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CAN STUDENTS WITH LD BECOME COMPETENT WRITERS?

Jean B. Schumaker and Donald D. Deshler

Abstract. The inclusion of students with disabilities in the general education curriculum *and* in district and state assessment programs has major implications for instruction because many of these students are expected to earn standard high-school diplomas and to meet the same standards as their typically achieving peers. This is especially problematic in the area of writing, which involves the use of many complex skills. This article reviews the research associated with a group of instructional programs on writing strategies that are part of the *Learning Strategies Curriculum* developed by researchers associated with the University of Kansas Center for Research on Learning. The research shows that students with disabilities can learn to use complex writing strategies to such an extent that they can write multi-paragraph themes appropriate for general education classes and that enable them to pass district and state competency tests.

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The 1997 Reauthorization of the Individuals with Disabilities Education Act (P.L. 107-15) brought about a very significant shift in how the quality of educational services on behalf of individuals with disabilities will be judged. That is, the focus shifted from *processes* to ensure adequate services were available for individuals with disabilities to producing positive *outcomes* for students with disabilities. In order to ensure that programming would focus on educational outcomes, the new law mandated the participation of students with disabilities in the general education curriculum (Goertz, McLaughlin, Roach, & Raber, 2000) and required that students with disabilities be included in district and statewide assessments and in other accountability programs (Kearns, Kleinert, Clayton, Burdge, & Williams, 1998; Kleinert, Kennedy, & Kearns, 1999). Similarly, the

1994 Improving America's Schools Act also called for the reporting of assessment results of students with disabilities along with other student results.

Around the same time that these two significant pieces of legislation were enacted, a growing number of states were specifying sets of curriculum standards that could be used to organize and design instruction as well as to judge the performance of students. Currently, all states have curriculum standards, and the vast majority also have procedures for administering assessments statewide. Nearly all of the states assess student competence in reading and mathematics, and 35 states include assessments in writing and science (Council of Chief State School Officers, 1999).

The inclusion of students with disabilities in the instruction provided through the general education

curriculum *and* in district and state assessment programs has major implications for the entire field of special education. The implications are especially significant for students who are classified as having a learning disability (LD) because many of these students are expected to earn regular high school diplomas and to meet the same standards as their typically achieving peers. Since nearly half of the school population with disabilities is included in the LD category, educators face a major challenge with regard to ensuring that these students succeed. While increasing numbers of students with disabilities are being educated according the requirements of the general education curriculum (U.S. Department of Education, 1999), a much smaller percentage of these students are being successful in passing district and statewide assessments (Olson, 2000). For example, in 2001, 91% of students with disabilities in the state of California failed the math section, and 82% failed the language arts portion of the high school exit examination (Egelko, 2002). Similarly, the National Center for Educational Outcomes reported that in 17 states a substantially smaller percentage of students with disabilities were able to meet state standards than the student population at large (Ysseldyke, Thurlow, Langenfield, Nelson, Teelucksingh, & Seyfarth, 1998).

As stated, most states require students to take state assessment exams in reading, writing, and math. While a great deal of attention during the past decade has been devoted to improving the performance of students with disabilities in reading (e.g., President's Commission on Excellence in Special Education, 2002), less attention has been devoted to writing, despite the very significant demands placed on both elementary and secondary students to perform well in this area (McDonnell, McLaughlin, & Morrison, 1997). Especially as students move into higher grade levels, they are expected to use writing skills to take notes, respond to essay tests, write lab reports and themes, send correspondence, and successfully complete district and state assessments.

In spite of these heavy demands for writing fluency, the National Center for Educational Statistics reported that in 1994 the average writing proficiency score for fourth graders was only 205 on a 500-point scale. The performance of students with disabilities on written expression tasks is especially poor. For example, Newcomer and Barenbaum (1991) reported that the writing deficits experienced by students with LD range from lower-order mechanical difficulties to higher-order cognitive and metacognitive problems. Graham, Harris, MacArthur, and Schwartz (1991) have found that basic writing skills such as spelling, sentence formation, capitalization, and handwriting are especially problematic

for students with LD. Additionally, these students have been found to struggle with writing complete and complicated sentences and correcting mistakes that they make in writing (Kline, Schumaker, & Deshler, 1991; Schmidt, Deshler, Schumaker, & Alley, 1988/89; Schumaker et al., 1982). These students have also been shown to lack strategies for handling all the cognitive processes involved in writing (e.g., planning, organizing, revising) (Bui, 2002; Englert, Raphael, Anderson, Gregg, & Anthony, 1989). In short, the limited set of skills and strategies possessed by these students underscores why they struggle so much in responding successfully to the demands of the general education curriculum and why their chances of passing district and state assessments in writing are slim.

Fortunately, a growing body of intervention research conducted with students with disabilities is suggesting that these students' performance can be successfully impacted if well-designed instructional methods are used. The purpose of this article is to summarize a programmatic line of research and development work conducted by staff and associates at the University of Kansas Center for Research on Learning (CRL) during the past two decades that has focused on learning strategies instruction as an instructional method for improving the writing performance of students with disabilities within the context of the general education curriculum as well as on district and statewide writing assessments.

The CRL Approach to Strategy Instruction

One of the major research goals adopted by the CRL staff has been to design and validate a set of instructional methods that are sufficiently powerful to impact the performance of students with disabilities in the general education curriculum, as well as on state assessment exams. The instructional model that has emerged through this line of research is largely determined by the instructional demands confronting students who are at risk for academic failure as well as the educational contexts in which they need to function and succeed.

While approaches to strategy instruction can be conceived in terms of two extreme positions (i.e., a more explicit approach versus a more implicit, constructivist approach), strategy instruction can also be conceived as existing somewhere along the continuum between these two extremes (Mercer, Lane, & Jordan, 1996) or even as a combination of the two extremes. CRL researchers maintain that one's position on the continuum should be influenced, at least in part, by the characteristics of the students being taught, the demands of the curriculum to which students must respond, and constraining factors placed on teachers. The instructional methods developed by CRL researchers as they worked with students with LD could best be described

Table 1
Learning Strategies Curriculum

Acquisition	Storage	Expression and Demonstration of Competence
Word Identification	First-Letter Mnemonic	Sentence Writing
Paraphrasing	Paired Associates	Paragraph Writing
Self-Questioning	Listening and Notetaking	Error Monitoring
Visual Imagery	Theme Writing	
Interpreting Visual Aids	Assignment Completion	
Multipass	Test Taking	

as explicit in nature, especially in the initial stages of strategy instruction (e.g., Deshler et al., 2001; Ellis, Deshler, Lenz, Schumaker, & Clark, 1991). However, as the instruction progresses and students move toward mastery, there is a conscious and marked shift to a set of more implicit constructivist methods to enhance the generalization of strategy use, as well as adaptation, independent design, and application of strategies by the students themselves. Thus, the CRL approach to strategy instruction might be categorized as a combination approach.

The primary reasons for using a more explicit approach to strategy instruction in the initial instructional stages have been the following. First, given the information-processing difficulties evidenced by students with LD, unstructured situations are especially problematic for them (Vaughn, Gersten, & Chard, 2000). Second, many academic tasks are complex and involve several steps to complete. With explicit instruction, complex tasks can be broken down into several steps, which can then be taught individually. Third, students with LD are not familiar with complex cognitive processing. Strategy usage involves covert cognitive processes, which many of these students do not use or invent (Ellis, Deshler, & Schumaker, 1989) and often have difficulty inferring. When they are explicitly introduced to them in overt and concrete ways, their learning is facilitated. Fourth, students with LD have experienced failure (in the case of adolescents, this history of failure is often prolonged and painful), and thus might not be motivated to learn. Within explicit instruction, the difficulty of the task can be scaffolded so that students can be successful at each level of task performance. As a result, they can gradually gain confidence in what they are doing and gradually become motivated to learn more. Finally, students with LD make errors as they learn (Kline, Deshler, & Schumaker, 1992). Within explicit instruction, they can receive feedback on their correct and incorrect responses, and their performance can be shaped over time.

The strategies and strategy instruction developed by CRL researchers have several defining characteristics. Pressley, Borkowski, and O'Sullivan (1985) argued that good strategies are "composed of sufficient and necessary processes for accomplishing their intended goal, consuming as few intellectual processes as necessary to do so" (p. 140). Thus, the strategies developed by CRL researchers are streamlined sets of steps that students can follow to get an academic task done efficiently and effectively (Schumaker & Deshler, 1992). Each step has been given a short name that tells the student what to do, and a mnemonic device has been incorporated within the list of steps to help the student remember the names of the steps (see Deshler, Ellis, & Lenz, 1996, for more information on the characteristics of CRL strategies).

The strategies designed by CRL researchers are in close alignment with the demands of the curriculum that students are required to address. They have been organized within the Learning Strategies Curriculum (Deshler & Schumaker, 1988). (See Table 1.) This organizational framework has been designed as an aid to students and teachers for reviewing different strategies that might be germane to the setting demands that students need to address. The curriculum is not intended to be "covered" by all students. Rather, strategies are selected that best match the needs of the student and the demands the student is facing in general education classes (Deshler et al., 1996). Through the use of this menu of strategies, students *and* teachers both have a voice in deciding on the strategy(ies) to be learned to

optimize the student's ability to more effectively respond to pressing curriculum demands.

The strategies are organized within three strands in the curriculum. Strategies in the Acquisition Strand enable students to gain information from written materials like novels and textbooks. Strategies in the Storage Strand enable students to take notes and store information in their brains so that they can use it at some other time. Strategies in the Expression Strand enable students to express their knowledge on tests, in homework assignments, and in written documents. (A detailed description of the writing strategies within the Expression Strand will be provided later in this article.)

The methods designed to be used to teach the strategies in the Learning Strategies Curriculum incorporate procedures that are sufficiently powerful to enable students with LD to learn the strategy relatively quickly and efficiently. Eight stages comprise the instructional sequence: (a) pretest and make acquisition commitments; (b) describe; (c) model; (d) verbal practice; (e) controlled practice and feedback; (f) advanced practice and feedback; (g) posttest and make generalization commitments; and (h) generalization (Ellis et al., 1991). Instruction within these eight stages is provided in the context of a learning apprenticeship (Hock, Schumaker, & Deshler, 1995), in which the teacher takes an active role in describing and modeling for students alternative ways to approach tasks that are potentially more efficient and effective. As students begin to understand what being a strategic learner is all about, some of the scaffolding is removed, and instruction shifts from an emphasis on teacher mediation to an emphasis on student mediation in the later stages of instruction (e.g., Deshler et al., 2001; Hock, Deshler, & Schumaker, 1993; Hock, Schumaker, & Deshler, 2001).

Support for the CRL Approach to Strategy Instruction

A programmatic series of 14 studies has been conducted by CRL staff and associates to determine whether the eight-stage instructional methodology listed above can be effectively used to teach strategies from the Learning Strategies Curriculum to students with LD and to determine the effects of these students' use of the strategies. Across the studies, the students' IQs ranged from 80 to 117, they were enrolled in grades 7 through 12, and most were receiving remedial or LD services. Measures were taken to determine if students learned the strategy, if they successfully applied it to academic tasks from the general education classroom, and if they generalized the use of the strategy across tasks and, sometimes, across settings. The data resulting from these studies indicate that the eight-

stage methodology resulted in student acquisition of the strategy, student application of the strategy to academic tasks, and generalization of the strategy to novel tasks and settings (see Schumaker & Deshler, 1992).

Three additional studies lend support to the notion that an explicit instructional approach can be effective when the targeted students have significant learning problems. In the first, a time-sample observational system was used to record the types of instructional activities that occur in a resource room in which learning strategy instruction was being implemented (Kline et al., 1992). Results showed that students with LD spent less than 12 minutes per day in learning strategy instruction, which resulted in an average of one learning strategy being learned per year per student. Based on these findings, a series of decisions were made and actions were taken by the teachers to determine how instruction would be planned and delivered in order to fulfill the goal of increasing the amount and intensity of instructional time spent on explicit strategy instruction. The outcome was that more than 31 minutes per day were spent on strategy instruction, with students mastering more than three strategies per year. Thus, when the structure and emphasis of classroom activities were markedly changed to highlight explicit strategy instruction, more strategies were learned (Kline et al., 1992).

Additionally, in light of the recent emphasis on inclusion of students with disabilities in general education, the CRL staff has been interested in the viability of teaching strategies for students with LD within the context of the general education classroom where the opportunity for explicit instruction is potentially lower than in a resource room or other remedial setting. The demands upon teachers to cover large amounts of curriculum content clearly alter the amount of time that can be spent explicitly teaching strategies to students. Additionally, this setting potentially alters the feasibility of having students master the targeted strategy (i.e., it may be relatively easy to make students aware of a strategy, but general education teachers may not be able to find sufficient time to ensure strategy mastery). Thus, Scanlon, Deshler, and Schumaker (1996) measured the effects of having secondary content teachers embed instruction in an organizational strategy into their content instruction. The implementation rate of the observed strategic teaching behaviors varied greatly across teachers but was generally low. That is, teachers gave students few opportunities to practice using the strategy, and only a small number of students actually mastered and applied the strategy.

Similarly, Wedel, Deshler, and Schumaker (1993) found that middle school social study teachers were willing to provide only a limited number of practice

opportunities and little instructional time for their academically diverse classes to learn a vocabulary strategy. As a result, most of the students with LD were not able to complete the necessary prerequisite steps (e.g., creating practice cards) and study the vocabulary words sufficiently to prepare themselves for the chapter test. They were, however, able to complete these tasks in a relatively short intensive instructional session (approximately 18 minutes in length) with the resource teacher in which they received explicit instruction and targeted feedback.

Thus, CRL research has shown that the eight-stage instructional methodology is effective when used to teach learning strategies and that instructional time needs to be devoted to using these methods if students with LD are to master them. The remainder of this article will provide a closer look at one group of learning strategies. It will include a description of the writing strategies and a synopsis of a programmatic line of research conducted by staff and associates of the CRL that has focused on the instruction of these strategies. No one study is sufficient in and of itself to warrant a claim of having a research-validated intervention. However, out of these collective research efforts, a series of written expression interventions has emerged that clearly indicates that students with LD can be taught a set of learning strategies that will markedly impact their performance on written expression outcome measures.

The Writing Strategies

Five instructional programs have been designed for teaching the five writing strategies in the Learning Strategies Curriculum (Deshler & Schumaker, 1988). When used in sequence, these programs enable students to write a variety of sentences, paragraphs, and themes and to find and correct errors in their written work. These programs were designed to enable students who have difficulty with writing to learn the skills needed to respond to the writing demands of the secondary and postsecondary curriculum.

The Sentence Writing Strategy is used by students to write four types of sentences: simple, compound, complex, and compound-complex. Two instructional programs may be used to teach students to write these types of sentences. The *Fundamentals in the Sentence Writing Strategy* program (Schumaker & Sheldon, 1998) can be used to familiarize students with basic writing vocabulary and concepts (e.g., subject, verb, linking verb, helping verb) and to use the Sentence Writing Strategy to write four types of simple sentences. The strategy involves choosing a structure for each sentence to be written, mentally exploring words to fit that structure, writing the words, and checking the sentence for completeness (e.g., checking whether it has a verb,

a subject, a capital letter, and end punctuation, and whether it makes sense). Once they have mastered simple sentences, students can proceed to the advanced program (the *Proficiency in the Sentence Writing Strategy* program [Schumaker & Sheldon, 1999]) where they review the four types of simple sentences and learn how to write 10 variations related to compound, complex, and compound-complex sentences. After students have learned to write all 14 types of sentences, their writing contains the variety of sentence structures required at the secondary and postsecondary levels.

The instructional methods associated with the Sentence Writing Strategy were designed for teaching the basic principles associated with sentence construction and written expression to students who have difficulty with language. Through these methods, students learn a set of steps and key formulas that help them recognize and write different types of sentences. Instruction is systematically sequenced and scaffolded so that students who have difficulty learning have ample opportunity to practice identifying and writing different types of sentences. Instruction in the Sentence Writing Strategy has been designed from a remedial perspective. Thus, it does not cover every sentence variation or all the grammatical terms that might be covered in a developmental language course.

The Paragraph Writing Strategy is used by students to write well-organized and flowing paragraphs. The instructional program associated with this strategy (Schumaker & Lyerla, 1991) is designed for teaching students the basic principles involved in paragraph construction. Thus, students learn how to (a) list ideas related to a topic; (b) plan the point of view and verb tense to be used in the paragraph; (c) plan the sequence in which ideas will be expressed and the transitions that will be used to connect the ideas within that sequence; and (d) write a variety of topic, detail, and clincher sentences. Students also learn a set of steps for integrating these skills as they write several kinds of paragraphs, including narrative, step-by-step, descriptive, facts, reasons, examples, compare, contrast, and compare and contrast paragraphs.

Instruction in the Paragraph Writing Strategy is sequenced so that students have ample opportunity to practice identifying and writing the different types of sentences required in a paragraph as well as writing the different types of paragraphs. Their writing of each paragraph is facilitated through the use of a paragraph diagram, which students fill out as they plan the paragraph. On the diagram are spaces for students to record the topic of the paragraph, the details to be included in the paragraph, the point of view, verb tense, and sequence chosen for the paragraph, and the transition words to be used.

The Error Monitoring Strategy is used by students to find and correct errors in their written work. The instructional program associated with the Error Monitoring Strategy (Schumaker, Nolan, & Deshler, 1985) stresses the importance of proofreading written work for errors and eliminating those errors before the work is submitted to a teacher. When students use the Error Monitoring Strategy, they make a rough draft of an assignment by writing on every other line of the paper using the Sentence Writing Strategy and the Paragraph Writing Strategy. Then they check their work for organizational errors. Next, they check each sentence, asking themselves a series of questions regarding their use of capitalization and punctuation, the appearance of the work, and the correct spelling of the words. When they find an error, they cross it out or circle it and note the correction above the writing. When necessary, the students ask someone else for help with a particular item. Finally, the students neatly recopy their work, paying particular attention to the notes they have made about corrections, and reread the revised copy as a final check.

Also during instruction of the Error Monitoring Strategy, the teacher and student do an indepth analysis of the kinds of errors the individual student regularly makes in written work. Together, they develop personal strategies the student can use to avoid those errors in the future such that more presentable work can be produced. Again, instruction in this strategy was developed from a remedial perspective and therefore does not cover all the rules of capitalization, punctuation, and grammar that might be covered in developmental language arts courses.

The InSPECT Strategy is closely aligned with the Error Monitoring Strategy in that it enables students to detect and correct spelling errors using a computerized spellchecker. (It can also be adapted for use with handheld spellcheckers.) It has been specifically designed for students who need help finding their spelling errors and using spellcheckers. Students use the steps of the strategy to start the spellchecker, peruse the options presented by the spellchecker for the identified word, and choose the correct spelling option. If the correct option is not obvious or if the spellchecker does not present any options (because the student has misspelled the word so badly), students sound out the word and try other spellings to see what new options the spellchecker presents. They also check their work for other spelling errors such as misused words (e.g., "there" instead of "their" and "end" instead of "and"). The teacher and student analyze the student's written work for words that the student often misuses and develop personal strategies for the student to help the student avoid those misuses in the future. Students also learn how to correct their spelling errors and recopy their work.

The instructional program associated with the InSPECT Strategy (McNaughton & Hughes, 1999) is a bit different from the other programs in that it includes a computerized set of lessons that teachers can download into the hard drives of computers so that students can learn how to use the spellchecking function of the computers. Each lesson contains a variety of spelling errors, including misused words. The passages within which students are expected to find the errors are written at either the fourth-, seventh-, or tenth-grade reading levels to accommodate a variety of student reading skills.

The Theme Writing Strategy (Schumaker, 2003) enables students to write well-organized and integrated themes that respond to the complex writing demands of secondary and postsecondary educational settings. The Theme Writing Strategy requires students first to think about what they know about a topic and then to do research to gather additional information about the topic. Next, students organize the information they know and/or have gathered using a theme writing diagram. They write the theme using a structure that includes an introductory paragraph, three or more detail paragraphs, and a concluding paragraph, connecting these paragraphs with appropriate transitions. Within each paragraph, they write particular types of sentences using the Sentence Writing Strategy and the Paragraph Writing Strategy. They then edit the theme for meaning and errors using the Error Monitoring Strategy and the InSPECT Strategy, and finally recopy the theme in polished form.

Instruction in the Theme Writing Strategy is advantageous for students for a number of reasons. First, it requires that they *actively* interact with and process information they know. If they need more information, the strategy gives them a means of approaching the task of gathering additional information. Second, it helps them to create a structure for the information that they know. Third, the strategy enables them to chunk a large task into smaller units. Students who have difficulty attending for long periods of time can approach each unit in turn, in separate sittings as needed. Fourth, the strategy requires that students express, in writing, their understanding of a topic. This process can enhance understanding and recall of information. Finally, the strategy requires students to monitor the quality of their writing and to polish their work to create a high-quality final product. As a result, they learn to take pride in their products and to feel good about their accomplishments. Thus, the Theme Writing Strategy can help students become better writers and expressers of information. Use of the strategy will help

them become more successful in situations where they need to demonstrate their understanding and mastery of information through written products.

The instructional programs associated with the five writing strategies share several features. First, skill practice is scaffolded so that students can be successful throughout the learning sequence. Early demands are easy so that students can be immediately successful. Then the difficulty builds slowly until, eventually, students are completing very complex tasks easily and quickly. Additionally, the instruction is sequenced within the programs so that skills are built within and across the programs. That is, vocabulary words and concepts taught in earlier programs are repeated and reinforced in later programs, and strategies taught in earlier programs are incorporated in strategies that are learned later. For example, when students use the Theme Writing Strategy, they are integrating all the other writing strategies into a flowing whole, plus they are adding unique steps of the Theme Writing Strategy. Each program requires that students complete a series of practice lessons and reach mastery on one type of lesson before proceeding to the next type of lesson. Enough lessons of one type are available so that students can practice as many times as needed to reach mastery. As a result, the teacher must be constantly aware of each student's progress within the lessons, must assign appropriate practice lessons each day, must score the lessons, and must give the students feedback with regard to appropriate and inappropriate responses so that each student improves on the next practice attempt. To help facilitate students' quick mastery at each level, teachers use demonstrations and guided practice activities involving all students in the group before students proceed to independent practice activities.

To provide an example of how the practice lessons are sequenced, the lessons in the *Fundamentals of the Sentence Writing Strategy* program can serve as a case in point. In the initial lesson, once students have heard a description of the strategy and the five basic requirements of a simple sentence, they begin practicing by finding errors related to three of those requirements (beginning capital letter, end punctuation, and makes sense) in five simple sentences. In the next lesson, they practice identifying the subject and verb in each sentence in addition to correcting the three types of errors. In the next lesson, they write five simple sentences with a single subject and a single verb.

Research on Writing Strategy Instruction

Several research studies and other evaluative projects have been conducted over the past 20 years to determine the effects of the individual writing strategy programs described above, as well as the combined effects of some of the programs. Those efforts are described in this section. The types of students involved, the measures and the research employed, and the results achieved will be presented for each effort.

Studies on individual strategies. In a study on the effects of Sentence Writing Strategy instruction, Kline et al. (1991) studied three groups of teachers and their students with learning disabilities (LD). A total of 24 teachers and 54 students with LD in grades 4-12 participated. All the teachers received instruction in how to teach the Sentence Writing Strategy in a day-long workshop and were provided all the materials needed to teach 10 students as well as an instructor's manual. One group of teachers was taught how to give elaborated feedback to their students. Elaborated feedback involves making at least three positive statements about the student's performance, specifying a category of error that the student has made, showing examples of the error type, describing how to avoid the error in the future, modeling how to perform in the future, having the student practice avoiding the error, and giving the student help and feedback until the student performs at least one example correctly. The second group of teachers received instruction on how to give elaborated feedback plus how to teach their students to accept the feedback using an "acceptance routine." At the end of the workshop, the teacher was to prompt the student to summarize the feedback and to write a goal statement related to the feedback. The student, in turn, was to review the written goal statement before the next practice trial. The third group of teachers was instructed to provide feedback as specified in the instructor's manual, which involved making three positive statements about the student's practice attempt, specifying a type of error the student made, reviewing the concept or rule associated with the error, and requiring the student to correct the error. These teachers' students will be referred to as the "comparison students."

The measures employed in this study included measures of the teachers' implementation of the feedback routines and student acceptance of the feedback, student trials to mastery within the instructional sequence for learning how to write simple sentences, and number of errors made by the students on their learning sheets within six error categories. Results of the multiple-baseline-across-teachers design showed that the teachers in the two elaborated feedback groups quickly and easily learned how to implement the elaborated feedback routine in conjunction with instruction in the Sentence Writing Strategy.

With regard to the student results, a 3 x 3 factorial design was employed for the trials-to-mastery data,

and several analyses of variance were conducted to compare student performance on four lesson sets across the three groups of students. Although all the students met the mastery criterion on all the lesson sets (i.e., earned 90% or more of the points available), significant differences were found in the average number of trials required to reach mastery across the groups. That is, the comparison students required the largest number of trials to reach mastery (total mean = 14.6); students in the feedback group required fewer trials (total mean = 10.78); and students in the feedback-plus-acceptance group required the fewest number of trials to reach mastery (total mean = 9.45). Significant differences were found between the average number of trials to mastery required by the comparison students and the average number of trials to mastery required by the other two groups of students. No significant differences were found between the two elaborated feedback groups.

With respect to the error results, a 3 x 3 x 2 repeated-measures factorial design was employed. Students in the two elaborated feedback groups had substantially fewer errors on the second trial than the first trial in all error categories across the lesson sets, whereas students in the comparison groups did not. In other words, students in the two elaborated feedback groups were performing substantially better on the second trial within each lesson set, and therefore were typically meeting the mastery criterion on that trial. Students in the comparison group did not perform better on the second trial and required more practice trials to meet mastery.

Thus, this study showed that students with LD can not only learn to write simple sentences, they can also reach mastery within two trials on each lesson set as long as their teachers provide them elaborated feedback after the first practice attempt.

In a study focused on the Paragraph Writing Strategy, Moran, Schumaker, and Vetter (1981) conducted two experiments. In the first experiment, three adolescents with LD in grades 8 and 9 were taught to use the Paragraph Writing Strategy to write three types of paragraphs: enumerative, sequential, and compare and contrast. For each type of paragraph, students were taught to write a topic sentence, at least three detail sentences, and a clincher sentence. During instruction, the students were introduced to the strategy. Then one paragraph type was described and modeled before the students were asked to practice writing that type of paragraph. Students met mastery on one paragraph type before proceeding to instruction on another. They earned points for each type of sentence appropriately written within each paragraph. Instruction was delivered in one, one-hour period per day. A multiple-baseline-across-paragraph-types design was used to show the effects of the instruction for each student. Average paragraph writing scores earned by the students were 59%, 50%, and 44% during baseline and 95%, 90%, and 87% after instruction for enumerative, sequential, and compare-and-contrast paragraphs, respectively.

Moran et al. (1981) conducted a followup experiment because the students generalized their use of the skills across paragraph types during the first experiment, thus interfering with the usefulness of the experimental design. Five students with LD in 7th-10th grades participated in the second experiment in which a multiple-baseline-across-students design was combined with the multiple-baseline-across-paragraph-types design. Otherwise, the two experiments were the same except that in the second experiment, the students had instruction in two-hour blocks each day since they were participating in summer school. Average paragraph writing scores earned by the students were 49%, 49%, and 38% during baseline and 92%, 87%, and 91% after instruction for enumerative, sequential, and compare-and-contrast paragraphs, respectively. The results of this experiment showed that improvements in paragraph writing occurred only in conjunction with instruction in the first paragraph type.

The results of the two experiments on the Paragraph Writing Strategy combined show that the instruction was equally effective in one- and two-hour time blocks. It was also effective for a variety of students, students who earned scores ranging from 19% to 71% on individual pretests. All of the students generalized their use of the strategy to at least one untrained paragraph type. Three of the students generalized their use of the strategy to both untrained paragraph types.

In a study on students' ability to find and correct the errors in their writing, Schumaker et al. (1982) taught the Error Monitoring Strategy (Schumaker et al., 1985) to nine students with LD in grades 8-12. This strategy was designed to help students eliminate four major categories of errors in their writing: capitalization, punctuation, appearance, and spelling errors. After the strategy had been described and modeled and the students had memorized the strategy steps, the students practiced using the strategy on written passages in which 20 errors had been inserted (these passages will hereafter be referred to as "teacher-generated passages"). Students were expected to find and correct these errors, and their scores on each passage were (a) the percentage of errors identified correctly and (b) the percentage of errors corrected correctly. Once the students had met the mastery criterion on the teacher-generated passages (i.e., had found and correctly corrected 18 of the 20 errors on one passage), they practiced finding and correcting errors in passages they had written themselves ("student-

generated passages"). The mastery criterion required that the students have fewer than one error in every 20 words (or .05 errors per word) in their final drafts.

Results of the multiple-baseline-across-students design showed that after the students learned the Error Monitoring Strategy, they found and corrected substantially more errors than before they had learned it. Specifically, before instruction, they each corrected less than 25% of the errors in the teacher-generated passages. After instruction, they all corrected more than 90% of the errors, and all met mastery within six practice attempts ($M = 96\%$). Indeed, most of the students met the criterion within three attempts. On the student-generated passages, before instruction, the students made as many as one error in every two words in their final drafts. After instruction, the students were making very few errors. Some students made none; others made a few, such as one error in every 20 or 30 words. All of the students met the mastery criterion within one or two practice attempts. Thus, this study showed that students with LD can learn to detect and correct the errors in someone else's writing and in their own writing. It also showed that they can learn to correct a variety of errors and can generatively use the strategy to detect and correct successive examples of different kinds of errors.

In a later study, McNaughton, Hughes, and Ofiesh (1997) focused on the detection and correction of spelling errors through the use of a computerized spellchecker. They taught the InSPECT Strategy to students with disabilities between 15 and 18 years old, and they evaluated the effects of the instruction using a multiple-baseline-across-students design that included three phases: baseline, intervention, and maintenance. Maintenance of strategy use was measured one, two, and four weeks after instruction was terminated. Three secondary students with learning disabilities, and specifically with a functional disability in spelling, participated. Measures of strategy use and spelling errors were employed.

During instruction, the students were taught to use the strategy in conjunction with a word-processing spellchecker program. The strategy was described and modeled, and the students were required to learn how to name the steps of the strategy in order until they met a 100% correct criterion. During the controlled practice activities, students were asked to correct spelling errors in passages designed by the researchers that each contained 20 spelling errors representing both misspelled words and incorrectly used words. Next, the students practiced correcting spelling errors in their own writing. Finally, they participated in generalization training where they committed to and discussed using the strategy in a variety of settings.

The results showed that the students used an average of 39% of the strategy steps during baseline, 79% during instruction, and 86% during maintenance. Before instruction, an average of 7.6% of the words in their compositions contained spelling errors, and they corrected an average of 41% of their spelling errors even though they had a spellchecker at hand. After instruction (during the maintenance condition), an average of 3% of the words in their compositions contained spelling errors, and they corrected an average of 75% of their spelling errors (McNaughton & Hughes, 1999). This level of performance is comparable to the spelling performance level of peers who do not have spelling disabilities. Thus, this study indicates that students who have disabilities in spelling can learn a strategy for using a computerized spellchecker that will help them eliminate spelling errors in their writing and perform at a level comparable to that of their peers who do not have such a disability.

Hock (1998) taught the Theme Writing Strategy to 28 freshman scholarship athletes enrolled in English 101, a required English course at a midwestern university. These were students who had earned an average score of 17.7 on the American College Test (ACT), a college entrance test, and a mean grade-point average of 2.8 in high school. Two of the students had learning disabilities, and one had ADHD. This group of students was required to participate in academic tutoring for 6 to 10 hours per week because of the skills they had learned prior to college. A comparison group of 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 also participated in the study. This comparison group had access to tutors for help with their coursework and also were enrolled in English 101; they did not receive instruction in the strategy. The research question was whether a group of underprepared students who were taught the Theme Writing Strategy could perform as well as a more prepared group of students in the English 101 course who did not learn the strategy.

During participation in the English 101 course, the students were required to write six themes — three written out of class and three written in class. For the in-class themes, students had 90 minutes to write a 400- to 500-word theme without help. The semester grade in the course was based on performance on the six themes.

Three measures were used. The first was a measure of student knowledge of the processes involved in theme writing. Students were asked an open-ended question about the steps they would take or the strategies they would use to write a theme. Students could earn up to 10 points on this test. The second measure was the

semester grade earned by each student in the course. The third measure was the semester grade-point average earned by each student for all college courses.

Although the experimental (underprepared) students earned scores that were significantly lower on the theme-writing knowledge pretest than the comparison students, at the end of the semester, they earned scores that were significantly higher than those of the comparison students. In the English 101 course, 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. The overall grade-point average was 2.5 for the experimental group and 2.54 for the comparison group during their first semester in college. There were no significant differences between the groups' grades in the English 101 course and their overall grade-point averages, even though students in the experimental group entered college with poorer skills than the comparison students. All three students with disabilities in the experimental group 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.

Studies focused on more than one strategy. Two investigations have involved the instruction of more than one writing strategy. In the first, seven students with learning disabilities in grades 10-12 were taught two or more writing strategies: the Sentence Writing Strategy, the Paragraph Writing Strategy, the Error Monitoring Strategy, and the Theme Writing Strategy (Schmidt, 1983; Schmidt et al., 1988/89). A multiple-baseline-across-measures design was employed for each student. For the Sentence Writing Strategy, the measures were the percentage of complete sentences and the percentage of complicated sentences in a given written product. For the Paragraph Writing Strategy, the measure was the percentage of points earned on the different kinds of required sentences in a paragraph. The measure associated with the Error Monitoring Strategy was the number of errors per word in a student's final draft. Finally, the measure associated with the Theme Writing Strategy was the percentage of points earned by the student on the different kinds of sentences required in a theme. The students received instruction in the strategies in sequence as listed above.

The students' written products were gathered in the special education resource room before, during, and after instruction in each strategy. In addition, written products were collected in their English and history classes throughout the study without the students' knowledge to obtain measures of generalization across settings. At least one written product was also gathered in the subsequent school year from a general education class to determine whether the students maintained their use of the strategies. Other measures included the students' scores on the Written Language Subtest of the Woodcock Johnson Psychoeducational Battery and their scores on the school district's writing competency exam.

All of the students exceeded the mastery criteria related to each strategy that was taught to them on products written in the resource room. Three of the students received instruction in all four strategies. Because of the instructional time available or because some students had few errors in their writing (and thus did not need to learn the Error Monitoring Strategy), three students received instruction in three strategies, and one student received instruction in two strategies.

When the students' writing performance was measured in their general education classes after instruction in a given strategy had been completed, the results were mixed. As a group, the students generalized their use of the Sentence Writing Strategy, the Error Monitoring Strategy and the Theme Writing Strategy to some extent to these classes (i.e., their scores improved), but not at a level equivalent to mastery. Based on these findings, the authors used a variety of instructional procedures to promote generalization across classes. First, the teacher reviewed the strategy with the students and had them practice using the strategy. This review condition produced generalization of some strategies by some students. For example, four of the students met criterion on their in-class writing samples with regard to the percentage of complete sentences written. However, these performance levels were not maintained over time. Next, the students participated in "transfer activities" where they were specifically told to generalize their use of the strategy to other classes, and they received individual feedback on written products they had produced in their classes. This condition produced higher mean scores than the review condition, and some students met the mastery criteria on several measures. Two students required implementation of a "self-control" condition where they set goals for themselves with regard to generalization and delivered reinforcers to themselves. One student required implementation of a cooperative-planning condition where the special education teacher taught the general education teacher how to prompt and cue the student to use the strategies. Both the self-control and the cooperative-planning conditions were successful in producing generalization. By the end of the school year, six of the seven students had demonstrated that they could write as well in general education classes as they had in the resource class. One of the students was below the mastery criterion on only one measure, percentage of complete sentences.

Before the study, the students' GPA was 2.1 in English and social studies courses taken in the resource

room; after the study, their GPA was 2.7 in English and social studies general education courses. Four of the students had GPAs at 3.0 after the study; none of the students had reached this level prior to the study. The students' mean grade-equivalent scores on the written language subtest of the Woodcock-Johnson Psychoeducational Battery were 6.2 at the beginning of the study and 8.2 at the end. (The mean expected score, statistically, was 7.0 at the end of the study.) On the district's minimal competency writing exam, the students who learned the Theme Writing Strategy earned a mean overall score of 3.5, which compared favorably to the mean score of 2.5 for eleventh graders in the district. Participating students who did not learn the Theme Writing Strategy earned a mean overall score of 2.4 on the district exam.

The other study that has focused on the instruction of several writing strategies was conducted in five fifth-grade general education classes (Bui, 2002). Students in three of the classes served as the experimental group whereas other students in two classes served as the comparison group. A total of 113 students (including 14 with LD) participated. The same teacher taught the three classes of experimental students to write simple sentences using lessons selected from the *Fundamentals in the Sentence Writing* program. She also used simplified versions of instruction in the Paragraph Writing Strategy, the Error Monitoring Strategy, and the Theme Writing Strategy. The instruction lasted for six weeks.

A pretest-posttest comparison-group design was employed. The groups were shown to be equivalent at pretesting on all but one measure. Students in the comparison group wrote more complicated sentences than students in the experimental group on the pretest. The major measures were those described above for the study conducted by Schmidt (1983): percentage of complete sentences, percentage of complicated sentences, percentage of points earned for a paragraph, number of nonspelling errors per word, and percentage of points earned for a theme. Another measure was each student's score on the statewide writing competency exam.

Results showed that the experimental students earned substantially higher scores on the posttest than the pretest on the majority of the writing measures. Additionally, their posttest scores were significantly higher than the posttest scores of the comparison group. Students in one of the experimental classes earned a mean score on the statewide writing exam at the satisfactory level (between 3 and 4 on a 6-point scale), and their scores on this exam were significantly higher than the scores of students in the other classes.

For students with LD, there were significant differences between the posttest scores earned by the exper-

imental and the comparison students with LD with regard to the percentage of complete sentences written and the number of nonspelling errors per word. Experimental students with LD made gains between the pretest and posttest on the percentage of complete sentences, the percentage of complicated sentences, and the paragraph writing measure that were significant at the .05 level. There were no differences between the groups of students with LD on the statewide writing assessment.

These results indicate that students at large in general education classes can benefit from writing strategy instruction. Although students with LD made some gains, the intensity with which the instruction was delivered was not the same as in the other studies. For example, the Sentence Writing Strategy instruction was the only instruction in which a scaffolded sequence of lessons was utilized. In most cases, providing individual feedback was not practical for these classes. Thus, students with LD may need more intensive instruction than was provided in this study.

Scaling-Up Efforts

Personnel in schools across the nation have implemented writing strategy instruction with all their students. For example, the staff of an inner-city high school in Michigan decided to implement instruction in two writing strategies (the Sentence Writing Strategy and the Paragraph Writing Strategy) in all English classes. In September 2000, the district's school board formalized the decision by adopting instruction in the Sentence Writing Strategy and the Paragraph Writing Strategy as part of the district's core curriculum.

Participants were all students regularly enrolled in English classes taught by general education teachers. They received instruction in the writing strategies within a large-group configuration. Students in the ninth and tenth grades learned both writing strategies in their English classes. General education teachers who taught subject-area courses (e.g., history, science) were taught instructional methods to help students generalize the writing strategies to the subject areas.

When the students in this school took the state writing competency exam in the eleventh grade (Class of 2001), 94% of them passed. Nine of the 11 students with LD who took the exam passed it. The average percentage of students who passed the state writing assessment in schools of comparable size to the targeted school was 74.5%, and the average percentage of students who passed the state writing assessment in all schools in Michigan was 85%. Thus, the school in which the writing strategies were taught outperformed other schools in Michigan, on average (S. Woodruff, personal communication, 2001).

In another scaling-up effort being conducted in the Topeka School District in Kansas, students in six middle schools are learning the writing strategies and other learning strategies. In the 2001-2002 school year, more than 1,000 students received instruction in the Sentence Writing Strategy in language arts and special education classes. In one language arts class, for example, the results showed that, at the beginning of the school year when students wrote a paragraph, an average of 66% of the students' sentences were complete sentences and an average of 9% were complicated sentences (i.e., compound, complex, or compound-complex sentences). At the end of the school year, an average of 93% of the students' sentences were complete, and an average of 45% were complicated. More than two thirds of the students in the class wrote paragraphs in which all of their sentences were complete sentences.

Finally, in the King and Queen County Public Schools, Virginia, instruction in the Sentence Writing Strategy begins in the second grade for all students. Over the third, fourth, and fifth grades, students receive additional instruction in the Sentence Writing and Paragraph Writing Strategies. During the 2001-2002 school year, the first student cohort who had received instruction in the writing strategies for all four grades took the fifth-grade Standards of Learning Writing Test for the State of Virginia. One hundred percent of the students in the fifth grade, including those with LD, passed the test (S. Leggett, personal communication, February, 2002).

Conclusion

These results show that writing strategy instruction can produce positive improvements in the writing performance of students with learning disabilities and other students. Students with learning disabilities can not only master the strategies, they can also generalize their use of the strategies to novel tasks and settings. Specifically, studies that have focused on the instruction of the Theme Writing Strategy have shown that students can learn to write five-paragraph themes that are acceptable in general education classes at the high school and college level. Some students have generalized their use of the strategies to district and state assessments. In addition, writing strategies instruction has been scaled up to be implemented across classes in single schools and across schools with successful results. These positive results have been achieved when the strategies are taught consistently and intensively. Typically, this means that the eight-stage instructional methodology was employed daily, and students had ample practice opportunities and teacher feedback to master each strategy.

As with any set of research studies, limitations are associated with the research studies reviewed here. However, the overall picture that has emerged is that students with learning disabilities can become competent writers, even at the high-school and college levels, as long as educators provide the appropriate kinds of instruction.

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