable word).

Step 3: Rearrange the letters (to form a word if order is not important).

Step 4: Shape a sentence (using the first word of each item in the list).

Step 5: Try combinations (create a remembering system by combining the information learned in "FIRST" steps 1–4).

Figure 12.1   Example of an Integrated System of Strategies: The FIRST-Letter Mnemonic Strategy Intervention

Note: The instructional details that the teacher uses with a student to describe, model, practice, give feedback, generalize across classes, and monitor progress are included in the manual used to implement this intervention with fidelity. The steps presented above are only the mnemonic devices used in the remembering system to help the student recall a larger set of cognitive, metacognitive, social, and emotional information prompts related to success in studying.

Source: Nagel et al. (1986). Used with permission.

The intervention developed by Nagel et al. (1986) was designed to be taught directly, with its use then transferred to a general education classroom via collaborative co-teaching arrangements to ensure generalization of the strategy to different content areas to meet the study demands of those settings. Similar interventions have been designed and empirically validated to address the process of remembering different types of information, such as pairs or grouping of information (e.g., *The Paired Associates Strategy* [Bulgren & Schumaker, 1996]) and vocabulary (e.g., *The LINCS Vocabulary Strategy* [Ellis, 2000] and *The Vocabulary LINCING Routine* [Ellis, 2001]). These interventions used a validated instructional methodology that ensured the use of direct, explicit instruction, practice, and feedback to promote learning for students with disabilities.

Another approach to promoting the use of good strategies for studying information was developed (Schumaker et al., 1998) and evaluated (Bulgren et al., 1994, 1997) to present design-and-use strategies for remembering as a collaborative instructional routine that a general education teacher could embed in their teaching as a part of ongoing content-area instruction. In this teaching routine, instruction is provided to an entire class on different types of recall devices (see textbox 12.1). Each device is described along with how and when it should be used. A "glossary" of recall devices is created for the class to reference on an ongoing basis.

TEXTBOX 12.1. THE "GLOSSARY" OF RECALL DEVICES INTRODUCED IN THE RECALL ENHANCEMENT ROUTINE

Picture Devices

- Snapshot
- Movie
- Story
- Relating
- Symbol

Keyword Devices

- Boxing
- Reminding

First-Letter

- Acronym
- Sentence

Series

- Pegword
- Location

Other

- Rhyming
- Coding

Source: Schumaker et al. (1998). Used with permission.

Once students are aware of the different types of devices that can be used to remember information, the teacher continues providing content-area instruction. When the teacher determines that there is a significant body of information that needs to be remembered, the teacher guides the class in creating a remembering system for that information. The routine involves: (a) formatting the information for recall, (b) analyzing the type of information and selecting an appropriate recall device from the "glossary," (c) creating a recall device for that information, (d) devel-

oping a narrative that links the device to their prior knowledge, (e) creating a set of questions to use for self-testing, and (f) developing a plan related to how they will use the device to study. Textbox 12.2 presents a worksheet that shows how a teacher would guide students in developing a recall device for study. This example incorporates many of the elements associated with developing a remembering system that can be used to retrieve information for performance tasks and personal use.

TEXTBOX 12.2. THE FACTOR WORKSHEET USED IN THE RECALL ENHANCEMENT ROUTINE

Recall Device Sheet

Format the Information (Type of information: List, Pair, Trio, Definition, or Other)
  Classes of Fishes
    Boney
    Jawless
    Cartilage

Analyze the Information and Select a Device
  Type of Memory Device: *Boxina*

Create the Recall Device

Boney
Jawless
Cartilage

Jaw   Bone   Cart   Mrs. Jackson
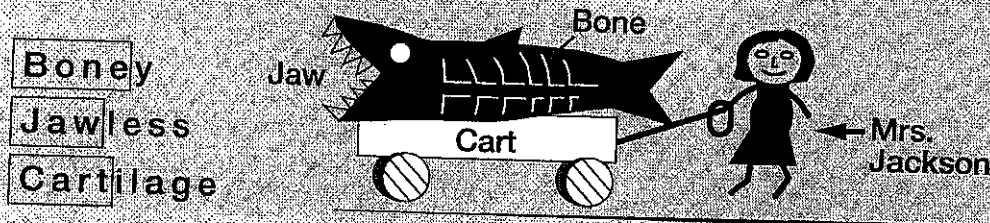
Tie It Together

  My husband went fishing and caught a huge shark, a type of fish. He had a big jaw, and we could see his bones. I wanted to show him to all of my students, so I took him to class on a cart. He was too heavy for me to carry. I got the words "jaw," "bone," and "cart" by looking for the little words found in the three items in our list. Be sure to remember the longer words for each of these short words.

Organize Some Questions
  What are the three classes of fishes?
  Describe the three classes of fishes.
  Compare and contrast the three classes of fishes.

Review Plan
  Partners will study together on Sept. 15

Note: From Schumaker et al. (1998). Used with permission.

Figure 12.2   Curriculum Map of Figurative Language: Personification
Source: Lenz et al. (2008). Used by permission.
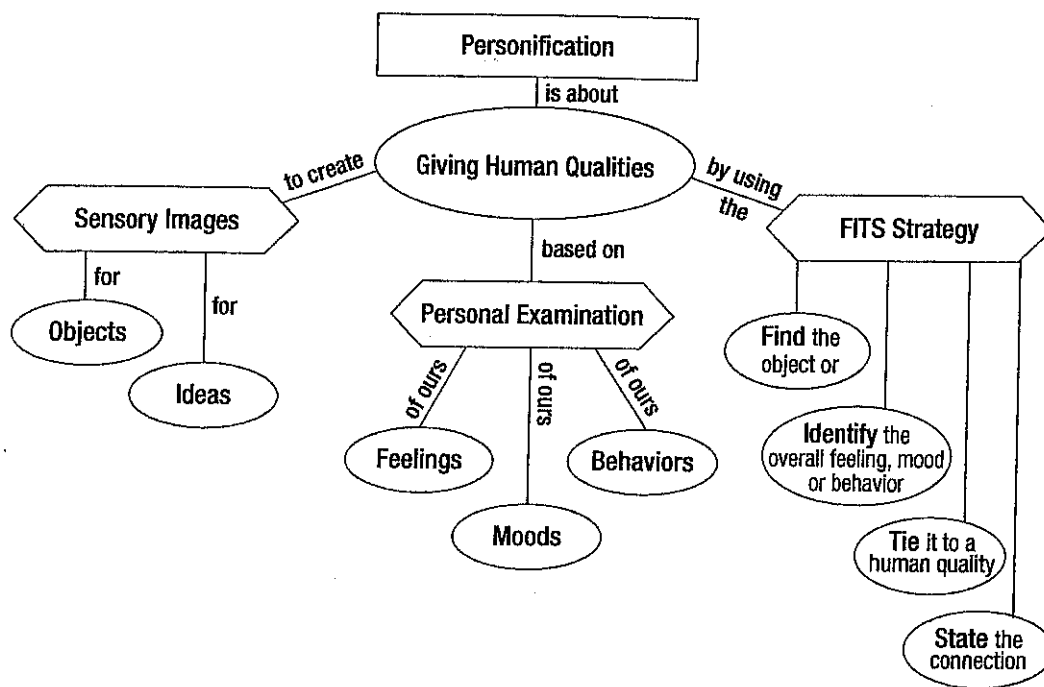
Many of the study strategies related to storage and retrieval suggest the use of flash cards for self-testing. In addition to the use of flash cards, self-questioning, rehearsal, and self-testing, some study interventions have included the use of graphic organizers to organize and prepare for tests. When teaching devices, such as graphic organizers, are used with students and students are also involved in co-constructing the information recorded in graphic organizers, explicit instruction in the procedural steps related to how and when to study with the device (e.g., prompts to rehearse and self-test) should be included as part of teaching good study strategies. As shown in figure 12.1, the last step in the strategy is to self-test.

For example, *The ORDER Routine* (Scanlon et al., 2004) incorporated the study of graphic organizers as part of self-testing. In another study, Lenz, Adams, Bulgren, Pouliot, and Laraux (2007) compared repeated information, guiding questions, and curriculum maps as ways to review information for tests. The results indicated that the test performance of students with learning disabilities on content tests was significantly greater when students reviewed information using questions based on the structure and line labels included in graphic curriculum maps over the use of only guiding questions or repetition. Figure 12.2 depicts one of the curriculum maps used in the intervention.

A question was posed for each shape with the corresponding answer found beneath it. Students were taught to use the map to generate questions and formulate answers as part of their review. The following example provides a possible question/answer chain prompted by the curriculum map.

Question: What is this lesson about?

Answer: Personification.

Question: What is personification?

Answer: Personification is about giving human qualities to something.

Question: How do we give human qualities to something?

Answer: We create a sensory image for an object or idea.

Question: What is giving human qualities based on?

Answer: We use personal examination of our own human feelings, moods, or behaviors.

Question: How do we use personification to give human qualities to objects or ideas?

Answer: We find an object/idea. Then we identify the overall feeling or behavior. Next, we tie the object or idea to the human quality.

Question: What is an example of an object that might be personified in a story?

Answer: Tree.

Question: What feeling, mood, or behavior could you tie to a tree?

Answer: A tree might be "crying."

Question: What could be the connection between a tree and crying?

Answer: A tree might be sad because it was going to be cut down. The tree could be described as crying.

Another important element that is often overlooked in teaching students how to study is their knowledge and use of social skills required to engage in collaborative study and self-testing. A set of interventions designed to promote collaborative study was developed by Sue Vernon and her colleagues at the University of Kansas. The social/emotional interventions developed by Vernon et al. represent the emphasis on teaching and practicing social skills in the context of authentic academic tasks where students are expected to collaborate around learning rather than social skills being taught as a separate curriculum. Table 12.1 lists interventions that were designed to teach students how to collaborate in ways that influence good study.

The Overall Study Plan

In addition, taking advantage of resources that can improve or make the process of studying better should be part of the study process. For example, opportunities for using technology to provide multiple ways to represent information, locating both print and online open education resources (OERs) that clarify information that is still misunderstood, using resources that show how information is organized, seeking out different opportunities for practice, creating different types of self-testing opportunities, and promoting collaboration that depends on the use of good strategies are also part of learning how to engage in good study under different conditions. These opportunities can be used to support the design of an overall study plan.

Table 12.1. Interventions to Promote Collaborative Study

Collaborative Skill	Focus of Intervention
Talking Together	Teaching students how to collaborate respectfully and responsibly during study by taking turns, giving others a chance to speak and be heard, showing kindness.
Basic Social Skills for Cooperation: *The SCORE Skills*	Teaching students how to share ideas, compliment others, offer help and encouragement, recommend changes, exercise self-control.
Following Instructions Together	Teaching students how to help each other follow oral and written instructions and complete assignments
Organizing Together	Teaching students how create an organized learning environment with partners to learn and apply organizational strategies such as calendars, notebooks, desks, lockers, and backpacks.
Taking Notes Together	Teaching students how to work with a partner to recording information quickly when listening to presentation, reading assignments, and using media.
The Teamwork Strategy	Teaching students how to work in a small group to analyze and break up assignments, equitably assign tasks to group members, ask and offer help, ask and give feedback, assemble assignment parts to a final product, and evaluate the group process and collaborative skills.
Thinking Together: *The THINK Strategy*	Teaching students how to work together to solve problems in different content areas to identify and analyze problems, investigate the problem, brainstorm solutions and their pros and cons, decide on a solution, develop implementation plan, evaluate the collaborative process.
Learning Together: *The LEARN Strategy*	Teaching students how to work with a partner to study and learn together by deciding what is important to learn, identifying key words and phrases, creating lists and developing mnemonic devices, self-testing together, and evaluating the collaborative process.
Building a Decision Together: *The BUILD Strategy*	Teaching students how to arrive at a decision by working with partners to examine an issue, gather facts, examine consequences of different decisions, identify compromises, review information to conduct a team vote, and evaluate the collaborative process.

Source: Vernon et al. (1993–2002).

PROGRESS MONITORING AND STUDYING

Evaluating and demonstrating the progress of a student learning a study strategy is based on several measurement factors. First, the teacher must identify measurable elements of the student's knowledge and use of the study process and how each element should be scored. For many of the interventions described in this chapter, a measurement system is included in the intervention materials. Often a checklist is created and used to evaluate a student's baseline performance and progress after the study intervention is introduced. For example, if the study strategy taught relates to the quality of steps needed for creating good lists needed for study, such as those incorporated in the "LIST" steps in the FIRST-Letter Mnemonic Strategy (see figure 12.1), two measures are needed. One measure evaluates the strategy for creating lists that the student uses during both baseline and the intervention period; another measure evaluates the student's test performance during baseline and then after the

study intervention is introduced. The strategy knowledge and use measure (i.e., the process measure) might include the checklist elements and scoring format based on the steps of a strategy for creating good lists for studying (see table 12.2).

The second measure focuses on how well the strategy for creating good lists affects the student's test performance (i.e., the content measure). For example, a passage from a content-area textbook is selected that contains information that could be used to create lists. The student is told that they have 30 minutes to read the passage, take notes to study, and to study for a test that they will take the following day.

Table 12.2. Scoring Lists for Studying

Points	Strategy Performance	Examples of Informative and Corrective Feedback
1	The heading of the list summarizes an information grouping in the passage.	Your heading is from the passage and is general so it cannot be confused with a list item.
1	The heading is designated as a heading by being separated from the list.	Your heading is correct, and you underlined it, so you can tell it is the heading.
0	The heading is short.	You have the right idea for a heading, but you should try to use fewer words.
1	The heading must be accurate.	Your heading accurately describes the items in your list.
0	The heading is limited so that it covers seven or fewer list items.	You have good items, but there are 12 items in your list. Can you organize it into two lists to study?
0	Each item in the list is related to the heading.	One of your items does not fit with your heading. It goes in another list.
1	Each item is short.	Each item you list is short and will be easy to remember.
0	Each item is accurate according to the passage.	Two of your list items are misspelled.
0	Each item must be useful/meaningful to understanding the passage.	One of your list items on the parts of digestive system is "How it works." Another list with items about how the digestive system works would be more useful.
0	Each item must be unique (not repetitive).	Two of the items on your list are the same.
Total Points 4/10		
Percentage 40%		

Scoring guidelines: Score "0" if the student does not perform the step correctly or if there is no response, and student should be provided informative and corrective feedback.* Score "1" point if the student performed the step correctly.

*During baseline, informative and corrective feedback is not provided since the purpose of the baseline phase is to measure the student's approach to studying.

Note: Adapted from Nagel et al. (1986). Used with permission.

At the end of 30 minutes, the passage and study notes are removed. The following day a test over the information is given. The testing process is constructed similarly for each passage. Since passages are selected that include an identifiable list, the question prompt is based on the heading of the list identified by the teacher. For example, the following test questions might serve as study prompts:

What are the parts of the digestive system?
What are the types of blood vessels?
What are defenses against diseases?
What did the author do to make you sympathetic to the villain?
How does an author build the plot of a novel?
How do you solve a multistep equation?

The student's score is the percentage of correct items generated by the student compared to the total number of items listed in the passage. Both the process score and the content score are placed on a graph. In the graph presented in figure 12.3, the teacher collected data across several days to assess the quality of the student's approach to study (i.e., the process used) and the effects of the approach to study (i.e., the content learned). In figure 12.3, baseline data showed that the student's process and content scores were at or below 10% of the total points possible. During the first intervention phase, the student was taught how to create lists and then was given opportunities to demonstrate the listing strategy and was given feedback to improve the quality of their lists. Data showed that the student learned to make good lists, and some increase was seen in content test scores (i.e., content test scores increased from about 10% to about 40% of the possible points).
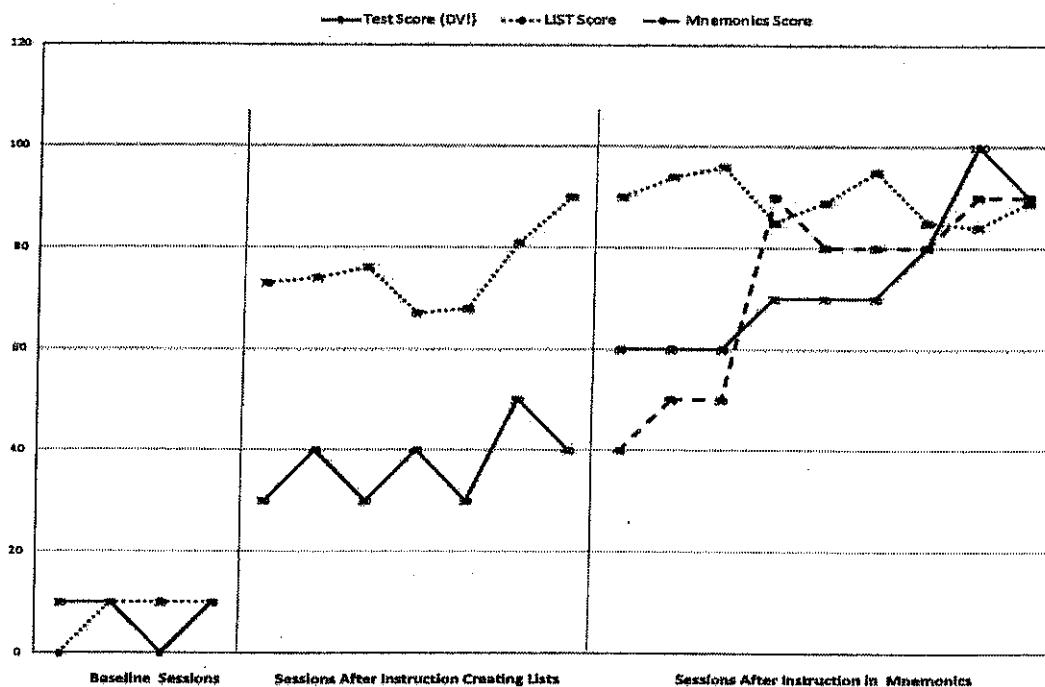

Figure 12.3   Progress Monitoring for Learning a Study Strategy

While an increase in a student's test scores is encouraging, the test scores earned were mostly below a 50% level. A score of 50% of the points possible on a test would be considered an "F" on a typical grading scale. Since the goal of instruction in good study strategies is to teach the student how to earn grades at a passing level or above, a grade of an "F" on a test is not going to convince a student or their teachers that the effort invested in learning a strategy for listing and organizing information was worth it. To meet the goal of earning passing grades, additional study interventions and measures should be introduced.

In textbox 12.1, the teacher analyzed the data and concluded that while the student had improved how they were identifying and organizing the information for study, an intervention focused on teaching them how to study the listed information and to conduct self-testing to prepare for the test was needed. The graph shows the effects of teaching the student a first-letter mnemonic intervention to improve test scores. The graph shows that the student maintained their use of a strategy to create good lists and that they learned how to create good mnemonics from those lists as well. As a result, the student's scores on the tests increased to grades that would be judged as passing.

While this progress monitoring example demonstrates the effectiveness of the study interventions introduced, the interventions and measures only addressed the use of some strategies, and those strategies only addressed a specific type of knowledge and testing demand. Additional study interventions with supports and measures that reflect the types of testing demands that students must face will be need to be incorporated as part of an overall plan to teach good study strategies to a student. As these study interventions are introduced, both the student's ability to apply the strategy as well as how the strategy influences content-learning outcomes should be included in progress monitoring efforts.

CONCLUSION

Our knowledge about what are good study strategies and how to teach them has grown significantly from the days in which instruction in study skills was included as a short unit in a middle school language arts class. Once characterized as habits to develop and general suggestions to guide study, research on how information is processed has helped us better define what must be taught about good studying. Good study involves the application of a set of integrated cognitive and metacognitive activities that evolve through the acquisition, storage, retrieval, and expression of knowledge. It is further shaped by our reading, writing, and listening abilities as well as the learning and performance demands of different settings, our motivation to learn, and social and emotional factors unique to each learner. We also know much more about the pedagogy required to ensure that students acquire and generalize good strategies for personal use. The body of knowledge that we now have about good study, especially for students who struggle with learning, should be used to offer a coherent curriculum that will increase the learning of information that is critical for student success.

REFERENCES

Berry, G., Deshler, D., & Schumaker, J. (2011). *The listening & note-taking strategy.* Edge Enterprises.

Bjorklund, D. F., & Douglas, R. N. (1997). The development of memory strategies. In N. Cowan (Ed.), *The development of memory in childhood* (pp. 201–46). Psychology.

Bryant, D. P., Bryant, B. R., & Smith, D. D. (2017). *Teaching students with special needs in inclusive classrooms.* Sage.

Bulgren, J. A., & Schumaker, J. B. (1996). *The Paired Associates Strategy.* Edge Enterprises.

Bulgren, J. A., Deshler, D. D., & Schumaker, J. B. (1997). Use of a recall enhancement routine and strategies in inclusive secondary classes. *Learning Disabilities Research & Practice, 12*(4), 198–208.

Bulgren, J. A., Schumaker, J. B., & Deshler, D. D. (1994). The effects of a recall enhancement routine on the test performance of secondary students with and without learning disabilities. *Learning Disabilities Research & Practice, 9*(1), 2–11.

Ellis, E. (2000). *The LINCS vocabulary strategy.* Edge Enterprises.

Ellis, E. (2001). *The vocabulary LINCING routine.* Edge Enterprises.

Faggella-Luby, M., Graner, P., Deshler, D, and Drew, S. (2012). Building a house on sand: Why disciplinary literacy is not sufficient to replace general strategies for adolescent learners who struggle. *Topics in Language Disorders, 32*(1), 69–84.

Harris, K. R., & Graham, S. (2018). Self-regulated strategy development: Theoretical bases, critical instructional elements, and future research. In R. Fidalgo, K. R. Harris, & M. Braaksma (Eds.), *Design principles for teaching effective writing: Theoretical and empirical grounded principles* (pp. 119–51). Brill.

Hock, M., Deshler, D., & Schumaker, J. (2000). *Strategic tutoring.* Edge Enterprises.

Hoover, J. J., & Patton, J. R. (2007). *Teaching study skills to students with learning problems: A teacher's guide for meeting diverse needs.* Pro Ed.

Hughes, C. A., Ruhl, K. L., Deshler, D. D., & Schumaker, J. B. (1995). *The assignment completion strategy.* Edge Enterprises.

Hughes, C. A., Ruhl, K. L., Schumaker, J. B., & Deshler, D. D. (2002). Effects of instruction in an assignment completion strategy on the homework performance of students with learning disabilities in general education classes. *Learning Disabilities Research & Practice, 17*(1), 1–18.

IRIS Center. (2013). *Study skills strategies (part 1): Foundations for effectively teaching study skills.* https://iris.peabody.vanderbilt.edu/module/ss1/

IRIS Center. (2013). *Study skills strategies (part 2): Strategies that improve students' academic performance.* https://iris.peabody.vanderbilt.edu/module/ss2/

Lenz, B. K., Adams, G. L., Bulgren, J. A., Pouliot, N., & Laraux, M. (2007). Effects of curriculum maps and guiding questions on the test performance of adolescents with learning disabilities. *Learning Disability Quarterly, 30*(4), 235–44.

McLeskey, J., Maheady, L., Billingsley, B., Brownell, M., & Lewis , T. (2022). *High leverage practices for inclusive classrooms* (2nd ed). Routledge.

Nagel, D., Schumaker, J., & Deshler, D. (1986). *The FIRST-letter mnemonic strategy.* Lawrence, KS: Edge Enterprises.

Rademacher, J. (1993). *The development and validation of a classroom assignment routine for mainstream settings* [Unpublished doctoral dissertation]. University of Kansas.

Rademacher, J. A., Deshler, D. D., Schumaker, J. B., & Lenz, B. K. (2011). *The quality assignment routine*. Lawrence, KS: Edge Enterprises.

Scanlon, D., Schumaker, J. B., & Deshler, D. D. (1996). Can a strategy be taught and learned in secondary inclusive classrooms? *Learning Disabilities Research and Practice, 11*(1), 41–57.

Scanlon, D., Schumaker, J. B., & Deshler, D. D. (2004). *The ORDER routine*. Edge Enterprises.

Schumacher, J., Bulgren, J., Deshler, D. & Lenz, B. K. (1998). *The recall enhancement routine*. University of Kansas.

Schumaker, J. B., & Deshler, D. D. (1988). Implementing the regular education initiative in secondary schools: A different ball game. *Journal of Learning Disabilities, 21*(1), 36–42.

Schumaker, J. B., & Fisher, J. B. (2021). 35 years on the road from research to practice: A review of studies on four content enhancement routines for inclusive subject-area classes, part I. *Learning Disabilities Research & Practice, 36*(3), 258–72. https://doi.org/10.1111/ldrp.12258

Schumaker, J. B., & Fisher, J. B. (2021). 35 years on the road from research to practice: A review of studies on four content enhancement routines for inclusive subject-area classes, part II. *Learning Disabilities Research & Practice, 36*(3), 258–72. https://doi.org/10.1111/ldrp.12259

Seigel, J. (2018). Did you take "good" notes? On methods for evaluating student notetaking performance. *Journal of English for Academic Purposes, 35*, 85–92.

Shanahan, T., & Shanahan, C. (2012). What is disciplinary literacy and why does it matter? *Topics in Language Disorders, 32*(1), 7–18.

Stenson, R. (2016, March 14). Is this the first time anyone printed, "garbage in, garbage out"? Atlas Obscura. https://www.atlasobscura.com/articles/is-this-the-first-time-anyone-printed-garbage-in-garbage-out

Vernon, S., Deshler, D., & Schumaker, J. (1993). *The teamwork strategy*. Edge Enterprises.

Vernon, S., Deshler, D., & Schumaker, J. (1999). *The THINK strategy*. Edge Enterprises.

Vernon, S., Deshler, D., & Schumaker, J. (2000). *Talking together*. Edge Enterprises.

Vernon, S., Deshler, D., & Schumaker, J. (2002). *Organizing together*. Edge Enterprises.

Vernon, S., Schumaker, J., & Deshler, D. (1996). *The SCORE skills*. Edge Enterprises.

Vernon, S., Schumaker, J., & Deshler, D. (1999a). *The BUILD strategy*. Edge Enterprises.

Vernon, S., Schumaker, J., & Deshler, D. (1999b). *The LEARN strategy*. Edge Enterprises.

Vernon, S., Schumaker, J., & Deshler, D. (2001). *Following instructions together*. Edge Enterprises.

Vernon, S., Schumaker, J., & Deshler, D. (2002). *Taking notes together*. Edge Enterprises.