

Adolescents with Learning Disabilities as Writers: Are We Selling Them Short?

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This article chronicles the evolution of a programmatic line of research on strategic writing instruction for adolescents with learning disabilities (LD) conducted by staff and affiliates of the University of Kansas Center for Research on Learning. The goal associated with this research is that students with LD learn the writing skills that they need to succeed in high school and beyond and that their skills are comparable to the skills of their peers. Individual studies have shown that adolescents with LD can master a given writing strategy and can apply that strategy to novel prompts and in general education classes. Moreover, they can learn simple writing strategies from computerized programs. They can also maintain use of a writing strategy over time. When students learn several writing strategies, their scores on standardized tests improve, and their writing competency is comparable to that of peers. Studies have also shown that teachers can teach the writing strategies and achieve successful results. Care must be taken, however, to ensure that students with LD receive the instruction under conditions where they have multiple opportunities to reach mastery on each skill and receive individualized feedback on practice attempts. Overall, the research has shown that adolescents with LD can learn complex writing skills such as planning, writing, and editing multiparagraph themes; can apply these skills to tasks that are assigned in required general education courses; and can be successful in those courses.

While most adolescents with learning disabilities (LD) have significant deficits in reading (Deshler et al., 2004), many have significant academic skill deficits in other areas, including writing (Schumaker & Deshler, 2003). These deficits generally persist unless these students receive intensive and special instruction (Meltzer, 2007). Without such instruction, these students continue to write, on average, at the fourth-grade level throughout their high school years (Warner, Schumaker, Alley, & Deshler, 1980). Only about half of their sentences are complete (Kline, Schumaker, & Deshler, 1991), and these tend to be simple sentences. Moreover, they do not know how to write a variety of sentences, organize their writing, write several connected paragraphs in an essay, or correct their writing errors (Schmidt, Deshler, Schumaker, & Alley, 1988/1989), and the overall quality of their writing is poor (Englert & Raphael, 1998; Graham & Harris, 1989; Thomas, Englert, & Gregg, 1987; Troia, 2007). The reasons for these writing problems range from difficulties with executing and regulating the processes underlying proficient composing (Graham & Harris, 1994; Graham, Harris, & Troia, 1998) to motivational factors (Pajares, 2003). Because of these severe deficits, adolescents with LD often refuse to write at all when they are given writing assignments, they receive average grades of “F” on these

assignments, and they cannot truly respond to the writing assignments in their courses that require them to write essays comprising several paragraphs (Graham & Harris, 2003; Schumaker & Deshler, 1984).

Nevertheless, the ability to write well has become more and more important for students with LD. The reauthorization of the Individuals with Disabilities Education Act in 2004 underscored the fact that students with disabilities must not only be placed in the general education classes but that they must have *true* access to participation in the curriculum (Cortiella & Burnette, 2006; Schumaker et al., 2005). Also, the law requires that students with disabilities be included in district and statewide assessments (e.g., writing assessments) and in accountability programs. Additionally, the No Child Left Behind Act of 2001 requires annual testing for all students (Grades 3–8) as well as annual statewide progress objectives aimed at ensuring that all students (including the subgroup of students with Individual Education Plans) reach proficiency levels or better by the 2013–2014 school year according to state standards. As a result, 45 states assessed students’ writing skills in 2007 (National Center for Educational Statistics, 2008). In 2006, 22 states required students to take high-stakes exams, which they must pass to graduate from high school (Center on Educational Policy, 2006). In addition, some standardized college entrance exams now include sections that assess students’ essay writing skills (College Board, 2005). Many colleges require students to submit written essays with their applications, as well.

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Moreover, the National Commission on Writing (2003, 2006) published a report calling for states to create comprehensive writing policies, to ensure that writing be taught at all grade levels and in all courses, and to make writing a centerpiece of the curriculum. The National Assessment of Educational Progress (NAEP) writing test planned now for 2011 (ACT, Inc., 2007) will require all students in Grades 8 and 12 across the nation to complete two writing tasks involving writing a persuasive essay, an explanatory essay, and/or an essay that describes a personal experience. Students will be required to use effective sentence structure, a variety of sentence types, and appropriate paragraph and essay structures.

Indeed, according to their state standards, states are now requiring students to learn how to write a variety of sentence types, as well as to write persuasive and expository essays, research reports, and responses to literature. For example, in California, state standards dictate that students are required to learn to write simple, compound, and compound-complex sentences and use effective coordination and subordination of ideas to express complete thoughts in the sixth grade (California Department of Education, 1999). In Texas, students are required to write complete sentences, including compound and complex sentences, beginning at the fourth- and fifth-grade levels (Texas Education Code, 1998). In New York, students are required to use simple, compound, and complex sentences by the fifth and sixth grades (The University of the State of New York, 2005).

With regard to the more complex writing skills, in California, state standards dictate that students are required to learn to write multiple paragraph compositions with an introductory paragraph, supporting paragraphs and a conclusion (California Department of Education, 1999). In Texas, as early as the first and second grades, students are required to learn the process of writing, including prewriting activities, drafting, revising, and editing. By the fourth and fifth grades, they must learn to write for a variety of purposes, including problem solving, persuading, describing, and narrating (Texas Education Code, 1998). In New York, students are required to learn the writing process including prewriting, drafting, revising, proofreading, and editing while also employing an organizational format comprising a beginning, middle, and end in their written products in Grades 2 through 4. By Grades 5 and 6, they are required to learn to state a main idea and support it with details. In addition, they need to learn to compare and contrast ideas, create narrative pieces, and write about information in chronological order (The University of the State of New York, 2005). Unfortunately, students with LD often enter the secondary grades without having acquired these skills, putting them at a disadvantage with regard to meeting writing requirements at the higher grade levels (Schmidt et al., 1988/1989).

Thus, the stakes are high, and, unfortunately, many students with LD and other at-risk students are not meeting them (Wagner, Newman, Camerto, & Levine, 2006, Ysseldyke et al., 1998). Effective educational programs are clearly needed to help these students fulfill the complex writing demands of required courses, state assessments, college entrance exams, and the world of work. The purpose of this article is to chronicle a line of programmatic research that has

been conducted by University of Kansas staff, their students, and their affiliates. This chronicle will provide evidence that such programs exist and can be used to promote success in writing for students with LD and their peers. Although this story could be told from a variety of perspectives since many researchers have been involved, it will be told from the perspective of two researchers, Jean Schumaker and Don Deshler, who have been at least tangentially involved in all of the development projects and research studies conducted within this line of research. The remainder of this article is from their points of view and is based on their memories. The story begins with memories from Jean and then progresses to joint memories.

A Brash Beginning

The story begins long before either of us became affiliated with the University of Kansas. In fact, it begins for me, Jean, when I was in junior high and high school. For 5 years, I had the same English teacher, Mr. Charles Brasher. Mr. Brasher was a brilliant man who had clear ideas of how to teach students writing skills. He scared all of us to death by assigning 15-page papers before he had taught us how to write a single paragraph! He firmly believed that all students could become wonderful writers if they followed his instructions and especially if they first learned how to think and organize information. He had created an elaborate graphic organizer, which he taught us to fill out before we wrote our themes. He emphasized the importance of carefully thinking through the placement of information on the organizer and the connections among the information before beginning to write. Then, using colored chalk on his chalkboard version of an organizer, he taught us how to write transition sentences to tie the information in the parts of the organizer together.

Each year, his instruction became more elaborate and refined. His work became controversial because many parents thought he expected too much of students and his concepts were too difficult for students to grasp. They complained that he did not teach the usual grammar lessons typically taught at that time. Nevertheless, his work planted seeds in my mind that sprang to life a decade later.

Programs Born out of Necessity

As I continued through school, I used the concepts and writing processes Mr. Brasher taught me as I wrote my papers for college and graduate school courses. Because I was intent on becoming a child psychologist, the furthest thing from my mind was teaching others how to write. Nevertheless, as I was working on my Ph.D., my minor coursework was in the area of juvenile justice. As a part of that coursework, I did an internship in the probation department of the local juvenile court in the early 1970s. I was assigned to several junior-high students who were truant from school, and as I worked with them, I noticed that they had severe academic skill deficits. Most of them could not write a complete sentence. I became very concerned about these students and decided to do what I could to help them. Jan Sheldon, who was a fellow graduate student at the time, and I set up a free summer-school

program for them, and among the programs we developed was a program to teach them how to write 14 types of sentences, a program to teach them punctuation skills, a program to teach them capitalization skills, and a program to teach them to write themes that expanded upon on Mr. Brasher's method and simplified it at the same time. All the programs were based on behavioral analysis of the skills to be learned, and they all had worksheets that slowly scaffolded instruction in the skills from easy to hard. Across the course of two summers, we tested and revised these programs and found them to be successful in teaching the targeted skills. However, we did not use an experimental design, and, as time progressed, we became involved in finishing the requirements for our degrees and launching our careers. The programs got stored in a closet.

Enter Learning Strategies

A few years later, I was hired to serve as the Director of Research Design for the Institute for Research on Learning Disabilities (IRLD) at KU. Also affiliated with the institute were Don Deshler (Research Coordinator) and Gordon Alley (Research Associate). We began working together as a team. The mission that we adopted for the Institute was the development of an intervention model for the education of adolescents with LD. Don and Gordon had just written a book (Alley & Deshler, 1979) on learning strategies instruction, which had not yet been empirically validated for students with LD. Nevertheless, learning strategies became the centerpiece for the intervention model to be developed under IRLD auspices because the major goal associated with the IRLD was to enable students with LD to succeed in required high school courses so that they could graduate from high school and succeed in postsecondary education and/or employment settings. We reasoned that, compared to other types of interventions being recommended at the time, teaching students to learn and apply task-specific learning strategies would have a greater chance of closing the achievement gap they were facing and enable them to respond to the demands of rigorous subject-matter courses in their curriculum. We surmised that students with LD entering secondary school had very little time before they might drop out of school around the 10th-grade level, so we wanted an intervention that would help them "close the gap" as quickly as possible.

Thus, from the very beginning of the IRLD, we adopted a vision that adolescents with LD could learn to perform at levels commensurate with their peers in required courses and, because of the limited amount of time available for remedial instruction, these interventions had to lead to large gains in relatively short periods of time. Necessarily, then, we focused on creating outcomes that were not only statistically significant but *socially* significant. In other words, we wanted to produce outcomes that would change the quality of students' lives. For example, if a student was failing tests with average scores of 50 percent, and we produced a gain of five percentage points, that might be statistically significant, but the student would still be failing. We decided that we would not be content with that type of gain. We wanted to produce gains that enabled students to earn grades of at least Bs and

Cs in required secondary courses because we wanted them to have a feeling of success that would propel them through high school to graduation and into postsecondary education. We reasoned that this would be the best way to ensure that they could succeed in the workforce and live independently.

In relation to writing, in particular, we knew that we had to teach students with LD not only to write complete sentences but to write themes of at least five paragraphs because this was a typical assignment in required high school and postsecondary courses (Schumaker & Deshler, 1984). We also knew that their themes had to be relatively free of errors, well organized, and composed of useful information because we wanted them to be worthy of grades of C or above. Thus, the types of measures that we adopted for our writing studies focused on the quality (i.e., content and structure) of the written products as well as on the mechanics of writing.

As we launched into the development of the intervention model, which we called the Strategies Intervention Model at the time (and which is now called the Strategic Instruction Model [SIM]), we envisioned a curriculum that would have three strands: (1) a strand of instruction for teaching students to acquire information (i.e., through reading and vocabulary building); (2) a strand of instruction for teaching students to store, transform, and manipulate information (i.e., through taking notes or studying information); (3) and a strand of instruction for teaching students to express information (i.e., through classroom discussion, writing, and taking tests). This curriculum eventually became known as the *Learning Strategies Curriculum* (Deshler & Schumaker, 1986). We reasoned that the three types of information-processing skills that we targeted for the curriculum (i.e., acquiring, storing, and expressing information) would enable students to respond to the majority of the academic requirements of secondary and postsecondary educational settings. We targeted learning strategies that were specific to the types of tasks assigned in these settings under each strand. For example, we knew that students would have to be able to comprehend novels and stories in their literature classes, so we knew we had to design a strategy for comprehending narrative text. We knew that students would have to be able to find errors in their writing and correct those errors, so we knew that we had to design a strategy for finding and correcting errors in students' own writing.

We defined a learning strategy as the way a learner plans, executes, and evaluates his/her own performance on a learning task (Schumaker & Deshler, 2006). For example, if good learners have an assignment to study the meaning of 20 vocabulary words for a quiz at the end of the week, they might think first about how much time is available to them to complete the task, plan what to do and in what order, create study cards, think of ways to remember each meaning, and test themselves over the meanings using the study cards until they know all the meanings. After taking the quiz and receiving a grade on it, they might think about how they will adjust their approach in the future to earn a better grade if necessary.

Not surprisingly, our initial work in the IRLD determined that students with LD were less likely than their peers to invent effective learning strategies like the one in this example (Warner, Schumaker, Alley, & Deshler, 1989). As a result, we set about designing a reasonable sequence of steps for

each strategy that we had targeted, based on what “expert” learners might do for each type of academic task (e.g., for more on this concept, see Pressley, Borkowski, & Schneider, 1987, 1989). As our work on designing learning strategies evolved over the years, each strategy comprised a sequence of cognitive and behavioral steps that a student could follow by instructing his/herself through the steps. Each step was worded as a self command, was short and therefore easy to remember, and was composed of simple words. Each set of steps was organized in the order in which the steps should be performed, and a first-letter mnemonic device was created to help students remember the names of the steps.

Simultaneous with the development of the initial learning strategies, we also designed an instructional sequence that eventually evolved to be composed of eight stages that teachers could use to teach a strategy to small-groups of students (Ellis, Deshler, Lenz, Schumaker, & Clark, 1991). This instructional sequence (or earlier versions or later variations of it) is the sequence that has been used in all of the learning strategy research studies conducted on the *Learning Strategies Curriculum*. In essence, the instructional sequence involves (1) pretesting the students’ skills, (2) describing the strategy to the students, (3) modeling the strategy for students, (4) conducting practice activities that enable students to name the steps of the strategy so that they can self instruct as they apply the strategy, (5) having the students practice using the strategy in relation to easy tasks so they can focus on learning the steps of the strategy, (6) having the students practice the strategy in relation to tasks comparable to what they would face in a required course at their grade level, (7) posttesting the students’ skills, and (8) teaching the students to generalize their use of the strategy to their general education courses and maintain their use of the strategy across school years. Throughout the sequence, an emphasis is placed on requiring mastery at each level of practice. In order to produce that mastery, teachers provide specific and individual feedback after each practice attempt (Kline et al., 1991).

As we designed the initial research studies on learning strategies slated for membership in the *Learning Strategies Curriculum*, we focused on several factors. First, we were working with small numbers of students with LD in resource rooms. We wanted to ensure that each student learned the strategy to a mastery level (so we could achieve socially significant outcomes), and we were interested in learning the number of practice trials required to achieve that level. We were also interested in determining whether the students could apply the strategy they learned to novel tasks of the same type and in different settings and whether their performance was comparable to the performance of their peers without disabilities. For example, if they learned to write paragraphs in the resource room, we were interested in determining whether they could write paragraphs in their English class on topics assigned by their English teachers that would receive grades comparable to peers’ grades. Thus, we chose an experimental design that would enable us to work with small numbers of students while watching their individual progress and their use of the strategies under a variety of conditions: a multiple-probe design (Horner & Baer, 1978) (which is a variation of the multiple-baseline design [Baer, Wolf, & Risley, 1968]). Later in our work, when sev-

eral classes of students were involved, we also have utilized pretest–posttest control-group designs (Campbell & Stanley, 1966).

The Writing Strategies Research

As we were piecing together the expression strand of the *Learning Strategies Curriculum*, we reasoned that we would need to begin teaching students with LD to write at the sentence level. Then we wanted to progress through paragraph writing and theme writing while also teaching students to detect and correct their errors. Based on Jean’s earlier experiences with developing materials for teaching sentence writing and theme writing, Don’s earlier experiences with researching error-monitoring skills (Deshler, Ferrell, & Kass, 1979), and our discussions about what learning strategies should be like and what the instruction should be, we initially focused on four learning strategies: sentence writing, paragraph writing, error monitoring, and theme writing. In other words, we built on our experience and our existing materials to create the initial writing interventions.

One of our first forays at the IRLD into investigating the effects of writing strategy instruction was focused on a paragraph organization strategy (since we already had some materials for sentence writing and theme writing in Jean’s closet). The strategy that was designed at that point comprised three steps that involved writing (1) a topic sentence, (2) three detail sentences, and (3) a clincher (i.e., concluding) sentence. (No mnemonic device was designed for remembering the steps at this point. That came later.) Moran, Schumaker, and Vetter (1981) conducted two studies where seventh through 10th graders learned to use this paragraph-organization strategy in conjunction with three paragraph styles: enumerative, sequential, and compare and contrast. In the first study, a multiple-probe across-paragraph-styles design was employed with three junior-high students. All three students learned to write organized enumerative paragraphs in the resource room, and, subsequent to strategy instruction, their scores on paragraphs assigned in a general education class improved above the 80 percent level. However, because the students also immediately generalized their use of the strategy to the other two paragraph styles (and therefore destroyed the experimental control inherent in the multiple-probe across-paragraph-styles design), Moran et al. decided to conduct a second study with five more students.

In the second study, a multiple-probe across-paragraph-styles design within a multiple-probe across-students design was used with five students. This study demonstrated that the students learned to use the paragraph organization strategy for enumerative paragraphs after instruction. All of the students generalized their use of the strategy to at least one other paragraph style; three of the students generalized to both additional paragraph styles. After instruction, all of the students met the mastery criterion of earning at least 85 percent of the points available for paragraph organization on all three paragraph styles. Their mean scores on enumerative paragraphs were 52 percent in baseline and 92 percent after instruction, on sequential paragraphs were 49 percent in baseline and 95 percent after instruction, and on

compare-and-contrast paragraphs were 38 percent in baseline and 91 percent after instruction.

At the end of that study, we took a hard look at the paragraphs that students were producing. Their after-instruction paragraphs included topic, detail, and concluding sentences that met our criteria for mastery, and their paragraph scores were very encouraging. However, the paragraphs left something to be desired. An example paragraph (somewhat exaggerated) was: "I like three types of food. I like hamburgers. I like hot dogs. I like tacos. These are the three types of food that I like." We reasoned that although these paragraphs had a basic structure, we had not pushed the students to the level at which, for example, they had to function to write a critical analysis of a short story in a high school English class. Meanwhile, Karen Lyerla, a special education teacher at Lawrence High School in Kansas, one of the schools where we were testing learning strategy instruction, also noticed that her students did not understand basic concepts like how to sequence ideas, use transitions, and maintain a standard point of view and tense throughout a paragraph. At that point, Karen and Jean put their heads together to design and pilot test a stronger paragraph writing strategy program, which through multiple trials took several years to develop. (See below for more on paragraph writing in the summary of the research study conducted by Schmidt et al., 1989.)

The other writing strategy study that was conducted relatively early through IRLD auspices was focused on the Error Monitoring Strategy (Schumaker, Nolan, & Deshler, 1985). This strategy was built on Don's earlier work and was designed to enable students to detect and correct errors in their own writing. We chose to focus the strategy on four types of common errors that students make in their writing, including Capitalization errors, Overall appearance errors (e.g., failure to adhere to a margin, dirty erasures, crossed-out words), Punctuation errors, and Spelling errors. The mnemonic device "COPS" was designed to help students remember the four types of errors they should detect and correct. The strategy involved six steps: (1) Use every other line as you write your rough draft, (2) As you read each sentence, ask yourself the "COPS" questions, (3) When you find an error, circle it and put the correct form above the error if you know it, (4) Ask for help if you are unsure of the correct form, (5) Recopy the paragraph neatly, and (6) Reread the paragraph as a final check. The "COPS questions" related to the four categories of errors the students were to detect and correct (e.g., The "C" question: "Have I capitalized the first word and proper nouns?"). (Please note that our strategy steps were not brief, and, again, a mnemonic device was not created at this time.)

The study conducted on the Error Monitoring Strategy included nine students with LD in Grades 8 through 12 (Schumaker, Deshler, Alley, Warner, Clark, & Nolan 1982). A certified teacher provided the instruction in small-group settings and proceeded through several stages of strategy instruction. During the controlled practice stage, students detected and corrected errors in teacher-generated passages that were written at two reading levels: the student's reading ability level and the student's grade level. Each of these passages had 20 errors embedded in it (five in each category of errors). During the advanced practice stage, students detected and corrected errors in their own written paragraphs.

A multiple-probe across-students design was used with three students in each repetition of the design.

During baseline, students were able to detect an average of 29 percent of the errors and correct an average of 26 percent of the errors in the ability-level teacher-generated passages, and they could detect an average of 31 percent and correct 29 percent of the errors in the grade-level teacher-generated passages. After strategy instruction, they were able to detect and correct an average of 92 percent of the errors in ability-level passages and 97 percent of the errors in grade-level passages. Every student met the mastery criterion in grade-level passages in one trial. With regard to finding and correcting errors in their own writing, during baseline, the students were making about one error for every four words written; after instruction, they made about one error for every 33 words written, which is comparable to the number of errors their peers without disabilities make in their writing. All the students showed improvement only after instruction was implemented.

Our next steps were to revise the error monitoring strategy instructional program based on the research study reported above, adapt the sentence writing and theme writing programs (that were in Jean's closet) to the eight stages of instruction and the cognitive strategies emphasis, and integrate these programs with the new paragraph writing strategy program being pilot tested by Karen Lyerla. Once that had been accomplished, we felt ready to conduct a study focused on all four writing strategies. At the time, John Schmidt, a former special education teacher, was working to design his dissertation study, and he was especially interested in the issue of generalization and maintenance of strategy instruction. Within the larger context of strategy research being conducted at the IRLD at the time, we had shown through a series of studies that the multistage instructional sequence was effective in teaching students with LD to use a variety of strategies designed for the *Learning Strategies Curriculum* in response to novel tasks. However, we had only shown that the students could generalize their use of one strategy (the paragraph writing strategy) across settings using a pretest-posttest design, and we had not shown that they could maintain their use of the strategies over time. Additionally, research staff members who were certified teachers had provided the instruction in all of the studies. Classroom teachers had not yet provided the strategy instruction under day-to-day classroom conditions in any of the IRLD studies up to this point.

To gear up for this study (Schmidt, 1983; Schmidt et al., 1988/1989), a plan was made for the sequence in which the four writing strategies would be taught across the course of a full school year. In addition to recruiting special education teachers to present the instruction, general education English and social studies teachers were recruited to give writing assignments in the targeted generalization settings. Participating high school students with LD who had not been enrolled in general education courses in the past were enrolled in these English and social studies classes at the beginning of the school year. The students were first taught the Sentence Writing Strategy (Schumaker & Sheldon, 1985) by their special education teacher in the resource room. Next, the students learned the Paragraph Writing Strategy (Schumaker & Lyerla, 1991). Subsequently, they learned how to detect and

correct errors in their writing by learning the Error Monitoring Strategy (Schumaker et al., 1985). Finally, they learned the Theme Writing Strategy (Schumaker, 2003). Throughout the instruction, the students' writing performance in both the resource room and in the targeted general education classes was monitored. That is, every time they wrote a paragraph or an essay in any of the targeted settings, the product was scored for the types of sentences used, the organization of the paragraph, the number of errors, and the organization of the essay.

A multiple-probe across-strategies design was employed. The seven students made the following average gains on writing assignments in the resource room after instruction in each of the writing strategies. They wrote an average of 70 percent complete sentences during baseline and an average of 99 percent complete sentences after instruction. They earned an average of 36 percent of the points available for a well-planned and organized paragraph during baseline and an average of 80 percent of the points after instruction. They made an average of .27 errors per word (i.e., about one error every three words) during baseline and an average of .04 errors per word (i.e., about one error every 20 words) after instruction. They earned an average of 24 percent of the points available for a well-planned and organized theme during baseline and an average of 74 percent of the points after instruction. The multiple-baseline across-strategies design demonstrated that each student made these gains only after instruction began for each strategy.

Most of the students also made the same kinds of gains on their writing assignments in general education classes, even though they had not been taught to use the writing strategies in those settings. The two students who did not generalize their use of the strategies to other classes did so quickly after they had been taught to do so. Before the study, the students' GPA was 2.1 in special English and social studies courses designed for low-achieving students and students with disabilities; after the study, their GPA was 2.7 in regular-track general education English and social studies courses. On a standardized test of writing, the Woodcock Johnson Psychoeducational Battery, the students' mean grade equivalent score increased by two grade levels from 6.2 to 8.2. On the district's minimal competency writing exam, the students earned a mean overall score of 3.5 (out of 5.0), which compared favorably to the mean overall district average of 2.5. With regard to maintenance of strategy usage, the four students who returned to the school the following school year and who had learned all the strategies demonstrated that they could write complete and complicated sentences in their general education classes at mastery levels. They also wrote well-organized paragraphs. However, their error rate increased, and their essays did not meet the mastery criterion.

Thus, this study demonstrated that students with LD could learn a series of writing strategies that were taught by their resource teachers, that they could generalize their use of the strategies to general education settings when responding to assignments regularly given by teachers in those settings, and that they could maintain their use of some of the strategies across several months. It also showed that strategy instruction was associated with growth in standardized writing

test scores and produced favorable writing competency test scores.

After completion of the Schmidt et al. (1988/1989) study, one of the questions that arose was whether there was a way to reduce the number of practice trials needed by students with LD to learn a writing strategy and therefore reduce the instructional time. Frank Kline, a former special education teacher, took on the challenge of designing a way of providing feedback to students that would enable them to learn faster with fewer practice trials. Kline et al. (1991) conducted a study that focused solely on the Sentence Writing Strategy, and particularly on teaching students to write simple sentences through a series of four lessons. Three groups of teachers taught their students the strategy. One group of six teachers provided elaborated feedback when students made errors while practicing their use of the strategy. The second group of six teachers used elaborated feedback plus a special student-acceptance procedure. The third group of six teachers used a standard feedback procedure that involved telling the students what they had done correctly and incorrectly on each practice attempt.

A total of 54 students with LD participated, 18 associated with each group of teachers. The results showed that the students in all three groups learned to use the Sentence Writing Strategy to write simple sentences at a mastery level, replicating the same kinds of gains made by students who participated in the Schmidt et al. (1989) study. However, students who received the elaborated feedback plus acceptance routine or the elaborated feedback routine reached mastery in an average of 9 or 10 trials, respectively, whereas students who received standard feedback reached mastery in an average of 15 trials. Because each trial translates into a class period of instruction, elaborated feedback seems to have a substantial reduction effect on the amount of instructional time required. When this is multiplied by the number of sentence types to be taught plus the number of other strategies to be taught, the amount of saved time is considerable.

Also after the completion of the Schmidt et al. (1989) study, we began to wonder whether college students could learn to use a writing strategy effectively at the college level. Mike Hock, a former special education teacher who was working with student athletes at a Midwestern university volunteered to teach the Theme Writing Strategy to 28 freshman scholarship athletes enrolled in English 101, a required English course (Hock, 1998). Two of the students had learning disabilities, and one had ADHD. The group of students had earned an average score of 17.7 on the American College Test (ACT), a college-entrance exam, and a mean grade-point average of 2.8 in high school. Because of their academic deficits, these students were required to participate in academic tutoring for 6 to 10 hours per week. Also participating in the study were 28 freshman scholarship athletes who had earned an average score of 23.2 on the ACT and a grade-point average of 3.3 in high school; they served as the comparison group. They did not receive instruction in the strategy, but they had free access to tutors for help with their coursework and also were enrolled in English 101. All students enrolled in English 101 were required to write six themes: three themes out of class and three in class. Their semester grade was based on their grades on the six themes.

The results at the end of the semester showed that the experimental (underprepared) students earned scores that were significantly higher than those of the comparison students on a test of theme writing knowledge (even though their pretest scores were significantly lower than those of comparison students). Also, the experimental students earned an average grade of 2.5 (A = 4, B = 3, C = 2, D = 1, F = 0), and the comparison students earned an average grade of 2.6 in the English 101 course. For their first semester in college, the overall grade-point average was 2.5 for the experimental group and 2.54 for the comparison group. No significant differences were found between the two groups' grades in the English 101 course and between their overall grade-point averages. With regard to the students with disabilities in the experimental group, all three earned Cs in the English 101 course, and they earned overall GPAs of 2.50, 2.62, and 2.91 during their first semester of college.

More recently, because of the inclusion of secondary students with LD in required courses where they need to respond to essay-type questions on tests and because of feedback from teachers in the field who wanted an instructional program that would help students respond to essay questions on subject-area competency tests, we began to focus on writing as it is related to test taking. As a result, a group of researchers that was led by Charlie Hughes and included Don and Jean, set about designing an instructional program that could be used in those courses or in resource rooms to teach students to write essay answers in test situations. The strategy they designed, called the Essay Test-Taking Strategy (Hughes, Schumaker, & Deshler, 2005), involves six steps, including analyzing the essay prompt by (1) Analyzing the action words in the question and (2) Noticing the requirements, then (3) Setting up a skeletal outline and (4) Working details into the outline, (5) Engineering (writing) an answer, and (6) Reviewing the answer. Within six quick lessons, the strategy is introduced, modeled, and practiced. Although the instruction incorporates the same vocabulary as the other writing strategies (e.g., topic sentences, detail sentences, Introductory Paragraph, Detail Paragraphs), detailed instruction on these concepts is not included because the program was designed so that it could be used in general education courses where time is at a premium.

The research study on the Essay Test-Taking Strategy included 42 seventh and eighth graders with reading and writing disabilities plus 10 average achievers who served as a same-age comparison group (Therrien, Hughes, Kapelski, & Mokhtari, 2009). The students with LD were assigned via a stratified random sampling method to an experimental or control group. A pretest-posttest control-group design was employed. The researchers designed a strategy-specific rubric for measuring student use of the strategy when writing essay answers where students earned points according to elements in their permanent products. They also used a six-trait essay measure where the six traits of writing were each scored on a five-point scale. ANCOVA results revealed a significant difference between the posttest strategy rubric scores of experimental and control students, representing a large effect size of 1.69 (Cohen, 1988). A separate ANCOVA also revealed a significant difference between the content and organization scores of the groups in favor of the experimen-

tal group. There were no differences between the content and organization scores of the experimental group and the same-age comparison group of average achievers. Thus, this study added another strategy to the *Learning Strategies Curriculum* that could help students respond to the demands of secondary courses and minimal competency tests.

Also because of the reduction of hours spent by students with LD in resource rooms and the increase in hours spent in general education, we began wondering whether students with LD could learn learning strategies if they were taught in large-group general education settings under typical classroom conditions. We also wondered whether we could abbreviate the instruction to be completed within part of a school year, before the writing competency test was taken. Yvonne Bui, a former special education teacher, took on this challenge and conducted a study focused on the instruction of several writing strategies in five fifth-grade inclusive general education classes in urban schools where a large proportion of students were living in poverty (Bui, Schumaker, & Deshler, 2006). Students in three participating classes served as the experimental group whereas students in the two other classes served as the comparison group. A total of 113 students participated, and 14 students with LD were enrolled in the classes. The three classes of experimental students were taught to use the Sentence Writing Strategy, the Paragraph Writing Strategy, and the Theme Writing Strategy by Yvonne Bui using abbreviated forms of the instruction. The comparison students participated in the district's chosen writing curricula for the same amount of instructional time and were taught by their regularly assigned teachers.

There were no differences between the experimental and comparison groups on the pretest, which required the students to write an essay. Experimental students earned significantly higher scores on the posttest than the pretest on the majority of the writing measures, whereas the comparison students did not. For example, separate ANOVAs revealed significant differences between the experimental students' pretest and posttest *complete sentence scores* in favor of the posttest, representing a large effect size. Significant differences were also found from pretest to posttest on the *complicated sentences score*, also representing a large effect size. The ANOVA for the *paragraph writing score* also revealed a significant difference in favor of the posttest (a large effect size). The ANOVA on the *theme-writing score* indicated a significant difference was found between the pretest and posttest scores (another large effect size). The only pre- to posttest significant difference found for the comparison students was related to the theme writing score, where they made a four percentage-point gain (a medium effect size).

For the experimental students with LD, separate ANOVAs revealed significant differences between the pretest and posttest complete sentences scores, paragraph writing scores, and the theme writing scores. All of these differences represent large effect sizes.

The mean score of the whole group of experimental students on the state competency exam was within the "Proficient" range (i.e., a passing score), whereas the mean score for the whole group of comparison students was in the "Basic" range (i.e., a failing score). The mean score of the experimental students with LD was in the "Basic" range and was

not significantly different from the mean score of the whole group of comparison students.

Although these results are certainly promising, there is cause for concern because the mean scores of the students with and without disabilities in the Bui et al. (2006) study did not approximate the scores achieved by students in the Schmidt et al. (1989) study. For example, after instruction in the Sentence Writing Strategy, students with LD in the Bui et al. study wrote an average of 66 percent complete sentences, whereas students in the Schmidt et al. study wrote more than 95 percent complete sentences. Similarly, students earned a mean of 38 percent of the available points for paragraph organization in the Bui et al. study and a mean of 85 percent of the points in the Schmidt et al. study. Thus, although the students in the Bui et al. study made statistically significant gains, they did not reach the mastery criterion for each strategy. We did not consider their results to be socially significant. Our thinking was that, because of the large-group instructional format and the need to move quickly through the instruction, the students with LD (and certainly some of the students without LD) did not engage in enough practice trials to enable them to master each strategy to the extent that they could generalize the strategies to the competency test. Their inability to pass the state competency test is an indication that our standard of social significance was not met. Thus, this attempt at teaching writing strategies with abbreviated methods to large classes was promising, but not as successful as we wished.

The Bui et al. study received some criticism because of the small number of classes involved as well as the fact that Yvonne Bui taught the three experimental classes, and regularly assigned teachers taught the comparison classes. A teacher effect could have been operating. We wondered whether several teachers could learn to provide the instruction in their general education language arts classes and wanted to see the results of a larger study. Nanette Fritschmann, also a former special education teacher, recently conducted such a study involving 13 general education teachers who were randomly assigned to either teach the Sentence Writing Strategy or a reading comprehension strategy (Fritschmann, Schumaker, & Deshler, in press) to their regularly assigned sixth-grade classes. The five teachers who were randomly assigned within their teaching teams to the writing strategy condition taught the Sentence Writing Strategy to a total of nine general education classes. A total of 529 students participated in the study, with 213 students receiving writing strategy instruction and 316 students receiving reading strategy instruction. A total of 28 students with disabilities received the writing strategy instruction, and 23 students with disabilities received the reading strategy instruction. These students were included in general education classes for most of the school day. Two measures were utilized: (a) a test of student knowledge of the Sentence Writing Strategy and associated concepts and (b) a test of student ability to write prompted sentences. On the latter test, students were given 11 prompts to write a certain type of sentence (e.g., "Write a sentence that has one subject and two verbs" or "Write a sentence with one subject, two verbs, and an infinitive.")

The hierarchical linear model approach with SAS PROC MIXED was used to compare the posttest scores of the ex-

perimental and control students. The students were nested within classes within the analyses, and pretest scores were used as the covariate in each analysis. For the whole group of students, a significant difference was found between the posttest scores of the experimental and control students on the strategy knowledge measure and on the sentence writing measure in favor of the experimental students. Similarly, for the students with disabilities, a significant difference was found between the posttest scores of the experimental and control students on the strategy knowledge measure and on the sentence writing measure. After instruction, the students with disabilities in the experimental classes were able to respond correctly to 76 percent of the sentence writing prompts while the whole group of students in experimental classes responded correctly to 85 percent of the sentence prompts. In contrast, the comparison students with disabilities and the whole group of comparison students correctly responded to 27 percent and 32 percent of the writing prompts, respectively. Thus, again, although their posttest scores were within the socially significant range, students with disabilities did not learn as well as we hoped (and did not perform as well as their peers) in the general education setting. Interestingly, though, the whole group of experimental students, struggling readers (those scoring below the 40th percentile on a standardized reading test), and students with disabilities in the experimental group made statistically significant gains on a standardized test of reading comprehension during the study.

With the addition of computers to many classrooms, the introduction of the computerized spellchecker into students' lives, and reports from teachers that students with LD were continuing to have difficulty correcting spelling errors while using the Error Monitoring Strategy, even when they could use spellcheckers, David McNaughton, a special education teacher, and Charlie Hughes, a former special education teacher, set about designing a strategy for proofreading and using spellcheckers. Their strategy, called the InSPECT Strategy (McNaughton & Hughes, 1999), involves (1) Starting the spellchecker "In" the document, (2) Picking the correct alternative, (3) Eliminating unrecognizable words, (4) Correcting additional errors, and (5) Typing in corrections. After the strategy was designed, three students took part in a multiple-baseline across-students design (McNaughton, Hughes, & Ofiesh, 1997) that included baseline, intervention, and maintenance conditions. All three students mastered the strategy (i.e., earned a score higher than 80 percent on performing the strategy in three consecutive trials). In addition, they were able to find and correct more spelling errors after instruction than before instruction in teacher-generated passages containing spelling errors and in their own writing. This improvement maintained for 4 weeks for two students who participated in the full maintenance condition. The students' spelling error rates at the end of the study approximated those of students without disabilities.

To build on this computer-based study and to provide additional computerized materials for students learning error monitoring skills, Charlie Hughes and colleagues recently designed a strategy called the EDIT Strategy, wrote an instructor's manual (Hughes, in press), created computerized practice activities for students, and conducted a research study with his student, Mandy Carranza. The EDIT Strategy

was based on the original Error Monitoring Strategy, with a few adaptations, so students could use the strategy while they were writing on a computer. Once students (1) Enter their rough draft into a software program, they are to (2) Do a spell check (here they might use the InSPECT Strategy), (3) Initiate the “SCAN” Steps to find errors in capitalization and punctuation and meaning errors, and (4) Type in corrections.

Thirty-seven students with LD (19 in the experimental group and 18 in the control group) and 25 general education students in the fifth, sixth, and seventh grades participated in the research study for the EDIT Strategy (Carranza & Hughes, in press). A pretest–posttest control-group design was used for the students with LD, with an additional maintenance probe. Students were asked to find and correct errors in experimenter-generated passages and in their own writing. According to MANOVAs, significant differences were found between the posttest scores of experimental and control students with LD on the experimenter- and student-generated passages. Experimental students and control students corrected a mean of 80 percent and 29 percent of the errors in experimenter-generated posttest passages, respectively. Experimental and control students made a mean of one error in every 25 words and a mean of one error in every five words in their own writing on the posttest, respectively. Similar results were achieved on the maintenance probe. No differences were found between the experimental group of students with LD and the same-age comparison group on the posttests, while differences were found between the control students with LD and the same-age comparison group in favor of the same-age comparison group.

Along the same lines, because of the proliferation of computers in schools and because two previously successful programs were still stored away in Jean’s closet, three writing strategy programs focusing on the mechanics of writing were created: the Commas Strategies Program (Schumaker & Sheldon, 2008), the Punctuation Strategies Program (Schumaker & Sheldon, 2009), and the Capitalization Strategies Program (Schumaker, 2009). These programs were developed to provide students with *instruction* in the prerequisite skills they need to use the error monitoring strategies and to respond to the complex demands of writing competency tests and college entrance exams. Prior to these programs being developed, none of the learning strategy programs included instruction in a computerized form. (The instruction for the InSPECT and EDIT Strategies was provided live by a teacher, and the only practice materials were in a computerized form.) Thus, for these three new programs, students actually received the instruction through the computer. Each of these programs is stored on a compact disc and comprises a series of lessons. The strategies taught within each program are different from the strategies in the previous instructional programs in that they involve a poem that helps students remember the rules in addition to some basic steps to follow. Each lesson within each program focuses on one rule. For example, the first lesson, first rule, and first line of the poem in the Commas Strategies Program (Schumaker & Sheldon, 2008) is “Commas like to introduce,” which involves learning about the use of commas in introductory phrases. The instruction is provided by a narrator, graphic devices, text on the screen, and a variety of practice activities.

The three programs have been field-tested in separate experimental studies (Schumaker & Walsh, 2008, 2009a, 2009b). Students with LD have participated in each study at both the junior and senior high school levels. Half of the students in each level were randomly selected into an experimental group and half into a control group. Students in the experimental group used the targeted computerized writing strategy program; students in the control group used a different computerized strategy program (e.g., a program for the Test-taking Strategy [Lancaster & Lancaster, 2008]). The amount of instructional time was controlled for the two groups. In the study conducted on the Commas Strategies Program, for example, a total of 82 junior high students and 42 senior high students with LD participated. Two measures were used in each study. For the first, students were given a test containing a list of sentences. In each sentence, one or more errors were present (e.g., for the Commas Program, one or more commas were omitted from the sentences). Students were asked to find and correct the errors (e.g., insert the missing commas). For the second measure, students were asked to demonstrate the use of each taught rule in their own writing. For example, they were asked to write a sentence containing an introductory clause.

The results of the studies conducted on the three computerized programs show that they are effective in teaching students with LD to use the strategies. According to the general linear model that was applied, there were no differences between the effects for junior and senior high students in any of the studies. Statistically and socially significant differences with very large effect sizes were found for all the measures for all the programs. For example, for the test in which students had to insert missing commas, there was a significant difference between the gains made by the experimental and the control group. Experimental students inserted a mean of 85 percent of the missing commas on the commas writing posttest, and control students, on average, inserted 36 percent of the missing commas. Similarly, there was a significant difference between the posttest scores of the experimental and the control groups on the commas writing test. Experimental students correctly demonstrated use of commas in a mean of 92 percent of their sentences, whereas control students did so for a mean of 15 percent of their sentences. Thus, the computerized writing strategy programs have been successful in producing statistically *and* socially significant effects for students with LD with regard to comma usage, other punctuation usage, and capitalization usage.

TOWARD THE FUTURE

The line of programmatic research and development reviewed here chronicles an evolution of instructional methods and techniques. Close to 30 years have transpired as we have worked to “get it right,” cover the writing needs presented by secondary students with LD, respond to teachers’ feedback, and adapt to changes in education. Some of the programs (e.g., the Paragraph Writing Strategy program) have taken as long as 10 years to “get right.” As mentioned before, our intention has always been to enable students with LD to perform at equivalent levels to their peers without disabilities.

Our expectations for students with LD have been high, so our expectations for our programs also had to be high. We tried to use teacher demands, typical grading procedures, and the performance of other students as our final measuring sticks. The results of our studies have shown that not only does the instructional sequence for teaching writing strategies work when it is applied with fidelity, but that it works to the extent that students with LD can perform at a level comparable to their peers without LD. Other researchers have had similar positive results with writing strategy instruction (see, for example, the reviews by Graham & Harris, 2003; Graham & Perin, 2007b), and writing strategy instruction has been recommended as part of a national effort on writing instruction (Graham & Perin, 2007a).

There is one caution that must be acknowledged, however. Our recent research has shown that when students with LD are taught strategies under typical general education conditions, opportunities for multiple practice attempts are not provided. In turn, feedback cannot be (or sometimes is not) given individually, and mastery is not required, so students do not learn the writing strategies at a socially significant level. In some cases, no differences are found between their scores and the scores of control group students. This is an important caution that needs to be heeded by educators of students with LD. That is, unless instructional conditions are created in which these students receive the kind of explicit and intensive instruction that they need to learn strategies, they are unlikely to benefit to the extent that they can perform at comparable levels to their peers without disabilities.

Nevertheless, the good news is that evidence-based programs do exist now which can be used to teach students with LD the writing strategies that they need to use through high school and into postsecondary life. Whether educators use these programs is the prerogative of individuals making decisions in educational settings about the instruction to be delivered to these students. Indeed, some schools have adopted writing strategy instruction as a part of their English curriculum. In some instances, only students with LD are taught the writing strategies; in others, all students receive writing strategy instruction. For example, at an inner city high school in Michigan, after *all* students in the school received instruction in the Sentence Writing Strategy and Paragraph Writing Strategy, 94 percent of the 11th graders passed the state writing competency exam versus 75 percent of the students in comparably sized high schools (S. Woodruff, personal communication, 2001).

Unfortunately, a model of instruction frequently relied upon in secondary schools is to “tutor” students with LD on class assignments to help them pass subject matter classes. Essentially this often means providing them with study-hall-like assistance with their assignments and “consulting” with their teachers on ways to adapt classroom instruction (Deshler & Schumaker, 2006). While classroom practices vary greatly, we fear that too frequently students are not given the types of instruction that have been shown through research to produce beneficial outcomes. Until investments are made in professional development that emphasizes research-based instruction for students with LD and administrators ensure that students with LD receive the instruction, less than satisfactory outcomes will be the result. Critical to the

decision-making process is a belief that students with LD can learn to write at levels comparable to their peers without disabilities and that a central component of instructional programs for these students are ample opportunities to do so. This article and others in this issue show that students with LD can, indeed, learn to write. Clearly, they should be given the opportunity to learn the skills and strategies they need to become productive citizens.

Given our current educational climate, where might we, as researchers, head in the future? As shown from the story of the evolution of our research above, we have been focusing lately on the delivery of writing instruction through technology. To date, we have focused on relatively simple computerized instruction for capitalization and punctuation. In the future, we are looking toward developing computerized multimedia programs for secondary students on the more complex writing skills such as writing paragraphs and themes. Our hope is that, eventually, students will be able to gain access to strategy instruction through computers regardless of the decisions made by the educators in their districts.

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