THE EFFECTS OF SELF-REGULATED STRATEGY DEVELOPMENT ON THE WRITING PROCESS FOR HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES

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Abstract. **Many students with learning disabilities (LD) exhibit deficiencies in the writing process. In order to achieve an adequate level of writing competence, these students must apply strategies that enable them to effectively plan, organize, write, and revise a written product. Explicit strategy instruction involving a structured style of learning has been found to increase students' writing competence (De La Paz & Graham, 1997a). The current study examined the effects of the Self-Regulated Strategy Development (SRSD) model on the writing performance of 15 high school sophomores with LD. Students were taught to apply the SRSD model as a strategy for planning and writing essays and to self-regulate their use of the strategy and the writing process. The effects of strategy instruction were examined using a repeated-measures design.**

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Writing is an integral part of the curriculum in secondary schools; indeed, written expression is the primary medium students use to demonstrate conceptual knowledge and communicate their thoughts, feelings, and beliefs (Graham, 1982). Within an accountability system, students in high school are often expected to compose narrative, persuasive, and informational essays for state- and district-level assessments. Moreover, displaying a minimum level of competence on state and district exams is increasingly becoming a mandatory requirement for students to advance from grade to grade as well as graduate from high school. Unfortunately, students with learning disabilities (LD) often have difficulty developing writing skills sufficient to satisfy these crucial benchmarks.

WRITING DIFFICULTIES EXHIBITED BY STUDENTS WITH LEARNING DISABILITIES

Students with LD often experience difficulty when asked to plan, write, and revise an essay. In general, these students lack a basic knowledge about how to approach writing and the writing process as a whole. Scardamalia and Bereiter (1986) identified five areas of competence that are particularly problematic for students with LD when developing an essay: (a) generating content, (b) creating and organizing structure for com-

positions, (c) formulating goals and higher plans, (d) quickly and efficiently executing the mechanical aspects of writing, and (e) revising text and reformulating goals.

Generating content for an essay typically begins with brainstorming. During this pre-writing phase, writers take time to reflect on their topic, select an audience, and develop ideas. Skilled writing depends, in large part, on a student's ability to plan before composing during this phase. MacArthur and Graham (1987) found that students with LD do not spend much time preparing to write. Instead, they often begin writing as soon as they are given an assignment with little or no preparation. Furthermore, students with LD tend to rely on an associative technique wherein they simply write whatever comes to mind (Thomas, Englert, & Gregg, 1987). Beginning to write immediately after receiving an assignment does not allow adequate goal setting or planning – two important techniques applied by successful writers. Subsequently, students with LD appear unsure of what to do when they are given time to plan (Burtis, Bereiter, Scardamalia, & Tetroe, 1983). Many students with LD do not regard strategies in the prewriting phase as valuable tools and fail to utilize meaningful techniques to become successful writers.

Students with LD also experience difficulty when attempting to generate content and organize a structure for compositions (Graham, 1990). This problem may be attributed to their under-utilization of strategies for retrieving useful information. Thus, these students frequently view a writing assignment as a question/answer task involving little preparation. In Graham's study, for example, when students with disabilities were given an opinion essay, they simply responded by writing "yes" or "no" (to agree or disagree), followed by a few brief reasons, and ended with no concluding statement. Graham's study demonstrated that, once students with disabilities believe they have answered a question, they often abruptly end their composition without a summation of their point of view. The end result is that very little content is generated. Barenbaum, Newcomer, and Nodine (1987) noted a similar finding: that students with LD produced substantially shorter and lower-quality stories than students who achieve typically. In most essays that Barenbaum et al. examined, the students with LD failed to frame their stories to include all of the basic elements. Instead, they generated relevant information from memory without any self-regulation, resulting in essays that were generally less coherent and organized than those of their peers without disabilities (MacArthur & Graham, 1987).

Formulating goals and objectives, a strategy that experienced writers use to plan and execute higher-level writing skills, is a third area of difficulty for students with LD (Graham, Harris, MacArthur, & Schwartz, 1991). Writing can be characterized as a problem-solving task that includes identifying goals for writing as well as the means to achieve them. During and after writing, these goals are assessed to deteremine whether a student needs to redefine the goals or continue with the writing process. In a study by Graham, MacArthur, Schwartz, and Voth (1992), students chose from a list of goals that they felt their paper should accomplish. Students were then taught a strategy that broke the writing task into several parts: (a) generate product and process goals, (b) develop notes, (c) organize notes, (d) write and continue the process of planning, and (e) evaluate success at obtaining goals. After being taught the goal-setting strategy, students met the goals they had set for their essays 90% of the time.

Many students with LD seem to be unable to quickly and effectively execute the mechanical aspects of writing. Specifically, in comparison to their peers, they make considerably more spelling, capitalization, and punctuation errors in their compositions (MacArthur, Graham, Schwartz, & Scafer, 1995), and their handwriting is less legible (MacArthur, Graham, & Skarvold, 1986). Basic skills like spelling, grammar, and handwriting are usually not taught at the high school level. It is likely that students with LD will continually lag behind their peers without disabilities if not taught specific strategies to improve the mechanics of their writing.

Sentence formation also tends to be problematic for some students with LD. They often lack a well-developed sense of sentence style and produce short and "choppy" sentences (Kline, Schumaker, & Deshler, 1991). Thus, the repetition of simple sentences and frequent use of run-on sentences are common mistakes exhibited by these students. By comparison, experienced writers edit for the conventions of writing as they proceed with composing their ideas and during the post-writing stage for refinement.

A final area of difficulty for students with LD is the revision of their writing. The revision process is an essential step that requires writers to "rethink" a portion of their writing by editing and rereading it many times, all the while appraising how effectively the written product communicates their intent to the audience. Students with LD often view the revision process as merely a time to correct mechanical and spelling errors, failing to realize the importance of revising and refining content (Scardamalia & Bereiter, 1986). For example, Graham, Schwartz, and MacArthur (1993) found that 61% of students with LD corrected only the mechanical aspects of their papers compared to 37% of students who achieve typically. To make matters more complicated, there are other elements to consider during the

revision process such as unity, development, order, clarity, emphasis, and diction. The revision phase of writing should be viewed as a recursive process that takes place during writing, rewriting, reading, and rereading.

Much emphasis in writing curricula has traditionally been devoted to handwriting, spelling, and grammar. Although these are important prerequisites, more is needed to improve the performance of students with LD who have difficulties writing. With respect to writing skills, students with LD are at a significant disadvantage compared to their peers. These students require more extensive strategies and explicit instruction to learn skills and processes that other students learn more easily (Newcomer, Nodine, & Barenbaum, 1988).

Strategy Instruction

Strategy instruction is effective for many students with LD (De La Paz & Graham, 1997a; Pressley & Levin, 1986; Wong, Harris, & Graham, 1991) and can be the foundation for reaching an adequate level of writing proficiency (Wong et al., 1991). Strategy instruction promotes knowledge transformation and construction, even when students are performing drill-and-practice activities (Resnick, 1987). Strategy instruction engages students with tasks requiring active understanding and assists them with constructing and personalizing a strategy.

Research indicates that as students develop effective strategies for planning and revising text and learn to self-regulate their writing, they exhibit more sophisticated writing (Wong et al., 1994). MacArthur, Graham, and Schwartz (1991) found that the quantity and quality of revision undertaken by students with LD participating in a process approach to writing instruction was improved substantially by explicit teaching of a strategy for peer revision. In writing, strategy instruction helps students enrich and upgrade their skills as writers by teaching them new or different ways to formulate and structure their prose.

Three basic features of effective strategy instruction involve (a) identifying the strategy that would be most effective for teaching students a particular task; (b) informing and explaining the use and significance of the selected strategy; and (c) fostering the development of self-regulation skills necessary for effective strategy deployment, independent strategy use, maintenance and generalization (Brown, Campione, & Day, 1981). Self-regulation skills can include goal setting, self-monitoring, self-recording, self-assessment, and self-reinforcement.

The increased emphasis on identifying appropriate strategies and teaching students with LD via strategy instruction has led to more research on the topic as well as an expansion and variation of teaching methods. Of particular interest is the research examining the application of the Self-Regulated Strategy Development model (SRSD) for teaching writing to students with LD (Graham & Harris, 1996). The SRSD model uses specific stages of instruction to teach students to accomplish writing tasks and procedures for regulating work and undesirable behaviors that impede performance. Specifically, SRSD targets writing skills that involve brainstorming, semantic mapping, generating writing content, setting goals, and revision.

Graham and Harris (1996) developed six instructional stages for instituting the SRSD model in writing instruction. The first stage, pretraining, is focused on generating and defining the components of an essay. Pretraining enables students to use their background knowledge or generate new knowledge that they will need for writing an essay. Reviewing the current level of performance is the second stage. Together the student and teacher assess the student's baseline writing performance and set target goals to reexamine during and after the instructional period. The teacher describes the learning strategy to the students and models its use in the third step. The fourth and fifth steps involve the students memorizing the strategy and then practicing the strategy in a collaborative manner. Mnemonics have been used in previous research to assist to students through the writing process (Graham & Harris, 1989; Sexton, Harris, & Graham, 1998). Self-regulation strategies such as criterion goal-setting are introduced during collaborative practice. The teacher and the student meet individually to establish a criterion of what should be included in their essay and how to collect data. The final stage of the SRSD model is independent practice for mastery. Here, students are allowed to work independently with fading assistance from the teacher. Students can monitor their own performance by checking to see if their essays meet the criterion that they have set individually with the teacher.

These instructional procedures are the basis for the SRSD approach to writing; however, variations have been reported (Case, Harris, & Graham, 1992; De La Paz & Graham, 1997b; Graham & Harris, 1989). Of particular relevance to the current study is an investigation of an earlier SRSD model conducted by Graham and Harris (1989). In this study, three sixth-grade students with LD were taught a planning strategy for writing opinion essays. Students were first taught to identify their audience and their purpose for writing. Then they were taught to use a mnemonic device to help them generate and evaluate their initial writing notes. Results showed that participants spent more time planning and preparing to write than they had during baseline, and their

written products contained greater detail and were more persuasive.

Purpose of Current Study

The purpose of the present study was to determine the effectiveness of the SRSD model with three classes of high school sophomores with LD. The study was designed to provide a systematic replication of the work of Graham and Harris (1989) using an updated version of the SRSD model. Similar to Graham and Harris's investigation, scaffolding was provided for students to learn the target strategy, a six-step instructional procedure was followed, and self-regulatory techniques were taught. However, in the present study, students were not only evaluated in terms of the number of words written, but also on the quality of their writing. Further, the participants' characteristics differed from those in the Graham and Harris study. That is, while Graham and Harris (1989) studied elementary-aged students in a general education setting, the current study focused on high school students in a special education resource setting. Little research involving teaching students to be more strategic in their writing has been conducted at the high school level. This study hopes to lay a foundation for more to come.

METHOD

Setting

The study took place in a large suburban high school in the southeastern part of the United States. The school's population of 2,675 students represented a diverse range of races and cultures. Two hundred and fifty-two of the students received special education services. Ninety-two of the students were identified as LD, 32 had a mild mental disability, 9 had moderate/severe mental disabilities, 51 exhibited emotional/behavioral disorders, and 68 were identified as having other health impairments. Some of the students were integrated into general education classes through an inclusion model for all of their academic classes. Others, like the participants in this study, received academic instruction in special education resource programs.

Participants

Student participants were selected from classes taught by a special education resource teacher who taught 10th-grade technical language arts for students in special education. Fifteen students identified with LD were invited to participate. These students received special education services for at least three academic classes daily and attended general education classes for the remainder of their school day. Each student participant met the following established criteria to be included in the study: (a) a diagnosis of LD by the school district, (b) an IQ score on the Wechsler Intelligence Scale for Children-Revised (WISC-R; Wechshler, 1974) between 80 and 115, (c) achievement scores at least 2 years below grade level in one or more academic areas, and (d) absence of any other disabling condition. The only other criteria for participation were regular class attendance, parental consent, and student assent.

All IQ scores were obtained from tests administered by a school psychologist serving the school within the past four years. The WISC-R was used as a measure of intelligence. Achievement scores were based on results from the Wechsler Individual Achievement Test (WIAT) subtest of written expression. The standard scores for this subtest have a mean of 10 and a standard deviation of 3. School personnel had administered the achievement tests within the past year. A summary of participating students' characteristics is provided in Table 1.

Of the 15 participants, 4 were female and 11 were male. All 15 participants were Caucasian. The ethnic composition of the study participants was not consistent with the school's demographic make-up; however, there were no students from other ethnic groups in the classrooms who met the criteria for participant selection.

All 15 participants were in the 10th grade for the first time. Their mean chronological age at the time of the study was 16.6 years (range = 15.3 to 17.4). Their mean IQ score was 99 (range = 80 to 113). The mean standard score on the WIAT subtest of written expression was 87 (range = 72 to 92), and the mean grade equivalent was 6.5 (range = 3.0 to 7.9). For all participants, writing performance was delayed by at least two years.

Design and Analysis

The effects of implementing the SRSD were assessed using a repeated-measures design. The eight probe conditions included (a) baseline, (b) pre-skill instruction, (c) modeling, (d) controlled practice, (e) independent practice, (f) post-instruction, (g) maintenance, and (h) generalization. A repeated-measures analysis of variance was conducted with follow-up trend and pairwise comparisons to determine which conditions were significantly different over time (Keppel, 1991).

Instructional Procedures

The lead author provided the instruction for the intervention and administered all writing probes with the exception of those administered in a world history resource class. Scripted administration directions were provided to the resource history teacher to ensure that procedures remained consistent across administrations and students. Lessons consisted of five sessions of 20-25 minutes each during 50-minute instructional periods.

Table 1
Participant Characteristics

Student	Grade	Age	Sex	Race	IQ[a]	WIAT(SS)[b]	WIAT(GE)[c]
Jeff	10	16.6	M	C	107	92	7.9
Allie	10	15.3	F	C	80	86	5.9
Phil	10	16.9	M	C	100	80	5.1
Don	10	16.3	M	C	93	92	7.9
Lara	10	16.6	F	C	95	92	7.9
Scott	10	16.8	M	C	103	92	7.9
Rhonda	10	16.5	F	C	107	92	7.9
Jake	10	16.1	M	C	91	72	3.0
Derek	10	16.3	M	C	93	80	5.1
Ed	10	16.7	M	C	101	92	7.9
Brian	10	16.9	M	C	113	88	6.9
Jim	10	17.4	M	C	104	88	6.9
Ken	10	16.4	M	C	104	76	3.9
Rita	10	15.10	F	C	82	84	5.9
Gary	10	16.7	M	C	110	92	7.9

[a] Full scale IQ score on the Wechsler Intelligence Scale-Revised.
[b] Standard score for the Written Expression subtest of the WIAT.
[c] Grade equivalent based on the scores from the Written Expression subtest of the WIAT.

Five lesson plans were developed and taught to all student participants. Two language arts special educators were asked to review the lesson plans and make suggestions for improvements. The teacher followed each lesson plan as written and was responsible for monitoring and checking off each part of the plans as they were completed.

Prior to implementing any strategy instruction, 26 essay topics were generated from the teacher's instructional material, other language arts teachers, and a review of writing exams used with previous classes. The two language arts special educators were asked to review the topics and evaluate each with respect to appropriateness, interest, and difficulty. Of the topics reviewed, four were determined unsuitable and therefore were not included in the study. Three language arts teachers who were not directly involved in the research randomly pre-assigned each of the essays to be used as probes throughout the study. Essays not used as probes were used during instruction as examples.

Students were provided with explicit instructions when asked to write on a given topic as follows. The teacher first asked students to clear their desks except for two pieces of lined paper and a pencil. Next, the essay topic was read aloud to the students and clarification was provided when questions arose. Last, the following instructions were given: "Based on the topic provided, write an essay." Feedback or assistance (spelling, idea generation, format, etc.) was not provided. Redirection was given if a student was not on task, and verbal praise was given when students had completed the task.

Self-Regulated Strategy Development Strategy Instruction

The current study replicated and extended work based on the SRSD model (Graham & Harris, 1989; Graham &

Harris, 1996). The students were trained in a small-group setting using a self-regulated development strategy to improve their writing skills. Similar to previous studies, students with LD were provided with a scaffolded strategy for planning essays and self-regulation of the strategy and writing process. The SRSD strategy consisted of six steps as outlined below.

Step 1: Develop background knowledge. The first stage of the SRSD strategy was to establish skills the students would need prior to learning the strategy. Instruction began with activities focused on defining, identifying, and generating the basic parts of an essay. Mnemonics have been used in previous research to help the students remember these components so that they will have a prompt to guide them through the writing process (Graham & Harris, 1989; Sexton, Harris, & Graham, 1998). A chart with the mnemonic device (DARE) was provided as a prompt for the basic framework for an essay. The menemomic device stood for (a) develop topic sentence, (b) add supporting detail, (c) reject arguments from the other side, and (e) end with a conclusion. Each step of the mnemonic device was explained and discussed as a group. Students practiced reciting DARE together and independently until they could recall it completely from memory. They were then guided by the teacher to determine details for a given topic and practice rejecting opposing arguments.

Step 2. Initial conference: Strategy goals and significance. The teacher reviewed the baseline probe scores with each student individually. This included examining the language arts scoring guidelines of the rubric used to score essay quality and the number of words written. The teacher explained the significance of setting goals and including all the basic components of an essay in their writing. Together, each student and teacher discussed the baseline results, which were provided numerically and graphed, to determine if the content and amount of content was sufficient. The students were asked to keep a folder with all of their essays and a graph plotting their performance. They were allowed to retain their writing folder for future use and reference after the study.

The primary variables of interest were number of words written and quality scores based on a scoring rubric used by the school district. Target goals for the instructional period were discussed and the criterion was established. Each student had varying target goals, depending on their performance. The goals were set at a minimum of a 25% increase on the number of words written. Students also set goals to improve the quality of their writing by earning at least two additional points on their quality score.

Students were introduced to the self-regulated strategy model by the use of a posterboard secured to the chalkboard. This visual prompt listed the three-step writing strategy: (a) Think, who will read this and why am I writing it; (b) Plan what to say using DARE; and (c) Write and say more. The strategy required students to think about their audience and the circumstances in which their essays would be read. It also provided them with an outline for their essay. The teacher began by explaining the components of the strategy and why each is important to their writing. Commitment to use the strategy was expressed by all participants.

Step 3: Modeling of the strategy. The three-step strategy was reviewed. One of the chosen essay topics was then read to the students. Utilizing the overhead projector, the teacher modeled the strategy by using a "think aloud" technique. As the essay was written, the teacher would constantly ask questions aloud to model what students should do themselves when they write. When the essay was completed, the purpose of self-instruction was introduced. The four main types as suggested by Graham and Harris (1989) were discussed: problem definition, planning, self-evaluation, and self-reinforcement.

Step 4: Memorization of the strategy. The students were given time to practice memorizing the three-step strategy and DARE. As part of the process, they were required to make a visual that they could keep in their writing folder to use as a prompt. In addition, they had to memorize the steps by either reciting them to the teacher or writing them on a sheet of paper. Students recorded the self-instruction statements in their writing folder and generated examples of each step. Examples of self-instruction questions included (a) problem definition ("What do I need to do?"); (b) planning ("OK, first I need to"); (c) self-evaluation ("Did I say what I really believe?"); and (d) self-reinforcement ("Great, this is a good reason") (Sexton, Harris, & Graham, 1998).

Step 5: Collaborative practice. Using the visuals of the three-step strategy and DARE as prompts, the students and the teacher wrote an essay using the overhead projector. The teacher led the direction of the composition, but otherwise it was mainly written from student input. Self-instruction procedures were used and encouraged. During this step, the responsibility of writing shifted from the teacher to the students. Individual student goals were reviewed at this time and modified as needed.

Step 6: Independent practice. The students composed two essays independently. Visual prompts were made available, but the students were encouraged to use them only if they felt it was necessary. Positive praise and feedback were given, but faded gradually.

Table 2
Rubric

I. FOCUS DEVELOPMENT

High Range 6-5	Mid Range 4-3	Low Range 2-1
____ Focus is strong and consistent.	____ Focus is easily identifiable.	____ Focus and/or main points are extremely limited or unclear.
____ Main points stand out in complete exploration of the topic.	____ Main points are clear but may be broad, simplistic, or inappropriate.	____ Support is irrelevant, insufficient, illogical, and/or non-existent.
____ All aspects of the task developed.	____ Most aspects of task developed.	____ Original writing is too limited to demonstrate development.
____ Supporting details are relevant and carefully selected.	____ Support is uneven, distracting, overused, broad, or limited in scope.	

II. ORGANIZATION

High Range 6-5	Mid Range 4-3	Low Range 2-1
____ Format fits the content and purpose.	____ Format is consistent but inappropriate.	____ Format is unrecognizable.
____ Introduction and conclusion are strong and effective.	____ Introduction and conclusion are unexceptional.	____ Introduction and conclusion are undeveloped or not present.
____ Transitions are effective among sentences, paragraphs, and ideas.	____ Transitions may be repetitive, stilted, or commonplace.	____ Transitions are lacking, ineffective, and/or overused.
____ Points are logically related throughout the response.	____ Points are logically related, but skeletal and/or rigid.	____ Relationship and sequence among points are unclear and/or ineffective.
____ Details fit where placed.	____ Details may not always be effectively placed.	____ Details are limited and/or randomly placed.

III. FLUENCY

High Range 6-5	Mid Range 4-3	Low Range 2-1
____ Sentence structure enhances relationships among ideas.	____ Sentence structure requires rereading to clarify ideas.	____ Sentence structure frequently obscures meaning.
____ Sentence structure is effectively varied with fragments used only for effect.	____ Control is present in simple but not complex sentence structure.	____ Sentence patterns are simple, monotonous, and/or confusing.
____ Fluency is demonstrated with one sentence flowing into the next.	____ Repetitive sentence structure may detract from flow of ideas.	____ Choppy or rambling sentence structure damages the flow of ideas.
____ Use of words is accurate, specific, and/or varied.	____ Use of words may be accurate and specific with some exceptions.	____ Use of words is imprecise, inadequate, or wrong.
____ Language is carefully placed for impact.	____ Language may rely on overused expressions.	____ Original writing is too limited to demonstrate sentence fluency and word choice.

IV. CONVENTIONS

High Range 6-5	Mid Range 4-3	Low Range 2-1
____ Both internal and end-of-sentence punctuation are used effectively.	____ End-of-sentence punctuation may be correct; internal errors are common.	____ Basic punctuation is omitted, inconsistent, or incorrect.
____ Spelling of both common and difficult words is correct.	____ Spelling errors, even in common words, may distract the reader.	____ Frequent spelling errors impair readability.
____ Capitalization is correct.	____ Capitalization is sometimes incorrect.	____ Capitalization is inconsistent, incorrect, or random.
____ Paragraph breaks reinforce organizational structure.	____ Paragraph breaks may run together or occur too frequently.	____ Paragraph breaks bear no relation to the organization of the text.
____ Correct grammar and usage contribute to clarity.	____ Errors in grammar and usage distract the reader.	____ Errors in grammar and usage interfere with or prevent meaning.
____ Proper citation of sources is evident.	____ Occasional lapses in citation of sources occur.	____ Little or no citation of sources is present.

Maintenance and Generalization Component

A maintenance probe chosen from the randomly assigned essays was administered two weeks after post-testing. The goal of cognitive strategy instruction is to not only apply the strategy during the class where it is prompted, but to effectively use it in the future as well as across settings and subject matter. After the strategy instruction had been taught and mastered, the teacher explained how it could be generalized to other classes and on standardized exams in the spring. Practice exam essays from the students' 10th-grade world history class were administered two weeks following the administration in the social studies classroom.

Instructional Validity

To ensure that all procedures were implemented as planned, the researchers followed two protocols. First, the teachers involved with the essay selection were trained in the language arts curriculum used by the school system and were knowledgeable about the writing skills expected of students in the 10th grade. Lesson plans and essays were developed based on their expertise in the area of writing. Lesson plan checklists were also completed to document when items had been instructed and completed.

Data Collection

When administering the writing probes, the teacher states the essay topic and the following directions, "Based on the topic provided, write an essay." Clarification on the topic was provided when requested. The students were allowed to only have two pieces of lined paper and a pencil on their desk. The teacher did not provide assistance (spelling, idea generation, format, etc.) or offer feedback. Redirection was given, however, if a student was not on task. The students had 15 minutes to write each of the essays. After 14 minutes into the essay, the students were given a 1-minute warning and were asked to complete their last thought or sentence. When time was over, the teacher directed all students to place their pencils on their desks.

Scoring Procedures

Writing samples were scored based on length and quality.

Length. All essays were scored for the number of words written. The total number of words included any word that represented a spoken word, regardless of spelling errors. Essay length was first determined by the teacher, and then independently scored by a second resource language arts teacher. Reliability was scored on all essays. Reliability was calculated by dividing the number of agreements by the sum of agreements plus disagreements. On the scoring of essay length, reliability was above 80%.

Table 3
Mean and Standard Deviation for the Number of Words Written Within Each Condition

Baseline		Baseline		Pre-Skills		Modeling		Controlled		Ind.		Post		Maint.		Gen.	
Time 1		Time 2		Time 3		Time 4		Time 5		Time 6		Time 7		Time 8		Time 9		Time 10		Time 11	
M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
95	8	95	11	97	8	106	10	115	9	142	13	122	10	126	9	133	9	128	10	130	11

Table 4
Mean Difference in the Number of Words Written for Each Condition and Time

Condition	Time	1	2	3	4	5	6	7	8	9	10	11
Baseline	1		2.6	2.3	10.9*	20.5*	47.7*	27.6*	30.9*	37.9*	33.8*	35.8*
Baseline	2			.33	8.3	17.9*	45.1*	25*	28.3*	35.3*	31.3*	33.2*
Baseline	3				8.7*	18.2*	45.4*	25.3*	28.6*	35.6*	31.6 *	33.5*
Pre-Skills	4					9.6*	36.8*	16.7*	20*	27*	22.9*	24.9*
Modeling	5						27.2*	7.06	10.4	17.4*	13.3*	15.3*
Cont. Practice	6							20.1*	16.8*	9.8	13.8*	11.9*
Ind. Practice	7								3.3	10.3	6.2	8.2
Ind. Practice	8									7	2.9	4.9
Post-Instruction	9										4.1	2.1
Maintenance	10											1.9
Generalization	11											

* <.05.

Quality. When scoring the essays for quality, a rubric designed and used by the school district was applied (see Table 2). The essays were scored by the lead author and a special education teacher who taught resource language arts. Both were trained by the school district to evaluate compositions with the rubric used in this study. The rubric consisted of four sections: Focus and Development, Organization, Fluency, and Conventions. The lead author and a second language arts teacher read the essays and scored them on a 6-point scale, with 1 representing the lowest quality indicator and 6 representing the highest quality. When the graders gave scores that were considered adjacent, an average of the two scores was recorded. If the graders gave scores that were discrepant, a third reader equally qualified was called in for a third read. His or her score was then averaged with the previous two scores. Discrepant scores occurred less than 2% of total reads.

RESULTS

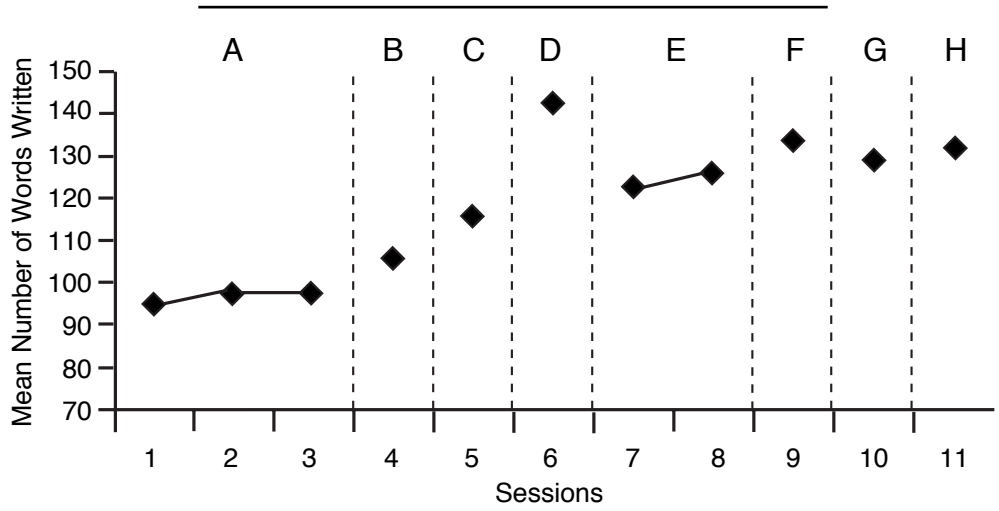
Results for Word Production

Table 3 presents the descriptive statistics for each time data were collected by the condition being implemented. Because the test for sphericity was nonsignificant, no correction procedure was used in conducting the repeated-measures analysis of variance (ANOVA). A significant main effect for conditions was found using a repeated ANOVA each time of assessment with the various conditions as the repeated factor, $F(10, 140) = 19.9$, $p = .000$.

Given the significant main effect for time, follow-up trend analysis and pair-wise tests using least-significant difference (LSD) procedures were conducted to determine which conditions were significantly different. A significant linear trend was observed indicating a linear relationship between conditions and number of words written, $F(1, 14) = 164$, $p = .000$, with time accounting for 92% of the variance.

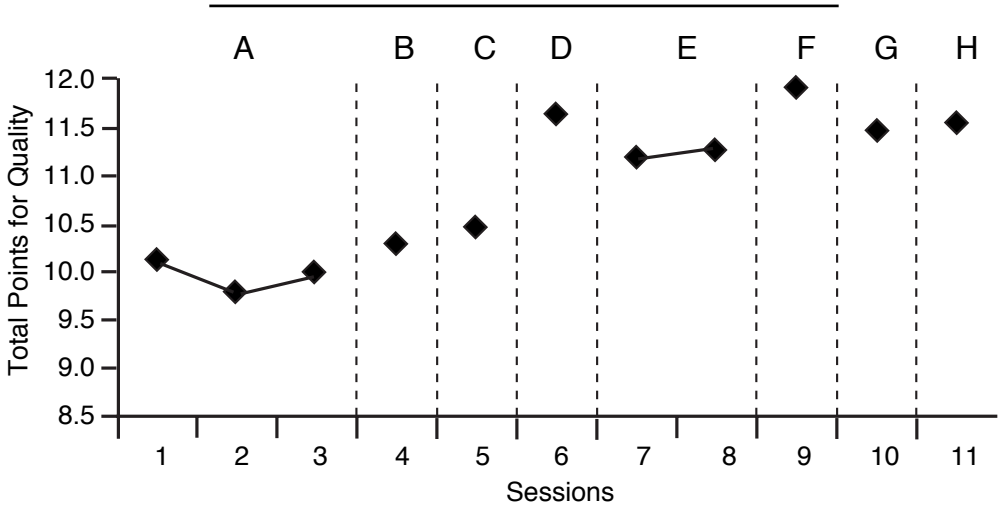
Table 4 provides an overview of the difference score for each time data were collected by the condition being implemented. None of the three baseline conditions was significant, verifying that the baseline represented an accurate indication of student performance before intervention. With the exception of time 4, in which two of the three baseline conditions were significant, each of the subsequent intervention, maintenance, and

Figure 1. Conditions in the repeated-measures design by session for mean number of words written on essay probes.



Probe Conditions
A = Baseline; B = Pre-Skill Training; C = Modeling; D = Controlled Practice; E = Independent Practice; F = Post-Instruction; G = Maintenance; H = Generalization.

Figure 2. Conditions in the repeated-measures design by session for total number of points on qualitative rubric.



Probe Conditions
A = Baseline; B = Pre-Skill Training; C = Modeling; D = Controlled Practice; E = Independent Practice; F = Post-Instruction; G = Maintenance; H = Generalization.

Table 5
Mean and Standard Deviation for the Quality of Essay Within Each Condition

Baseline		Baseline		Pre-skills		Modeling		Controlled		Ind.		Post		Maint.		Gen.	
Time 1		Time 2		Time 3		Time 4		Time 5		Time 6		Time 7		Time 8		Time 9		Time 10		Time 11	
M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
10.1	3.1	9.8	3	10	2.8	10.3	3	10.5	2.7	11.6	2.9	11.2	2.6	11.3	2.7	11.7	2.8	11.5	3	11.5	2.9

generalization conditions were significant when compared with baseline conditions. The pre-skills condition was significantly different from each of the subsequent conditions. Modeling was significant with each condition except for one of the two independent practice conditions. Controlled practice was not significant with the post-instruction probe; however, significant differences were observed for both the maintenance and generalization probes. Figure 1 provides a graphic overview of the conditions.

Results for Quality of Essay Probes

Table 5 provides an overview of the descriptive statistics for the quality of the responses generated from the essay probes. A repeated-measures ANOVA was conducted to examine differences between points in time. Like word production, the test for sphericity was nonsignificant, and sphericity was assumed. The repeated ANOVA revealed a significant main effect, indicating that quality improved over time, $F(10, 140) = 21.5$, $p = .000$. Follow-up trend analysis revealed a linear trend, $F(1,14) = 115.9$, $p = .000$, with an eta squared explaining 89% of the variance. Follow-up pair-wise comparisons using LSD procedures indicated a similar significant difference between baseline conditions (i.e., time 1, 2, and 3) and subsequent conditions starting at time four. Figure 2 provides a graphic overview of the linear growth demonstrated by intervention, maintenance, and generalization conditions when compared to baseline.

DISCUSSION

Written expression is a fundamental skill for today's high school students. Those who lack the ability to adequately demonstrate conceptual knowledge and communicate their thoughts and beliefs in writing are at a grave disadvantage. Being facile with written language and writing is required to pass state and district exams, advance from grade to grade, and to graduate from high school. An alarming number of students with learning disabilities struggle to develop writing skills sufficient to satisfy these crucial benchmarks.

The purpose of this study was to extend prior research on the use of strategy instruction for planning and writing essays using self-regulation. Specifically, the study aimed to provide an effective means for improving students' writing, resulting in modest improvements in both quality and quantity of writing. Prior to the intervention, the student participants' performance and test scores indicated a considerable weakness in writing. Thus, when given an essay topic, many students generated essays of poor quality. Using studies by Graham and Harris (1989; 1996) as a guideline, a SRSD intervention was applied. The results of

the study indicated students benefited from an approach to writing that helped them develop strategies for brainstorming, semantic webbing, setting goals, and revising.

The word production and quality of students' essays increased following strategy instruction. It is important to note that for both dependent measures, there was little or no overlap in participants' word production and quality of essays prior to intervention, compared with their performance throughout the instructional, maintenance, and generalization phases. The majority of growth was in word production. While there was an increasing trend across conditions for the quality measure, the improvement was not as pronounced. A more sensitive measure of progress such as scoring the number of thought units might yield better results.

The study has several limitations. Most notably, there was no control group. In addition, the participants were a "sampling of convenience." Neither random sampling nor random assignment occurred. Another limitation is the way in which data were used. Data collected from student essays were shared with and graphed by students as part of the intervention. This presents a potential confound, as those same data were also used to evaluate the results of the intervention. Pre-post standardized measures of writing and written expression may have strengthened the results. Further, despite the range of ethnicity within the school, only students that were Caucasian were included in the study based on the requirements chosen by the author. As such, caution must be used in generalizing the results. Further research on strategy instruction across a range of cultures is needed to substantiate its effectiveness for students with LD.

Much of the published research to date regarding written expression has focused on elementary and junior high/middle school-aged students. Considering the increased writing demands at the high school level, coupled with current "high-stakes" accountability systems that often rely on written language to measure student achievement, there is a compelling need for more research on how to improve the written language skills of high school students. Research is particularly needed on strategies capable of improving the written language skills of secondary students with learning disabilities.

Despite clear limitations, the findings of the study are promising and add to a growing body of research supporting the use of strategy instruction to improve the writing performance of students with LD. Future research studies should examine a broader range of students, consider dependent measures that may be more sensitive to growth or changes in writing quality, and employ designs that would allow stronger conclusions to be drawn. In particular, studies using randomized treatment-control group designs with high school-aged students with LD are warranted.

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