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The Effect Of Prewriting Strategy Instruction On The Written Products Of High School Students With Learning Disabilities

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THE EFFECT OF PREWRITING STRATEGY INSTRUCTION ON THE WRITTEN PRODUCTS OF HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES

by

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ABSTRACT

We know that many students with learning disabilities struggle throughout their school years with the writing process. High school is no exception. Writing is a life skill that can directly impact the quality of life for older students preparing to graduate and progress to college, a career, or simply the world of work. A need in society exists to improve the writing of all students including those who are on the threshold of high school graduation.

Students with learning disabilities enter their ninth year of school with a performance gap of 4 to 5 years placing their equivalent learning in the late elementary years. Few studies however have investigated the impact of explicit written expression strategy instruction for students with mild disabilities in high school. Thus, expanding the knowledge base for this group of students becomes especially critical.

The present study examines the effects of explicitly teaching a writing strategy to high school students with learning disabilities. A multiple baseline design across subjects was used to observe changes in student writing. A total of 11 students in three subject groups participated in the study. Eleventh grade students in three learning strategies classes were pretested to determine the level of their organizational skills for written products. Scoring criteria were described to students using a written expression rubric to provide them with the specific expectations for their daily writing. Mind-mapping, an organizational strategy for writing, was explicitly taught to each of three classes during their daily learning strategy period. Data were collected relative to the students' rubric scores and visually inspected for changes in writing performance before, during, and following the strategy instruction. Pre- and post-tests were administered to the student

groups. Following data collection and the post-test, interviews were conducted with the teacher and each of the participants.

Findings indicate that the mind-mapping intervention had limited success in improving students' written products when measured by the multiple baseline across subjects design. Pre- and post-test data, however, show that writing quality certainly did improve. The participants' teacher specifically noted during her interview that, in her perception, improvements in student writing as a result of using the mind-mapping strategy did occur. The teacher also felt strongly enough about the efficacy of the mind-mapping intervention that she plans to teach the strategy to her future students. Most of the students reported during their interviews that they felt that learning mind-mapping helped them to become better writers. The vast majority of students also stated that they planned to use the strategy for tests and writing assignments.

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INTRODUCTION

Written expression is a complex process that is especially daunting for students with learning disabilities (LD). For many students, including those who are either learning disabled or non-learning disabled, written expression is an extremely difficult skill to master (Walker, Shippen, Alberto, Houchins, & Cihak, 2005). The process of writing places significant cognitive demands upon the individual limiting the capacity of any writer to produce text (Torrance & Galbraith, 2006). Recent findings of the National Assessment of Educational Progress show that even the *average* American student is writing at less than mastery (Persky, Danne, & Jin, 2003). For students with even mild disabilities, producing cohesive written products can be especially difficult. In fact, the investigations of a number of researchers have indicated that students with LD write poorly compared with their non-disabled peers (e.g., Englert, Raphael, Anderson, Anthony, & Stevens, 1991; Gersten & Baker, 2001; Graham & Harris, 1997). However, to succeed in the information age in which we live, students must have the skills for effective communication through writing (Hall & Kennedy, 2006).

For students with LD, the efforts required for competently producing written products are quite significant (Englert et al., 1991; ERIC/OSEP Special Project, 2002). Students with disabilities struggle with not only basic writing skills such as spelling, sentence formation, capitalization, and handwriting, but also with the cognitive processes of writing such as planning, organization, and writing (Schumaker & Deshler, 2003).

Significantly improved student outcomes have been realized through the explicit teaching of writing skills and strategies for students with LD (De La Paz & Graham, 2002; Graham & Harris, 1993). However, the writing instruction delivered in most classrooms may not adequately

prepare students with LD for a strategic approach to the writing process. Without a strategic approach, "children do not effectively orchestrate, monitor, or adapt the cognitive, linguistic, and physical operations inherent in composing texts for a variety of purposes and audiences" (Troia, 2002, p. 250). The limited emphasis on explicit strategy instruction in typical classrooms may have an especially detrimental effect upon the written expression of students with LD. However, it has been shown that the performance of students who have LD can be positively impacted through the use of well designed instructional methods (Schumaker & Deshler, 2003). As student knowledge of the writing process increases, more sophisticated strategies are utilized, and the writing quality improves (Graham & Harris, 1993). Thus, research efforts to increase the understanding and impact of explicitly teaching specific writing strategies are necessary to help improve the outcomes of students with LD.

The writing process has been described in term of stages which include planning, translating plans into sentences, and reviewing (Torrance & Jeffery, 1999). Writing is not, however, a linear process. Producing written products has been described as a recursive process during which writers may repeatedly revisit the stages to rethink their planning, translate, or review their composition (Flower & Hayes, 1980).

Prewriting is a strategy for planning for the components of a written product. Planning for writing provides a strategic framework for organizing students' work: an external memory, which they can call upon while completing their work. When a memory aid is utilized, the students' working memory is freed to allow space for phrases, sentences, images, or other information critical to the process (Flower & Hayes, 1980; Kellogg, 1990). Researchers have shown that overburdening the working memory inhibits the writing effectiveness (Benton, Kraft,

Glover, & Plake, 1984). Thus, reducing cognitive overload for students with disabilities through the use of prewriting strategies may significantly improve their writing performance.

Students with LD, however, spend little or no time planning before beginning to write (Graham, Harris, & Troia, 2000a). They, in fact, frequently view the planning process as worthless and do not use planning strategies during the writing process (Chalk, Hagan-Burke, & Burke, 2005). MacArthur and Graham (1987) studied fifth- and sixth-grade students with mild LD and found that they averaged less than one minute of advance planning time before beginning their writing. Rather than spending time planning, student writers with LD rely on the generation of written content by using a relevant idea generated from memory.

Such writing behavior is described by Bereiter and Scardamalia (1987) as a knowledge-telling model. The knowledge-telling model describes the products of beginning writers wherein they generate content in a stream-of-consciousness manner rather than using an explicit set of strategies for composition. Writers at this stage use the writing prompt as a topic cue and their own memory to focus their initial thoughts. The written response may not, however, be appropriate if the writer cannot retrieve the information from available memory. The writing output also depends upon the prior knowledge of the writer. Written work builds by adding subsequent sentences from the ideas generated by each prior sentence (Scardamalia & Bereiter, 1986). Knowledge-telling is contrasted with more sophisticated writers who not only draw knowledge from memory, but also compose fully developed thoughts through planning and revision.

The process of writing can be seen as a series of reflective thoughts that transform the knowledge into fully developed concepts rather than simply expressing thoughts in the order that they are retrieved from the writer's memory (Kellogg, 1994). In other words, planning is the

process of "working through the task at an abstract level in advance of working through it at a more concrete level" (Bereiter & Scardamalia, 1987, p. 192).

Current Educational Climate

The field of education has found itself immersed in an era of accountability. With accountability comes an increased focus on specific academic skills. The 2004 Reauthorization of the Individuals with Disabilities Education Improvement Act (IDEA) mandates that students with disabilities be included in district and state assessments. As a result, writing instruction has become an essential element in the success of students at the secondary level. State and district assessments often determine whether students pass on to the next grade level or are retained (Marchant, 2004). In fact, seven states require that their students pass a test to be promoted to the next grade (National Education Association, 2001). Furthermore, to graduate with their non-disabled peers, students with mild disabilities are expected to meet the same standards (Schumaker & Deshler, 2003).

Currently, twenty-two states require students to pass an exam in order to receive a high school diploma and three additional states are phasing in exit examinations (Kober et al., 2006a). A report by the Center on Education Policy (2006) found that in 2006, exit exams affected 65% of the nation's high school students attending public schools. The report also found that the exit examinations expected to be added by the three additional states by the year 2012 will test 71% of public high school students and 81% of minority public high school students. Nineteen states require students to respond to a writing prompt as part of the exit exam requirements (Kober et al., 2006b). The ability to write polished, expansive, coherent, and effective products has become especially critical for students who must pass state and district assessments before advancing in grade level or to graduate from high school.

Students with disabilities who hope to be college bound should be prepared to demonstrate their written expression abilities to earn a standard high school diploma (Chalk et al., 2005). In addition to grade level advancement, every student who desires to attend college must have written communication skills equivalent to the requirements of admission tests and classroom expectations of the institution. There is no differentiation in the admission process for individuals with disabilities.

Testing is frequently a determinate in which college a student will attend (Marchant, 2004). The three most commonly used college admission tests include the SAT Reasoning Test (SAT), the ACT, and the Graduate Record Examinations (GRE). Each test includes a writing component (ACT, 2007; Educational Testing Service, 2007; The College Board, 2007). While writing sections of the SAT and the GRE are compulsory, the ACT writing section is an optional component. The focus upon testing writing has been increasing in recent years. For example, the GRE Writing Assessment was introduced in 1999 and the SAT began administering the writing section of the test in March, 2005. As the importance of writing skills for college admittance increases, the written expression skills of students with mild disabilities must be enhanced to increase the likelihood of their successful advancement to post-secondary institutions.

Concurrently, in an effort to improve student outcomes in public schools, a greater emphasis has been placed on including students with LD in general education classrooms. Specifically, the 2004 Reauthorization of the Individuals with Disabilities Education Improvement Act (IDEA) mandates that students with disabilities participate in the general education curriculum. As recently as 2002, approximately 75% of all students in special education spent 40% of their school day in general education (SPeNSE, 2002). In an attempt to ensure adequate services for individuals with disabilities, the service delivery model shifted

away from a process approach to focus on improving student outcomes (Schumaker & Deshler, 2003). As a result, the number of students in special education being educated in the general education curriculum has increased (U.S. Department of Education, 2004a). While the movement towards providing positive outcomes for students has led to increased emphasis upon improving skills in literacy (Hall & Kennedy, 2006), students with LD are at significant risk without a firm grasp on the writing process. This emphasis on inclusion now necessitates that students demonstrate a greater capacity for written expression.

The effect of increasing inclusion for students with LD in general education classrooms has been to place appropriately high demands on students with disabilities. However, students with LD possess a limited set of strategies often leading to their struggling with the demands of the inclusive classroom. For example, mastery and competence in core subjects is demonstrated through expository writing (Wallace & Bott, 1989). So all students, including students with disabilities, must be competent writers to be successful.

Thus, as accountability for student performance increases, standardized tests that include writing components are becoming more prevalent. As the advancement of tests that determine grade placement or graduation continues, and the number of inclusive classrooms increases, teaching students the process of expressive writing becomes more imperative.

Written Expression for Secondary Students

The expectations for the written expression products of secondary students are significantly different than for students in elementary grades. Not only is a greater volume of expressive writing expected of students at the secondary level, but there is a significant increase in the level of abstraction required in the written products (Indrisano & Squire, 2000). Writing is expected to become more sophisticated as students move out of the elementary school years and

into middle and high school (Harris & Graham, 1996). Writing across the curriculum also is more prevalent. Subject areas once devoid of written expression such as math, science, and social studies now require that students use their writing skills more effectively (Applebee, 2000).

Another difference for students in secondary classrooms is the change in instructional focus for written expression. Writing at the elementary level is taught as a core subject while at the secondary level writing is used for demonstrating accumulated knowledge (Platt & Olson, 1997). A shift occurs in the English curriculum in grades 5-12. Curriculum for older students includes more knowledge-based themes such as literature, language, composition, speaking and listening, critical thinking, and vocabulary development (Glatthorn, 1988). Less emphasis is placed on the direct teaching of writing strategies in secondary schools. Rather, writing is generally used to convey knowledge and mastery of curriculum. By the time students reach middle or high school, effective utilization of written expression skills is critical, though the act of teaching writing has diminished (Applebee, 2000).

Purpose of the Study

Adolescents at the secondary level are in an especially risky position without a stable foundation in written expression. Without a firm grasp on the process of composing a written product, students with LD are at a significant disadvantage to their non-disabled peers since expressive writing is an essential skill for success in high school and beyond. It is critical that students be competent in their ability to communicate their conceptual knowledge in a meaningful way through written expression (Chalk et al., 2005). To communicate their knowledge of content, secondary students also are required to compose longer documents with more complexity and incorporate information from a variety of sources into their written

products (Sturm & Rankin-Erickson, 2002). Given the increasing expectations for sophisticated writing in middle and high school, struggling writers require a variety of support mechanisms and explicit instruction (Harris & Graham, 1996).

Secondary students also must prepare for graduation. Without adequate writing skills, there are significant implications for students with mild disabilities who desire to graduate with a standard diploma. Graduation requirements frequently mandate that students demonstrate minimum competencies to pass state and district assessments (Chalk et al., 2005). State and district assessments have become more prevalent in recent years (Lagenfeld, Thurlow, & Scott, 1997) and the requirements for passage have become more stringent. In fact, nearly two-thirds of the nation's public high school students are affected by exit examinations (Kober et al., 2006a).

In addition, the amendments of PL105-17 and the Title I provisions of the No Child Left Behind Act of 2001 mandate that, whenever possible and with appropriate accommodations, students with disabilities must be included in state and district standardized assessments (Cronis & Ellis, 2000; Thompson, Lazarus, & Thurlow, 2003). It is necessary then that the written expression skills of secondary students with LD meet the rigor of content classes, graduation requirements, and assessments mandated by states and districts.

Students with LD who are learning with their non-disabled peers require a cache of effective strategies to allow them to succeed. Research has shown that the performance of students who have LD can be positively impacted through the use of well designed instructional methods (Schumaker & Deshler, 2003). Students with LD benefit from learning specific skills as taught through explicit interventions. Strategic interventions can successfully be applied by teachers in content area classes to increase the success of students with LD in the general curriculum (Deshler et al., 2001). Explicitly teaching research-based strategies is imperative for

improving student outcomes across content areas. Thus, research efforts to increase the understanding of specific strategies is necessary to improve the outcomes of students, including students with disabilities at the secondary level.

The current investigation was conducted in a high school setting with students who had been diagnosed as LD. The study sought to provide a deeper understanding of the impact of explicit strategy intervention upon the written products of high schools students with learning disabilities.

Rationale

Though a rich undergirding of research has been accumulated over the last three decades related to written expression strategy instruction (Gersten & Baker, 2001), there has been a dearth of studies analyzing strategies and interventions presented to students at the high school level. The emphasis of the majority of research dealing with written expression has studied young writers in both elementary and middle school (e.g., Christenson, Thurlow, Ysseldyke, & McVicar, 1989; De La Paz & Graham, 1997; Englert et al., 1995; Englert, Wu, & Zhao, 2005; Graham, Harris, & Mason, 2005; Hudson, Lane, & Mercer, 2005). Graham (2006) completed a meta-analysis of 39 studies: 20 large group and 19 single-subject design studies. Of the studies examined in his meta-analysis, only two large group studies and two single-subject studies included high school students in their samples. This phenomenon should be expected considering that the majority of writing strategy instruction takes place in the early years of school.

We know that students with LD often struggle with writing throughout their school years. High school is no exception. Given that few studies have investigated the impact of explicit strategy instruction for students with mild disabilities in high school, expanding the knowledge base for this group of students becomes especially critical.

Research Question

The present study investigated the effects of prewriting strategy instruction on the written products of high school students with LD. A multiple baseline, across-subjects design was used to systematically compare the efficacy of a prewriting strategy between students. The following research question was investigated: What are the effects of mind-mapping strategy instruction on the written products of high school students with LD? The current study considered the effects of a strategy explicitly taught to high school students with LD to help them improve the quality of their written products.

Definition of Terms

The following terms are defined as they are used in this study.

Cognitive capacity: A cognitive resource that is shared between resource-demanding processes (Fayol, 1999; McCutchen, 1996)

Compositional fluency: The number of words produced in a written product (McCutchen, 2006).

Learning Disabled: Students who participated in the study had a diagnosis of Learning Disabled as defined by the Florida Department of Education: "A disorder in one or more of the basic psychological or neurological processes involved in understanding or in using spoken or written language. Disorders may be manifested in listening, thinking, reading, writing, spelling, or performing arithmetic calculations." (Florida Department of Education, 2007).

Expressive writing: Writing for the purpose of displaying knowledge or supporting self-expression (Graham & Harris, 1989a).

Holistic rubric: A scale for evaluating written products that lists the specified criteria for a student writing assignment using graduating levels of quality. The holistic rubric included three

elements (a) focus, (b) organization, (c) and development. Each domain of the rubric had an anchor statement or series of statements to describe the level of proficiency necessary to obtain the score for that level.

Holistic scoring: Using a holistic rubric to evaluate a written product where the composition is considered as a whole without focusing on a single element of the rubric (Florida Department of Education, 2001a).

Narrative writing: This type of writing describes a personal or fictional experience or may tell a story. The description may be based on a real or imagined event (Florida Department of Education, 2001a).

Mind-map: A non-linear prewriting technique that yields a visual representation of the writing task in graphic form. Graphic shapes such as circles and rectangles are connected by lines to represent the main and subordinate ideas in the prompt and are used to represent the text structure for the organization and generation of written products. This strategy is also known as cognitive mapping, flowcharting, clustering, semantic mapping, and graphic organizers (Kellogg, 1994; Sturm & Rankin-Erickson, 2002).

Planning: One cognitive phase of the writing process during which writers set goals, collect and organize ideas, and consider alternatives. Planning is a fluid process during which ambiguities and inconsistencies are considered, dismissed, or incorporated into the written product. The planning phase can range from the use of nonverbal imagery to graphical or textual representations. Planning is part of the recursive process of writing and is not necessarily executed only at the beginning of the process. (e.g., Bereiter & Scardamalia, 1987; De La Paz, 2005; Flower & Hayes, 1980; Hillocks Jr., 1995; Kellogg, 1994; Sturm & Rankin-Erickson, 2002).

Prewriting: A reflective system of planning used prior to beginning the written draft and that is used throughout the writing process to enhance organization wherein a broad view of the process relative to the final product is considered (Kellogg, 1994). Prewriting is often referred to in the literature as synonymous with planning (e.g., Graham, MacArthur, Schwartz, & Page-Voth, 1992; Zipprich, 1995). However, for the purposes of this study, prewriting was considered a sub-step of planning which occurs before and during the writing process.

Recursive: Writing is not a linear sequence of stages. Rather, writing is a process during which phases recur and are revisited an indefinite number of times (Hayes & Flower, 1980).

Scribe: A student provides a verbal response to an individual who translates the student's answer to written form; it is often used for writing extended responses on state assessments (Lazarus, Thurlow, Lail, Eisenbraun, & Kato, 2006).

Self-regulation: Self-regulatory strategies "…are strategies for managing one's own cognitive behavior during writing"(Bereiter & Scardamalia, 1987, p. 249).

TOWL-3: For the purposes of the current study, TOWL-3 will refer only to subtest 8 Story Construction (Hammill & Larsen, 1996).

Working memory: "the temporary storage of information that is being processed in any range of cognitive tasks" (Baddeley, 1986, p. 43)

Writing day: A writing day for the current study is defined as one of the days occurring during the four phases (pre-baseline, baseline, intervention, post-intervention) on which students wrote an essay for 15 minutes in response to a posted prompt.

Writing process: Phases necessary for the production of a written composition.

Written products: Compositions produced by students during the course of this study.

CHAPTER TWO:
REVIEW OF LITERATURE

A review was conducted examining the research and professional literature relative to this study. The chapter begins with an overview of the writing characteristics of students with LD. Cognitive capacity theories will next be examined for pertinence to written composition followed by a review of research related to self-regulation, effective writing intervention strategies, and explicit instructional strategies. An emphasis will be placed upon research utilizing mind-mapping and related strategies. Finally, the chapter concludes with a discussion of the relevant historical perspectives of written expression research for students with LD.

Factors Affecting the Composition of Students with Learning Disabilities

Students with disabilities make up approximately 11% of the school-age population. Nearly half (2,866,908) of the over 6 million students with disabilities who receive services are students with LD (U.S. Department of Education, 2004b). Students with LD frequently lag behind the performance of their non-disabled peers. They enter high school with an achievement level equivalent to the 4^{th} or 5^{th} grade which translates into a performance gap of at least five years (Deshler et al., 2001). A performance gap of this magnitude necessitates that high school students with LD be taught specific strategies to assist them to become successful in reducing or eliminating the deficits in their achievement levels.

Students with disabilities must write effectively to be successful across educational settings. To face the intense performance demands placed upon all students, students with LD must develop an array of skills to improve their chances for success in all content areas. Content literacy is defined by Lenz and Ehren (1999) as the fluent application of specific strategies and skills such as listening, speaking, reading, and writing necessary for success in content areas.

An abundance of writing strategies have been studied with many proving to be successful for students with LD. However, teachers can realistically apply only a limited number of strategies in their classrooms. Teachers simply do not have enough time to utilize all available strategies. Additionally, the time demands for teaching children the essential elements of the curriculum limit the number of strategies that can be taught to students. Thus, it is important that interventions for students with LD be clearly focused to provide the most significant impact on improving performance in the classroom.

Writing Characteristics of Students with Learning Disabilities

The expressive writing process is fraught with difficulties due to the complex nature of the process (Marchisan & Alber, 2001). Students with LD consistently exhibit several characteristics relative to the complexity of the writing process. The problems that students with LD experience have a great deal to do with their frequent inability to direct the appropriate cognitive resources towards the process of composing rather than the lower-level skills required for the mechanical construction of text (Berninger, 1999). For example, students with disabilities often exhibit limitations in their attention span, perception, and memory (Troia, 2002). These critical factors contribute to their limited capacity to apply learning to various tasks such as writing. Berninger (1999) compared writing to a juggling act in which the writer must attend to "multiple simultaneous goals". The goals to be balanced can include planning, sentence formation, text production, and revision.

Confounding problems for struggling writers with LD include the transcription demands of writing such as spelling, sentence formation, capitalization, and handwriting that often overshadow the writing process itself (Baker, Gersten, & Scanlon, 2002). Students with LD also

generate shorter compositions, make more errors in word usage, and have less legible handwriting than their non-disabled peers (De La Paz, 1999; Graham, 1990).

Transcription Skills

One of the problems students with LD consistently demonstrate with written discourse is difficulty with transcription skills. Transcription skills are those processes necessary for generating text such as spelling and handwriting. For students who have difficulty with the mechanics of writing, the functions of planning and composition can be compromised as a result of the mechanics interfering with higher-order writing processes (Graham, 1990).

Transcriptions skills can interfere with the writing output of students for whom their difficulty with mechanics overshadow their ability to communicate effectively. For example, a student who must accurately answer written response items on state assessments, needs to be able to communicate by writing. If the student's writing skills are inadequate, the test may not accurately measure the student's achievement level (Thurlow & Bolt, 2001). Students with disabilities who are included in state assessments are often afforded accommodations prescribed by their Individual Education Plan (IEP).

The switching of attention from sentence development to the mechanical skill of spelling may cause the student to lose the plans for writing that had been held tenuously in working memory. Bereiter and Scardamalia (1987) emphasize that attending to low-level tasks such as spelling and handwriting can interfere with the ability to attend to higher-level tasks such as planning and organizing. They concluded that "freeing children from concerns about written language mechanics improved the quality of their writing" (p. 110). Thus, for students with LD, the complexities of the writing process can be particularly daunting due to the skills required for balancing both mechanical and cognitive demands necessary for both low- and high-level

functions. The strain of such cognitive resource demands can reduce the quality of student writing.

Dictation

Dictation can be used as an accommodation to help students with disabilities reduce the cognitive demands of transcription skills. The most frequently applied accommodation for the writing component of high-stakes tests is the use of a human scribe (Lazarus et al., 2006). The scribe records the student's dictated answers to test questions that require extended responses. Currently, 33 states allow the use of a scribe as an accommodation for written response items (Lazarus et al.). The use of a scribe demonstrates one method for overcoming students' difficulties with transcriptions skills.

The issues relative to the mechanics of writing have been investigated by using dictation to compose essays. To isolate the interference due to the mechanics of writing from the effects of rate of production, Scardamalia, Bereiter, and Goleman (1982), studied the results of composing essays under three different production modes: normal dictation, writing, and slow dictation. They worked with fourth- and sixth-grade students who did not have LD. The amount of text generated and the quality of their compositions were measured. Initially, the students' rate of writing was established. Under the slow dictation condition, the students dictated their compositions according to their predetermined rate of writing production. Scardamalia and her colleagues were able to compare the effects of mechanical interference by comparing their writing to the results of the slow dictation condition since the production rates were equivalent. It also was thought that isolating the effects of mechanics on the rate of production could be accomplished by comparing the normal dictation and slow dictation since the mechanical demands were similar. Normal dictation was about five times faster than either the writing or

slow dictation production modes. Results indicated that both rate and mechanics influenced the quantity of text generated. The longest compositions were produced under the normal dictation mode. Intermediate length compositions were generated using slow dictation while the least amount of text was produced in the writing condition. So, Scardamalia and her colleagues concluded that low-level tasks may make a difference in the quantity of text production. Quality, however, was not influenced by either rate or mechanics. The impact of mechanics upon the quality of compositions for intermediate grade students was concluded to be negligible.

Graham (1990) replicated the study by Scardamalia et al. (1982) reported above with students who were LD. Both studies investigated the resource demands imposed by the transcription skills necessary for fluent written expression. Graham's study included 23, fourth and sixth grade children with LD who received instruction in resource rooms. The students wrote three papers using three separate modes of composition.

The modes used to produce essays included written, normal dictation, and slow dictation. The written mode was simply the act of composing an essay by writing as much as they could about the topic. The second mode, normal dictation, required the student to speak into a tape recorder. Slow dictation, the third mode, emulated the speed of writing required for handwriting. In this mode, the research assistant told students that they would listen as the student dictated; the research assistant wrote the essay for them. Written products in each mode were scored using a holistic rating scale for length, quality, essay elements, and coherence.

Graham found that normally dictated essays were of higher quality than written essays and that dictated essays were generated more quickly. Additionally, essays produced in the slow dictation mode were nearly twice the length of those generated using normal dictation. This effect was attributed to the students' use of the pause while the scribe caught up with the

students' speaking rate to generate additional content. In other words, the writers had time to think about what they wanted to say in their essay as it was being scribed. Each of the text production modes had a significant positive effect on the quality of the written product. The results of the study indicate that young writers with LD have significant improvements in writing quality when the transcription demands are removed. Slow dictation, however, is not a perfect control for rate of production since students under the slow dictation condition compose at only a *similar* rate to writing by hand.

Speech Recognition

Computer speech recognition also has been used to reduce the effects of mechanics on student writing. Higgins and Raskind (1995) studied the essays composed by older students with LD under three different conditions. A sample of 29 college students with LD was chosen. Each of three essays was written using a computer speech recognition system, dictation to a human scribe, and with no assistance. Students writing under the no assistance condition were allowed to choose to handwrite their essays or use a word processor without using the spell check function. The compositions were scored by two readers using a 1 to 6 point holistic rubric. A third reader was used for discrepant scores. A statistically significant difference was found between the speech recognition and the no assistance criterion. No significance, however, was shown between the no assistance or the speech recognition conditions and the human scribe. Results indicate that a computer speech recognition system can assist older students with LD to compensate for their difficulties in written discourse. However, this study does not confirm that students with LD always benefit from removing the resource demands of transcription skills since the dictation condition did not significantly improve essay scores. Study limitations include the small sample size and the potential differences between writing formats. The study was

conducted on postsecondary students and may not be generalizable to students with LD in secondary or elementary schools.

Predictive Text and Speech Synthesis

Not all attempts to reduce cognitive demands for struggling writers have yielded the anticipated results. MacArthur (1999) investigated another aspect of transcription skills through two consecutive studies. He wanted to understand the impact of word prediction with speech synthesis software for students with severe spelling problems. Word prediction is a computer software program that uses the first several letters of words to generate a list of potential words that would fit into the spelling pattern initiated by the typist. For MacArthur's study, the student could choose to type a word he was unsure of into a special window at the top of the computer screen and the computer generated a list from which to choose the correct word. For example, when typing the word "research" the computer might automatically generate a drop-down list after the letters "res" were typed. The list could include several words that begin with "res" such as "reservation", "resume", or "rest". From the list, the student writer could choose the most appropriate word by simply clicking on the word. The computer would add the word to the text in its complete form. The speech synthesis software is designed to read the words from the word list using a computer-generated voice.

MacArthur employed a single subject, alternating-treatments design whose nine and ten year old participants were three students of which two were identified with LD. The students each had significant problems with spelling which affected the readability of their writing. Each student was comfortable with the functions of a word processor as observed by the researchers. The written product generated by the students was a classroom journal. MacArthur compared the

proportions of legible words in handwriting and word processing. Differences in the composing rate also were measured.

MacArthur found no differences in legible words for the young writers and no trends were evident. One student experienced a 14% increase in his spelling score using the word prediction software. This gain was considered only modest. The rate of text production, however, increased for two of the students. MacArthur conjectured that the student whose spelling improved, but whose rate of text production did not, spent more time using the word prediction software than the other two writers. In fact, the two students who seldom used the word prediction were able to generate text at a more rapid rate. MacArthur further explained that the students seemed to find the word prediction software difficult to use because of its robust capabilities and the low vocabulary demands of the classroom journaling assignment.

A second study was conducted with the same students. However, the demands of the writing task were increased. Journal writing was identified as having "modest" vocabulary demands. MacArthur wanted to more clearly understand the effects of word processing and word prediction with speech synthesis on legibility and spelling in student written products when a task requiring a more complex vocabulary was employed. Rather than composing a journal, students were instructed to write more text passages as a research assistant dictated. The text passages were expected to increase the complexity of the vocabulary. Both the handwriting and word processing conditions were used. The intent was to explore whether the students' legibility and spelling would be better when using word prediction compared with handwriting or word processing without word prediction when a more difficult writing task was assigned. Results indicated that two students achieved higher legibility scores with word prediction compared with the handwriting and word processing conditions. The third student experienced no consistent

effect on legibility. All three students, however, wrote two to three times faster using handwriting. Word prediction and word processing significantly decreased text production.

MacArthur's (1999) two studies demonstrate that, under certain circumstances, limited improvements in the writing of students with severe spelling problems can be realized using word prediction with speech synthesis software. Varying the task demands of the writing assignment can also influence the frequency of use of the word prediction software to improve legibility and spelling accuracy.

Using computer software as a means to improve writing, however, does not necessarily reduce the cognitive demands of the writing task. As demonstrated by the research of MacArthur (1999), a tradeoff may occur between the goals of improved spelling and a significant reduction in text production. Similar results were found by Handley-More, Dietz, Billingsley, and Coggins (2003) in a study similar in design to MacArthur's 1999 research. The researchers (Handley-More et al., 2003) studied the potential effects of word prediction compared with handwriting and word processing upon legible words, correctly spelled words, total amount written, and rate of writing for grade 4 and 5 students with LD including handwriting problems. Using a single subject, alternating treatments design, they found improvements in two students' legibility and spelling. However, even though the students were diagnosed with handwriting difficulties, the rate of text production was best for handwriting.

Handwriting and Spelling Instruction

Handwriting and spelling are specific transcription skills that have been shown to interfere with the quality of written discourse for students with LD. Researchers have investigated ways to assist students in surmounting specific transcription issues. Graham (1999) reviewed the literature relative to the impact of deficits in spelling and handwriting skills on the

composing process for struggling writers with LD. He focused his investigation on the interference that students experience when composing as they find themselves stopping to attend to spelling a particular word. He acknowledged the negative impact of lower-level skills deficits such as spelling and handwriting upon the higher-order skills such as planning and composing. Recommendations included explicit and systematic strategy instruction in spelling and handwriting. He summarized that switching attention during the process of composing from higher-order composition skills to lower-level skills, such as the mechanics of spelling or handwriting, may cause writers with LD to lose track of the ideas that they had planned to incorporate into their written discourse.

Graham and colleagues (1997) predicted that handwriting and spelling would contribute to both compositional fluency and quality in the written expression of 600 children attending first through sixth grades. Compositional fluency is the number of words produced in a written product (McCutchen, 2006). None of the students were receiving special education services. Two timed handwriting measures were administered to assess the children's ability to produce text. Spelling assessment included the dictation of spelling words to students and the evaluation of spelling accuracy within two compositions. Students wrote a narrative essay and an expository essay each for a five minute period. The writing samples were scored for writing fluency and quality. Fluency scores were obtained by counting the number of words written. Quality was rated using a scale of 1 to 5 where 1 equaled below grade expectations. Of the two factors, handwriting and spelling, the former was found to have a direct correlation between fluency and quality. Graham et al. (1997) interpreted the results to indicate that the mechanics of writing directly influence the quality. In contrast, this study also indicates that the influence of spelling

may be limited to compositional fluency and has significantly less effect on the quality of writing.

Clearly, transcription skills play differing, but crucial, roles in the writing process and each can interfere with the quantity and quality of writing. In the study above, Graham et al., (1997) considered the influences of the mechanics of writing upon the compositions of students in the general education settings *only*. The likelihood of poor handwriting and spelling skills negatively impacting the written products of students with LD is entirely plausible.

In fact, the effects of handwriting instruction upon the compositional fluency of young writers with disabilities has been shown to be similar to that of their non-disabled peers (Graham, Harris, & Fink, 2000b). Three hundred students in first-grade classrooms were screened to identify those students with handwriting and writing difficulties. Of the 38 students who were chosen to participate in the study, 14 were identified as having a mild disability. Graham and colleagues randomly assigned them to two groups. The treatment group received handwriting instruction which consisted of 27 individual lessons. The control group received an equal number of lessons. However, the control group was taught lessons in phonological awareness which has been shown to be beneficial to children, but does not influence the process of learning to write letters. Following the treatment period all students were tested for compositional fluency and handwriting performance. Statistical differences were found between the two groups on both measures. No statistical difference, however, was found for improvements in fluency and handwriting between students with and without disabilities. Thus, a causal relationship was found to exist between handwriting instruction and students' handwriting ability and writing ability. In fact, long-term improvements in compositional fluency were shown after a maintenance probe was administered six months after the treatment. The implications for

students with mild disabilities is that when mechanical factors such as handwriting are improved, a reduction in cognitive demands is realized and compositional fluency increases.

Transcription skills such as handwriting and spelling have been shown to affect the fluency, quality of writing for students with LD (Graham, 1990; Graham & Harris, 1997; Graham et al., 2000b). Strategy instruction and technology have been studied to help understand the degree of influence mechanics have on student writing and the impact they have on the cognitive demands necessary for producing written expression (Graham et al., 2000b; MacArthur, 1999).

Capacity Theory

Understanding the mental operations and capacity limitations relative to their effect upon the writing process is critical to understanding the issues that impact young writers with LD. The theoretical underpinnings relative to the cognitive demands for writing will be discussed in the following section. The cognitive processes guiding the writing process have generally been described using capacity theory.

To best appreciate cognitive capacity and its relationship to working memory, a convenient metaphor has been borrowed from Torrance and Galbraith (2006). Recent advances in computer technology and software development have rendered computers manufactured only 10 years ago obsolete. Imagine running several of today's programs concurrently on an older machine. The memory capacity of the computer would quickly become overburdened by the demands of the complex software. Processes would slow and eventually stop. The reason for this phenomenon is that when several software operations are taking place simultaneously, the working memory (random access memory) of the computer is severely taxed. When a computer

stops or slows significantly, the working memory is generally the problem. It simply cannot handle all of the processing requirements simultaneously (cognitive capacity).

Working Memory

Working memory has been defined as "the temporary storage of information that is being processed in any range of cognitive tasks" (Baddeley, 1986, p. 43). Baddeley and Hitch (1974) proposed an early model of working memory with multiple components for both the storage and the processing of verbal and visuospatial tasks. The components comprise a system incorporating a limited-capacity central executive system and two peripheral systems. Each peripheral system acts as a slave to the executive system. The phonological loop is a slave system that handles verbal and auditory information. The second slave system, the visuospatial sketchpad, manages visual and spatial information. Like the printer of a computer, the slave systems can only perform one task at a time. In contrast, the central executive system coordinates tasks and manages the slave systems. Performance is expected to decline when task demands exceed the capacity of the collective resources.

Kellogg (1996) expanded the Baddeley and Hitch (1974) model of working memory. Three language production processes were distinguished: formulating, executing, and monitoring. Each process includes two sub-processes. Formulation includes the planning and translating of sentences that may later be handwritten or typed. The first of the two execution functions is programming: controlling motor movements. The second execution function includes the process of executing: typing, handwriting, or dictation. Monitoring consists of reading and editing. The most significant difference between the Kellogg model and Baddeley and Hitch model is that Kellogg is explicit that the production processes can operate simultaneously; processing is similar to the random access memory (RAM) of a modern

computer. For example, the formulation of a subsequent sentence may take place at the same time as the typing. Capacity limitations can become overloaded if the demands on the central executive system are excessive.

Brain Research

A number of models of language processing have been proposed that hypothesize a limited pool of cognitive resources is available to process linguistic demands in working memory (Weismer, Plante, Jones, & Tomblin, 2005). Medical technology has been used increasingly to help researchers understand the neural systems that the human brain uses to process cognitive demands (Pugh et al., 2006). Several tomographic imaging technologies including roentgen-ray computed tomography (CT), magnetic resonance imaging (MRI), and single photon/positron emission computed tomography (SPECT/PET) and have been used for neuroimaging (Johnson, 2007). Tomography images are a series of "slices" approximately 3 to 5mm thick taken as a series of views. Recent developments in neuroimaging technology and techniques have made it possible for researchers to look inside the human brain as it processes the cognitive demands related to domains such as language, reading, memory, and mathematical reasoning (Papanicolaou, Pugh, Simos, & Mencl, 2004). Functional neuroimaging such as functional magnetic resonance imaging (fMRI) allow researchers to identify regions of the brain that are activated when subjects engage in cognitive tasks such as language processing (Pugh et al.). In fact, some brain regions have been identified that are specifically associated with language processing and do not overlap with regions known to be associated with visual perception, memory tasks, or mathematical reasoning (Frankowiak, Friston, Frith, Dolan, & Mazziotta, 1997). While little neuroimaging research has been conducted in the study of writing and its

disorders, scientists believe that writing may share overlapping neurobiological domains with other language functions such as reading (Pugh et al.).

Since reading and writing deficits through behavioral research are frequently seen together in students (Berninger, Abbott, Abbott, Graham, & Richards, 2002) and the neuroimaging of brain systems for each have been shown to be overlapping (Pugh et al., 2006), future research may help us develop interventions based on neuroimaging screening and understand why certain writing interventions work better than others. It may also be shown in future research that processing problems resulting from the cognitive demands of written discourse may have a physiological link based on cognitive capacity.

Cognitive Capacity

Cognitive capacity has been described as a cognitive resource that is shared between resource-demanding processes (e.g., Fayol, 1999; McCutchen, 1996). Torrance and Galbraith (2006) postulate that cognitive capacity is a fluid resource that is shared among some or all mental processes. Lea and Levy (1999) underscore this perspective with an example of the consequences of overloading cognitive capacity. Their dual-task experiments include university students as participants who experience varying levels of interference during the execution of linguistic tasks. Lea and Levy postulate that cognitive capacity is distributed between simultaneous tasks in varying quantities. But, cognitive capacity can be overloaded by adding phonological and visuospatial tasks simultaneously with text production.

Models of Writing – Hayes and Flower

Cognitive capacity has been described as a single resource for which Hayes and Flower (1980) developed a model to describe how writers manage the demands of the writing process. Their description of the cognitive operations necessary for composition is quite similar to the

computer metaphor above: “The writer must exercise a number of skills and meet a number of demands – more or less at once. As a dynamic process, writing is the act of dealing with an excessive number of simultaneous demands or constraints. Viewed this way, a writer in the act is a thinker on a full-time cognitive overload” (Flower & Hayes, 1980, p. 5).

The Hayes and Flower (1980) model is one of two seminal models of the cognitive process that emerged in the 1980’s. These models provide the foundation for the discussion of capacity theory. The first is a model proposed by Hayes and Flower (1980) designed to account for the processes utilized by skilled, adult writers. They define three major cognitive processes involved in composing. The model is unique since it is a widely accepted model based upon cognitive psychology and one of the first models to utilize a three-prong approach.

The major processes include planning, translating, and reviewing. Planning is described as the process of drawing information from the long-term memory and using it to establish writing goals and create a framework for text production. Subprocesses to planning include the creation, organization, and goal setting necessary during composition. As a writing plan is created, symbolic representations of ideas for writing emerge often in the form of symbols that can only be interpreted by the writer (Kellogg, 1994). Freedom to develop a variety of temporary organizational thoughts can be explored prior to committing them to sentence form.

An example of a symbolic representation can be found in the mind-mapping process used in prewriting. A graphic depiction of the organizational structure is developed to help the writer see their plan. The plan is used to guide language production generated from memory during the translating process. During translation, the ambiguous, symbolic representations created during planning are communicated in the form of sentences and paragraphs (Kellogg, 1994). Finally, the reviewing process is employed to revise the text using language conventions to improve the

quality of the composition and make meanings more precise. Hayes and Flower (1980) make it clear that planning, translating, and reviewing are not mutually exclusive processes; they interact with one another throughout the composing process. The Hayes and Flower model was a significant shift in describing the writing process. Prior to the introduction of their model, writing had been conceptualized as a linear stage process consisting of little more than a planning, editing, and writing process. With the advent of their model a new, more cognitive and recursive process, was depicted (Galbraith & Torrance, 1998).

In a companion article, Flower and Hayes (1980) apply the components of their model to the planning process of writing. Constraints upon writing are described in which writers experience considerable demands upon their attention and effort. They emphasize that planning for writing reduces the "cognitive strain" upon the conscious attention of the writer. Planning reduces the process to manageable components. In fact, Flower and Hayes advocate for the vigorous teaching of planning for writing.

Models of Writing – Bereiter & Scardamalia

While the Hayes and Flower (1980) describe the conceptual planning of adults within their model, the second model appropriate to this discussion is that of Bereiter & Scardamalia (1987) who emphasize the organizational and production processes of young or novice writers. Again, the approach conveyed by their model was not described as a linear process. Rather, writing was described in terms of two types of processes utilized for the generation of text. The first, knowledge-telling is the simple listing of ideas used by unsophisticated writers. It is the process of simple retrieval of information from long-term memory (Galbraith & Torrance, 1998). Conversely, expert writers use a knowledge-transforming method of composition in which overt problem-solving occurs in working memory. Essentially, knowledge is retrieved from long-term

memory, processed, and developed into written products. Knowledge-transforming, however, also includes the *modification* of ideas during the writing process, allowing for knowledge to be expressed with more sophisticated results. Kellogg (1994) concludes, utilizing the Bereiter and Scardamalia model, that as writers mature, more emphasis is placed upon the components of planning and reviewing.

Both theories, Hayes and Flower (1980) and Bereiter and Scardamalia (1987), provide the basis for a discussion of the cognitive capacity in which the limits of the production of text for both expert and novice writers are strained. Torrance and Jeffery (1999) define cognitive capacity theories as those which "seek to explain exactly how much information, and of what kind, can be held active and processed" (p. 3).

Capacity Arguments

Four broad capacity arguments envelop the discussion of capacity theories: (a) single vs. multiple resources, (b) resource vs. structure, (c) storage vs. processing, (d) short term vs. long term storage (Torrance & Jeffery, 1999). Due to the limited scope of this discussion, only the single vs. multiple resources argument will be addressed. In this view, cognitive capacity is shared by all processes in much the same way as the modern computer example that was described earlier. Working memory is a finite cognitive resource which is called upon during the writing process to assist in the development of written products.

The impact of composing on working memory is substantial. Lower-level processes involved in the actual production of text compete with higher-level processes such as planning during the writing process (McCutchen, 2006). For example, lack of fluency in the mechanics of writing create a demand on the working memory during text production. The constraints upon the available working memory impact the ability to produce text due to the limits of cognitive

resources (Torrance & Jeffery, 1999). Differences in the abilities of writers to manage the demands upon their working memory may result in difficulties in structuring their text, constructing arguments, and text generation . Ultimately, it may contribute to the lack of planning that has been observed in children's writing (McCutchen). Thus, adaptive strategies must be utilized to off-load the working memory in order to reduce the cognitive cost of composing (Fayol, 1999). Reducing the cognitive demands upon the working memory to a manageable level will directly benefit the writer and the compositional process (McCutchen, 1996).

Differences in compositional fluency have been observed between children of different ages and writing ability when their working memory resources have been constrained (McCutchen, Covill, Hoyne, & Mildes, 1994). McCutchen and colleagues compared the essays of a group of third and fourth graders with an older group of seventh and eighth graders who were designated as either skilled or unskilled writers. Differences in the developmental levels of the children were found to affect their compositional fluency; the working memory of older students was free to generate text without the burden of cognitive processes necessary for the writing process.

McCutchen et al., (1994) determined that planning, writing, and revising must be executed within the bounds of the student's working memory. So if the processes necessary for sentence generation are operating efficiently, they will not burden the working memory. Writers then have more cognitive resources available for composition.

Capacity Theory Summary

The previous chapter section provided an overview of models of working memory and cognitive capacity theories. Much like a modern computer, cognitive capacity has been shown to

impact working memory when a limited capacity working memory becomes overburdened by process intensive tasks. Two working memory models were introduced in this chapter. The Baddeley and Hitch (1974) and Kellogg (1996) models of working memory provide a framework for understanding the intricacies therein. Both models involve a separation of the functions necessary for language production. The former model limits cognitive processing to a serial mode where processes operate individually and singularly. Kellogg's model expands the Baddeley and Hitch model by providing for the simultaneity of processes during composition.

A summary of current advances in functional neuroimaging was provided. Understanding the neural systems in the human brain that process the cognitive demands of language domains can lead to practical interventions for language production. For example, increasing the knowledge base for regions of the brain that process language demands can allow researchers to "see" the results of interventions. This insight may provide the physiological link necessary to validate treatments for behaviorally-based interventions.

Cognitive capacity models also were introduced earlier in this chapter. Models of cognitive capacity generally use a multiple-component approach. Seminal models were developed by Hayes and Flower (1980) and by Bereiter and Scardamalia (1987). Hayes and Flower employ a three prong cognitive capacity model to describe the major cognitive processes involved in composition. They postulate that planning, translating, and reviewing are the primary processes employed during the process of writing. Hayes and Flower also emphasize that writing is recursive and that the primary processes interact with each other throughout the development of written products. The second cognitive capacity model described was developed by Bereiter and Scardamalia (1987). Their emphasis shifted the discussion from a global view of writers to a model specific to young and novice writers. The model developed by Bereiter and Scardamalia

described a continuum of writing that begins with knowledge-telling and matures to knowledge-transforming. As writers develop in their skills, more emphasis is placed on planning and reviewing. Both cognitive capacity theories acknowledge that cognitive capacity is a finite resource that, when strained, limits the production of text.

A capacity argument of single vs. multiple resources also was reviewed. The impact of the process of composing on working memory was considered within the framework of lower- and higher-level memory processes. McCutchen and her colleagues' (McCutchen, 1996; McCutchen, 2000; McCutchen, 2006; McCutchen et al., 1994) research revealed that planning, writing, and revising must be accomplished within the capacity of students' working memory. The implications for students with LD include the necessity to incorporate strategies into their skill set to allow struggling writers to off-load some of the cognitive demands of test production. Since the development of their writing skills has often been delayed, struggling writers with LD may benefit from reductions in the demands on their working memory through improved skills in planning, writing, and revising.

The cognitive demands of writing can overburden even expert writers who cope by developing strategies to off-load the cognitive costs (Fayol, 1999). Researchers have speculated that older and more experienced writers develop strategies for managing the demands placed upon working memory. The ability to generate text, in fact, has been shown to be predictive of compositional fluency in high school students (Dellerman, Coirier, & Marchand, 1996). However, students with LD write shorter texts than those of their non-disabled peers (Graham, 1990).

Deshler (2001) found that students with LD enter high school with a functional grade level of fourth to fifth grade. Thus, it may be adduced that high school students with LD are

often writing at the fourth or fifth grade level; the grade at which most direct instruction in written expression is reduced or eliminated from the curriculum. The finding leads to the postulation that high school students with LD who are not provided with strategy interventions to aid in the cognitive capacity of their working memory will experience significant difficulties in both compositional fluency and organization. Thus, indicating that the need for instruction in specific strategies intended to reduce the cognitive costs of writing may play an important role in lessening the performance differential between normally achieving and struggling students. While the complexities of the writing process lead to difficulties for students with LD, some of the components can be temporarily deemphasized. When students do not have to concentrate on the mechanics of expressive writing, they are free to focus on planning and organizing.

Self-Regulation

The researchers whose writing models were reviewed above each acknowledge that the process of composing is a cognitively challenging task. In as much as writing is a difficult and demanding enterprise, motivating students to write can often be a monumental undertaking. The set of cognitive strategies necessary for monitoring the writing process has been characterized as self-regulation. Self-regulation has consistently been described using several components in its definition (e.g., Graham & Harris, 1989a; Graham & Perin, 2007; Pintrich & De Groot, 1990; Zimmerman, 2002). Terms used include self-instruction, self-monitoring, self-reinforcement, goal setting, and self-assessment. Bereiter and Scardamalia (1987) provide a concise definition that will guide discussion in the following sections. Self-regulatory strategies "…are strategies for managing one's own cognitive behavior during writing" (p. 249).

Skilled writers engage in substantial levels of self-regulation that incorporates self-planning, self-initiating, and self-sustaining control over the process (Garcia-Sanchez & Fidalgo-

Redondo, 2006). Motivating students to use self-regulation strategies for writing, however, can be challenging. Three components of student motivation have been incorporated into a theoretical framework proposed by Pintrich and De Groot (1990) that links student motivation with self-regulation. The components included are expectancy, value, and affective. Expectancy involves student beliefs relative to their ability to perform the task. The value component incorporates goals and beliefs about the reason for doing the task. The third motivational component concerns the affective response to the task. The affective component acknowledges how a student may feel about the task at hand. In other words, student motivation is dependent upon whether learners believe the task is doable, it is important enough to perform, and whether the task causes anxiety or promotes feelings of accomplishment. Careful application of self-regulated strategies to help students become motivated to write can be accomplished through explicit strategy instruction.

The self-regulatory model that is most frequently researched is the self-regulated strategy development (SRSD) model proposed by Graham, Harris and colleagues (e.g., Chalk et al., 2005; De La Paz, 1999; De La Paz, Owen, Harris, & Graham, 2000; Garcia-Sanchez & Fidalgo-Redondo, 2006; Graham et al., 2000a; Graham et al., 2005; Harris & Graham, 1996). SRSD has been shown to be effective for teaching explicit strategies for planning, drafting, and revising written products to students with LD and other academic learning problems (Graham & Perin, 2007). The SRSD approach is used to teach students self-regulatory procedures such as goal setting, self-monitoring, and self-reinforcement (Graham et al., 2000a). In a recent meta-analysis, SRSD was shown to be a powerful approach for teaching writing strategies (Graham & Perin, 2007). One hundred and forty-two studies were included in the meta-analysis. Of the 11 key elements identified for effective adolescent writing instruction, writing strategies were shown to

be the most effective. Among the writing strategies analyzed, the SRSD approach was shown to be the most effective model for teaching adolescent students to write in grade 4 to 12. It is postulated that the self-regulation element of the model aids in student motivation. The SRSD model will be discussed in detail in a following section.

Applying self-regulatory strategies has been shown to be particularly effective in motivating students to learn to write. Students who are motivated are more likely to become actively engaged in the writing process and are thus, more willing to participate in learning to write (Gleason & Isaacson, 2001).

Strategy Instruction

Choosing appropriate interventions and strategies requires a review of what works best for students with LD. Swanson and Hoskyn (2001) developed a meta-analysis of 180 experimental design studies published between 1963 and 1997. Their focus was upon studies whose participants were adolescent students with LD. The importance of their work was characterized by their review of increasing challenges faced by adolescents as a result of curriculum demands in middle and high school. Swanson and Hoskyn furthermore noted the performance gap between adolescent students with and without LD was similar to that described by Deshler et al., (2001).

The Swanson and Hoskyn (2001) review of literature focused upon *how* information was taught rather than *what* was taught. The interventions were categorized into eight intervention factors including 1) Questioning, 2) Sequencing and Segmentation, 3) Explicit Skill Modeling, 4) Organization and Explicit Practice, 5) Small-Group Setting, 6) Indirect-Teacher Activities, 7) Technology, and 8) Scaffolding. Of these, the only factor to contribute significant variance to effect size was Organization and Explicit Practice. Adolescent students with LD were more

successful in their learning when allowed to develop or access advanced organizers. Advance organizing establishes a "mental scaffold" that can assist in the organization of student learning. Providing students with the opportunity for explicit practice of organizational structures also is critical to the application of specific skills and learning. Swanson and Hoskyn conclude that the design of instructional programs for adolescents with LD should include opportunities for advance organization that are reinforced by explicit practice of discrete skills.

Baker, Gersten, and Scanlon (2002) indicated that students with LD experience significant difficulty organizing unfamiliar material and have difficulty transferring learned strategies to new situations. For example, students with LD who learn strategies in a resource room can experience difficulty applying them in content classrooms (Troia, 2002). Teachers expect their students to transfer the strategies they have mastered in their classes across differing domains and content classrooms. However, students frequently fail to use strategies beyond the context in which it was taught or when a number of steps is required for the application of the strategy (Troia).

To aid in the learning and generalization of material, procedural facilitators can be applied. Procedural facilitators are used by teachers to help struggling learners to achieve better outcomes through the use of questions, prompts, or basic outlines and provide a common language for discussing student assignments (Scardamalia & Bereiter, 1986). Procedural facilitators have been described in other terms. These descriptions include cognitive strategies (Harris & Pressley, 1991), cognitive tools (Jonassen & Carr, 2000), and scaffolding (Palincsar & Brown, 1984; Stone, 1998).

Englert, Mariage, and Dunsmore (2006) specify that procedural facilitators as writing tools can take the forms of "mental, linguistic, and physical devices…including notational

systems, writing symbols, instruments, diagrams, graphic organizers, text structures, mnemonics, writing implements, procedures, rules of thumb, grammar and spell checkers" (p. 211). They emphasize the benefits of providing cognitive support prior to the act of writing to allow young writers to utilize procedural facilitators for effective planning.

For example, Englert, Wu, and Zhao (2005) studied the writing performance of fourth- and fifth-graders with LD. Through the use of a web-based technology, they were able to effectively scaffold student writing. Students wrote personal daily news stories as a narrative text structure. Using heuristic questions to elicit responses such as *who* are the main characters, *what* is the topic, or *where* and *when* did the event take place, students wrote expository responses in the form of news reports. The web-based software provided instructional scaffolds that aided in making the organizational structure of the text visible. The results of this study showed that writing performance improved through the use of technological scaffolding. Of particular significance was the improved ability of the students to produce text that was better organized.

Englert and colleagues (1991) showed that student expository writing improved as a result of systematically taught interventions utilizing the program *Cognitive Strategy Instruction in Writing* (CSIW). Their intent was to enhance students' metacognitive knowledge relative to the writing process. The authors hypothesized that the strategies that the students received would assist them in performing better than students in a comparison group on reading and writing tests and on measures of metacognitive knowledge about writing. One hundred and eighty-three upper elementary grade students participated in the study of which 55 were students with LD. Student learning was scaffolded by modeling a series of graduated questions to aid in the retrieval of information relative to the writing process. Metacognitive strategies were modeled by the teacher as the writing process was taught. Graphic organizers in the form of "think sheets" were

demonstrated by the teacher and used by the learners to plan and organize their writing. Specific steps in the writing process were modeled and students were encouraged to engage in collaborative dialogue with their teacher and fellow students. Students showed significant improvement in their overall writing quality. In fact, the writing gains of students with LD advanced at an accelerated rate. By the end of the program, the writing performance of students with LD were similar to the nonintervention, non-disabled students. This study provides insight to the potential for increasing the writing quality of students through the use of comprehensive strategy instruction programs into which are embedded student support especially in the form of procedural facilitators such as graphic organizers for planning of expository writing.

Hallenbeck (1996) expanded the work of Englert and colleagues by applying CSIW in the secondary setting. Hallenbeck's work is one of the few examples of written expression research at the high school level that investigates planning for writing. Junior and senior high school students with LD were taught CSIW over the course of nine months. Pre- and post-tests were administered that assessed student writing on overall quality, structural traits, number of words, and an audience sensitivity score. However, the genres for the pre- and post-test were different necessitating differing criteria for the structural trait score. During the instructional phase, the teacher modeled the steps of the writing process using handwritten, think sheet graphic organizers for planning and organizing. The writing step was done on a computer word processing program. Editing involved transferring their thoughts back to a handwritten format utilizing an editor think sheet. An additional handwritten think sheet organizer was used for revising their papers. Finally, the revised essays were transferred back to the computer and printed.

The results of Hallenbeck's (1996) pre-and post-test evaluation showed significant differences in all scoring categories providing affirmation of the value of the CSIW program. However, there were severe flaws in the methodology of the Hallenbeck study. Students planned their work manually, wrote their papers on a computer utilizing a word processing program, transferred their work to handwritten form for editing and revising, and completed their final product on the computer. Hallenbeck described their computer skills as varying in degree indicating the possibility of a confounding variable since no formal measure was taken of student mechanical ability nor was any credence given to the possibility of problems transferring information from their handwritten graphic organizers to the word processing format. Significant improvements were shown on all assessment levels. Hallenbeck emphasized that the organizational think sheets were powerful tools in developing students' ability to structure paragraphs and group ideas. Thus, the application of procedural facilitators in the form of think sheet graphic organizers provided students with LD the necessary structure for improving their written expression.

Moreover, procedural facilitators reduce the cognitive load during the writing process (Baker et al., 2002). As in the use of any cognitive tool, the performance demands inherent to the activity are transferred to the tool allowing the user to focus on other aspects of the activity (Jonassen & Carr, 2000). Many of us employ simple procedural facilitators such as making lists to aid us in our grocery shopping or using written directions to travel to various locations. In either case of lists or directions, the accompanying task is facilitated by reducing the cognitive load for the main task of shopping or driving. Students in advanced mathematics classes use calculators to allow them to focus on the intricacies of the process rather than the mechanics of adding, subtracting, multiplying, or dividing. In the same sense, struggling writers are well

served by using graphic organizers as a tool to reduce the cognitive demands of the writing process. Ultimately, the goal is to help writers internalize procedural facilitators utilizing them in a self-directed manner (Englert et al., 2006); thus, the scaffolding, a temporary structure, becomes unnecessary. Eventually, students are expected to apply their learned strategies to a variety of situations including different content areas and testing environments.

Strategy instruction has been shown to improve the written products for struggling writers. Procedural facilitators help to advance student performance and increase the likelihood of improved outcomes. Students have learned to apply procedural facilitator to reduce their cognitive load and become more self-directed. However, refining strategy instruction for improving student performance can be accomplished by applying explicit strategy instruction.

Explicit Strategy Instruction

A number of researchers have found explicit strategy instruction to be effective for students with LD (e.g., Englert et al., 1991; MacArthur, Graham, Schwartz, & Schafer, 1995; Sawyer, Graham, & Harris, 1992; Welch, 1992). Early work in the application of explicit strategy instruction for struggling writers can be seen in the seminal research of Graham and Harris (1989a). Borrowing from the field of cognitive psychology, Graham, Harris and colleagues developed the self-regulated strategy development model (SRSD). The conceptualization and development of SRSD began in the early 1980's to address the needs of students experiencing difficulties with academic learning. The model incorporates strategy instruction for students with mild to moderate learning disabilities. While not a heterogeneous group, a common factor associated with students with LD is that their learning deficits often involve cognitive, behavioral, and affective concerns (Graham et al., 2000a).

Three primary areas of concern are impacted by the SRSD model: (a) cognitive, (b) behavioral, and (c) motivational/affective. The complexity of the task of writing places significant cognitive demands upon students. The resources of the writer's working memory are taxed as several complex processes are put into play including content generation, content organization, and transcription (McCutchen, 1996). In addition, writing is not considered to be a linear process. Rather, composing has been described as a recursive process in which planning, writing, and revising are revisited during writing (Bereiter & Scardamalia, 1987; Hayes & Flower, 1980; Kellogg, 1994). Transcription skills also are employed which can strain the cognitive resources of the writer (McCutchen et al., 1994).

In addition to cognitive issues, students with LD often exhibit a range of behavioral issues which limit their ability to regulate their actions (Troia, 2002). The SRSD model includes strategies that help students regulate their writing behavior by teaching strategies for appropriate self-talk. This cognitive process also has been referred to as metacognition before and during the writing process (Bracewell, 1983; Harris & Graham, 1996). The process itself involves the deliberate, internal dialogue carried out by the student during all stages of writing. Troia (2006) observed that students with LD often possess limited awareness of "domain-specific knowledge, skills, and strategies" necessary for effective application to the writing process. Troia also emphasizes that it is necessary that effective writing instruction teach students to reflect upon their writing capabilities and make modifications to the writing process through deliberate determination.

The third component of SRSD addresses the affective and motivational issues. By providing a rationale for each strategy, students are taught to appreciate the value of their learning and academics helping to increase their motivation for producing written work. The

application of SRSD requires extensive teacher modeling of strategies relative to cognition, behavior, and motivation (Troia & Graham, 2002). The researchers initially applied the SRSD to the teaching of the writing strategies, skills, and knowledge. The SRSD model emphasizes the teaching of writing strategies together with the development of self-regulatory skills. Self-regulatory skills are those which limit the effects of students' poor motivation.

Six stages are present in the model: (a) develop background knowledge needed to use the strategy successfully, (b) discuss the purpose and benefits of the strategy, (c) modeling of the strategy by the teacher, (d) memorization of the steps of the strategy, (e) teacher support and scaffolding student mastery of the strategy, and (f) independent use of the strategy with little support (Graham, Harris, & MacArthur, 2006). In addition, four basic strategies for self-regulation are taught: (a) goal setting, (b) self-instructions, (c) self-monitoring, and (d) self-reinforcement. The SRSD model has proven to be successful in helping struggling writers. In fact, over 20 studies using SRSD have been published by different researchers that span a variety of planning and revising strategies (De La Paz, 1997; Saddler, Moran, Graham, & Harris, 2004; Troia & Graham, 2002), student groups (Chalk et al., 2005; De La Paz, 1999; Englert et al., 1991), and writing genres (De La Paz et al., 2000; Graham et al., 2005; Wong & Butler, 1996). Significant improvements have consistently been shown in the written products of students with disabilities and their non-disabled peers when the SRSD model is applied. The preponderance of the SRSD studies has been with younger students. Few studies have been conducted with secondary students with mild disabilities (e.g., Chalk et al., 2005).

De La Paz and Graham (2002) used the SRSD model to study the effects of explicitly teaching a strategy that provided organizational steps and processes for planning and writing an essay. Fifty-eight middle school students were taught planning, writing, and revising procedures.

None of the students received special education services. Within the genre of expository writing, essay topics of the explanatory and persuasive type were used for prompts. The emphasis on expository writing was in preparation for a pending, state-wide writing competency exam. Students in the experimental group were explicitly taught strategies for planning, drafting, and revising text. The SRSD model was applied (Harris & Graham, 1996) using the six stages of instruction previously described. So, in addition to the explicit strategy instruction, students learned self-regulatory procedures such as goal setting, self-instruction, and self-monitoring. Writing strategy instruction was provided by classroom teachers over 6 weeks involving 4 days each week. The fifth day was used for other content instruction not related to the study. The control group received a traditional writing curriculum which provided instruction in the mechanics of writing (e.g., spelling, grammar, and vocabulary), characteristics of expository essays including the 5-paragraph essay form, time to compose essays, and teacher guidance in planning for writing essays. Students in the control group did not receive instruction in specific strategies related to planning, writing, or revising.

Four levels of scoring were analyzed: (a) planning, (b) word count, (c) vocabulary, and (d) quality. Planning was scored using a 5-point scale ranging from no planning to accurate, fully developed. The highest planning scores (5) were given to those students who generated a mind map or outline that identified a central theme. Vocabulary scores were developed based upon the number of words that included seven or more letters. A holistic rating scale was used to assign scores for quality. A range of scores from a low score of 1 to a high score of 8 were given to each measure of word choice, sentence structure, quality of ideas, and mechanics.

Results showed that students in the experimental group demonstrated significant improvement in essay length, maturity of vocabulary, and overall quality. Effect sizes for word

count, vocabulary and quality were strong and ranged from 0.82 to 1.71. Essay planning also showed improvement. Prior to the intervention only 20% of the students generated any written plans prior to beginning writing. After the instructional period, 97% of the experimental group participants developed plans prior to beginning essay composition. The significance of this study is shown in the improvements in the length, vocabulary, and overall quality. Moreover, the frequency of planning and planning skills increased markedly after explicit strategy instruction was shown.

Strategies for Older Students

Explicit strategy instruction also has been shown to be effective for secondary students with LD who have difficulties with writing (Chalk et al., 2005; De La Paz, 1997; Montague & Leavell, 1994). However, since the *teaching* of writing diminishes and the *use* of writing to express knowledge increases during the secondary years, students are less likely to receive explicit strategy instruction.

Yet, the impact of explicitly teaching strategies to older students can be substantial. Consider the work of Chalk and colleagues (2005) with high school students with LD. Using a single-subject, repeated-measures design, they replicated Graham and Harris' (1989b) study by applying the SRSD model to the explicit instruction of high school students with LD. The authors noted that few studies have been done examining the effects of teaching students at the high school level to be more strategic in their writing. Fifteen participants were chosen from the 10^{th} grade LD population as a convenience sample. Four strategies were taught including brainstorming, semantic webbing, setting goals, and revising. The lead author taught the intervention and administered the 26 writing prompts. In addition, the six steps of the SRSD model were taught to the participants.

Participant essays were scored for fluency and quality. The fluency scores reflected the total number of words written regardless of spelling errors. A four-domain analytic rubric designed by the local school district for writing assessments was used to score the essays for quality. The domains included: (a) focus and development, (b) organization, (c) fluency, and (d) conventions. Each domain had 6-point to 1-point scale with 6 representing the highest quality. Students' compositions were read by two raters whose scores were averaged. A third rater was called upon if the scores of the two raters were not adjacent (e.g., within one point of each other).

The results of this single-subject, repeated measures design study were graphically presented. Visual inspection indicated modest improvements in quantity and quality of student writing evident after the strategy instruction. The most prominent gains were seen in compositional fluency. Students clearly benefited from an overall instructional package which included strategies for brainstorming, semantic webbing, goal setting, and revising.

While it could be posited that the gains observed in fluency could be attributed to the strategy instruction, it is likely that the design of the Chalk, Hagan-Burke, and Burke (2005) study applied too great a number of independent variables and the resulting intervention effects could not be attributed to a specific variable. For example, eight independent probe conditions were applied that included (a) baseline, (b) pre-skill instruction, (c) modeling, (d) controlled practice, (e) independent practice, (f) post-instruction, (g) maintenance, and (h) generalization. Within the probe conditions, the eight SRSD steps were applied. The SRSD steps require a substantial investment in time which was not apparent in the number of lessons used to teach the SRSD model. Only five lesson plans were developed and 22 essay prompts were used.

Future studies which isolate effects for specific variables on the written products of high school students, such as semantic webbing or graphic organizers, will be valuable for their

contribution to the field in providing greater understanding of the effect of specific strategies for improving written composition. This study provided groundwork to guide researchers in understanding benefits of combining explicit strategy instruction with the SRSD model for students at the high school level and the effects upon their written products.

Specific Graphic Organizer Strategy Instruction

The use of specific strategy instruction to teach the use of graphic organizers to improve the written products of students with LD is demonstrated in the research of DiCecco and Gleason (2002). The researchers used graphic organizers to help middle school students portray key relationships between concepts in passages that they read. In an experimental design, participants were randomly assigned to two groups. Pre- and post-test essays were used to measure the effects of the instructional intervention. Two measures were used to assess student essays. The number of words written was counted to determine compositional fluency and the quantity of relational knowledge statements was calculated. Relational knowledge statements were defined by the researchers as statements that aligned with the principles implied by the text.

The instructional sequence consisted of reading social studies textbook passages, teaching students to determine the main idea and sub-concepts, and guiding them in the development of graphic organizers that depicted the content. Students were expected to align their graphic organizers with the content of the text prior to writing. The main concept was placed on the page in a large rectangle. Subordinate details were drawn in smaller rectangles that were connected to the main idea with lines and arrows.

The post-test essays for the experimental group showed significant gains in both compositional fluency and the use of relational statements. Students in the experimental group were able to not only retain and recall the knowledge, but they were able to apply their

knowledge to the development of essays that demonstrated their understanding of the relationships between the main concepts in the texts. This study demonstrates that teaching students with LD a strategy to organize concepts graphically can significantly improve their written products.

Planning and Prewriting Strategies

The explicit teaching of planning and prewriting strategies has been shown to be an effective method for improving the written discourse of students. Planning for writing is one of the recursive processes which makes up the writing process (Hayes & Flower, 1980). Rather than a stage, planning is a process used repeatedly as composing progresses. Though the majority of planning is often completed at the beginning of the process (Lee, 2002). The development and organization of ideas are essential elements of the planning phase of writing (Kellogg, 1994). The process of planning for writing is essential in order to manage the complexities of writing (Bereiter & Scardamalia, 1987). In fact, Flower and Hayes (1980) emphasize that planning helps to reduce the "cognitive strain" during the process of composition relative to the number of demands made upon the writer's "conscious attention". The process of planning also helps to prioritize the elements and goals of the writer (Flower & Hayes). Students benefit from breaking the writing process into more manageable phases such as planning, writing, and revising since students can find the process overwhelming (Graham et al., 1992).

Planning can be a simply a cognitive activity or it can be externalized onto paper in the form of a list of key words, a graphical representation, or an outline whose meanings are derived by only the writer (Kellogg, 1994). In other instances, planning is a more formalized process during which the writer follows a specified strategy for preparing to write such as outlining or developing Venn diagrams (Kim, Vaughn, Wanzek, & Wei, 2004). Other variants of planning

include brainstorming, free writing, listing, or cubing (Scott & Vitale, 2003). Accomplished writers make extensive use of planning before and during composition, however writers with LD minimize planning, especially prior to writing (Troia & Graham, 2002). Schumaker and Deshler (2003) also note that young writers with LD experience significant difficulties with the cognitive processes of planning and organization.

Planning Strategies

Wong and colleagues (1996) taught students to use "interactive dialogues" for planning and revising opinion essays. Thirty-eight eighth and ninth grade adolescents participated in the study. Of the student participants, 76% were students with LD and 24% were students identified as low achieving as indicated by their test scores, low grades, and teacher input. The study comprised the majority of the school year beginning in late fall and culminating near the end of the last semester. Using a quasi-experimental research design, Wong, et al., taught students planning and revising strategies for essays written using computers with word processing software. A planning sheet was used to guide students' organization during the prewriting phase. Students collaborated their efforts with a partner to express their beliefs on the planning sheet. All opinion essays were composed on a computer.

The dependent measures for this study (Wong & Butler, 1996) were clarity and cogency. Clarity was defined as "the degree of persuasiveness of the arguments presented" (p. 205). Cogency was defined as "the degree of persuasiveness of the arguments" (p. 205). Each compositional period lasted approximately one week. Only six essays were produced by the student groups. During the revising phase, student pairs took turns acting as writing critics. The teacher also provided assistance to student writers for editing their compositions by providing feedback and helping students to achieve sufficient clarity and cogency.

The results of a MANOVA run on the two dependent measures indicated significant differences between the trained and untrained groups for both clarity and cogency. The students in the experimental group wrote less ambiguous and more persuasive essays. Student compositions also were substantially longer than those produced for pretest measures. The results suggest that students benefited appreciably from instruction in planning and revising.

Three questionnaires were used prior and following the strategy instruction to judge students' attitudes relative to writing, self-efficacy, metacognition, of student participants. Participant responses on the self-efficacy questionnaires indicated that, following training, student perception of their ability to write showed significant differences. Students were more positive in their opinion of their own writing capability. The students, however, did not improve their general attitude toward writing. They continued to indicate that their feelings towards writing remained negative. The authors noted their disappointment that the findings for attitudes and metacognition were non-significant speculating that the affective responses for students with LD resulted from years of academic failures that contributed to a negativity towards learning. The lack of significant changes in metacognition were attributed to the potential difficulties associated with teaching metacognitive skills; metacognitive changes were beyond the scope of the instruction included in the intervention. The researchers indicated that more exposure to explicit instruction directed towards encouraging metacognition may enhance the process relative to composition. Comparisons of pre- and post-test changes in dependent variables indicated significant improvements in both clarity and cogency of student compositions.

In sum, the study indicates that specific strategy instruction in essay planning can positively affect the written products of students with LD. Significant improvement in writing performance can be demonstrated following instruction that includes the use of specific planning

strategies. However, it was unclear from the study description how writing instruction was distributed throughout the school year. It is apparent that the authors allowed students one week periods for the generation of essays. But, they produced only six written products. Considerable periods of time may have passed between instructional periods in written expression. Perhaps intensive strategy instruction focused over a shorter period of time may have produced even more significant results.

The seminal study by Graham and Harris (1989b) established the efficacy of planning instruction utilizing a multiple-baseline across-subjects design. In an early iteration of SRSD, three sixth-grade students with LD participated in a study that provided explicit teaching and overt modeling of strategies during instruction. Students wrote essays based on written prompts provided to them and wrote stories based on pictures shown to them.

Graham and Harris used the mnemonic TREE to help students memorize the steps for producing a superior persuasive essay. TREE describes four prompts (a) note Topic sentence, (b) note Reasons, (c) Examine reasons, (d) and note Ending. Twenty-five percent of the students' written products were randomly selected for scoring to calculate interrater reliability. Holistic rubric scores for two raters were used to determine a .77 level of interrater reliability for essays using Pearson product-moment reliability coefficients. Interrater reliability for story writing was calculated at .83. Data were collected on essay elements, coherence, number of words written, time spent during prewriting, story grammar elements, quality ratings, and self-efficacy.

Following strategy intervention, the students' writing showed marked improvement. Two of the three students increased the average number of functional essay elements in their compositions. Coherence also improved for two students. Although, inconclusive evidence was produced for the number of words generated for student essays, the average prewriting time

increased for all three students. Essay quality also improved for all participants. Holistic rubric scores were improved by 3 to 4 ½ points over scores than quality scores recorded during baseline.

Planning instruction substantially improved the essays produced by the participants in this study. In fact, during an interview to enhance social validity, each student reported that "they believed the strategy helped them to write better" (Graham & Harris, 1989b, p. 213). Comments specific to the helpfulness of the strategy for organizing content were made by the students who also felt that their friends should receive the strategy instruction to help improve their writing.

De La Paz (1997) extended the work of Graham and Harris (1989b) in a single-subject design study that evaluated the effectiveness of a planning strategy for persuasive essays. The strategy was intended for use both before and during the writing process. Participants included three 5th-grade students from two suburban elementary schools. They were identified as students with learning disabilities who had significant difficulties organizing and generating written compositions. De La Paz assessed the effects of teaching the planning strategy through a single subject design using a multiple-probe, across-subjects approach. Two dependent variables to measure planning were used. The first was the time spent planning prior to writing. The second dependent variable was the number of "transformations". Transformations were measured by counting the number of unique ideas on student planning sheets and comparing them with the number of unique ideas included on the essays. This determination was thought to show the extent to which planning occurred during the writing process. Essays also were scored for the number of words written. De La Paz also measured the number of "functional essay elements" that supported the student's persuasive position in their essays. Finally, a holistic rubric was used to assign each essay a score for quality.

A minimum of three observations were used as baseline data. Students received strategy instruction during a minimum of three consecutive sessions during the intervention condition. The strategy instruction continued until mastery was established. De La Paz did not specify a criterion for mastery. A maintenance check was administered a minimum of six weeks following instruction utilizing a single essay.

Her instructional approach was based on the early SRSD intervention studies of Graham and Harris (Graham, 1990; Graham & Harris, 1989b). A four prong planning strategy was taught using the mnemonic STOP to help the students remember the steps necessary to complete their plans for writing a persuasive essay. The first step was **S**uspend judgment wherein the writers brainstormed both sides of the argument before taking sides. Their ideas were recorded on a planning sheet of paper. Next, the writers were asked to **T**ake a side based on which side of the argument they believed most. The third step required students to use their planning sheet to **O**rganize their ideas. Students were encouraged to identify the strongest argument to use as the thesis of their essay. Finally, students were reminded to continue to use the planning sheet during their writing using the **P**lan mnemonic.

Results of the interventions indicated that students writing improved substantially. The length of essays was approximately double for two students. An increase essay length of three to four times longer was realized by the third student. Additionally, significantly more functional essay elements were present in student papers. Two of the three students overtly used the planning strategy both before and during writing. The maintenance probes showed that two of the three students maintained their post-instruction gains. In fact, learning to use the planning helped students change their approach to writing. Rather than spend almost no time planning as was seen in the pre-instruction condition, students spent time planning and used approximately

40% of the ideas generated during planning in their essays. Social validity interviews conducted following the study for two of the three students "indicated that they thought the strategy helped them to write better and that it could be used to help other children" (De La Paz, 1997, p. 236).

Prewriting Strategies

One group of planning strategies, explicitly taught, that have shown to be beneficial for improving the compositions of students with LD is prewriting. (e.g., De La Paz, 1999; Sturm & Rankin-Erickson, 2002). Prewriting is a category of planning that can aid writers in reducing cognitive load through the development of a framework that is either pictorial or linguistic (Johnson & Bender, 1999).

Troia and Graham (2002) examined the effectiveness of planning strategies explicitly taught to fourth and fifth grade students with LD. The three strategies, goal-setting, brainstorming, and organizing, yielded impressive results compared with their peers who were taught process writing. Twenty students were randomly assigned to two groups. Pre- and post-test writing probes were administered to measure the strategy transfer effects. The experimental group was explicitly instructed in planning for composing. The control group received instruction which neither emphasized nor de-emphasized planning for writing. Students who were taught the planning strategies wrote stories which were qualitatively superior to the control group. Results show that measurable improvements in the written products of students with LD can be observed when planning strategies are explicitly taught.

Prewriting strategy instruction also has been shown to be effective for older students with LD who are taught in inclusive settings. De La Paz (1999) found impressive results using SRSD to instruct middle school students in general education classrooms. Twenty-two students were chosen to participate in this single-subject, multiple-probe design. Of the 22 students, six were

identified as learning disabled, six low achieving, six average, and four high achieving. All students were taught a planning strategy that included outlining. The planning strategy was used to generate five-paragraph essays. Prior to the intervention, 93% of all students' essays were generated without using a plan. Following strategy instruction, each student generated plans prior to beginning their essays. Students with LD generated the shortest compositions of the lowest quality compared with the other student groups. An immense gain in compositional fluency was see in the written products of the students with LD; the length of their essays increased by 250%. In addition, 89% of the posttreatment essays written by students with LD had a conclusion compared with only 47.5% during pretreatment. This research successfully demonstrated the effectiveness of teaching planning strategies to students in inclusive settings.

A prewriting strategy that has, in fact, been shown to be effective in improving the writing of students is the use of graphic organizers (Anderson, Yilmaz, & Washburn-Moses, 2004). Graphic organizers have been used successfully as procedural facilitators in writing instruction (Englert et al., 1991; Idol & Croll, 1987; Sturm & Rankin-Erickson, 2002).

Not all studies have shown planning for writing using graphic organizers to improve compositional quality. Kellogg (1990) measured the quality of informative essays and prewriting plans generated by college students. None of the participants was identified as LD or as having any significant writing difficulties. Two hundred and seven participants were randomly assigned in equal numbers to one of nine conditions. Content and style were rated by two scorers utilizing a 7-point scale for each domain. Raters also assigned scores to the prewriting plans developed by the students using a similar scale.

Two types of prewriting strategies were used by the students: clustering and outlining. Clustering was encouraged by providing instructions for choosing a topic word and expanding

the plan with details surrounding the topic on the paper. Students were instructed to plan by clustering for a full 10 minutes. The students in the outlining condition were instructed to develop a hierarchical outline and continue using it to plan for 10 minutes.

The quality of compositions for students in the outlining condition improved significantly. Both style and quality improved. In contrast, clustering did not improve the quality of the written essays. Clustering, in fact, hindered the fluency of student writers compared with the conditions for no prewriting and outlining.

Holistic Scoring

The nature of writing is such that it is an open-ended and non-prescriptive process (Goldberg, Roswell, & Michaels, 1998). Assessing writing necessitates that the mechanism for assessment also be flexible and open-ended. The application of holistic scoring for assessing compositions, thus, becomes necessary. Currently, the most common method for the assessment of written products is through the use of a holistic rubric (Huot & Neal, 2006). Holistic scoring is the process of using a holistic rubric for writing assessment. A holistic rubric is a scale for evaluating written products that uses narrative statements that list the specified criteria for a student writing assignment using graduating levels of quality (Cohen & Spenciner, 2005). Holistic rubrics are generally four- to six-point scales that provide a metric for scoring writing resulting a minimum of measurement errors (Penny, Johnson, & Gordon, 2000).

Holistic rubrics are used to assess student writing for different educational assessments and for writing assessment across the school years. For example, the scoring of state writing tests is often accomplished utilizing holistic scoring (Cahalan-Laitusis & Educational Testing Service, 2004). Major college entrance exams including the SAT, ACT, and GRE also employ holistic scoring (ACT, 2007; Educational Testing Service, 2007; The College Board, 2007). In addition,

the writing of younger students is frequently assessed by applying holistic scoring .(e.g., Englert et al., 1991; Graham, 1990; Graham et al., 2005). Holistic rubric scoring also is used for scoring writing assessments in post-secondary settings (Benton & Kiewra, 1986; Higgins & Raskind, 1995).

By definition, holistic scoring is accomplished when a composition is considered as a total piece of work and assigned a single score (Camara, 2003). Using this scoring approach, all elements of the written product are taken into account without singling out specific elements (Isaacson, 1999) such as focus, organization, support, sentence structure, spelling, or grammar. The total effect of the writing is considered and no individual factor is "…weighted to the exclusion of any other" (Florida Department of Education, 2001b, p. 32). The Florida Department of Education (FLDOE) is an example of a state agency that uses holistic scoring for assessing their state mandated tests (Florida Department of Education, 2001a). The FLDOE requires scorers to evaluate the whole essay and assign a single score while considering the elements of focus, organization, support, and conventions. As essays are read, the scorers judge the writing as a whole without focusing on a particular element.

Holistic scoring is a relatively new phenomenon and considered one of the most important developments for writing assessment (Huot, 1990). Holistic scoring grew out of a need for scoring written products in a reliable and consistent manner especially for large-scale writing assessments such as standardized tests (Huot & Neal, 2006). The development of holistic scoring took place during the 1970's by the Educational Testing Service (ETS). ETS has continued to develop standardized examinations such as the Graduate Record Exam (GRE), College Level Examination Program (CLEP), and the SAT. Rather than assessing writing through the indirect modality of multiple-choice tests, ETS determined that a valid, reliable, and economical measure

of writing ability was necessary. The economics of scoring individual elements of compositions can be time consuming and tedious. To meet the need for an economical, valid, and reliable scoring methodology, ETS researched and developed holistic scoring (White, 1984). The result was a significantly more efficient scoring method that also met the criteria of validity and reliability.

Dissenting views of holistic scoring also exist. Limitations of holistic scoring include its inability to give a diagnostic evaluation since the metric yielded is a simple ranking in accordance with the scoring criteria (White, 1984). Specific elements of student writing cannot be evaluated using holistic scoring due to the single score that is given for the whole written product (Cohen & Spenciner, 2005). To increase scoring reliability, two or more raters are frequently used (Johnson, Penny, & Gordon, 2001). Their scores however are rarely in perfect harmony. Raters frequently score essays differently leading to reliability questions regarding the accuracy of discrepant scores (Johnson, Penny, Gordon, Sumate, & Fisher, 2005). Holistic scores can also be influenced by the length of the essay or the quality of student handwriting (Huot, 1990). The success of holistic scoring is dependent upon multiple raters to agree on their scores on each composition (Huot & Neal, 2006). Even with its shortcomings, holistic scoring has proven to be a reasonably reliable and valid method for the assessment of writing. As a result, holistic scoring continues to be the most common form of writing assessment (Huot & Neal, 2006).

Prior Perspectives

Tradition had long held that students must master the technical aspects of writing before they can advance to the more complex task of writing expressive essays. However, researchers in the 1990's found that temporarily de-emphasizing the mechanical elements allows students to

focus their efforts on the conceptual aspects of writing such as planning, organizing, and revising (Englert et al., 1991).

Current research has built on the premise that completing a coherent, organized essay is more critical than emphasizing the mechanics (Baker, Gersten, & Graham, 2003; Baker et al., 2002; Deshler, Schumaker, & Bui, 2003). While struggling writers have significant deficits in their ability to apply the mechanics of capitalization, punctuation, and spelling, students with LD who are asked to write about complex ideas reveal an ability to conceptualize at a much greater level when the mechanical elements are deemphasized (Goldman & Hasselbring, 1997).

One of the most critical elements of successful writing is the initial planning and organization. Effective planning has been shown consistently to improve writing of students with LD (Brodney, Reeves, & Kazelskis, 1999; Chalk et al., 2005; De La Paz & Graham, 2002; Graham et al., 2000a).

Changes in Instructional Focus

Writing research for students with LD over the past three decades has yielded a small, but expanding knowledge base. The research of the 1970's found focus in issues related to the mechanics of the writing process. Spelling, punctuation, handwriting, and sentence formation studies provided a robust foundation relative to the mechanics of the writing process (Deshler & Ferrell, 1978; Gillingham & Stillman, 1973; Poteet, 1978; Stowitscheck & Stowitscheck, 1979).

In contrast with the previous decade, researchers in the 1980's, influenced by advances in cognitive psychology, found that higher-order cognitive processes impacted the written expression of students with LD (Wong, 2000). Researchers in the late 1980's and early 1990's expanded the database through research into the cognitive and metacognitive aspects of written

expression such as student awareness of their own cognitive processes during writing (Graham & Harris, 1993).

An example of research that focused on the cognition and metacognition of struggling writers can be found in the work of Wong, Wong, and Blenkisop (1989). The cognitive and metacognitive aspects of writing impact the knowledge of text structure and the writing process for struggling writers. Wong, Wong, and Blenkisop studied student metacognition relative to the writing process with 21 eighth and eleventh graders with LD as the participants. In addition, comparison groups included 15 non-disabled eighth graders and 23 non-disabled sixth graders. All participants wrote three essays and completed a questionnaire. The questionnaire was designed to probe student metacognition about the writing process. The normally achieving groups were chosen for their average performance in essay writing and since they did not have reading problems as demonstrated on a grade equivalency examination.

The students wrote three essays over the course of three weeks. They were allotted 40 minutes to complete their essays. The essays were given a holistic score on a 0-point to 5-point scale. The essays also were scored for fluency; the total word count was analyzed. After completing the three essays, each student individually answered a set of questions. Five metacognitive questions were asked including themes such as student opinions for why students have difficulty writing, what is writing about, how do you write, what goes on in your mind as you write, and what things do you need to learn to be a better writer.

The essay scores of the students with LD were compared with those of their non-disabled peers. Results showed that the students who were normally achieving invariably wrote essays of greater quantity and quality than their peers with LD. In addition, the survey indicated that the eighth grade students who were normally achieving were better able to articulate their

conceptions of the writing process showing a greater awareness of the need for planning and keeping the reader in mind during composing.

The essays of eighth and eleventh grade students with LD also were compared with the writing performance of the sixth grade students who were normally achieving. Similarities were observed between groups on the holistic essay scores, structural ratings of the paragraphs, and metacognition about the writing process. The eighth and eleventh grade students with LD showed superiority in their essay length compared with the sixth grade students who were normally achieving. The researchers concluded, however, that the students with LD exhibited very similar patterns of performance to the younger students without disabilities. The researchers also determined that students with LD experience a developmental delay in the cognitive and metacognitive aspects for written products.

Strategy Foci

Specific writing interventions have been the subject of researchers in the field of writing instruction. Among the most prevalent are interventions which are combined as a series of instructional interventions often referred to as strategic frameworks. An example of the use of strategic frameworks can be seen in the work of Graham and Harris (1989a). Using the approach of Graham and Harris, the research of De La Paz and her colleagues has advanced the knowledge of strategies which help prepare students for state assessments which measure writing (De La Paz et al., 2000).

Other researchers have pursued a line of research which investigated composing skills within a sociocultural framework. Specifically, the teaching of writing with a sociocultural approach involves lessons in which strategies are taught in a classroom community (Englert et al., 1991). The emphasis of Englert's work has been on the interactions between teachers and

students in classroom literacy communities in which the production of knowledge, rather than just the production of written products, is viewed as the goal (Warger, 2002).

Understanding the benefits of explicitly teaching writing strategies has been another major research emphasis. The literature from relevant fields such as cognitive psychology, English Language Arts instruction and assessment, linguistics, motivation theory, education, discourse analysis, and English as a Second Language indicate that explicit teaching of strategies is one of the 3 most effective support measures for adolescent writers (Meltzer, 2001). Explicitly teaching planning strategies for writing at the secondary level helps students produce essays that are longer, contain more mature vocabulary, and are qualitatively better (De La Paz & Graham, 2002; Troia & Graham, 2002). Essentially, when students receive extensive, structured, and explicit instruction, significant improvements can be realized (Danoff & Harris, 1993; MacArthur, Graham, Schwartz, & Shafer, 1991).

Issues specific to the written expression of students with LD also have been investigated. Gersten and Baker (2001) compiled a meta-analysis of literature related to writing interventions for students with LD. The major findings of the meta-analysis specified that the explicit teaching of the steps of the writing process is critical. Thirteen studies were analyzed of which 10 included instruction that emphasized steps to help students plan and organize their writing as part of the process. Seminal studies which feature strategies for helping students plan include Graham and Harris (1989) and the more recent work of Englert, Raphael, Anderson, and Stevens (1991). More contemporary studies also investigated planning the process of writing (De La Paz, 1997; Troia & Graham, 2002; Wong, Butler, Ficzere, & Kuperis, 1997).

In a recent comprehensive meta-analysis of specific teaching techniques for 4th- to 12th grade students, Steve Graham and Dolores Perin (2007) reported on 11 elements of writing

instruction that were found to be the most effective for improving student writing quality. The authors expressed the Needels and Knapp (1994) definition of quality as "…coherently organized essays containing well-developed and pertinent ideas, supporting examples, and appropriate detail" (Graham & Perin, 2007, p. 14). Quality was the only outcome measured across the studies analyzed since quality incorporates a broad interpretation of impact on writing outcomes.

The instructional elements identified were ranked according to their effect size as determined by the meta-analysis of 142 studies. Explicitly teaching writing strategies was the number one recommendation of the authors. Writing strategies include those instructional elements which teach students to plan, revise, and edit their compositions. In addition to the broad category of writing strategies, prewriting was specifically ranked as the number 7 strategy with the greatest effect size. The ranking indicated that explicitly teaching students to organize their writing before and during the writing process significantly improved writing quality. Studies of prewriting that were included in the meta-analysis included those that investigated developing visual representations of plans.

Studies such as the Graham and Perin (2007) meta-analysis again indicate that teaching students to plan prior to and during writing can significantly improve the quality of students' written products. Explicit planning instruction should be considered a critical element in the process of teaching writing to all students and especially to students with LD.

Literature Review Summary

The previous chapter discussed the professional literature that has examined writing for students with LD. Nearly 3 million students are classified as LD (U.S. Department of Education, 2004b). The academic performance of students with LD frequently lags behind their peers

without disabilities. As students with LD enter high school, an achievement gap is often seen that equates their performance to students learning at the 4th or 5th grade level (Deshler et al., 2001). A performance gap of this magnitude puts students with LD at a distinct disadvantage when compared with their non-disabled peers. Specific strategy instruction is necessary to help students with LD close the performance gap and increase student success.

Writing is a skill that is necessary for student success in all academic content areas. Students with LD, however have difficulty with the writing process. Several characteristics are consistently exhibited by students with LD relative to the process of composition. Students with disabilities have limited capacity for attention, perception, and memory (Troia, 2002). Characteristics also include difficulties with transcription demands such as spelling, sentence formation, capitalization, and handwriting (Baker et al., 2002). Compositions developed by students with LD are frequently shorter, include more errors in word usage, and are more illegible that students without disabilities (De La Paz, 1999; Graham, 1990). In other words, students with LD often have difficulty with a number of skills as they navigate the writing process.

Students with LD can benefit from accommodations for their difficulty with transcription issues. Dictation (e.g., Lazarus et al., 2006; Scardamalia et al., 1982), computer speech recognition (Higgins & Raskind, 1995), predictive text (MacArthur, 1999), and speech synthesis (Handley-More et al., 2003) have been shown to improve student writing. Handwriting and spelling instruction are specific transcription skills that also have been investigated and shown to be effective in improving the quantity and quality of student compositions.

The theoretical underpinnings of cognitive capacity limitations and their effect on the writing process were also discussed. Working memory was shown to be integral in the writing

process especially as related to the planning and production of text (Kellogg, 1996). There remains a question as to the exact processes necessary for composition.

Brain research may provide insights to the links between the linguistic demands of working memory and the language production areas of the brain. Some brain regions, in fact have been shown to be specifically associated with language processing (Frankowiak et al., 1997). Continued research may provide vital understanding of the neurobiological processes related to writing problems and lead to the development of more potent behavioral interventions to aid struggling writers.

Two cognitive capacity models were also reviewed relative to their impact on the writing process. The work of Hayes and Flower (1980) provides a framework for understanding the cognitive processes that are active as composition occurs. Hayes and Flower used a three-prong approach that incorporates the steps of planning, translating, and reviewing into the compositional mix for older or skilled writers. The Bereiter and Scardamalia (1987) model was also discussed. The model was juxtaposed with the Hayes and Flower model for its focus on the organizational and production process of young or novice writers. Bereiter and Scardamalia emphasized two processes: knowledge-telling and knowledge-transforming. Knowledge-telling is used by unsophisticated writers to convey simple list-like thoughts drawn from long-term memory. Conversely, knowledge-transforming employs a procedure by which information in long-term memory is retrieved, processed, and developed into more complex text. Mature writers use knowledge-transforming that is enhanced by emphasis on planning and reviewing during composition. The Hayes and Flower model and the Bereiter and Scardamalia model provide conceptual frameworks for a discussion of cognitive capacity and its impact on working memory. A summary of cognitive capacity was also included in the chapter.

Self-regulation for struggling writers was also addressed. Pintrich and De Groot (1990) link student motivation with self-regulation in their theoretical model. Student motivation was shown to be dependent upon whether students believe they can accomplish the academic task, whether the task is important enough for them to pursue, and whether performing the task increases feelings of accomplishment or causes anxiety (Pintrich & De Groot). Strategy instruction was shown to be integral in improving student self-regulation. The most frequently researched self-regulatory model was proposed by Graham and Harris (Graham, 2006). The model, SRSD, has consistently been shown to improve student self-regulation during the writing process (e.g., Chalk et al., 2005; De La Paz, 1999; De La Paz et al., 2000; Garcia-Sanchez & Fidalgo-Redondo, 2006; Graham et al., 2000a; Graham et al., 2005; Harris & Graham, 1996). SRSD is particularly effective in increasing student motivation and engagement during the process of writing (Graham et al., 2000a).

Specific strategic interventions for improving the compositions of students with LD were also discussed. The analysis was framed by the work of Swanson and Hoskyn (2001) whose review of recent literature emphasized strategic teaching. Instructing students with strategies that promote the use of mental scaffolding improves student compositions (Englert et al., 2005). Procedural facilitators were introduced as aids in the learning and generalization of strategies (Englert et al., 2006). Specifically, strategies for providing cognitive support were elaborated upon. While not all strategy instruction research has proven to be effective, as was shown by Hallenbeck (1996), a number of studies has shown specific strategy instruction to be effective for improving the writing of students with disabilities.

The effectiveness of strategy instruction can be improved through explicit instruction. An excellent example of explicit strategy instruction is found in the SRSD model (Graham & Harris,

1989a). The model has been used successfully to teach planning and revising strategies that have improved the written products of students with disabilities (e.g., De La Paz, 1997; Saddler et al., 2004; Troia & Graham, 2002). Explicit strategy instruction was also shown to be effective for improving the writing of secondary students with LD. Chalk, Hagan-Burke, and Burke (2005) successfully applied the SRSD model to older students who showed improvements in the quality of their written discourse.

Studies in which planning and prewriting strategies were shown to be effective for improving student writing also were discussed. Explicitly taught strategies such as the use of graphic organizers for secondary students with LD were included in the discussion (Chalk et al., 2005). When students are explicitly taught strategies for planning, their written products improve in clarity, cogency, coherence, fluency, and other measures of quality (De La Paz, 1997; Wong & Butler, 1996). Student motivation also improves when students are overtly taught strategies that increase their confidence in their writing abilities (Gleason & Isaacson, 2001).

Graphic organizers are a specific form of prewriting strategy that have been particularly effective for improving written discourse (Anderson et al., 2004). As procedural facilitators, graphic organizers have been shown to be a particularly potent strategy for improving the writing of students with disabilities (Graham & Perin, 2007).

Assessing student writing is most commonly accomplished using holistic scoring (Huot & Neal, 2006). The holistic scoring process is a relatively new tool for writing assessment. It was developed in the 1970's to evaluate standardized tests used for college entrance examinations (Huot & Neal). The concept of assigning a single score to a composition, however, has not always been met with enthusiasm due to holistic scoring's inability to provide analysis of

specific elements of written products (White, 1984). To improve scoring reliability, multiple raters are used to score student writing. Normally, the mean scores of two raters are used to assign a score to individual essays (Johnson et al., 2001). Holistic scoring has been shown to be reasonably valid and reliable method for scoring written products (Johnson et al., 2001).

The teaching of writing also has changed over time. The traditional method of teaching writing through the emphasis of the mechanical elements has given way to more effective strategic instruction (Baker et al., 2003; Baker et al., 2002; Deshler et al., 2003). Current scientific investigations of writing instruction have concluded that allowing students to focus on planning, organizing, and revising improves their ability to conceptualize at a much higher level than when mechanics are emphasized (Goldman & Hasselbring, 1997). This has led to a greater understanding of student writing through more process oriented research.

When secondary students with LD are explicitly taught strategies for planning and prewriting, significant improvements in quality can be realized. Teaching specific prewriting strategies such as graphically organizing compositions can reduce cognitive overload allowing students to formulate written products of higher quality. Thus, explicit strategy instruction is necessary for improving the written products of older students with LD who struggle with the writing process.

CHAPTER THREE:
METHOD

Setting

The study took place at a suburban high school with an enrollment of 4,137 students whose population includes a diverse range of races and cultures. The ethnicity of the school included a population represented as 56% Caucasian, 28% Hispanic, and 10% African American. The remaining six percent of students are Asian/Pacific Islander (3%), multiracial (2%), and American Indian/Alaskan Native (<1%). There were 576 students staffed into special education making up 14% of the total student population. Of the students who were included in special education, 387 students were classified as Learning Disabled (LD). Forty-one percent of the students staffed as LD were taught in at least three general education classes daily. Resource rooms were used to teach learning strategies to students with mild disabilities.

The study was reviewed by the university Institutional Review Board for compliance. All documents including consent forms, teacher interview questions, and participant interview questions were evaluated and approved by the Institutional Review Board. (See Appendix A.)

Participants

The participants for this study were chosen from a group of students with LD who attend general education classes for the majority (three or more classes) of the school day and who received specialized strategy instruction in a resource room for one period daily. The participants were 11th grade students seeking a standard diploma.

Students who participated in the study had a diagnosis of Learning Disabled as defined by the Florida Department of Education: "A disorder in one or more of the basic psychological or neurological processes involved in understanding or in using spoken or written language.

Disorders may be manifested in listening, thinking, reading, writing, spelling, or performing arithmetic calculations." (Florida Department of Education, 2007).

Students from three learning strategies resource classes made up the pool of potential participants for the study. The Story Construction subtest of the Test of Written Language (TOWL-3) (Hammill & Larsen, 1996) was administered to every student in the three learning strategies classes from which participants were chosen. The local school district had already approved the TOWL-3 for use in evaluating the written language skills of exceptional students. A single subset of the test was administered to each resource room class as a group prior to baseline data collection.

The TOWL-3 is a comprehensive assessment for evaluating written expression. It consists of eight subtests that estimate student writing ability through measures of vocabulary, spelling, style, logical sentence formation, sentence combining, contextual conventions, contextual language, and Story Construction. Only the Story Construction subtest of the TOWL-3 was administered to students for the purposes of this study. The Story Construction subtest is based upon spontaneous written responses to a picture presented to students in their test booklet. Students were given 15 minutes to write their stories. Using TOWL-3 guidelines, the story written by each student was evaluated for plot quality, prose, action, sequencing, character development, and interest to the reader. Scores were compared across age-equivalent quotients to obtain standard scores. The mean for the Story Construction subtest is 10 with a standard deviation of 3. Students whose grade equivalent standard scores were one or more standard deviations below the mean were considered for the participant pool.

Florida Comprehensive Achievement Test (FCAT) is a state assessment that includes a writing assessment component. The grade 10 Florida Writing+ (Florida Writes) is holistically

scored on a scale of 0 to 6 points where 0 is unscorable and 6 is the highest possible score. The pool of potential student participants included those who received scores of 4.5 points or less on the Florida Writes component of the FCAT. The FCAT and Florida Writes tests are administered separately each year during the spring semester.

Exclusions from the sample pool were made on the basis of two criteria. Students were excluded from participation in the study if they had a poor attendance record. The high school implemented an electronic attendance system that can be accessed by the attendance office, administration, or teachers. The student attendance records were examined by the classroom teacher for the prior nine-week grading period. Students with more than ten absences indicated by the teacher were not considered for participation in the study. Also, students who used assistive technology for writing were not included in the selection pool.

A pool of potential participants was generated by utilizing the criteria referenced above. Twenty-three students were eligible to be included in the sample pool. To choose the final participants, student names were chosen randomly. A simple drawing was used to make the final participant selection. A total of twelve participants were chosen. The original twelve student participants included four students with LD from each of three separate learning strategies classes. One student dropped out of the study shortly before the intervention phase after 14 weeks of participation.

The 11 remaining student participants received instruction in three separate classrooms. Students from each classroom were designated as a group. Each group received a letter for identification purposes. Four students were in groups A and B. Group C had three students due to the attrition of one member. Group C also included a student whose TOWL-3 scores were higher than the grade equivalent standard scores for other students. The student was selected to

participant since the pool of students in her classroom was very limited due to the number of students in the class and their poor attendance records. The characteristics of the groups are shown in Table 1.

Table 1 Participant Characteristics and Test Scores

				TOWL-3 Pre-test Scores			
Group Members	Sex	Race/ Ethnicity	Florida Writes Score	Raw	Standard Scores	Percentile	Grade Equivalent
A	M	A	3.5	1	1	1	2
A	M	C	3.5	6	6	9	2.7
A	M	C	3.0	6	6	9	2.7
A	F	C	4.5	6	6	9	2.7
B	M	C	4.0	5	5	5	2
B	F	C	4.0	5.5	5	5	2.7
B	M	H	4.5	7	7	16	2.4
B	F	A	3.0	6	6	9	3.4
C	F	H	3.5	12	10	50	12.7
C	F	H	2.5	1.5	1	1	2
C	F	C	4.0	8.5	8	25	4.4

Note. A = African American, C = Caucasian, H = Hispanic.

Students were issued a spiral notebook in which to write their compositions. The pages of each spiral notebook were pre-numbered with a randomly generated number for purposes of anonymity. To alleviate the potential for data loss due to misplaced papers, student responses to daily writing prompts remained in the spiral notebook and were stored on a counter top in the

resource room. The notebooks were collected every third class period to allow for scoring. All names and identifying information were removed from the students' written products to protect their anonymity. Each composition was scored twice, once each by two different raters. Raters were not informed of which class was experiencing the intervention. This arrangement reduced the possibility of rater bias due to knowledge of the intervention being taught and scores being influenced.

Design and Analysis

This study employed a single-subject design. The study examined the effects of explicitly teaching a writing strategy for planning descriptive essays upon the written products generated by students with LD. The specific intervention studied was a mind-mapping strategy used for planning and organizing during prewriting and drafting. For the purpose of examining the effects of a mind-mapping strategy for planning of narrative writing, a multiple baseline across subjects design was implemented. The multiple baseline design allowed the researcher to concurrently take repeated measures of baseline performance for several subjects using individual baselines (Kennedy, 2005). Subjects for the current study were three subject groups from different classrooms of three to four students.

One of the strengths of the multiple baseline design is its ability to demonstrate the effect of the intervention at the time that it is applied (Kazdin, 1982). In addition, the single-subject design allowed for the control of most threats to internal validity and allowed for the determination of a functional relationship between manipulation of the independent variable (mind-mapping strategy) and the dependent variable (quality of written products) (Horner, Carr, Halle, McGee, & Wolery, 2005). Through graphical representation, the multiple baseline design provided opportunities for the visual analysis of the impact of the intervention when it was

applied. Visual inspection of the data necessitates that trends be observed. Trend is defined by Kennedy (2005) as "the best-fit straight line that can be placed over the data within a phase" so that the slope and magnitude may be observed (p. 197). Slope refers to the upward, downward, or flat inclination of the data. Magnitude is the size (steepness) of the slope.

One of the major strengths of the multiple baseline design is the "documentation of unequivocal relationships between manipulation of independent variables and change in dependent variables" (Horner et al., 2005, p. 169). Multiple baseline design is also appropriate when the dependent variable is exhibited by a number of students (Foster, Watson, Meeks, & Young, 2002). In this instance, the population of students from the learning strategies classes generally exhibited a lack of sophistication in their writing skills as indicated by the TOWL-3 pre-test results making the multiple baseline design appropriate for the study sample.

In addition, enough writing samples were collected to allow identification of any changes in quality of student writing over time. Sixty-six writing prompts were administered to the students by the classroom teacher. While maturation effects were predicted, the threat to internal validity was minimized through the ability to observe graphic representations of writing scores as they progressed over time.

Four phases were incorporated as part of the design for the current study: (a) pre-baseline, (b) baseline, (c) intervention (independent variable), and (d) post-intervention. Each phase will be discussed in the following sections.

The quality of student descriptive writing was measured by the Written Expression Rubric (WER) (see Appendix A). The Written Expression Rubric was developed based on the holistic rubric used for the grade 10 Florida Writing+ (Florida Writes) component of the Florida Comprehensive Achievement Test (FCAT) (Florida Department of Education, 2001a, pp. 12-13).

The Florida Writes rubric can be viewed in Appendix B. The WER was derived from the Florida Writers rubric by applying the domains which correspond to the focus, clarity of the organizational pattern, and development of supporting details. The elements of quality included Focus, Organization, and Support. Word choice and convention scoring elements were removed from the WER and not considered during scoring. Conventions include basic writing skills such as punctuation, capitalization, spelling, and sentence structure. These elements along with word choice were not relevant to this study.

Prior to the introduction of the intervention, a stable rate of baseline performance was established (Kazdin, 1982; Kennedy, 2005). To establish each baseline, stability must be observed in the student performance (Horner et al., 2005; Kennedy, 2005). For the current study, data were graphed to allow for the observation of baseline and to establish an initial pattern of response for individual participants in each group. Criteria for baseline stability is described below. The establishment of stable baseline required that a non-substantive trend or a trend opposite from that predicted by the intervention be observed (Horner et al., 2005). The data from the participants in each class were considered as a group. The stability of baseline data were determined for each student group. This arrangement necessitated that the data for all of the students in the group be stable prior to intervention. Stability of data determined the order of movement to the intervention phase for each group. The criteria for considering student group baseline stability was defined by their WER scores. When WER scores for a group did not vary more than two points over five days they were considered stable. Baseline also was considered stable for a student group whose WER scores exhibited a consistent or repeating pattern over five days. For example, a group's WER scores may have been recorded during each assessment period as 2, 4, 2, 4, 2 and considered to be stable.

Students were administered daily writing prompts. Data for all groups were observed until the data from one group were stable. The group was designated group A. When a stable baseline was established, the independent variable in the form of the writing intervention was introduced to the group A. Students from the first intervention group continued their daily writing in response to prompts written on the classroom blackboard. Data were collected during the intervention phase as students were taught the prewriting strategy over a period of four class sessions and wrote for the final 15 minutes of each class period.

Data in the form of student essay scores were collected during the four day intervention phase. To allow for the observation of the separate effects of the intervention upon each participant group, the intervention was applied only when the writing performance became stable for the group in the intervention phase. Stability criteria was defined above. Since the effects of the intervention were examined over a period of time, the pattern of data established were considered a data series (Kazdin, 1982). The predicted interaction of the introduction of the mind-mapping strategy on the quality of student writing was documented within each data series and across the data series through staggered introduction of the strategy.

When writing performance stabilized for the individuals in the student group with whom the strategy was introduced, the strategy was taught to the next group of students. Stability was judged using the criteria established above. This sequence continued until students from all subject groups received the writing intervention. The across subjects design is unique for its ability to show the effects of the intervention upon each subject or subject group individually (Kennedy, 2005).

Dependent Variable

The dependent variable studied was the quality of student descriptive writing as measured by the WER. The present study adhered to the four criteria set forth by Horner et al., (2005). (a) The dependent variable was operationally defined allowing it to be consistently assessed during the study. The operational definition also allows for study replication. (b) The dependent variable was measured repeatedly across conditions; multiple baseline across subjects represented the repeated condition. (c) Student writing was scored for each writing day (consistently) and interrater concurrence was monitored. Interrater agreement also was maintained through multiple rater trainings. (d) The dependent variable was selected for its social importance as established in the review of current literature.

A single score was assigned for each composition. The total possible rubric score was six points encompassing the three elements (i.e., Focus, Organization, Development of Support). A maximum of 6 points total and a minimum of 1 point was possible. If an essay was unscorable according to the criteria listed on the rubric, it received 0 points. Each point level of the rubric included an anchor statement or series of statements to describe the level of proficiency necessary to obtain the score for that level. To maintain concurrent validity, the wording of the anchor statements for each rubric level corresponded exactly to the FCAT Writing Rubric – Grade 10, (Florida Department of Education, 2003). A single word change was made to the 1 point level. The word "marginally" was added since the FCAT Writing Rubric did not differentiate between the 2 point level and 1 point level for the Focus domain. For the purposes of this study, "marginally" was defined as "barely exceeding the minimum requirements" (Merriam-Webster Online Dictionary, 2006).

Rubric Examination for Validity

Educators compared the WER for face and concurrent validity with the Florida Writes rubric. Two high school teachers familiar with descriptive writing for the Florida Writes inspected the WER to help ascertain face validity based on their experience with holistic scoring of high school students' written products. Each teacher was interviewed separately. The teachers were asked to examine the WER to determine whether it looked as if it would accurately assess the written products collected. The teachers also compared the WER with the Florida Writes rubric for concurrent validity. They were provided with copies of both the Florida Writes rubric and the WER for inspection. They read each rubric. The teachers compared each scoring section of the rubrics word for word to identify any inconsistencies between them. No differences were found except for the "marginally" in the first sentence of the 1 point section on the WER. Both face and concurrent validity were ascertained independently by each teacher. The review of WER established it as a valid instrument for measuring student writing.

In addition, university faculty familiar with the development and use of holistic rubrics for the teaching of narrative writing was asked to review the WER for concurrent validity. A university faculty member was asked to compare the WER with the Florida Writes rubric for concurrency and content. A copy of each rubric was provided to the faculty member. Each section was examined for concurrency or discrepancies. The only discrepancy found was the use of the word "marginally" which had been added by the researcher to differentiate between scoring levels 1 and 2. The university faculty member indicated that the two rubrics were concurrent.

Rubric Concurrency with Sample States

Holistic rubrics are used by states for the scoring of students' written products on state mandated assessments. Eleven states, whose assessment information was available on the internet, were examined as a convenience sample. Their holistic scoring rubrics were analyzed for concurrency with the Florida Writes rubric, the rubric from which the WER was derived. The sample included states with significant populations and that represented a broad geographic cross-section. California, Colorado, Connecticut, Georgia, Massachusetts, Minnesota, New Jersey, Pennsylvania, Tennessee, Texas, and Washington were included in the sample. The holistic rubrics were compared with the Florida Writes rubric for similarity on the elements of Focus, Organization, and Support.

Of the rubrics sampled, California was the only state to have no consideration for focus and organization. Three states were not concurrent with the WER on one element. Colorado and Tennessee did not include focus as an element in their rubric. Georgia did not include an element for support. However, seven of the eleven states' rubrics were concurrent with the WER on the three elements of Focus, Organization, and Support; the three domains which are the focus of this study. Therefore, the elements of the WER were determined to be concurrent with those of holistic rubrics used for scoring student written products in several states who require writing as a component of mandated testing.

Writing Prompt Overview

The type of narrative writing examined in this study were the descriptive essay wherein the prompts address general knowledge topics. (e.g., "Describe your favorite vacation."). General knowledge prompts were utilized to minimize the effects of differences in levels of student curriculum content knowledge. Personal narratives of this sort are a key component of

most types of writing and are generalizable to other kinds of writing (Hillocks Jr., 1995). In fact, personal narrative is the form of writing most commonly addressed in state standards (Isaacson, 2004).

The writing prompts for state mandated tests from several state department of education sites were obtained from the internet. State departments of education have posted prompts online which had been used during prior testing years and have been retired from use. Prompts from the Nevada High School Proficiency Exam in Writing (Nevada Department of Education, 2006) were used for the current study. The Nevada prompts were used since they were differentiated by grade level grouping and year. Only prompts from those for grades 11 and 12 were used. The prompts from these years were combined on the webpage and it was not possible to identify differences between those used for the 11^{th} and 12^{th} grade as they were clustered together.

Prompts were selected for their uniformity components, and potential interest level for high school students. Each prompt included a writing situation and specific directions for writing. The writing situation informs the writer of the topic, the setting, who may be included in the essay, and what will be described in the essay. Prompts were classified into three groups including personal interest, fantasy, and community issues. Personal interest prompts asked students to write about a topic that might directly affect the writer. Fantasy prompts required students to imagine a situation or setting that does not exist or may not be possible. Students also were asked to respond to prompts on the topic of their community. The community typically could have included the students' school, neighborhood, city, state, or country. Each prompt type including, personal interest, fantasy, or community were arbitrarily assigned to the schedule for each week. The total number of prompts represented by each category was balanced so that an

equal number of each was used. The students received a total of 66 prompts over the course of the study.

Prompts also were chosen for their potential for being relative to all high school students for being interesting or thought provoking and for providing clear purpose and expectations. Prompts were reviewed by a high school exceptional education English teacher to determine if they would be interesting to 11th grade writers. The prompts were rated on a scale of 1 to 5. If the rating of a prompt was below 3, it was not used for this study. A schedule of all prompts administered is included in Appendix D.

Descriptive essays were assigned to all students in the three learning strategies resource rooms over a period of 17 weeks. Data were compiled only for students participating in the study. The written products composed by students who did not participate were not used for data analyses.

Independent Variable

The independent variable for this study was a writing strategy intervention. Students were explicitly taught a mind-mapping strategy for planning descriptive writing. Timing of the introduction of the intervention was actively manipulated to determine a functional relationship upon changes in the dependent variable (Horner et al., 2005). In other words, each participant group received the mind-mapping intervention only after stability had been established for the group who had previously received mind-mapping instruction as defined above. A detailed description of the mind-mapping strategy follows this section.

Strategy

The mind-mapping strategy used in this study enables writers to visualize the organization of their writing prior to the writing process. It also serves as a reference or

organizational reminder during drafting. The mind-mapping strategy is also known as cognitive mapping, flowcharting, semantic mapping, and graphic organizers (Sturm & Rankin-Erickson, 2002). Mind-mapping is a non-linear brainstorming technique yielding a visual representation of the task in graphic form. Using a non-linear strategy corresponds to established models for written expression (Hayes & Flower, 1980; Kellogg, 1994) and research demonstrating that writing is a recursive process rather than a linear progression of steps (Hidi & Boscolo, 2006; Pritchard & Honeycutt, 2006). The visual organizer provides a format by which an initial concept is written in the center of the paper and expanded upon by physically connecting ideas to each other in a web-like pattern. Key words are placed in a manner to suggest a relationship with the main idea. Branches emanating from the main idea are developed which allow the expansion of the concept and visualization of the components so that the relationships become visible (Boyle, 1996).

Previous studies have shown this strategy to be an effect tool for organizing student writing (Baker et al., 2002; De La Paz & Graham, 2002; Sturm & Rankin-Erickson, 2002). See Appendix E for one example of mind-mapping. The Florida Writes requires students to demonstrate knowledge of organizational patterns. In fact, the 2005 draft of FCAT Writing+ Test Item Specifications, Grade 10 (Florida Writes) illustrates a writing plan based on a mind-map similar to those used in this study (Florida Department of Education, 2005). The specific mind-mapping instructional sequence is embedded within the instructional procedures detailed in the following section.

Instructional Procedures

A single written expression prewriting strategy was presented to subjects in this study. Mind-mapping was chosen as the methodology for this intervention. All students in each of three

learning strategies classes were required to write a response to a prompt presented by their regular teacher daily at the beginning of the class period. The students in each class were required to organize and write a short descriptive essay each day for the duration of this study. The high school prefers that the beginning of each class period be reserved for a short assignment designed to help the class get focused and ready for instruction. This time is often called "bell-work" and encompasses approximately the first 15 minutes of each class period. Students in the present study utilized the first fifteen minutes of each class period to write in response to a prompt written on the board at the front of the room. Due to the limited time for organizing and writing each day, the length of student writing samples was expected to be approximately three to five paragraphs.

Initially, no instruction was given to students. They were simply asked by their regular resource room teacher to respond in writing to the daily prompts written on the blackboard. At the beginning of the writing time, the teacher read the prompt to the class from the written example posted on the board. The students began writing in their numbered spiral notebooks and wrote continuously for the 15 minute period. The teacher announced when five minutes remained in the writing period. Data were collected daily. In the event of school holidays, field trips, or in the event of student absences, daily writing did not occur. Students did not make up work for days when writing did not take place. Rather, the day was recorded as a non-data day.

Prior to the baseline phase of data collection, a pre-baseline phase was established during which writing samples were collected for three days. Following the three day writing period, the WER was described in detail to all students. It has been shown that the presentation of a rubric prior to a performance-based assessment improves outcomes (Sundeen, 2002). To reduce the effects of teaching the WER and it becoming a potentially confounding variable, the WER was

presented after three days of data collection and prior to the first intervention phase (independent variable). This sequence was expected to reduce the possibility that, in addition to the intervention effects, teaching the rubric could help improve student performance. The first intervention phase did not occur until after nine days of student writing after the presentation of the WER. Teaching students the rubric provided learners with a specific understanding of the expectations for the writing assignments. Allowing for data collection prior to describing the rubric permitted the data to be graphed and visually inspected for any influence of the presentation of the WER.

The WER lesson took approximately 20 minutes and included a discussion of the purpose of the rubric, description of the scoring, the role of raters, and description of its similarity with the Florida Writes rubric. Each scoring level was read to the students and was accompanied by a detailed explanation of the scoring elements. Three overhead transparencies were shown, each with one of the three elements of the WER: Focus, Organization, and Support. (See Appendix M.) The content of each slide contained definitions from the Performance Task Scoring Practice for Educators, Grade 10 Writing (Florida Department of Education, 2001a, pp. 10-11). Focus was characterized as "how clearly the writing presents and maintains a main idea, theme, or unifying point" and "staying on topic". Organization was described as "the structure or plan (beginning, middle, and end) and the relationship of one point to another". The third element, Support, was presented to the students as "the quality of details used to explain, clarify, or define". The majority of students in each class confirmed that they were familiar with the Florida Writes rubric by a show of hands. Students in each class were encouraged to contribute to the presentation of the WER by responding to the instructor's questions and discussing the specific elements of the rubric.

Students were provided with a description of the scoring procedure together with the scoring criteria of the WER. The roles of the raters were elaborated upon so that students would be familiar with the scoring procedure. It was described that each essay would be read by two different raters whose scores would be averaged to arrive at a final score. The classes were made aware that if the raters' scores were more than one point apart, another person would read the essay and help determine the final score. The similarity and differences between the WER with the FCAT Writes Rubric also were discussed. Students were encouraged to ask questions about any aspect of the rubric about which they were unclear. The point levels of the WER were read to the students and questions were elicited to confirm understanding of the scoring criteria. Throughout the study, students kept a copy of the rubric in their spiral notebooks to allow them consistent access to the scoring criterion. A detailed description of the four lesson instructional sequence is provided in the intervention section. The instructional sequence of the study for each group is presented in Figure 1.

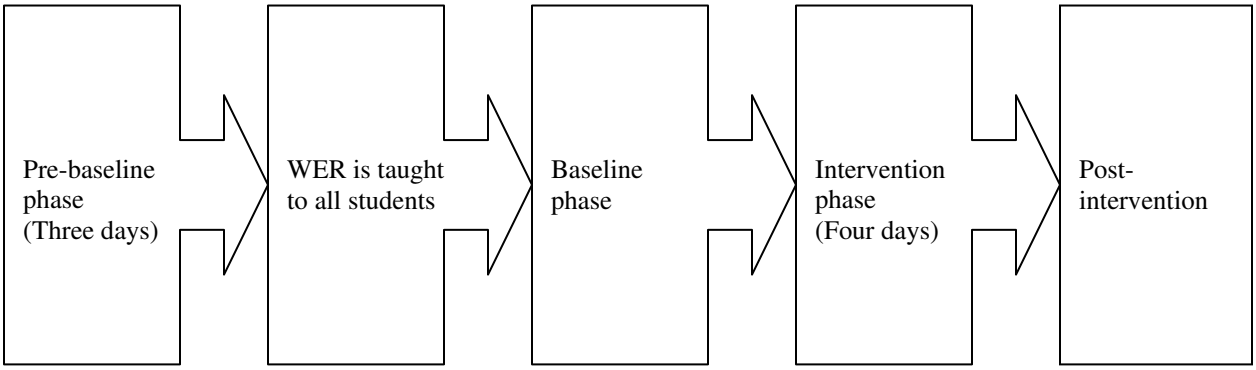


Figure 1 Instructional Sequence for a Single Group

Pre- Post-testing

Students in the three classes were administered a pre- and post-test. Story Construction, Subtest 8 of the TOWL-3 was administered prior to the baseline phase of data collection and again after daily writing had ceased. Raw scores were determined by two qualified raters who were trained using TOWL-3 materials from the examiner's manual. Detailed description of the training process is included in a following section. Raw scores were calculated using the subtest 8 Story Construction score sheet that can be seen in Appendix F. Percentiles and grade equivalent scores also were developed from the raw scores. The normative scores for percentiles and grade equivalents were based on TOWL-3 testing materials. Subtest 8, Story Construction, standard scores have a mean of 10 and a standard deviation of 3. The percentiles were computed directly from raw scores earned by students tested for the norming process. Of the methods for score interpretation, percentiles are considered to be the most accurate (Campbell, 1994). The grade equivalent interpretation is questionable since only 12% of the normative sample scores for the TOWL-3 were from students 16 and 17 years old. Scores were used for comparative purposes only.

Interrater Reliability

Scoring written products is a complex process which can prove to be relatively reliable by using multiple raters and by applying appropriate rater training (Brown, Glasswell, & Harland, 2004). The objective of assessing written products is to accurately reflect the proficiency of the individual (Johnson et al., 2005). Converse to scoring multiple-choice questions, written products require a subjective judgment (Johnson, Penny, & Gordon, 2000). Subjectivity can be reduced when raters are trained to use a rating scale such as a rubric for assessing written products (Penny et al., 2000). The degree to which raters agree in their

interpretation of rubric scores is referred to as a consensus estimate (Stemler, 2004). To improve the reliability of scores, at least two raters are preferred. In fact, in a recent survey by Johnson and colleagues (2000), it was determined that 76% of states that include written-response items in their student testing programs use two or more raters for scoring decisions.

For the purpose of this study, each written product was evaluated by two raters. A third rater was used in cases where scores were not adjacent (e.g., 4 and 6). Two raters, a doctoral student majoring in education and a nationally certified special education teacher who was state certified in English, were trained by the researcher as independent examiners in the use of the WER.

TOWL-3 Rater Training

Both raters were trained using materials available in the TOWL-3 testing kit. Each kit contained two sets of test booklets to be used for pre- and post-testing, score sheets for recording scores, and an examiner's manual. The examiner's manual provided guidelines for test administration and scoring procedures according to specific subtests. Only the Story Construction subtest was administered for the purposes of the current study. Guidelines for interpreting the score results also were included in the examiner's manual. Sample stories with example Story Construction score sheets also were included. See Appendix G. The score sheet was analogous to an analytic rubric. Eleven domains were included on the score sheet. The domains consisted of specific scoring criteria such as "story beginning" and "story ending" Each domain presented raters a scoring range. Most domains included a range of 0 points to 2 points. Some domains ranged from 0 points to 3 points. The total points available for the story were 21.

Rater training for the TOWL-3 consisted of three steps. The raters familiarized themselves with the score sheet by reading each scoring domain and the accompanying criteria

and reviewing the available points. Raters received copies of samples stories from the examiner's manual from which to anchor their scoring procedure. The raters compared their scores with the sample score sheets to ascertain their scoring accuracy. The training session lasted approximately one hour.

Raters were trained in a separate session to score student's written products generated from daily prompts. The training materials utilized for training raters for the current study were obtained from the Florida Department of Education. Materials used for training raters for the FCAT were used for training raters in the present study (Florida Department of Education, 2001a; Florida Department of Education, 2001b). The FCAT Performance Task Scoring Practice for Educators, Grade 10: Writing, provides an overview of the FCAT, definitions, descriptions of holistic scoring, a copy of the grade Florida Writes rubric, suggestions for the training sequence, anchor papers, and training sets of student papers. The anchor papers are actual copied examples of student writing that are used to exemplify the quality of student writing necessary to obtain a specific score. See Appendix H for an example. The training sets also contained additional exemplary student essays. The suggested use of the training sets is for independent study by raters. For the purposes of this study, the training set essays also were used to for rater training. It was necessary to include the training sets due to the fact that one of the raters had seen several of the anchor papers in previous FCAT training.

An initial four hour training session was presented by the researcher to the raters. The Performance Task Scoring Trainer's Guide (Florida Department of Education, 2001b) was used to sequence the training of the two raters in the current study. The criteria level for rater concurrence was set at .85. The researcher used the guidelines for the comprehensive scoring workshop to guide the process of training the two raters. The sample schedule for comprehensive

scoring workshops was followed. Raters reached criterion sooner than expected. The time sequences suggested for each topic or activity was reduced to accommodate for available time and the rater's prior knowledge.

The training sequence consisted of providing an overview of the training session, an overview of FCAT performance tasks, and an explanation of how FCAT is scored using holistic rubrics. The WER was given to the raters and they read it thoroughly. The researcher described the differences between the FCAT Writing Assessment Rubric for Grade 10 (Florida Department of Education, 2001a, pp. 12-13) and the WER. The raters learned that the WER excluded the elements of Conventions of Mechanics, Punctuation, and Spelling, while retaining the elements of Focus, Organization, and Support. The elements of Focus, Organization, and Support were elaborated upon using the definitions and explanations provided for each in the manual used for FCAT training, the Performance Task Scoring Practice for Educators (2001b, pp. 10-11).

The raters received the sample notebooks that were written during pre-baseline phase. A sample of notebooks from the three classes were randomly ordered and distributed to each rater during their WER training session. Student names and other identifying information such as the teacher name and room number did not appear on the writing samples. For each student group, the pre-baseline phase took place during the writing days just prior to the teaching of the WER. During the pre-baseline phase, 79 essays were generated by the students in the three classes. A sample of 27 essays was chosen by randomly selecting nine student notebooks from each period. The sample of essays represented 34% of all writing samples generated during the pre-baseline phase. Sample essays were scored by two independent examiners using the WER during a training session. The two raters were taught to use the WER during a two hour training session. Training of raters is expected to reduce the chance of measurement error (Penny et al., 2000).

The WER was taught to each rater by providing an overview of the scoring criteria and the description of each scoring level. Exemplar papers from the student writing samples were chosen to establish the criterion for compositions at each point level of the WER. These papers served as anchor papers during the balance of the WER training. The anchor papers chosen were not part of the 34% of sample papers that were scored to establish interrater reliability. Anchor papers afforded an opportunity for raters to refer back to exemplars for each point level of the WER.

Interrater reliability can be estimated utilizing consensus estimates when scoring rubrics are used for evaluation (Stemler, 2004). Each student essay was scored once by each of two raters resulting in two scores per written product. Each rater assigned an overall score based on the criterion established in the WER to each writing sample. Consensus coefficients were calculated using percent agreement and percent adjacent agreement (Penny et al., 2000; Stemler, 2004). Percent agreement and percent adjacent agreement are among the most commonly used consensus coefficients for calculating interrater reliability (Brown et al., 2004). A broadened definition of agreement may be used that combines the percent agreement and percent adjacent agreement scores to reflect a single score (Stemler, 2004). Combining the scores has the advantage that raters would not have to be trained to reach exact agreement. Rather, their scores were considered to have reached consensus if the raters' scores were within one point above or one point below each other. Since the scale of the WER ranged from 0 points to 6 points, the consensus score determined by the combined exact and adjacent scores was an appropriate measure of interrater reliability (Stemler, 2004). So, the combined scores were used for the measure of interrater reliability.

Pearson product moment coefficient is another common measure of interrater reliability. It was not appropriate for this study due to the distribution of the essay scores. There was little

variance in the scores with most falling in the 0 to 2 point range. Utilizing a correlation measure such as Pearson product moment to evaluate scores with little variance leads to an artificially deflated correlation coefficient and could lead to the incorrect conclusion that interrater reliability was low (Brown et al., 2004).

Stemler (2004) indicates that the literature for interrater reliability provides a guideline that consensus estimates are reliable above 70%. An interrater reliability consistency coefficient of .85 for combined percent exact agreement and percent adjacent agreement was the criterion level set for this study. Weekly calculation of interrater reliability for all essays evaluated indicated the frequency for retraining of the raters. If the interrater reliability fell below .85 for a given week, raters were retrained. To enhance the reliability of scoring, raters were trained during six one hour sessions over the course of the study.

Scoring Procedures

Scoring procedures during data collection used the following procedural guidelines. Each paper was scored independently by each of the two raters. An average of both rater's scores was recorded as the final score for each essay. Averaging raters scores provides an accurate measurement for reliability (Brown et al., 2004). According to Huot (1990), the score assigned to the product of an assessment should, under perfect circumstances, reflect exactly what the student knows: true score. Reality is quite different. The observed score is the combination of true score with an element of error. The difference between the true score and the observed score is referred to as measurement error. By averaging the scores of the two raters, the overall score is closer to the measure of true proficiency and reduces the possibility of random measurement error (Penny et al., 2000). Averaging the scores of raters when they are found to be equivalent or

adjacent is the most typical method of obtaining an overall score for writing evaluations under state testing programs (Johnson et al., 2001).

The average score for the present study was calculated by adding the two rater's scores together and dividing by two. The average was calculated only if the raters' scores were adjacent. Adjacent scores are those that fall within one point of one another such as 2 and 3. If the scores of the raters differed by more than one point, the composition was rated by the researcher in the role as the third rater. If the third rater's score matched either of the original scores, then the final score was the matched score of the third rater's score and the matching rater's score. Also, if the third rater's score was adjacent to the scores of both raters then the third rater's score was averaged with that of the highest of the original scores. If the scores of the two raters were not adjacent and the third rater's score did match either nor was adjacent to either, then the average of the highest rater's score and the third rater's score was used as the final score. (See Appendix I.)

Intervention

After a stable baseline had been established for a single group of students, the researcher taught the prewriting strategy to the whole class as the daily lesson in their learning strategies classroom. During the intervention phase, the researcher assumed the role of instructor for the entire four days of instruction. The lessons consisted of four 50-minute classroom sessions encompassing the whole class time (see Figure 2). See Appendix J to review lesson plan outlines used for each intervention lesson. The subjects remained with the whole class and were *not* singled out for individualized instruction. The regular classroom teacher did not participate during instructional sessions.

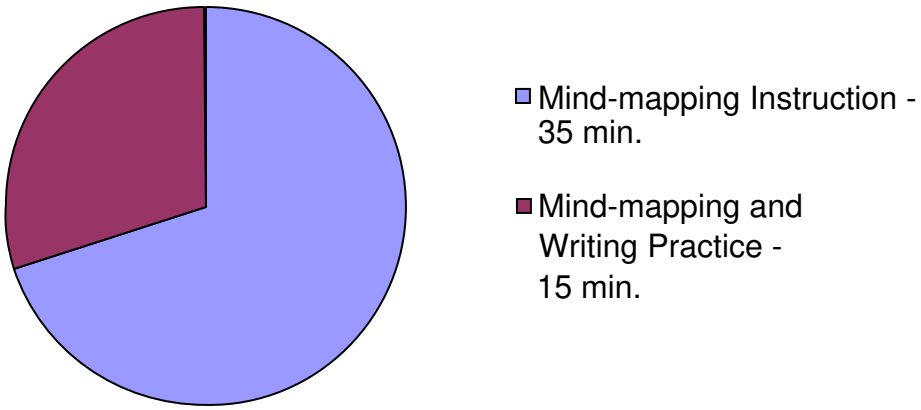


Figure 2 Allocation of Instructional Time for the 50 Minute Class Period

Four 50 minute classroom periods were used to teach the mind-mapping strategy. During the final 15 minutes of each 50 minute session, students were asked to respond to a prompt. They used the 15 minutes to plan and compose an essay and the written products were included as part of the intervention phase data. The final one or two minutes of the 50 minute instructional period were used to instruct students to read the prompt and begin writing. Figure 2 provides an example of the allocation of instructional time during the 50 minute class period. Each of the three groups experienced four days of instruction during their group specific intervention phase.

Lesson Plan Checklist

To maintain treatment validity, an outline used as a checklist for each lesson was developed as a guide for instruction during the intervention phase (independent variable); it was closely followed by the researcher while teaching each lesson (Chalk et al., 2005; Graham et al., 2005; Sturm & Rankin-Erickson, 2002) (see Appendix J). An audio recording was made of each lesson. An independent rater reviewed each of the recordings using the checklists to check for consistency in completing all steps of each lesson for each group.

Explicit Instruction

Students received explicit strategy instruction (e.g., Chalk et al., 2005; De La Paz, 1997; De La Paz & Graham, 2002; Englert et al., 2005; Graham, Harris, & Larsen, 2001; Graham et al., 2005; Walker et al., 2005) during each 50-minute classroom session describing the rationale for the use of mind-mapping, specific elements of the strategy, modeling of the strategy, modeling of metacognitive processes, guided practice of the strategy, and independent practice of the strategy. See Table 2 for a summary of the lesson plan sequence.

The explicit instruction was provided in a demonstration format whereby the instructor described the rationale behind the strategy and demonstrated the specific steps to carry it out (De La Paz, 1997; De La Paz, 2005; De La Paz & Graham, 2002; Graham & Harris, 1989a; Warger, 2002). During each lesson, examples of the strategy were modeled (Chalk et al., 2005; De La Paz, 1997; De La Paz & Graham, 2002). The instructor physically illustrated the steps for developing a mind-map: (a) look for key words in the prompt, (b) write the main idea in the center of the page and circle it, (c) place subtopics around the main idea, (d) circle and link the subtopics to the main idea, (e) add details to each subtopic, (f) number the subtopics in the order that they are to be put into the response, and (g) write the narrative response using the mind-map as a guide.

Students practiced each step above by developing a series of mind-maps in response to a variety of writing prompts. The researcher broke each step of instruction into components designed to maximize comprehension by each student. On the first day of the intervention, the class received an overview of the objectives and expectations for the four days of instruction. Classes were taught the purpose of the mind-mapping strategy and its relevancy to their learning. Students were instructed that the strategy could be used to help them in all of their courses

whenever they are required to complete written essay assignments. Since participants were in 11th grade and nearing graduation, it also was appropriate to communicate the importance of writing skills for transition to college and employment.

Instruction – Day 1

The initial day of instruction began by confirming that the students were all expecting to graduate with a regular diploma. The students indicated by a show of hands whether they also expected to attend college after graduation. This discussion allowed the instructor to set the stage for establishing the importance of writing effectively. Establishing the importance of writing was the first of two objectives for the first day of instruction. Writing as an essential form of communication was exemplified through a discussion of how it could be used beyond the walls of the high school. Students were queried as to the types of professions that they would seek beyond high school or college. The ensuing discussion incorporated their responses relative to writing as part of career attainment or promotion. Students cited examples of writing used in the professions that they were considering. A variety of professions were cited by students as goals for their careers. This discussion allowed the researcher to individualize the message of the importance of writing well for students in order to achieve a deeper connection with each learner.

To impress upon students the critical nature of proficient writing, specific information from the National Commission on Writing (2004) report was cited. For example, 81% of companies with the greatest employment growth potential assess writing as part of the hiring process. Students were shown the benefits of using an organizing strategy prior to starting to write. The specific benefits included the ability to see what they are going to put into their essays, the importance of including only relevant information in their writing, seeing the connections between ideas, and how ideas can flow together into a complete essay.

To further establish a topical rapport with the students, it was acknowledged that writing is one of the most difficult skills for students to learn. A list was established of the reasons why writing is difficult that included the necessity for both mental and physical skills to be applied. The students contributed their thoughts as a list was compiled on an overhead transparency. The instructor also noted that writing can be especially difficult for students for whom English is their second language.

Table 2 Lesson Plan Sequence

Day 1	Day 2	Day 3	*Day 4*
Lesson objectives described Overview of Intervention Discussion Reasons for learning to write well -Student examples Kinds of writing -Student examples Acknowledge that writing is difficult Motivation and self-regulation Elicit reasons for writing well -Student examples Discussion Review WER Summarize and review lesson Provide instruction to begin writing Students write – 15 minutes	Review prior day lesson Objectives overview Overview of Intervention Discussion Elements of good writing -Show examples Common problems for student writers -Student examples Strategies that have worked for students -Student examples Demonstration – analyzing prompts and transfer main idea to a graphic Guided practice -Think, Pair, Share with teacher feedback Independent practice -Students practice analyzing several prompts Pass out WER Review WER Summarize and review lesson Provide instruction to begin writing Students write – 15 minutes	Review prior day lesson Objectives overview Overview of Intervention Discussion Organization Introduction Body Conclusion Demonstration – organization strategy using mind-mapping Teacher metacognition of the mind-mapping process Guided practice -Think, Pair, Share with teacher feedback Independent practice -Students practice creating several mind-maps -Think, Pair, Share -Student examples Guided practice-teacher feedback Review WER Summarize and review lesson Provide instruction to begin writing Students write – 15 minutes	Review prior day lesson Objectives overview Overview of Intervention Discussion Demonstration – organization strategy using mind-mapping Teacher metacognition of the mind-mapping process providing examples Guided practice -Think, Pair, Share with teacher feedback Independent practice -Students practice creating several mind-maps -Think, Pair, Share -Student mind-map examples Summarize and review lesson Provide instruction to begin writing Students write – 15 minutes

Students were encouraged to demonstrate an understanding of how writing effectively would be helpful to them. To emphasize this second objective of the first lesson, several uses of writing were elaborated upon. Students were asked to share their ideas for the different uses for writing in high school and for kinds of writing that they expected to use in the future. Examples such as essays for college, memoranda to bosses, letters to relatives, email, and notes were covered. The importance of organizing each type of writing was also emphasized.

The instructor also acknowledged that motivation and self-regulation are often obstacles for student writers. Cook, Green, Meyer, and Saey (2001) surveyed ninth and twelfth grade students and found evidence of a lack of motivation for writing due to low self-confidence, lack of control over writing tasks, inadequate time for expanding on written work, lack of emphasis on writing organizers, limited collaboration with peers, and insufficient relevance to real life. Each of the preceding de-motivators was listed and discussed with the class.

Finally, the scoring criteria were reviewed. The three elements of the WER upon which the essay scores would be established were reviewed. The instructor showed overhead transparencies of the words and definitions for Focus, Organization, and Support as they applied to the WER. A brief discussion of these elements was encouraged and the students concluded the class period by writing for 15 minutes in response to one of the scheduled daily prompts.

Instruction – Day 2

The second day of explicit instruction included a review of the prior days instruction. The objectives were stated which included students demonstrating a clear understanding of how to interpret several prompts and students identifying key words in prompts. A preprinted mind-map graphic organizer was projected on a screen using an overhead projector and transparency (See Appendix K). The instructor indicated that the goal of the next several lessons was to learn to

organize written assignments by completing the mind-map through effective analysis of written prompts. It was explained that the mind-map was a tool for organizing writing.

The instructor next showed students how to interpret writing prompts while utilizing an overhead projector and transparencies to demonstrate the process. Care was taken to model the metacognition necessary to analyze writing prompts. During each instructional period, the thought processes and metacognition for successful application and implementation of the strategy was modeled (Englert et al., 1991; Welch, 1992) by the researcher.

The first step in the process described was to read the entire prompt. This provided an opportunity for active reading; the process of relating the prompt to prior experiences or learning. Next, the first sentence of the prompt was read again to identify key words. The instructor verbalized the process involved in identifying key words. Students heard the instructor's thought process for deciding upon the most important words in the prompt for interpretation and writing. The thought process included analyzing the sentences for key words that provided clues as to the intent of the prompt. Next, the key words were underlined on the transparency. As key concepts were determined, the researcher as teacher "talked through" each cognitive step in the process. For example, a prompt which asked students to describe their favorite vacation might include a sequence of heuristics relating to where did I go, what did I do, who went along, how long were we gone, or what did we see. The answers to these questions would eventually make up the subtopics of the mind-map. The instructional sequence was repeated for three prompts.

Students were then provided with a list of prompts; and individually read the prompts and underlined key words. The students were paired with each other to share their work. They were instructed to share the words that they underlined in each prompt and justify why they chose

specific words as key words. Each student in the group received one minute to share their justification with their partner. The students were next instructed to individually practice finding key words in four prompts. The instructor circulated throughout the room answering questions and guiding their practice. Following guided practice, the instructor reviewed the lesson and displayed the mind-map visual again while indicating that the goal would be to use it for organizing their writing. Students were instructed to read the prompt and begin their essays. The class period concluded with students writing for 15 minutes in response to one of the scheduled daily prompts.

Instruction – Day 3

Day three instructional objectives provided that students would demonstrate their understanding of how to transfer the topic and main ideas from prompts onto a mind-map and showing how to add branching details using a mind-map graphic organizer. A review of the lesson from the prior day was provided to allow students to build upon prior knowledge. Initially, students learned that the prompts they had been responding to were descriptive prompts which required an introduction, body paragraphs, and conclusion. The descriptive form was contrasted with the story form of writing since stories have a beginning, middle, and ending rather than introduction, body, and conclusion. A preprinted overhead transparency was used to demonstrate that the introduction should be described as analogous to "Tell them what you are going to tell them"; the body was described as the part when the narrative "Tells them"; the conclusion paragraph was shown to be when the writer will "Tell them what you told them" (see Appendix L). The bottom the transparency was printed with three review questions relating to the number of sentences in a paragraph, the number of paragraphs in a short essay, and when transitions should be used.

Students were next introduced to the concept of the three big ideas. The three big ideas are subheadings of the topic upon which the body paragraphs are built. Students were taught that the big ideas are also included as details in the introductory and concluding paragraphs in a descriptive essay.

The instructor provided an example of how to underline the key words in a prompt, decide on the topic that the prompt suggests, and how these elements are transferred to a mind-map. During this process, the instructor consistently modeled the metacognition necessary for the process. The topic was written into the center oval of a model mind-map and the big ideas were included in the three boxes surrounding the topic on an overhead transparency. The instructor reviewed that only one big idea would be included in each body paragraph of the essay. The metacognition demonstrated included developing decision points relative to the importance of each subtopic and where it might be placed on the mind-map. Next, the periphery boxes were numbered to demonstrate the sequence in which they would appear in the essay. Students helped choose several key words that might help them to elaborate on each big idea. These words were written on the mind-map transparency below the boxes representing the main ideas. The details were shown as branches emanating from the main idea boxes. Students practiced the steps of a single mind-map for a prompt posted on the overhead projector. As the class practiced each step of the strategy, the researcher monitored student progress while providing feedback (De La Paz & Graham, 2002).

The lesson for the third day concluded with a review of the concepts presented during the class period. After the review of the days learning, students wrote an essay for 15 minutes in response to a prompt written on the chalk board.

Instruction – Day 4

The final day of instruction began with a brief review of the concepts presented during the prior class periods. The sequence for analyzing prompts by underline key words, deciding upon the topic, writing the topic in the center of the mind map, and adding the three big ideas to the mind-map was elaborated upon. Using the overhead projector for visual cuing, the instructor demonstrated the process while thinking aloud regarding the steps for organizing a short essay. Students created a mind-map from a prompt that they underlined in an earlier class session. The instructor circulated among students answering questions, providing positive feedback, and giving encouragement. Next, students created another mind-map applying the sequencing taught earlier. The students were paired with another student in close proximity. They were given two minutes each to describe and justify their mind-maps to each other. Each group had a total of four minutes. The class came back together and discussed specific elements of their mind-maps while elaborating on their choices of topic, main ideas, and details. Students practiced mind-mapping using several more prompts. During guided practice, the instructor provided explicit feedback on student products. The feedback included specific praise and constructive suggestions. To complete the lesson, the instruction provided over the prior days and the current class periods lesson were summarized and reviewed. Students concluded the class period by writing a short essay for 15 minutes in response to the prompt scheduled for that day.

Treatment Fidelity

Treatment fidelity was obtained during the teaching phase of each intervention. To ensure that the instructional procedures were consistent for the presentation of each strategy, checklists were developed for each of the strategies introduced (De La Paz, 1997; Graham et al., 2005; Sturm & Rankin-Erickson, 2002). Individual lesson plan outlines served as the checklists during

delivery of each lesson. The researcher referred to a checklist during each of the strategy instruction lessons. Audio recordings also were made of each lesson to allow for the determination of treatment fidelity. The audio recordings were compared to the checklists by one of the independent raters for consistency of lesson presentation.

Social Validity

The significance of this study has been described in terms of its social importance (Horner et al., 2005) within the context of the current state of accountability in education whereby students are required to pass high stakes tests in order to advance in grade level, graduate from high school, gain college admission, or enter the workplace. The mind-mapping intervention described herein may prove to be a valuable strategy for struggling writers whose organizational skills are limited. It is expected that the mind-mapping intervention will be useful for students across a wide range of settings and be incorporated into a set of writing skills that can be used far beyond the confines of the high school environment.

Interviews were conducted by the researcher (De La Paz, 1997; Sturm & Rankin-Erickson, 2002) with the resource room teacher and each student participant after all data had been collected. Interviews were conducted after data collection for all groups had ceased and the post-test had been administered. During the interview, the participants' teacher was asked for her opinions relative to the feasibility and effectiveness of the intervention. In addition, the resource room teacher was queried as to whether she planned to use the strategy for teaching future students.

Each participant was interviewed and asked to reflect on their observations of the use of the strategy in their classrooms. It was critical to establish their opinions regarding the ease of use of mind-mapping for organizing writing, the perceived benefits of using the strategy, and

their likelihood of using the strategy for class assignments and for the written sections of standardized tests.

Subjective evaluation is also an important component of social validity (Kazdin, 1982; Wolf, 1978). After all data had been collected, the participants' teacher and three expert subjective evaluators were asked to subjectively evaluate compositions written by the same student. The three expert evaluators were doctoral students in exceptional education.

The evaluators were asked to read the WER to familiarize themselves with the expectations for student written products. Two student notebooks from each of the three student groups were chosen randomly from the stack of student writing notebooks. Three written products from each student notebook were chosen as representative of their baseline, intervention, and post-intervention phases. A total of 18 essays were ranked by each of the three doctoral subjective evaluators. The essays were grouped by student number. The three essays for each student were randomly shuffled so that each evaluator received papers in a different order. Evaluators were then asked to rank the essays in order of which showed the best, middle, and poorest examples of writing according to the WER. It was expected that teacher and experts would rank papers which were produced after the intervention more favorably than the earlier compositions; thus, demonstrating the benefits of the intervention for students.

Finally, social validity was expected to be demonstrated through verification that the intervention met the needs described previously in this study (Horner et al., 2005). Among the criterion established earlier are the necessity for well organized and effective expressive writing for the demonstration of knowledge in the classroom in a variety of content areas and for responding to the constructed-response sections of high stakes tests.

CHAPTER FOUR:
RESULTS

Research Question

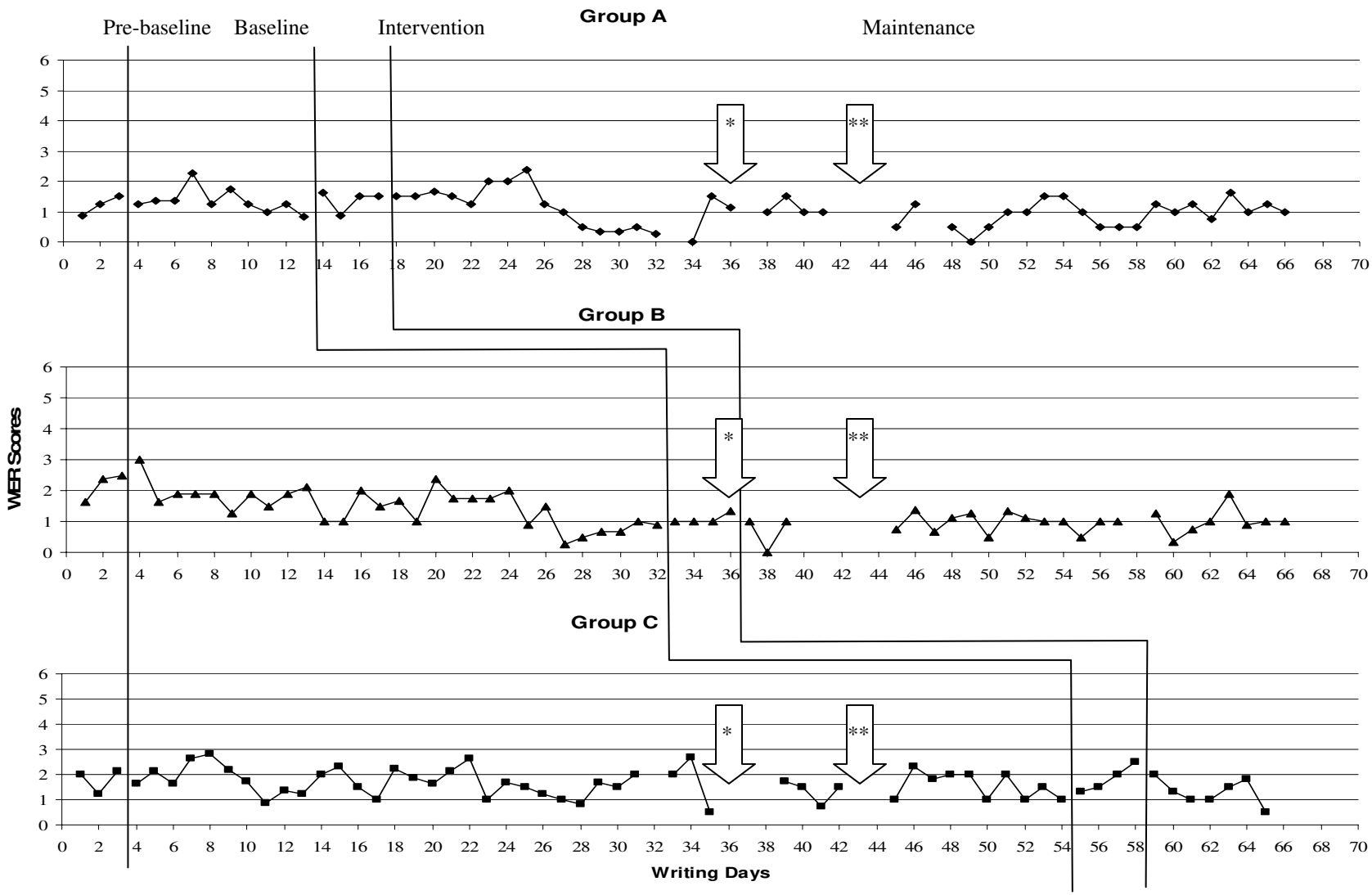
The purpose of this investigation was to understand the role of a writing strategy intervention for improving the organization of written discourse of secondary students with mild disabilities. This study was designed to answer the research question, "What are the effects of mind-mapping strategy instruction on the written products of high school students with LD?" The following chapter sections analyze the writing quality scores as measured by the Written Expression Rubric (WER). Average quality scores for each group can be visually inspected by phase in Figure 3.

Overview

The present study relied on a multiple baseline design across subjects to measure the effects of a mind-mapping strategy explicitly taught to high school students with LD. The focus of the mind-mapping strategy was to emphasize the importance of organization before and during the writing process. Three subject groups were established. Each group represented a single subject. Subject groups of four students each from three resource classrooms were chosen to participate. One student did not complete the study and stopped attending school after 14 weeks of writing. This left 11 participants who wrote essays daily in response to prompts posted at the front of the classroom. The study lasted for 17 weeks during which 66 prompts were administered to students.

Student writing was holistically scored using the WER holistic rubric to measure the quality of their daily essays. While each written product received a single score, the WER

included three elements to guide the raters in their scoring of the essays. The elements included focus, organization, and support. These elements were closely related to the focus of the mind-mapping intervention for increasing writing quality through improved prewriting organization. Each essay was assigned a maximum of 6 points and a minimum of 1 point. Essays that were unscorable received 0 points.



Note. * = End of spring break; ** = Regular teacher returned to class

Figure 3 Writing Scores by Group for All Study Phases

Data were analyzed within the context of a multiple baseline design across subjects which included four phases: Pre-baseline, baseline, intervention, and post-intervention. Each group represented a single subject. Groups were assigned letters A, B, and C to indicate the order in which they received the intervention. Each phase was introduced at staggered intervals. When baseline stability was achieved for the first group (group A), they were moved into the intervention phase. Following the intervention phase, WER scores were observed for stability. As the WER scores for a group stabilized following their intervention phase, the next group was moved into the intervention phase. This sequence continued until each group completed the intervention phase. The cycle was complete when data from the final group to experience intervention stabilized during the post-intervention phase. Specific phases will be discussed in detail in the following sections. Charts were constructed to allow visual inspection of the data and writing quality scores that occurred in each phase.

The means of individual student daily writing scores were calculated to arrive at an average daily score. The average daily scores appear in the three charts of Figure 3. For the purposes of data analysis, the student groups are referred to as groups A, B, and C. Each group was taught for 35 of 50 minutes during their daily resource room class period. Fifteen minutes of each class period was spent writing. Group A attended class during the third class period; group B were students in the fourth period class; group C consisted of students in the second period. One student in group C dropped out of the study just prior to the intervention phase. The data for this student were not included in this analysis.

The study spanned a total of 17 weeks of school during the spring semester. Students received prompts on a total of 66 school days during their learning strategies class period. Of the 716 assigned essays, 185 were not completed and 531 were written and scored. The pre-baseline

phase lasted three days and the WER was taught on the fourth day. Following the baseline phase, students experienced four days of explicit strategy instruction as the intervention phase (the independent variable). A post-intervention phase followed the intervention phase. Students continued their daily writing with no feedback or intervention. The post-intervention phase length was different for each group as it commenced immediately following the intervention. The minimum time spent during the post-intervention was spent by group C. Eight writing days were included in the group C post-intervention phase.

The study occurred during the spring semester of the school year. Writing day 35 was the last day before spring break. The classroom teacher was out of the classroom for eight writing days following spring break. Her absence includes writing days 36 to 43 during which substitute teachers were in charge of the classroom. Student writing during this period was inconsistent. Visual inspection of Figure 3 shows the spring break beginning at day 36 and the regular classroom teacher returning on day 43. The teacher's absence from the classroom coincided with a period of unstable data and inconsistent writing. There were days when no writing took place.

Table 3 shows a summary of the mean WER scores by experimental phase for each group. Group A baseline scores increased from scores observed during pre-baseline. Post-intervention phase group A scores dropped from intervention phase scores by 0.4 points. Scores for group B steadily declined from a high of 2.4 during pre-baseline to a low of 0.9 during the post-intervention phase. Group C scores were more cyclical compared with groups A and B. Pre-baseline scores of 1.8 declined to 1.7 during the baseline phase, rose again during the intervention phase, and descended again during the post-intervention phase. Table 4 summarizes the inconsistencies of the student scores for each phase of the current study. No conclusions can be drawn from the above analysis.

Table 3 Mean WER Scores by Phase

Group	Pre-baseline	Baseline	Intervention	Post-intervention
A	1.2	1.4	1.4	1.0
B	2.4	1.4	1.1	0.9
C	1.8	1.7	1.8	1.3

Phase One: Pre-baseline

A pre-baseline phase was necessary to observe student writing scores prior to the introduction of the WER and to observe any possible effects of introducing the WER to the students. During pre-baseline, students wrote daily during the first 15 minutes of each class period in response to a prompt written on the board. Three days of pre-baseline writing occurred prior to the WER instruction day (see Table 4). Scores for the group A pre-baseline phase were ascending from .9 to 1.5. The average pre-baseline for group A was 1.2. Pre-baseline for group B also ascended from 1.6 to 2.5. Scores increased from 1.6 to 2.5 and averaged 2.4. The group C pre-baseline scores averaged 1.8 and exhibited either a trend that was ascending very slightly. Overall, each group exhibited an ascending trend during the pre-baseline phase. (See Table 5.)

Table 4 Pre-baseline Scores by Group

Group	Day 1	Day 2	Day 3	WER Instruction Day
A	0.9	1.3	1.5	1.3
B	1.6	2.4	2.5	3.0
C	2.0	1.3	2.1	1.6

Phase Two: Baseline

Following the pre-baseline phase during which the WER was introduced, baseline for each group was recorded. The first group to receive instruction was the third period class, group A. The group A baseline was observed for nine days after the introduction of the WER before score stability was observed. Scores during baseline were 0.2 higher than during the pre-baseline phase. Writing quality during baseline as measured by the WER ascended somewhat and gradually descended (see Table 5). The group A scores during the baseline phase reached a high point of 2.4 on the 7th writing day. After the day nine score of 1.8, the trend declined culminating at 0.8 on the 13th writing day.

Baseline for group B was recorded for 29 writing days. Overall writing quality declined slightly during the baseline phase as evidenced by a downward trend (see Table 5). The average scores observed during the baseline phase declined to 1.4 from the pre-baseline average of 2.4. The highest baseline score occurred on the fourth writing day immediately after the WER was taught. While the peak baseline score was 3.0, the minimum average score of 0.3 occurred on the 27th writing day.

The baseline of the third group, C, maintained a narrow range of averaged scores during baseline which generally ranged between 1 point and 2 points. Scores averaged during the baseline phase were lower by 0.1 point than the scores observed during the pre-baseline phase. A group C maximum of 2.8 was observed on the eighth writing day and minimum of 0.5 on the 35th writing day. The 35th writing day was on the day before spring break. Student baseline averaged scores exhibited a slight downward trend.

Table 5 Trends - Average Writing Quality by Phase

Group	Pre-baseline	Baseline	Intervention	Post-intervention
A	Ascending	Descending	Descending	Descending
B	Ascending	Descending	Ascending	Descending
C	Ascending	Descending	Ascending	Descending

Phase Three: Intervention

Each group was taught the mind-mapping strategy intervention in accordance with a multiple baseline across subjects design. The first group (A) received strategy instruction after a stable baseline was observed for their group. The subsequent student groups (B and C) received strategy instruction after the data stabilized for the prior group who received the intervention. The intervention was taught during four days of instruction. During the intervention phase, the student writing occurred during the last 15 minutes of each class period.

The intervention phase (independent variable) for group A, the first group, began on the 14th writing day. The average group score on the first writing day was the highest during the intervention phase. It was recorded at 1.6. The score for the second intervention day dipped to 0.9, the lowest group A score of the intervention phase. Scores on the final two days of instruction remained stable at 1.5. Compared to the average baseline writing scores, the average intervention scores were the same at 1.4. Group A was the only group to experience a descending trend during the intervention phase as seen in Table 5.

The group B intervention commenced following the observation of stable post-intervention phase data for group A as seen in Figure 3. Group B experienced 33 days of writing

prior to the intervention phase. The intervention phase was broken into two periods of two days each. One period occurred just before the students' spring break. The second set of two intervention lessons took place on the students' first two days back from their spring break. Mean intervention scores for group B were the lowest of all three groups at 1.1. (See Table 3.)

Group C was the final group to experience the four day intervention. Each group in the study originally included four participants. One of the students in group C stopped writing three days prior to the intervention and withdrew from the study. The group C scores increased steadily during the intervention phase starting at 1.3 and increasing to 2.5 yielding an ascending trend (see Table 5). Group C realized an increase of 1.2 points over the four day intervention. Their average low score was also 0.1 point higher than the baseline phase.

Phase Four: Post-intervention

Following the intervention phase, a post-intervention phase occurred for each group. During this phase, no instruction took place. The students continued responding to the daily prompts.

The longest post-intervention phase was experienced by group A lasting for 48 writing days as seen in Figure 3. Student writing performance for group A remained high immediately following the intervention phase. The group achieved their highest post-intervention phase score eight days (writing day 25) following the intervention phase. The group A scores declined dramatically after the 25th writing day to a low score of 0 on day 34. On writing days 33 through 41, there were gaps in writing performance. The post-intervention phase trend for scores for group A were descending overall. (See Table 5.)

On day 37, the post-intervention phase for group B commenced. The post-intervention phase for group B can be observed in Figure 3. Recall that the intervention phase for group B

spanned their spring break with two intervention days occurring before and two occurring after the spring break. Their post-intervention phase began while the teacher was out of the classroom and a substitute teacher was present. Compared with the intervention phase, scores dropped for the first three days of the post-intervention phase. These three days were followed by five days during which no writing took place. This five day period coincided with the days when the regular teacher was not present and a substitute teacher was in place. Consistent writing commenced again on the 45th day. The mean score for writing during the group B post-intervention phase was 0.9. A descending trend during the post-intervention phase was observed. (See Figure 3.)

The post-intervention phase for group C began on the 59th writing day and continued for eight days. Scores declined immediately after the intervention phase for three days to a low of 1.0. (See Figure 2.) Writing scores remained at 1.0 for two days after which a slight increase in WER scores was observed. The mean score during post-intervention was 1.3. The mean post-intervention phase score was 0.5 points lower than scores during the intervention phase. Visual inspection of the declining trend of the post-intervention phase for group C can be found in Figure 3.

Pre- Post-tests

Pre-tests were administered the day before the students began writing to the first prompt. Post-testing occurred the day immediately following the last writing day. Testing days were not considered to be writing days and were not recorded on Figure 3. The TOWL-3 Story Construction subtest was given as both the pre- and post-test. Students wrote a story in response to viewing a picture. Different pictures were presented for each test. The TOWL-3 measured the participants' ability to write a logical and organized story that included a theme or plot.

Character development and the ability to compose engaging prose also were measured by the TOWL-3 subtest. Writing was timed for pre- and post-testing and did not exceed 15 minutes. The total possible score for each test was 21 points. Average scores calculated for each group were used for the following analysis.

Two separate sets of pre- and post-test scores were calculated using different scoring criteria. TOWL-3 scoring criteria was used to determine student scores. In addition, pre- and post-test scores were calculated using the WER. Using both scoring criteria allows comparison between pre- and post-test scores on different scales to test the reliability of scoring measures.

Pre- Post-test Results – TOWL-3 Scoring

Pre- and post-test average scores using the TOWL-3 criteria are compared in Table 6. Scores for group A averaged 9.2 for the pre-test and 15.8 for the post-test. The score change represents an improvement of 6.6 points. Group B mean scores increased by 4.7 points from 4.8 to 9.5. Post-test scores also were higher for group C; an increase of 6 points was observed from an average pre-test of 5.9 to a post-test mean of 11.9.

Table 6 Pre- and Post-test Average Scores Compared – TOWL-3 Scoring

	Pre-test Mean	Post-test Mean	Score Increase	Percent Increase
Group A	9.2	15.8	6.6	72
Group B	4.8	9.5	4.7	98
Group C	5.9	11.9	6	102

Table 7 provides an overview of the descriptive statistics for the quality of responses generated from the pre-tests and post-tests. Standard deviations also are shown for each group by

pre- and post test. The average scores for each group were discussed above. Standard deviations varied considerably by group and from pre- to post-test indicating that the variance of scores from the mean were not consistent. For example, the standard deviation for the group A pre-test was 8.0, the largest standard deviation recorded for this study. The group A post-test standard deviation, however was only 0.8 indicating that the post-test score were tightly clustered about the mean. The pattern described for group A was reversed for group C, though the difference was not as pronounced. Table 7 shows that the pre-test scores for group C were closer to the mean than the post-test scores. Consistency in standard deviation from group to group and from pre-test to post-test was not observed.

Table 7 Means and Standard Deviations for Pre- and Post-test Scores – TOWL-3 Scoring

	Pre-test Mean	Post-test Mean	Score Increase	Percent Increase
Group A	9.2	15.8	6.6	72
Group B	4.8	9.5	4.7	98
Group C	5.9	11.9	6	102

Figure 4 provides a graphic view of the score changes from pre- to post-test. Post-test scores for each group were higher than those recorded for the pre-test. Scores for group A were the highest for both pre- and post-test total scores. Group B, in contrast, exhibited lower overall scores while realizing a total increase in scores from 5.9 to 11.9 representing a 6 point improvement.

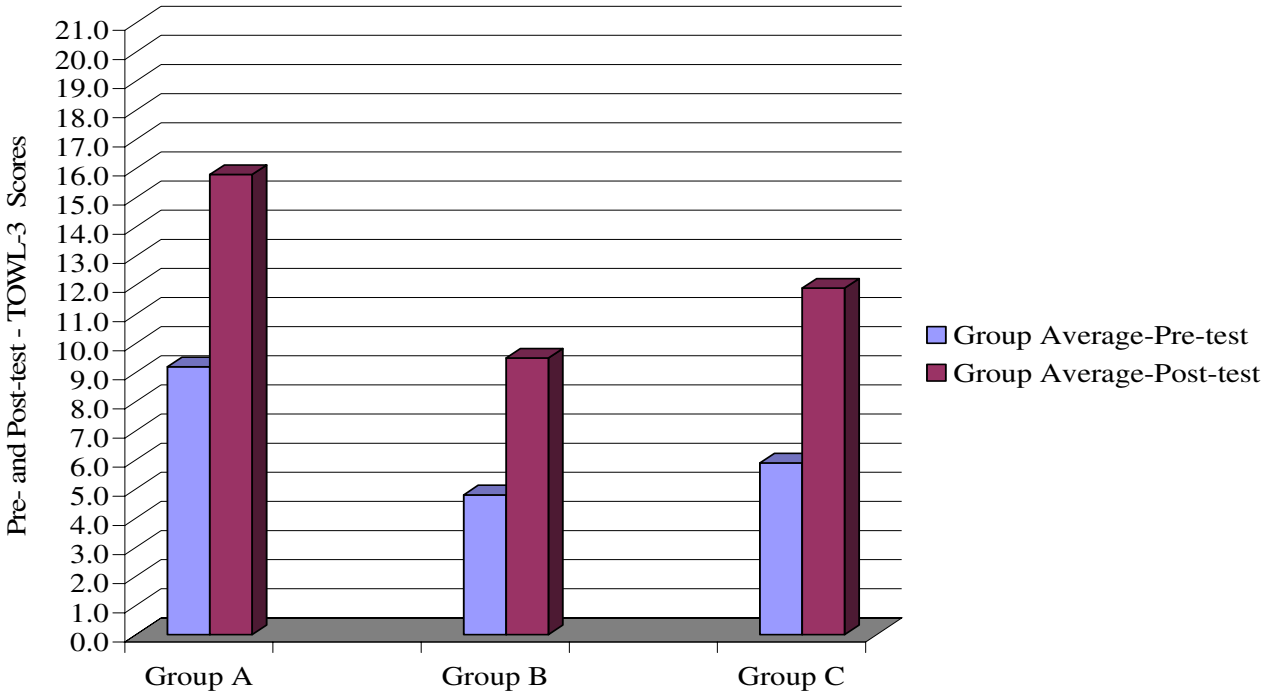


Figure 4 Pre- and Post-test Scores by Group Mean – TOWL-3 Scoring

Pre- Post-test Results – WER Scoring

The pre- and post-tests also were scored using the Written Expression Rubric (WER). Results are recorded in Table 8. The mean pre- and post-test average scores as measured by the WER for group A were the highest overall. Scores for group A averaged 2.0 for the pre-test and 2.3 for the post-test. The post-test scores increased by 15% resulting in a raw score increase of 0.3. Group B scores increased by the largest margin. Based on the WER scoring criteria, the percentage change of 100% resulted from an increase from 1.0 average points on the pre-test to a post-test average score of 2.0. An increase of 0.4 was observed for group C that resulted in a 36% improvement in scores.

Table 8 Pre- and Post-test Average Scores Compared – WER Scoring

Group	Pre-test Mean	Post-test Mean	Score Increase	Percent Increase
A	2.0	2.3	0.3	15
B	1.0	2.0	1.0	100
C	1.1	1.5	0.4	36

Descriptive statistics for the WER pre- and post-tests are shown in Table 9. Mean scores and standard deviations are given for groups A, B, and C. Mean pre-test scores ranged from 1.0 to 2.0. Post-test means encompassed a range of 0.8 resulting from group A average post-test scores of 2.3 and group C average scores of 1.5. Variability from the mean was greatest for group C on the post-test WER standard deviation of 1.29.

Table 9 Means and Standard Deviations for Pre- and Post-test Scores – WER Scoring

Group	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD
A	2.0	0.0	2.3	.29
B	1.0	.71	2.0	.91
C	1.1	.48	1.5	1.29

Graphic analysis for average pre- and post-test scores for all groups can be seen in Figure 5. Notice that while group B scores were lowest on the pre-test, the group demonstrated the greatest overall gain. Mean scores for groups A and C improved from pre-test to post-test, although the increase was not as substantial as the difference in scores for group B.

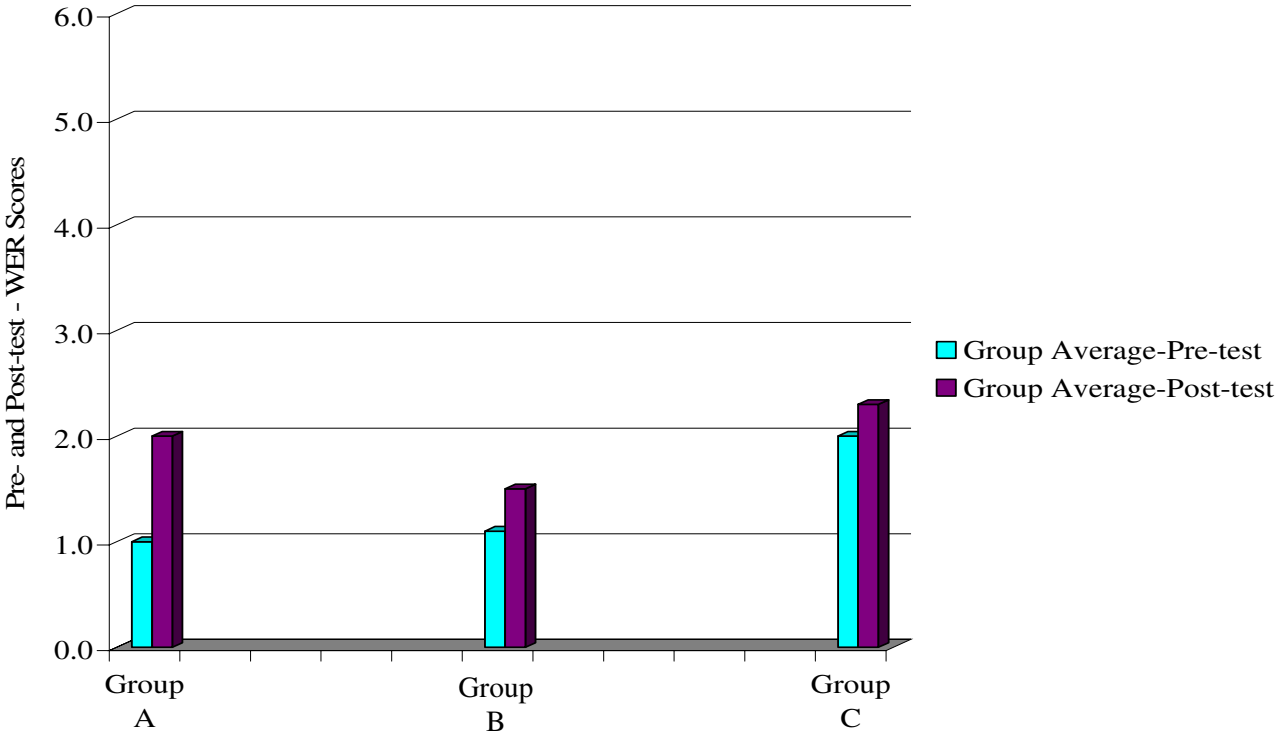


Figure 5 Pre- and Post-test Average Scores by Group – WER Scoring

Figure 6 compares percent change in the pre- and post-test scores from both scoring criteria. This figure demonstrates a comparative measure between the TOWL-3 and WER scoring criteria. Notice that group B had the largest percentage gain in scores from pre- to post-test using both the TOWL-3 and WER scoring criteria, 98% and 100% respectively. Groups A and C percent change in scores varied greatly between scoring criteria. Scores for group A increased by 72% on the TOWL and only 15% on the WER criterion. The group C scores showed a similar discrepancy of a 102% increase using TOWL-3 criteria and only 36% using the WER. The TOWL scoring criteria appears to be more sensitive to changes in student writing performance than the WER.

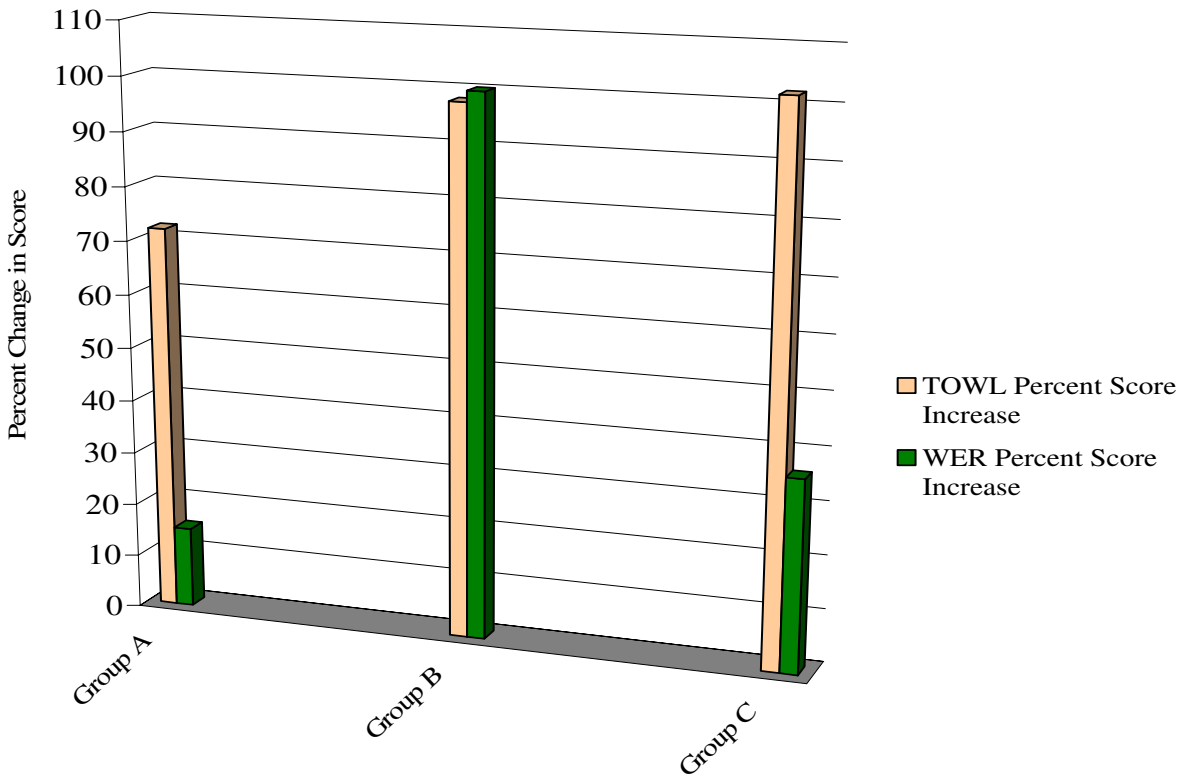


Figure 6 TOWL-3 and WER Percent Change in Score from Pre- to Post-test

Both scoring criteria revealed an increase in student scores from pre- to post-test. The score increase indicates that students certainly did experience improvement in writing scores from the administration of the pre-test to the post-test. The percentage of increase however, varied greatly. The difference in percent change in scores from pre- to post-test cannot be explained by large differences in interrater reliability. The interrater reliability was high for both measures as shown in Table 10. The difference may best be explained by the lack of a normal distribution of scores when the WER was used for to evaluate the tests. The scores for the WER were not normally distributed on the essay scoring either.

Table 10 Pre- and Post-test Interrater Reliability Compared for TOWL-3 and WER Scoring Criteria

Scoring Criteria	Pre-test	Post-test
TOWL-3	.94*	.92*
WER	.91**	.91**

Note. * Calculated with Pearson Product Moment. Correlation is significant at the 0.01 level. ** Calculated with percent agreement and percent adjacent.

Pre- and Post-test Percentiles

Percentiles were calculated from the raw TOWL-3 scores of the pre- and post-test. Increases were observed across all participants in every group indicating that an improvement in writing quality occurred. (See Figure 7.)

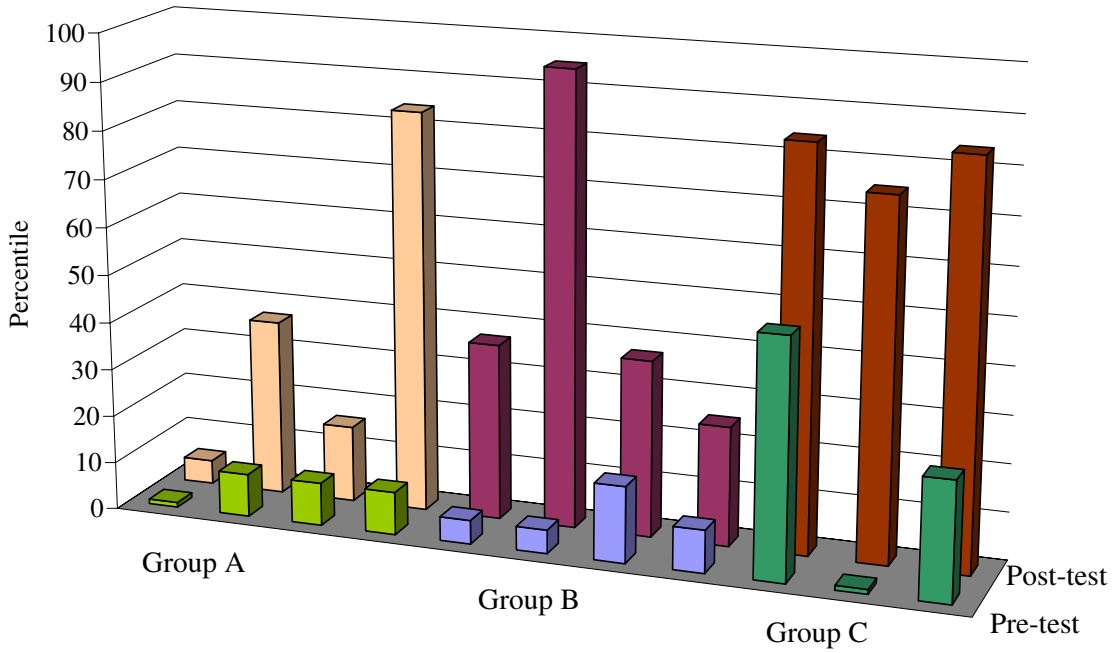


Figure 7 TOWL-3 subtest – Pre- and Post-test – Percentiles

Pre- and Post-test Grade Equivalency

TOWL-3 scores also were evaluated using the grade equivalency scores in the TOWL-3 examiner's manual. Figure 8 shows the increase from pre- to post-test in grade equivalent scores. Increases in grade equivalent scores were observed for all groups indicating that writing performance improved from the administration of the pre-test to the post-test.

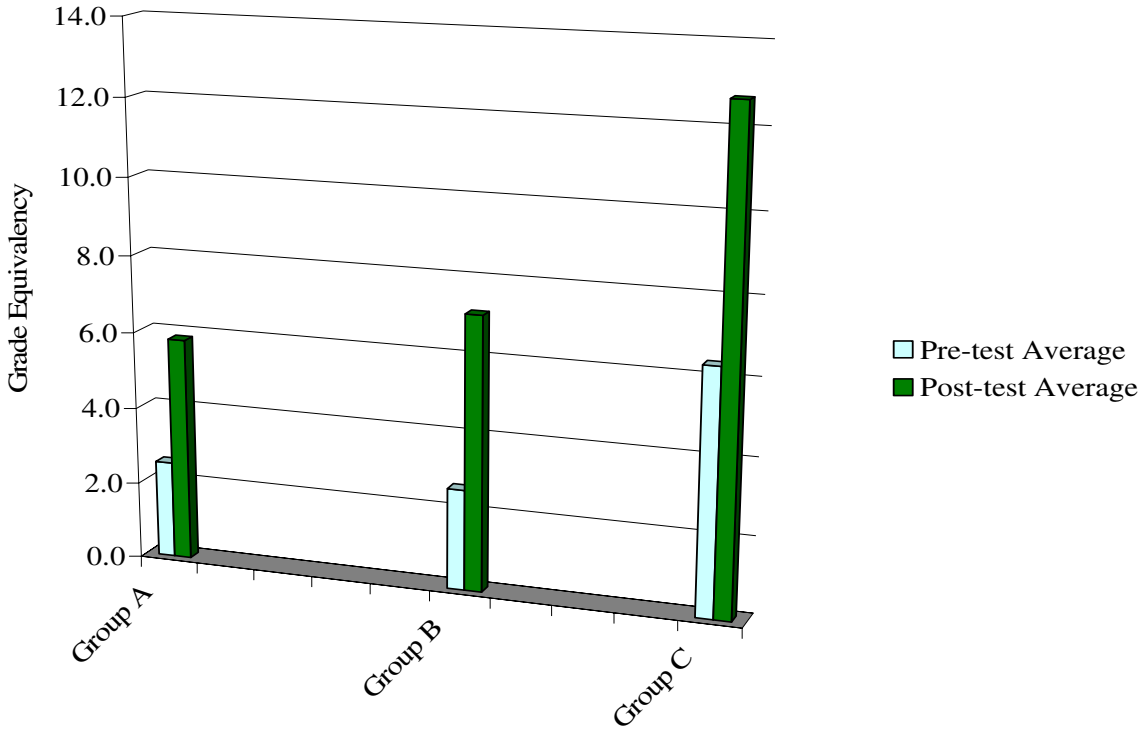


Figure 8 TOWL-3 subtest – Pre- and Post-test– Grade Equivalent Scores

Reliability

Pre- Post-test

Raters were trained prior to the administration of the Test of Written Language Third Edition (TOWL-3) pre-test. Training materials from the TOWL-3 were used to develop rater expertise for scoring student pre-and post-tests. The training materials consisted of anchor papers representing varying levels of writing ability. Each anchor paper was accompanied by a score sheet indicating a normative score for the essay. Raters read anchor papers, developed a total score, and compared their score with the anchor papers.

Means and standard deviations were calculated for the pre-test scores of each rater. The means for rater 1 and rater 2 were 7.09 and 5.64 respectively (see Table 11). The mean of pre-

test scores for rater 1 are higher than those of rater 2 indicating a propensity for higher pre-test scoring by rater 1. Standard deviations were 4.95 for rater 1 and 3.78 for rater 2 indicating that the scores of rater 2 were more tightly clustered about the mean than the scores of rater 1.

Table 11 Pre-test Descriptive Statistics for Raters – TOWL-3

Rater	Mean	Standard Deviation	Total Participants
1	7.09	4.95	11
2	5.64	3.78	11

Post-test descriptive statistics were calculated for raters 1 and 2 as seen in Table 12. The means of both raters increased for the post-test scores indicating an increase in student post-test scores. Mean scores attributed to rater 1, however were lower than those of rater 2 for the post-test. The standard deviation for post-test scores of rater 1 were slightly less suggesting a tighter dispersion of scores about the mean than those of rater 2. Note that the post-test descriptive statistics show a reversal for means and standard deviations for rater 1 and rater 2 compared with the pre-test statistics.

Table 12 Post-test Descriptive Statistics for Raters – TOWL-3

Rater	Mean	Standard Deviation	Total Participants
1	11.18	4.8	11
2	13.00	5.2	11

A Pearson Product Moment Reliability test was performed to compare the correlation between the pre- and post-test test scores given by the raters (see Table 13). A correlation between the scores of rater 1 and rater 2 revealed that their scores were significantly related, $r = .94$, $n = 11$, $p < .01$ indicating a strong positive correlation between raters' scores (see Table 13). There also was a significant correlation between the post-test scores given by the raters, $r = .91$, $N = 11$, $p < .01$. The correlation coefficient indicates a strong positive correlation between the scores given by raters to post-tests. A strong positive correlation of the magnitude reported above for both pre- and post-test indicates that raters applied consistent scores to both the pre- and post-tests. The scores that raters applied to student tests were shown to be reliable.

Table 13 Pre-test Interrater Reliability Correlations

Rater	Pearson Correlation Pre-test	Significance	Pearson Correlation Post-test	Significance	Total Participants
1	.94*	.000	.92	.000	11
2	.94*	.000	.92	.000	11

Note. * Correlation is significant at the 0.01 level.

Interrater Reliability

Each student essay was scored by two raters trained to use the WER. Thirty-four percent of the student writing samples obtained during baseline were used for rater training. Training took place prior to the baseline writing phase. Interrater reliability was established on a point-by-point basis using the following procedure. Scores were compared point-by-point for scores that were the same (exact) for each rater or scores that were within one point plus-or-minus

(adjacent). Interrater correlation was calculated by combining percent agreement and percent adjacent scores. The interrater reliability criterion was set at .85. Exact agreement occurred when raters scores were equal; percent adjacent scores are those within plus or minus one point of each other; scores that were not equal or adjacent were categorized as neither.

Interrater agreement for the initial training is shown in Table 14. Twenty-five percent of the essays generated during the pre-baseline phase were used to establish interrater reliability correlations. Note that the interrater correlation as measured by summing exact (56) and adjacent percentage (33) agreement was 89. Initial rater training resulted in a reliability correlation of 89% exceeding the 85% minimum criterion allowing the study to commence.

Table 14 Interrater Reliability Correlation-Initial Training

	Interrater correlation	Exact Agreement	Adjacent	Neither
Frequency	27	15	9	3
Percent	89	56	33	11

Note. Interrater correlation = the sum of exact agreement and adjacent; Exact = Raters scores matched exactly; Adjacent = Raters scores were within ± one point; Neither = Raters scores were more than ± one point; N = 27.

Final interrater reliability correlation scores can be viewed in Table 15. These data represent the total of all essays written by study participants. The final interrater correlation percentage (95) increased compared with the data for the initial training (89). Rater exact agreement, also improved markedly; increasing from 56% to 71%. This improvement indicates that rater 1 and rater 2 were more consistently scoring student written products.

Table 15 Interrater Reliability Correlation-Final

	Interrater correlation	Exact Agreement	Adjacent	Neither
Frequency	503	375	128	28
Percent	95	71	24	5

Note. Interrater correlation = the sum of exact agreement and adjacent; Exact = Raters scores matched exactly; Adjacent = Raters scores were within ± one point; Neither = Raters scores were more than ± one point.

Rater Training

Rater training occurred six times over the course of the study. Raters were trained prior to the administration of the first prompt of the baseline phase and five times during data collection. The percent of interrater agreement increased steadily as determined though point-by-point comparison (see Table 16). Exact agreement increased from 43.2 percent to 70.6 percent. Percent adjacent declined steadily from 41.9 percent to 24.1 percent. The percentage of scores that were neither exact or adjacent also declined steadily. The reduction in the percent of adjacent scores and percent neither scores was expected due to increases in the percent exact agreement. The final interrater correlation was higher (95) than the initial training correlation (89) and accuracy of scoring increased as indicated by the increase in exact percentage agreement. The analysis above also indicates an increase in the concurrency of scoring by raters which translates to more accurate scores.

Table 16 Percent Interrater Agreement by Rater Training Week

Interrater Agreement	Jan. 17	Jan. 24	Feb. 7	Mar. 7	Apr. 11	May 2
Concurrence	85	87	88	92	93	95
Exact	43	44	47	60	64	71
Adjacent	42	43	41	32	29	24
Neither	15	13	11	8	6	5

Note. Exact = Raters scores matched exactly; Adjacent = Raters scores were within ± one point; Neither = Raters scores were more than ± one point.

Figure 9 illustrates the steady improvement in the percentage of exact rater agreement. Exact agreement and adjacent agreement during the first training session were nearly equal at 43 and 42. The final measurement of interrater agreement occurred on May 2. Scores neither exact nor adjacent decreased from 15% to 5%. Conversely, the exact agreement score had climbed to 71% as the adjacent scores declined to 24% indicating that raters were more synchronous in their scoring.

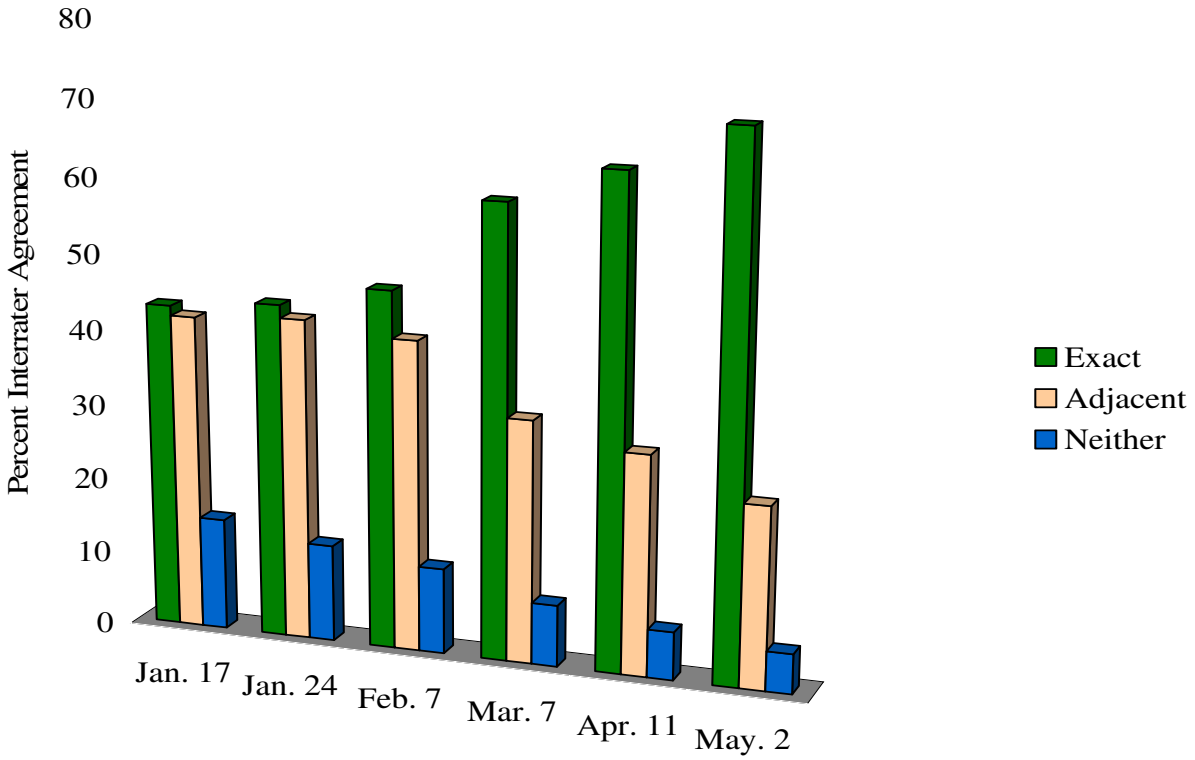


Figure 9 Percent Interrater Agreement by Rater Training Week

Interviews

Interviews were conducted with the teacher and the students who participated in the present study. All interviews were conducted in the school setting. The teacher interview was conducted in the school guidance office. Student interviews were conducted in the office of one of the assistant principals. The interviews were audio recorded. Each recording was summarized on a matrix that corresponded to interview questions (See Appendixes M and N). The matrixes developed for the teacher and student recordings were analyzed for themes using content analysis by applying sampling units based on frequency of themes discussed by the interviewee (Stemler, 2001). Content analysis allowed the researcher to recognize themes that developed during the interviews. To maintain reliability, data were reviewed by three evaluators who

checked for consistency between the audio recordings, the question matrixes, and the content analysis tables. Written statements were provided by each evaluator. (See Appendix O.)

Teacher Interview

A semi-structured interview was conducted with the participants' teacher that lasted 22 minutes and was conducted in the school setting. See Appendix P for a list of the interview questions. The teacher interview revealed nine primary themes. See Table 17 for details. The themes of the teacher interview revealed that she was very aware of her students' need for writing strategy instruction. She indicated that students have a difficult time organizing their thoughts during the writing process. There also was a sub-theme that the students in her resource room are reluctant writers who had written for an extended period of time prior to the implementation of the current study.

The participants' teacher shared that the mind-mapping intervention helped students with planning and organization. The classes that she felt benefited most were of groups B and C. They were more conscious of what they planned to write. The group A class, however, did not seem to use the mind-mapping strategy overtly. The biggest difference observed by their teacher was when she saw them pausing to think through the prompt before they began writing. Group A students did not write down their mind-maps.

The classroom teacher also indicated emphatically that she felt that she planned to teach the mind-mapping strategy to future classes. She was enthusiastic about the strategy for its potential for helping her visual learners due to its graphic nature. The teacher also indicated that her students "really did get the concept" and that she "saw them grasp it".

Four specific recommendations for future studies also were made by the participants' teacher. She explicitly mentioned that students would have benefited from more practice after the

strategy was introduced. Her student's need repetition before they can remember to use the strategy and before they can use it effectively. The need for specific feedback also was suggested for future studies. Her students wondered how they were doing and wanted to see if they were getting better at writing. The third recommendation for future studies was to include 10th grade students. Tenth-graders take the FCAT Writes and the mind-mapping strategy would be beneficial to them. The teacher's final recommendation was to begin the study during the fall of the school year. There were too many distractions during the spring including the administration of the FCAT in February, spring break, and a change in student attitudes to thinking that they should be learning at that time of year. Starting in the fall would help the students stay focused.

Table 17 Teacher Interview Themes

Student Abilities	Planning	Organization	Practicality of mind-mapping strategy	Plan to teach mind-mapping strategy	Mind-mapping is effective	Improvements needed	Students understand importance of writing?	Implementation issues
A lot of them don't write unless you make them; Some of them, this is the most writing they've ever done in their life. Students have a difficult time arranging their thoughts. …(students said) need help in my writing. Show me how it can help me and let's see what we can do. The majority of them need…this is where I put this and this and this.	Second and fourth…yes. With second especially I saw them think in their mind…what am I going to write?	…a little more conscious of what they are going to write. The main thing is it helped them get their ideas down.	I think that its very practical. It is something that can be used and even transferred into younger or older grades. They won't use it if it is difficult to use.	Yes…yes (emphatically).	Its wonderful for my visual students…a lot of them are visual…learners. I believe it helped tremendously. They wrote more than they would have before. I saw them grasp it. I think they really did get the concept. I think it went rather well with everything that was going on this semester.	…add more practice. My kids have to do it so many times over and over before they can even use it and remember to use it. Practice and repetition. Feedback would have helped as far as motivation. Teach the strategy to 10th graders because that is the year that they take the FCAT Writes.	They understood that writing does not end at FCAT writes. They made the connection to the real world about the importance of writing.	We should have said that you will be doing this for the whole semester. You have to take into account spring break, the time of the year…after FCAT they don't think that they should be learning anything after that.

Student Interviews

Eleven student participants were interviewed following the last writing day and the administration of the TOWL-3 post-test. A semi-structured format was used for the interview. Interview questions can be seen in Appendix Q. Ten themes were developed as seen in Table 18. Nine of eleven students found that learning the writing strategy helped them to become better writers. Of the two students with dissenting opinions, one found the mind-mapping strategy confusing to use. The other student who said that she did not feel that learning the strategy helped her was resistant to learning the strategy during the intervention phase. She also was very negative during the interview. Initially, she asked if she really had to do the interview. The researcher told her that she did not, but the student continued with the interview answering in short, terse replies none of which were of a positive nature towards the study or the intervention. A theme that emerged unexpectedly from several students was based on a cycle that they observed over the course of the study. Students from two groups noted that the students were tired or lazy at some point during the study. Comments from a student in group C included, "some kids were lazy at first, then on a roll, then lazy, then on a roll".

Students in group A were the least loquacious in their interview responses. This demeanor correlated well with comments made by the teacher during her interview and during the course of the study. The teacher consistently referred to her group A class as the least enthusiastic and least likely to apply the strategy. Group A did indicate that the strategy helped them plan to write. Two group A participants found the strategy easy to use while one stated that mind-mapping was "medium hard" to use. They each said that they would use mind-mapping to help them with tests that included writing. Three of the four group A members said that they would use it for organizing their writing assignments in their other classes. One student in group

A remarked, “I believe that it will help me graduate from high school and to move on to college or university”.

Group B was the second class to receive the intervention. Three out of four students stated that the mind-mapping strategy helped them become better writers. Two of the four group B students used mind-mapping to re-think their plans before beginning to write. Of the students in group B who used the strategy, most indicated that they spent at least an extra 2 minutes and up to 5 minutes planning before writing. Additionally, group B students felt that the strategy helped them stay organized and get their work done just as quickly. The strategy did not take away any time needed to complete their essays or waste time. Three of the four group B members found mind-mapping easy to use. In fact, most of the group B students plan to use the strategy to help them with tests and on writing assignments beyond the resource room in which they learned mind-mapping. Students in group B made it a point to mention that they liked the prompts that asked for responses based on personal interest topics rather than fantasy or community interest prompts.

One student in group B found that using the mind-mapping was confusing. She said that she would rather just write “what comes to me” instead of using the strategy to plan. In fact, she stated that she does not really plan things out when she writes. She initially tried using the strategy, but stopped when she became confused. Part of her complaint issued from the fact that she had been taught similar strategies in elementary school, middle school, and high school. Each time a similar strategy was taught, she became more confused due to the lack of consistency of teaching a single strategy through the years. Rather, the strategies that were taught to her in prior years were each different in some way. The result was that she found the use of

the mind-mapping for the present study somewhat confusing. This student however, does expect to use the mind-mapping strategy when writing a “big, major essay”.

Group C was the last group to receive explicit mind-mapping strategy instruction. The students in group C were all quite positive about learning and using the strategy. They each stated that mind-mapping helps them to plan before they write. There also was consistency in their answers relative to the strategy helping them organize their writing. One student recalled that the strategy helped them, “not to go off topic and start talking about different things”. Another member of group C said their mind-maps allowed them to, “look back and see what I wanted to talk about”. Two of three group A students found mind-mapping easy to use. The third said that, “it was hard at first. I had to think a lot but then it was easier to plan”. All students in group C expect to use the strategy for tests and assignments in their other classes. Only one participant said that she had seen a similar strategy.

Reliability Summary

The majority of participants described the experience of learning the mind-mapping strategy as quite positive (see Table 18). Most students felt that they were better writers after strategy instruction. The strategy was proclaimed to be easy to use while helping students to plan and organize their writing. Most students said that they would use the mind-mapping to help them on future tests and writing assignments in their other classes. Some students had been taught similar strategies in the past, though only one student mentioned that he actually used strategies that he had learned previously.

Table 18 Student Interview Themes

	Overall Assessment	**Help me be a better writer**	**Plan to write**	**Amount of increased planning time**	**Organization assistance**	**Ease of use**	**Use on test**	**Use on writing assignments**	**Used similar strategy**	**Did not like or long, boring**	**Prompts were good**
Group A	Mostly positive; one student did not like writing at all; One student was very resistant to participating in interview but did agree.	3 of 4;	3 of 4; think what you want to write about first			Medium; 3 of 4 said easy; one said medium hard.	4 of 4	3 of 4	3 of 4 said never; one had seen but never used		
Group B	Positive; one student found it confusing; good practice	3 of 4 found that it helped them to be better writers	2 of 4 used mm to plan re-think	2-3 min 2-5 min 5 min	3 of 4 felt it helped with organization of writing; get your work done just as fast; numbering helped	3 of 4 found it easy; one worried about using on unfamiliar topics	3 of 4	4 of 4; one said *only* if it was a really big essay	3 of 4; circle maps, bubble maps, Venn diagrams, tables	Students were tired.	3 liked personal interest prompts best
Group C	Very positive	3 of 3 felt it helped; one said helped a lot ; helped me open up more; stay on topic; get used to writing more;	Helped me think about what I was going to write; helps me draw out what I am already going to write	2 of 3 said no; One said 5 minutes;	Made me stay on topic; helped to put it in order; not go off and start talking about different things; can look back and see what I wanted to talk about	2 of 3 said easy; 1 said that it was hard at first, "I had to think a lot but then it was easier to plan"	All	All	One had seen before	Some kids were lazy at first-then on a roll-then lazy again-then a roll	

Treatment Fidelity

Four lessons were taught to each student group. The researcher taught the lessons over a period of four class periods. Lesson plan outlines were developed as checklists for the researcher to follow during instruction. An audio recording was made of each lesson. An independent examiner listened to the lessons and compared the presentation points against the lesson checklists to ensure treatment fidelity. No discrepancies were identified between the lesson presentation and the checklists.

Validity

Subjective Evaluation

The classroom teacher and three doctoral students were asked to be experts for a subjective evaluation procedure. Two notebooks from each group were selected randomly. From each of the six notebooks, two essays were chosen at random from the baseline phase, two from the intervention phase, and two from the post-intervention phase. So, each evaluator reviewed six sets of three essays. The evaluators were asked to rank the essays from each set of three placing them in order according to the experimental phase. The result for each set of three essays was a number from one to three written on each page (see Figure 10). The number 1 represented that the essay was from the set that the evaluator determined to be from the baseline phase. A number 2 indicated that the evaluator deemed that the essay was from the intervention phase. If a number 3 was written on an essay, the evaluator had ranked it as from the post-intervention phase.

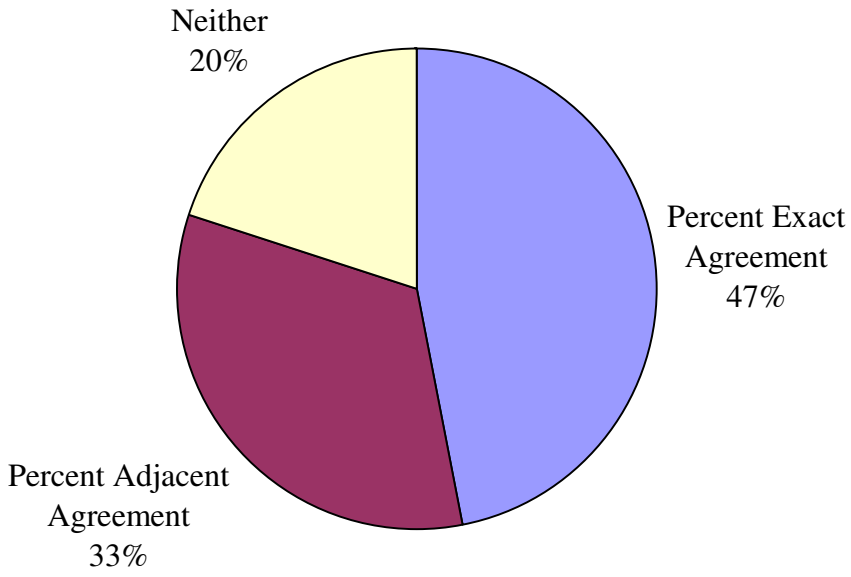


Figure 10 Percent Agreement for Subjective Evaluation – Doctoral Student Evaluators

Data were evaluated by calculating the frequency that the evaluators were correct in identifying the essays from the correct experimental phase. If the evaluator's ranking matched the phase of one essay, it was considered to be exact agreement. When essays were ranked within 1 phase of being exact, it was considered as adjacent agreement. Essays were scored as neither when the ranking was neither exact or adjacent. Table 19 summarizes the results of the subjective evaluation. See Figure 3 for a graphic representation of the results.

Table 19 Percent and Frequency of Subjective Evaluator Agreement – Doctoral Student Evaluators

	Percent	Frequency
Concurrence	80	43
Exact Agreement	47	25
Adjacent Agreement	33	18
Neither	20	11

Note. N = 54.

Results show that the three doctoral evaluators effectively ranked essays exactly 47% and adjacent 33% of the time. Total exact and adjacent agreement was 80% indicating that the subjective evaluators concurrence was moderately accurate.

The teacher also subjectively evaluated the same group of student essays using the same criteria described above. Results for the teacher were slightly higher than the rankings of the doctoral student subjective evaluators. (See Figure 11.)

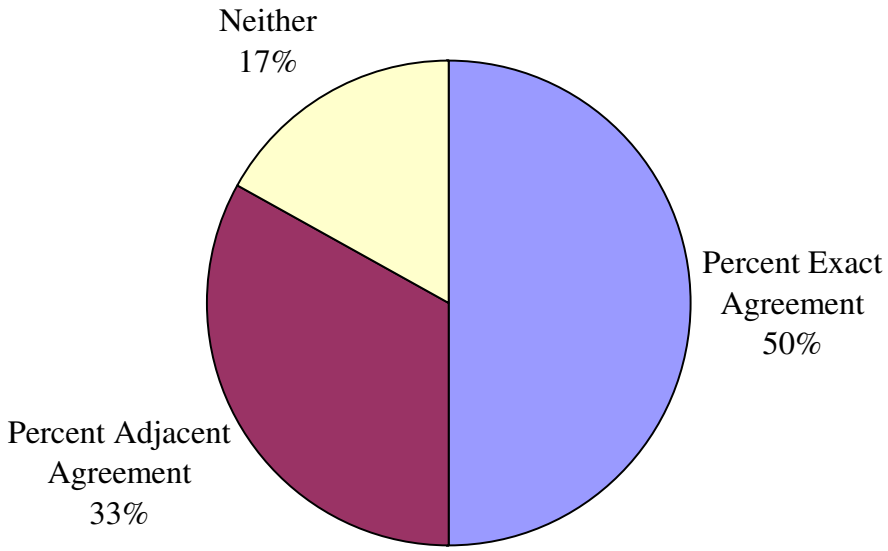


Figure 11 Percent Agreement for Subjective Evaluation - Teacher

Table 20 shows that the teacher obtained exact agreement for 50% of the essays and adjacent agreement 33%. The total of exact and adjacent agreement was 83% indicating that the teacher successfully recognized essays from each phase with moderate accuracy.

Table 20 Percent and Frequency of Subjective Evaluator Agreement – Teacher

	Percent	Frequency
Concurrence	83	15
Exact Agreement	50	9
Adjacent Agreement	33	6
Neither	17	3

Note. N = 18

Social Validity

Social validity is the cornerstone of research in education. Horner and colleagues (2005) have identified four goals of social validity within the context of single subject research: a) the dependent variable should have significant social importance; b) establish that the intervention can be applied by teachers (or other intervention agents) in schools or other learning contexts; c) establish that teachers (or other intervention agents) find the intervention acceptable, feasible, effective, and plan to use the intervention; d) establish that the intervention met the need defined by the study. Within this framework the present study will be evaluated.

The first social validity goal, social importance, has been demonstrated through a review of current literature establishing that students with LD often struggle with the writing process. Their writing difficulties include problems with planning and organization. The current educational climate, however requires that all students be proficient writers. The 2004 Reauthorization of IDEA requires that district and state mandated assessments must include students with disabilities. Writing competency must also be demonstrated on state and district assessments that determine whether students advance to the next grade level (Marchant, 2004). Nineteen states include compulsory writing as part of exit examinations required before graduation (Kober et al., 2006b).

Social importance beyond secondary school also has been established. The most commonly used college admission tests frequently determine if a student will attend college (Marchant, 2004). All three tests include writing sections as components (ACT, 2007; Educational Testing Service, 2007; Marchant, 2004; The College Board, 2007). Measures such as these require students with disabilities along with their non-disabled peers to prove their competency in written communication. Implementing a writing strategy intervention which can

be applied across settings was shown to improve student the organizational aspects of writing, thus meeting the requirements for social importance.

The second social validity goal outlined by Horner, et. al. (2005) requires that the research design demonstrate that the intervention can be applied by teachers in an educational setting. The current study applied an explicitly taught intervention to a normal classroom environment. No special equipment or other means was necessary to implement the independent variable. The resources used were those normally found in a classroom such as an overhead projector, transparencies, markers, and paper. The time necessary for teaching the mind-mapping intervention was not prohibitive. The lessons were taught over a period of only four days.

The third requirement for socially valid single subject research is that teachers find the intervention acceptable, practical, and efficacious. Teachers must also plan to use the intervention as part of their teaching repertoire. To establish the functional aspect of social validity for this study, the participants' teacher was interviewed. The semi-structured interview lasted 22 minutes and was conducted in the school setting. See Appendix P for the list of questions. The teacher stated that she found the mind-mapping strategy acceptable. In fact, she had taught classes in previous years strategies similar to mind-mapping. The students' teacher also believes that the strategy taught to her students was "very practical" and can be "transferred to younger or older students". She also was very emphatic that the mind-mapping strategy was effective for her students stating that, "I believe that it helped tremendously". The teacher also enthusiastically said that she planned to use the mind-mapping strategy in future classes.

The fourth primary goal of single subject research should be demonstrating that the intervention made a difference, as defined by the parameters of the study, for the participants. Visual inspection of the data and the pre- and post-test results showed that the writing strategy

presented to the students was effective for improving the written products of students with LD. The participants' teacher also corroborated the data during her interview. The teacher specified explicitly that she observed improvement in her students' planning before writing and organization of their final written products.

Semi-structured interviews were conducted with the three groups of students who participated in the study. All but two of the student participants stated that they found learning the mind-mapping strategy to be helpful for making them better writers. Nearly every student in each group felt that mind-mapping helped them to plan their writing through better organization of their thoughts. Students in groups B and C mentioned that they increased their planning time before writing to 2 to 5 minutes. Most found it easy to use and plan to use the strategy on tests and writing assignments.

Summary

The present study was designed to answer the research question, "What are the effects of mind-mapping strategy instruction on the written products of high school students with LD?" A multiple baseline design across subjects with four experimental phases was used to observe the effects of a strategy intervention. The subjects included three groups of students with LD in separate class periods. Mind-mapping was the strategy taught to each student group in a staggered implementation pattern. Figure 3 allows for visual inspection of the effects of the intervention on the participants' written products as measured by the WER.

The performance of all groups improved during the pre-baseline phase. Each group had a descending trend during baseline. Groups B and C however, exhibited slightly ascending trends during the intervention phase. A descending trend for the three groups was observed again during the post-intervention phase.

TOWL-3 subtest 8, Story Construction pre- and post-tests were administered to each group prior to the pre-baseline phase and after the post-intervention phase respectively. The TOWL-3 subtest measures the ability to write a logical and organized story that includes a theme or plot. Character development and the ability to compose engaging prose also are measured. To maintain scoring reliability, pre- and post-tests were each scored twice, once using the criteria for the TOWL-3 and a second time using the WER as the scoring criteria. The results of the pre- and post-test showed a marked increase in scores for each group for raw scores. Improvements also were observed in percentile rankings for each group. Percentile scores represent a value on a normal distribution of scores. TOWL-3 grade equivalent scores also improved from the pre- to the post-test administrations. Differences in pre- and post-test scores indicate that student writing improved over the term of the study.

Reliability was measured for rater concurrence on the daily written products as well as the TOWL-3. Interrater reliability remained above the .85 criterion level for essays and the pre- and post-tests.

Reliability measures also included teacher and student interviews. Thematic elements of the interviews were distilled and analyzed. Results indicated that both the teacher and the students felt that the mind-mapping strategy was a beneficial planning and organizational tool for improving student writing. Treatment fidelity was maintained through recorded lesson plans that were reviewed for consistency by an independent evaluator.

Validity for the present study was assessed by subjectively evaluating written products using the teacher and three doctoral students as expert evaluators. Social validity for the study was demonstrated according to the guidelines established by Horner and colleagues (2005) whereby social importance, ease implementation in an educational setting, feasibility and

likelihood of using the intervention by the educator, and that the intervention made a difference in student performance. The present study met all of the criteria of the Horner, et. al. (2005) guidelines.

CHAPTER FIVE:
SUMMARY AND DISCUSSION

The current chapter restates the research question and reviews the methods used in this investigation. The relationship of the current study to current literature is addressed. This chapter articulates the limitations of the investigation and discusses the implications of the research findings. Finally, the chapter concludes with a discussion of the need for future research related to this study.

Research Question

This study was designed to observe the effects of an explicitly taught writing intervention on the written products of struggling writers. It was specifically designed to examine the daily progress and overall writing achievement of struggling writers with learning disabilities (LD). The current investigation sought to address the research question, "What are the effects of mind-mapping strategy instruction on the written products of high school students with LD?"

Research Methods Review

The intent of this study was to evaluate the impact of the explicit teaching of a planning and organizing strategy. Eleven high school students with LD participated in this study which used a single subject across subjects design. A pre-test was administered to determine the initial level of student performance. The four experimental phases included pre-baseline, baseline, intervention, and post-intervention. Three subject groups in different classes wrote descriptive essays daily for 15 minutes. Participants wrote in response to 66 prompts over a period of 17 weeks during the spring semester of the school year. The intervention consisted of an explicitly taught mind-mapping strategy. The strategy was intended to improve the organization of student essays.

Written products were scored by two raters who received training six times before and during the study to assure interrater concurrence. Essays were holistically scored using the Written Expression Rubric (WER). The WER was derived from the Florida Writes rubric. Except for removing the elements for word choice and conventions such as basic writing skills including punctuation, capitalization, spelling, and sentence structure, wording of the rubric remained virtually the same. Word choice and conventions were not relevant to this study. The average of the raters scores for each written product were charted as data during this study. A post-test was administered following data collection and the scores were compared with the pre-test. The participants and their teacher were interviewed following data collection. Results of the intervention phase and the pre- and post-test indicate that the mind-mapping strategy had a positive impact on the organization of some of the participants' written products. Results of the interviews suggest that students and their teacher felt that their writing improved as a result of learning the mind-mapping strategy.

Findings from the current investigation include:

1. An observed improvement in student writing during the intervention phase for two of three groups as indicated by ascending trends in WER scores.
2. Each student group experienced an improvement in writing as demonstrated by changes in raw scores from the pre-test to the post-test as measured by two scoring criteria.
3. Percentiles and grade equivalent scores for each student group's writing quality improved from pre- to post-test.
4. Students in each subject group expressed during interviews that the intervention helped them to become better writers.

The overall findings indicate that student writing improved over the course of the study. The intervention phase did not yield substantial differences in the organization of written products when compared with group baselines. However, Kazdin (1982) emphasizes that "the results may not be dramatic by visual inspection criteria. However, small changes, when accrued over several different persons and an extended period of time, may be very important" (p. 244-245). In contrast to the small changes observable in student writing scores during the intervention phase, teacher and student interviews indicated that the mind-mapping strategy had positive effects. Students expressed that the strategy helped them to become better writers. They indicated that learning the strategy helped them to plan and organize their writing. Student planning time improved, according to both the students and their teacher. Most students said that they planned to use mind-mapping for future writing both on tests and assignments to help organize their thoughts. Finally, the pre- and post-test results indicated that student writing made impressive improvements over the course of the study.

Results of the Study Relative to the Current Literature

A review of literature was conducted to investigate the research and professional literature related to written expression strategy instruction for students with LD. The results of the present study are compared to current literature as follows.

Writing effectively has become a critical skill for students in educational and professional settings (Graham & Perin, 2007). Students need appropriate writing skills to advance in grade level (Marchant, 2004), pass state and district assessments, graduate from high school (Kober et al., 2006a), and achieve appropriate admissions scores to attend college (ACT, 2007; Educational Testing Service, 2007; The College Board, 2007). Following graduation, employers frequently evaluate applicants on their ability to write effectively (National Commission on Writing, 2004).

Professional promotion often requires competency in compositional skills (National Commission on Writing, 2005). The critical nature of writing effectively is directly congruent with the rationale for implementing the current study. Research with older students with LD is necessary to gain greater understanding of strategies that are most or least helpful for advancing the skills of struggling writers. The importance of writing intervention research was established due to the dearth of studies investigating writing strategy instruction with older students.

It is evident that students with LD often experience difficulty with the writing process (e.g., Englert et al., 1991; Gersten & Baker, 2001; Graham & Harris, 1997). Barriers to successfully producing written products include cognitive processes such as planning and organization that have been shown to be especially difficult for students with disabilities (Schumaker & Deshler, 2003). Overburdening the working memory reduces the capacity to produce well written products (Benton et al., 1984). However, providing students with an external framework such as a mind-map has been shown to reduce the cognitive overload that can impede student writing performance (Kellogg, 1996). It was thus determined for the current study that high school students with LD would benefit from the explicit strategy instruction of a prewriting strategy.

Deshler described a performance gap for students with LD of approximately 5 years when they enter high school (Deshler et al., 2001). Essentially, a typical student with LD entering the ninth grade has achievement scores equal to a 4^{th} or 5^{th} grade student. While the use of grade equivalent scores for interpreting standardized tests should be used with caution (Campbell, 1994), the pre- and post test scores for this study revealed improvements that may be associated with improvements in grade equivalent skills. Every student group showed marked increases in their grade equivalent scores indicating that the performance gap for older students

with LD can be narrowed. The results of the present investigation also demonstrated an impressive improvement in student percentile scores further implying that the students in the current investigation improved their writing skills over the course of the study.

The present investigation extends the work of Chalk, Hagan-Burke, and Burke (2005) who applied a single subject repeated measures design to measure the effects of writing strategy instruction on high school students. Chalk and colleagues replicated the seminal work of Graham and Harris' (1989b) with older students and realized modest gains in student writing performance. The limited gains were thought to be a result of eight SRSD probe conditions being applied. SRSD probes were discussed in detail in chapter 2. The present study isolated one of the variables investigated in the studies discussed above, namely mind-mapping. For the current study, mind-mapping was specifically targeted for its potential to positively impact student writing by improving the planning and organizing skills of struggling writers.

The results of the current study appear to confirm that students with LD benefit from explicit strategy instruction for planning and organization. Ascending trends for two of the three groups during the intervention phase indicate that the instruction had an effect, albeit minimal, on their ability to plan and organize their written products. Even group A whose trend for the intervention phase did not ascend, showed an improving trend for nearly two weeks after their intervention was completed. Oddly enough, groups B and C showed descending trends in their post-intervention phases immediately following the intervention phase. This phenomenon for group B may be explained by the teacher being absent from the classroom for eight days following spring break. Group C may have experienced a lack of motivation due to the proximity of the end of the school year.

Students with LD usually spend little or no time planning prior to composing (Graham et al., 2000a). Planning time prior to writing can average less than one minute (MacArthur & Graham, 1987). However, student interviews and teacher observation during the current study indicate that participants increased their planning time up to five minutes. Students self-reported that they spent more time planning before writing after they had been taught the mind-mapping strategy. The teacher observed that the students had spent no time planning prior to the mind-mapping intervention. Although students with LD frequently consider the planning process to be useless (Chalk et al., 2005), participants of the current investigation indicated through their interviews that they found the mind-mapping strategy a valuable tool for organizing their thoughts during the writing process. The participants' teacher also observed that many students, especially in groups B and C increased the time that they spent planning before writing.

Theoretical undergirding relative to this investigation was established and used in each daily lesson during each intervention phase with all groups. It is necessary to provide specific instructional focus within the context of explicit strategy instruction (Isaacson, 2004) including self-regulation instruction (De La Paz, 1999; Garcia-Sanchez & Fidalgo-Redondo, 2006) and teaching planning and prewriting strategies (Deshler et al., 2003; Kellogg, 1990; Noskin, 2000) in order to improve the written products of struggling writers. To address issues relative to self-regulation, the critical need for adequate writing skills for advancement in grade level, graduation, application to college, and for employment and promotion was established within the first lesson and reviewed in the second lesson. The instructor also modeled the metacognitive processes necessary for strategic planning and organizing (De La Paz, 1997; Hallenbeck, 1996) using a mind-map (Chalk et al., 2005; Sturm & Rankin-Erickson, 2002). Students in each group participated in the lessons through cognitive and metacognitive interaction by asking and

answering questions (Wong et al., 1989; Wong & Butler, 1996). The present study included in each lesson during the intervention, the specific research-based instructional elements discussed in this section which have been shown through to be effective in improving student outcomes.

Limitations

The current study fell prey to several design limitations. The use of a single subject design was expected to allow the researcher to directly observe the impact of the intervention on the subject groups at the time that it was applied (Kazdin, 1982). While changes in writing behavior were observed during two of the three groups' intervention phase, other confounding factors may have contributed to the success of the strategy instruction or lack thereof.

Single Subject Design

There are general limitations inherent to single subject design research methodology. Threats to internal validity can include: (a) history effects and (b) maturation effects. (Kennedy, 2005). Other threats associated with the single subject across subjects design include issues related to prolonged baselines: (a) boredom and (b) ethical concerns (Kazdin, 1982).

Internal Validity

No assurance that the introduction of the independent variable as the intervention was exclusively responsible for the changes in behavior. It was predicted that the determination of a functional relationship between the introduction of the mind-mapping strategy (independent variable) and the quality of written products (dependent variable) would be possible (Horner et al., 2005). However though small changes are evident, visual inspection of the data are inconclusive. Changes in writing behavior for two of the three participant groups can be observed with trends that ascend very slightly (see Figure 2). The other group's data during the intervention phase was a saw tooth pattern that did not improve over the baseline phase.

However, differences in the pre- and post-test scores show that student writing improved. The improvement in writing quality cannot be directly attributed to the intervention.

History Effects

History effects are "events that occur outside of the experimental situation but can potentially influence behavior during the study (Kennedy, 2005, p. 33). History effects for the current investigation included the school district spring schedule. Administration of the FCAT occurred during the eighth week of the study. The test is given for extended time periods over several days. The teacher suggested that writing should not take place during FCAT week. The researcher agreed. Following the week of FCAT administration, was the week preceding spring break. It was determined through observation of the data for group B that the intervention should occur during the week before spring break. To facilitate a phase change and keep motivation as high as possible, it was determined that the intervention for group B would be split. Two intervention days took place in the week before spring break and two immediately following spring break. The impact of the historical effects resulting from FCAT administration, spring break may have reduced student motivation to participate in daily writing in the week between those two events. While the students demonstrated their ability to write prior to the eighth week, the quality and frequency of writing suffered. Inspection of Figure 3 for day 36 shows the group B scores sharply declining following the introduction of the independent variable.

Historical effects also may have occurred immediately following spring break. The participants' teacher was away from school for eight days. The study design specified that the regular classroom teacher was responsible for posting the prompts on the board and insuring that the students began each class period by writing for 15 minutes. However, the researcher observed that the substitute teachers did not follow the regular teacher's lesson plan which

included instructions to change the daily prompt and have the students write for the first 15 minutes of class. The researcher also observed that when the writing period was supposed to occur that the students were not discouraged from talking with each other or on their cellular phones. The result may have been a reduction in motivation to write. Additionally, the teacher was out of the classroom for at least four additional writing days while working on other assignments in the school. The absence of the participants' regular teacher also may have negatively affected student writing performance.

Maturation Effects

Developmental changes in the participants may have impacted this investigation. The study spanned 17 weeks of the school year. Increases in age or experience from daily writing were expected to improve student writing quality. In addition, the opportunity for daily practice should have improved the quality of the desired behavior (Kazdin, 1982). In the present study, the desired behavior was improvement in the quality of student writing. Maturation effects were predicted, but were expected to be observable through visual inspection of group data as it progressively improved or remained stable over the course of the study. Yet, the trends for all groups descended rather than ascended during their baseline phases. Changes in trends for other phases may not be attributable to maturation due to the introduction of the independent variable during the intervention phase.

Independent Variable

A substantial improvement in writing quality was observed over the course of the study as measured by the pre- and post-tests. While criteria for a carefully developed independent variable was followed, other factors may have influenced the change in writing scores as measured from pre-to post-test. The present study adhered to the three criteria set forth by

Horner et al., (2005) for independent variables in a single subject design. (a) The independent variable (mind-mapping) was operationally defined allowing it to be validly interpreted. The operational definition also allows for study replication of the procedures. (b) The independent variable was "actively manipulated" to demonstrate experimental control. The mind-mapping intervention was introduced across subjects; multiple baseline across subjects represented the repeated condition. (c) The fidelity of implementation of mind-mapping instruction was maintained through lesson plan checklists and documented through audio recordings reviewed by an independent examiner for consistency.

A substantial improvement in scores from the pre- to the post-test was observed. Quality of student writing showed marked gains. Apart from the independent variable described above, alternative explanations for the improvement in student scores over the duration of the study may be possible. For example, no two prompts make exactly the same demands on students (White, 1984). In an attempt to reduce the potential confounding nature of writing prompts, the prompts were selected from the list of retired prompts for the state assessment of the Nevada Department of Education (Nevada Department of Education, 2006). The prompts were selected from a single internet site to maintain consistency. However, students indicated during their interviews that they preferred certain prompts over others. This preference may have influenced the quality of their writing.

Improvement in writing scores also may have been influenced by the process of teaching the same lesson to three different groups. It is impossible to accurately replicate the teaching of a lesson plan without some variance in delivery. Even though treatment fidelity was maintained to the greatest degree possible, differences in the engagement of student groups during each lesson varied due to the presence of different individuals.

Every group was taught in the same classroom. However, the lessons were presented at different times of day. Each group was from a different class period beginning at different times: second period – 8:18 a.m., third period – 9:09 a.m., and fourth period – 10:08 a.m.. Time of day may have contributed to differences in writing scores.

Finally, improvements in student writing as measured by the pre- and post test may have resulted from daily writing practice. Student interviews revealed that consistent daily practice helped some students feel that their writing had improved.

Prolonged Baselines

The current study was expected to span from six to eight weeks. Yet, the present study encompassed 17 weeks of the school year. By design, a multiple baseline across subjects experiment relies upon withholding the independent variable from the first subject group until baseline stability is observed (Kazdin, 1982). Following the intervention for the first group, subsequent interventions are withheld from the next subject group until data is found to be stable from the prior group that received the intervention. The pattern continues until the intervention has been presented to all participant groups. There is a risk that the baselines may extend for several weeks before all groups receive the intervention. The current investigation experienced a prolonged baseline that was unanticipated and that may have limited the effectiveness of data collection.

Student Attitudes

Reduction in participant performance due to boredom is a risk of extended baselines in multiple baseline across subject designs (Kazdin, 1982). Lack of motivation due to boredom with daily writing may have substantially influenced student performance and contributed to the declining trends that were observed (see Table 5). As early as the sixth week of the study, the

participants' teacher confided to the researcher that student motivation was beginning to deteriorate. The students had been asking how long the study would have to go on and said that they were tired of writing every day. Wong and Butler (1996) experienced similar results judging from their observation that motivational issues can undermine consistency in adolescent learning and outcomes. They found that motivation of students with LD is a major contributing factor to their poor performance. Discussions with the classroom teacher revealed that student motivation declined substantially after spring break and as the end of the school year approached. She also reemphasized the lack of student motivation in her post-study interview.

As discussed, there were several historical effects impacting the study including FCAT administration, spring break, teacher absences, and the proximity of the study to the end of the year. These factors also may have changed student motivation towards daily writing. Their motivation may have declined as each of the above factors occurred or was pending and the result was reflected in the trends observed during the phases of the study.

Ethical Concerns

The prolonged baselines of the current study raised ethical concerns. Kazdin (1982) cautions against withholding treatment if it appears to improve student outcomes. Due to the single subject across subjects design, it was necessary to withhold treatment until stability of data was observed prior to the intervention phase change. For group A, intervention was early in the study occurring after writing day 13. By design, it was necessary to wait for the data from group A to stabilize before introducing the intervention to group B. The researcher did not expect, however, a period as long as nearly two weeks for the group A data to stabilize. Group B did not receive intervention until the 33rd writing day: a period of nine weeks. The last group to move to the intervention phase wrote for 55 days (15 weeks) prior to intervention. For students with

disabilities who may already be academically lagging behind their peers, extended baselines cause concerns for delaying educational interventions that may benefit the participants (Barger-Anderson, Domaracki, Kearney-Vakulick, & Kubina Jr., 2004). Baselines as protracted as those for this study bring to bear the question of ethics for withholding treatment for extended periods of time for students for whom an immediate intervention may hold significant benefits.

The present study also withheld feedback for student performance. A single subject design, by definition, precludes making changes to the educational environment during baseline data collection (Horner et al., 2005). The baseline phase is a comparison condition for the dependent variable prior to the introduction of the independent variable during the intervention phase. For the current study, the dependent variable was the quality of student writing measured by the WER. Providing assistance in the form of feedback would have compromised the validity of the study and would have made replication nearly impossible. Feedback would have been desirable for maintaining student motivation and self-regulation since students could have understood whether their writing was improving and by what degree. In a normal educational situation, feedback also provides opportunity for students to make changes based on a better understanding of their performance. Feedback however, was not desirable for the present investigation due to its potentially confounding properties. The absence of feedback for the present study is consistent with state mandated assessments such as the FCAT for which students do not receive specific feedback for performance.

Practice is another important element in successful instruction. The design of the study at hand limited the instructional phase to four days. This design was necessary to limit the overall time needed for the study. But while extending the intervention phase by one or more days

would have allowed time for additional practice, the risk was weighed against extending the study. It was decided that prolonging the study would not necessarily improve student outcomes.

Scoring

Holistic scoring was used to evaluate the written products of the current study. White (1984) posited that the information derived from the holistic score limits any specific analysis of student writing; the single holistic score does not allow the researcher to determine whether a score is dependent upon specific skills. In other words, a single holistic score for the essays generated by students in the current study does not tell whether the student had difficulty or not with the specific aspects of focus, organization, or support. Since holistic scoring depends on assessing the general impact of the text (Huot, 1990), specific determinations for the current investigation regarding the reasons for lower or higher scores were not possible.

The researcher also fielded complaints about the rubric from the rater who was a special education English teacher. Her complaints emanated from the elimination of the rubric elements. Recall that the WER was based specifically on the Florida Writes rubric. However, the elements associated with word choice and conventions such as punctuation, capitalization, spelling, and sentence structure were removed. The rater was familiar with the rubric from her prior FCAT and Florida Writes training. So, the rater found it difficult to score based on only the elements of focus, organization, and support.

Pre- Post-test

The TOWL-3 subtest 8 Story Construction was used as the pre- and post-test to determine changes in writing quality that occurred over the course of the present study. The TOWL-3 measured somewhat different types of writing elements than were measured by the WER. According to the TOWL-3 examiner's manual the Story Construction subtest measures

"the ability to write in a logical, organized fashion; to generate a specified theme or plot; to develop a character's personality; and to employ an interesting and engaging prose". The WER measured compositional focus, organization, and support of written products. The WER was not developed to measure elements specific to story writing such as plot or character development.

The delivery of the prompting to write differed between TOWL-3 Story Construction and the WER. Students taking the TOWL-3 respond to a black and white picture of a complex setting that includes people and objects with which they appear to interact. In contrast, the compositions scored by the WER were initiated by presenting a prompt written on the board at the front of the classroom. Students may have responded differently to the presentation style of the prompts to write.

The differences between the presentation of the TOWL-3 pre- and post-tests and the essays produced on writing days that were scored by the WER indicate that changes in student writing may not be concurrent from one measure to the other. Thus, caution must be used when considering the improvements shown between the pre-and post-test not to assume that the changes in writing occurred as a result of the writing intervention since WER judged writing quality differently than the TOWL-3.

Another difference for the improvement in student writing between the scores on the pre- and post-test and the limited improvement in student compositions during the intervention phase may be due to students knowing that they were taking a test when the TOWL-3 was administered. The TOWL-3 was presented to students using a test booklet on which the words "Test of Written Language" appear in large bold print on the upper right hand corner. So the students were aware that they are taking a test rather than responding to a daily prompt posted by

their teacher. The students may have tried harder on the pre- and post-tests than they did on their daily essays because they were more motivated to do well on tests than on daily assignments.

Prompts

The prompts for the current study were general knowledge prompts for descriptive writing. They were obtained from a website for the Nevada High School Proficiency Exam in Writing (Nevada Department of Education, 2006). They were chosen for their continuity and anticipated interest level for high school students. The prompts for the current study also were chosen since they did not require the students to have prior knowledge based on high school curriculum. The prompts required only prior personal knowledge.

The participants in the current investigation were 11th grade students in the final months of the school year. During the lesson plans presented by the researcher, students expressed knowledge that writing is important during high school, college, and employment. The discussion of the uses of writing in high school and beyond were intended to improve student self-regulation. It is plausible that students would have responded more enthusiastically to daily writing prompts utilizing text structures that were aligned with the writing curriculum and the kinds of writing that students need to be skilled in for successful in high school, college, and the workplace.

Graham et al., (2005) provided a choice of two prompts for each writing assignment to increase student motivation. Allowing students to choose between several prompts for their daily writing may have improved student motivation for the current study.

Timing

The current investigation took place during the spring of the school year. Implementing the study during the spring meant that it was affected by events occurring concurrently within

that timeframe. Events that coincided with the study included the administration of the FCAT state assessment, spring break, and the pending conclusion of the school year. According to the classroom teacher during her post-study interview, some of the events occurring concurrently with the study caused a decline in student motivation that affected their willingness to participate in the daily writing assignment. In addition, the participants' teacher was not present for eight school days after the spring break. The teacher was also out of the classroom for four additional days during the spring months. The researcher observed that the substitute teachers did not implement the daily writing assignments according to the regular teacher's lesson plans. Effects of the events described above may have attenuated student attitudes towards writing.

Teaching

The multiple baseline across subjects design is expected to show a functional relationship between the independent and dependent variable (Horner et al., 2005). However, the distinction between the baseline and intervention phases did not show a sharp contrast in student writing performance. Using multiple baseline across subjects design for the current study limited the amount of time available for administering the intervention (independent variable). It was determined that the intervention would be taught over the period of four class periods. The researcher felt that a longer period of time would prolong the study inordinately. Teaching a strategy over only four days, however may have limited its impact and effectiveness since it did not allow for extended periods of guided practice. An increase in time for guided practice may have improved the power of the intervention to affect student writing behavior.

Summary

The present study had limitations that restrict the ability for firm conclusions to be drawn. The preceding section discussed several limitations of the present investigation. Limitation of the

current study include those inherent to single subject across subjects experimental designs. The inherent design limitations included those associated with threats to internal validity. Additional design limitations described included historical effects, and maturation effects. Limitations also were discussed related to the potential for attributing changes in student writing behavior to only the independent variable when other factors may have been influential. A discussion of the effects of a prolonged baseline on student attitudes and on associated ethical concerns also was included.

Other issues that could have made substantial impacts on the study outcomes include scoring issues, pre- and post-test concurrency with the daily writing task, difficulties with prompts, timing of the study, and specific limitations relative to teaching the intervention.

The research question for the current study focused on the effects of mind-mapping instruction on the written products of high school students with LD and was scrutinized through the microscope of the single subject experimental design. Although limitations persisted in the current investigation, student writing was shown to improve during intervention phases of two groups and through pre- and post-testing for all groups as measured by the TOWL-3 and the WER.

Perhaps the most important consideration from observing the data for the current study and the pre- and post-test is that writing *did* improve over the course of the study. The results may show simply that students who are required to practice writing daily will inevitably improve their compositional skills.

Implications for Practice

Teachers

Well planned and effectively organized writing is an important part of the repertoire of skills necessary for success both in school and employment. Teaching secondary students strategies for crafting written products is necessary for expanding their skills to a level of competency necessary for passing required assessments, communicating curricular knowledge, advancing to college, gaining meaningful employment, and promotion or advancement in the workplace. Writing well becomes then a survival skill, a necessity for life in the 21st century.

Effectively communicating through writing requires planning and a level of organization that allows the reader to glean the intended meaning from the text. Mind-mapping is one strategy that can be used to improve the planning and organizational skills of secondary students with LD. While the current study did not show a powerful functional relationship between the independent and dependent variables, mind-mapping has previously been shown to be an effective strategy for improving the compositions of students with LD (e.g., De La Paz, 1999; Sturm & Rankin-Erickson, 2002).

Teachers of secondary students with LD should teach the mind-mapping strategy with the following recommendations in mind: (a) provide explicit strategy instruction, (b) demonstrate the strategy and model the metacognition necessary for carrying out mind-mapping, (c) provide opportunities for specific feedback, and (d) allow sufficient time for practice to achieve mastery of the strategy. Certainly, requiring students to write daily over an extended period of time will evoke an improvement in compositional skills.

Researchers

Mind-mapping has been shown to be an effective strategy for improving the skills of struggling writers with LD. The current research was affected most significantly by three factors which limited the effectiveness of the intervention. First, applying a multiple baseline across subjects experimental design for measuring the impact of a writing intervention includes the risk of extended baselines. It is recommended that such a design would be best carried out during a period of the school year with the least opportunity for student distraction due to state mandated assessments and student holidays. The second concern regarding the current experimental design is ethical. Students who participated in this study received no feedback for their compositions at any time during the investigation. They had no idea if their efforts were helping them to improve or not. Feedback through all study phases also may have helped with student motivation. Providing students with scores for their work may have benefited their performance as a result of knowing the score for each essay. The third concern was another ethical issue linked to the limited practice that the students received during the intervention phase. For more significant gains in writing performance to be realized, additional practice should be added to the intervention phase. One or two extra days of practice may have made the intervention more powerful.

Recommendations for Further Research

The current study can serve as a catalyst for future research involving mind-mapping strategy for secondary students with LD who struggle with writing. A distinct need exists for improving the writing of all students including those who are on the threshold of high school graduation. Communicating effectively through writing is a life skill that is necessary for high school students and their future successes in college or careers.

Limitations of the present investigation are guideposts to additional research. Multiple baseline across subject research can be designed with considerations for avoiding prolonged baselines. Individuals in a single class rather than groups in different classes may more effectively demonstrate a functional relationship between the dependent and independent variables. Intervening in a single class would reduce the risk of threats to internal validity that may be associated with introducing the independent variable in different settings.

The current research took place during a very busy time of the year for students and teachers. During the spring of the school year, state mandated tests are administered, spring break splits the continuity of the semester, and the end of the school year looms large. Future research would be best conducted to end prior to major spring events or be conducted during the fall of the school year when distractions may be limited. Continuity of the research could be better maintained.

To improve treatment fidelity, changes in the presentation of the lesson should also be investigated. Technology such as in-class video streaming video would provide precision to the delivery of the intervention. Disadvantages of the lack of feedback during pre-recorded lesson delivery could be limited by training the teacher to field questions or provide feedback and practice opportunities.

Scoring alternatives may be beneficial to investigate. Applying an analytical rubric rather than holistic scoring may serve to improve research precision. Rather than applying a single score to written products, analytic rubrics provide a breakdown of specific scoring elements. Researchers would have an opportunity to understand specific deficits or strengths associated with individual essays.

Identification of a standardized test of writing skills that more clearly aligns with the elements scored during the experimental phases would reduce threats to internal validity. The present study clearly demonstrated improved student writing as compared by the TOWL-3 Story Construction pre- and post-tests. Though precisely identifying the elements of writing that improved was not possible with the present experimental design.

The current study used prompts that were previously used for state mandated writing assessments. Future studies could categorize prompts. Student participants in the current study seemed to write more enthusiastically in response to prompts that involved topics of personal interest to students such as describing the qualities of a good friend. The student response to prompts dealing with community interests such as describing where a student might choose to volunteer, seemed to elicit less enthusiasm in content of their essays. Analyzing categories of prompts may provide future research opportunities. In addition, prompts pre-printed on lined paper may improve writing responses for students who have difficulties transferring information from the board to their own paper. Another research opportunity may include providing two or more prompts from which students could choose to write.

Another study done with 10^{th} rather than 11^{th} graders would add to the social validity. The state writing assessment is given to students in grade 10 during the spring of the school year. Providing mind-mapping instruction to 10^{th} grade students may increase their chances of scoring better on the Florida Writes examination.

Students with LD frequently have little or no planning time before beginning their writing. Future studies should provide opportunities for observing and measuring improvements in planning time prior to writing after mind-mapping has been introduced as an intervention.

Improvement in student writing also can be measured through increases in text production. Any changes in writing fluency should be measured after the independent variable is introduced. Word counts for each essay would help to deepen the understanding of how improvements in planning and organization might contribute to changes in the amount of text that students produce.

Self-regulation has been shown to be a problem for struggling writers. Additional research for high school students with LD is necessary to develop strategic interventions for reluctant writers. Blending mind-mapping strategy instruction with self-regulation interventions may prove to quite effective for improving the quality of student writing. If student motivation improves, the quality of written products may also increase.

Chapter Summary

This investigation tested the efficacy of explicit mind-mapping strategy instruction for improving the organization of writing for high school students with LD. A multiple baseline across subjects design was used to observe changes in student writing. Three subject groups participated in the study. Pre- and post-tests were administered to all student groups. Following data collection and the post-test, interviews were conducted with the teacher and each of the student participants.

Findings indicate that the mind-mapping intervention had limited success in improving students' written products when measured by the multiple baseline single subject experimental design. However, pre- and post-test data show that writing quality certainly did improve. The participants' teacher specifically noted during her interview, that in her perception, improvements in student writing as a result of using the mind-mapping strategy did occur. The teacher also felt strongly enough about the efficacy of the mind-mapping strategy that she plans

to teach the strategy to her future students. Most of the students reported that they felt that learning mind-mapping helped them to become better writers. The vast majority of students also stated that they planned to use the strategy for tests and writing assignments.

Writing is a life skill that can directly impact the quality of life for older students preparing to graduate and progress to college, a career, or simply the world of work. Continued research and replication is necessary to provide rigor to explicit strategy instruction for improving writing skills. Priority for future research must be given to investigations of strategies for improving the writing skills of older students with LD.

APPENDIX A: INTERNAL REVIEW BOARD

University of Central Florida

Office of Research & Commercialization

November 21, 2006

Todd Sundeen, Doctoral student
University of Central Florida
Department of Child, Family & Family Sciences
ED 209
Orlando, FL 32816-1250

Dear Mr. Sundeen:

With reference to your protocol #06-3996 entitled, "The Effects of Prewriting Strategy Instruction on the Written Products of High School Students with Learning Disabilities," I am enclosing for your records the approved, expedited document of the UCFIRB Form you had submitted to our office. **This study was approved on 11/21/06. The expiration date for this study will be 11/20/2007.** Should there be a need to extend this study, a Continuing Review form must be submitted to the IRB Office for review by the Chairman or full IRB at least one month prior to the expiration date. This is the responsibility of the investigator.

Please be advised that this approval is given for one year. Should there be any addendums or administrative changes to the already approved protocol, they must also be submitted to the Board through use of the Addendum/Modification Request form. Changes should not be initiated until written IRB approval is received. Adverse events should be reported to the IRB as they occur.

Should you have any questions, please do not hesitate to call me at 407-823-2901.

Please accept our best wishes for the success of your endeavors.

Cordially,

Joanne Muratori
(FWA00000351 Exp. 5/13/07, IRB00001138)

Copies: IRB File
Wilfred Wienke, Ph.D.

JM:jm

12201 Research Parkway • Suite 501 • Orlando, FL 32826-3246 • 407-823-3778 • Fax 407-823-3299

THE UNIVERSITY OF CENTRAL FLORIDA

INSTITUTIONAL REVIEW BOARD (IRB)

IRB Committee Approval Form

#06-3996

PRINCIPAL INVESTIGATOR(S): Todd Sundeen
(Supervisor – Wilfred Wienke, Ed.D.)

PROJECT TITLE: The Effects of Prewriting Strategy Instruction on the Written Products of High School Students with Learning Disabilities

[X] New project submission
[ ] Resubmission of lapsed project #
[ ] Continuing review of lapsed project #
[ ] Continuing review of #
[ ] Study expires
[ ] Initial submission was approved by expedited review
[ ] Initial submission was approved by full board review but continuing review can be expedited
[ ] Suspension of enrollment email sent to PI, entered on spreadsheet, administration notified _____

Chair
[ ] Expedited Approval

Dated: _____
Cite how qualifies for expedited review:
minimal risk and _____

[ ] Exempt

Dated: _____
Cite how qualifies for exempt status:
minimal risk and _____

[X] Expiration Date: 11/20/2007

IRB Reviewers:

Signed: _____
Dr. Tracy Dietz, Chair

Signed: _____
Dr. Craig Van Slyke, Vice-Chair

Signed: _____
Dr. Sophia Dziegielewski, Vice-Chair

Complete reverse side of expedited or exempt form
[ ] Waiver of documentation of consent approved
[ ] Waiver of consent approved
[ ] Waiver of HIPAA Authorization approved

NOTES FROM IRB CHAIR (IF APPLICABLE): _____

REVISED 11/20/06

APPROVED BY
University of Central Florida
Institutional Review Board
IRB Designated Reviewer

Informed Consent

December 1, 2006

Dear Educator:

I am a doctoral student at the University of Central Florida. As part of my coursework in exceptional student education, I am conducting research, the purpose of which is to learn about the effects of prewriting strategy instruction on the written products of students with learning disabilities.

The study will involve the students participating in the Test of Written Language (TOWL-3). It will be used to identify students who could be part of this study. I will administer only the story construction subtest which is timed for 15 minutes. You will not have to administer or score the test. Twelve students will be chosen for participation in the study.

Also, students will be asked to write daily responses to short prompts. The writing will take place during the first few minutes of each class period and be limited to 15 minutes. You will not need to score any of the written products. Also, I will supply spiral notebooks and pencils to the students. The notebooks will be prenumbered to maintain confidentiality for students. The essays will be stored in a locked cabinet at the university office and will be destroyed soon after the research process is complete.

The study also includes an instructional element. With your permission, I will teach your students how to understand the Written Expression Rubric (WER). This lesson should take about 15 minutes. The WER is nearly identical to the grade 10 FCAT Writes rubric. I would also like to teach your students a mind-mapping strategy during four class periods. I will have prewritten lesson checklists that you can review prior to instruction. To check for consistency, I will make audio recordings of the four lessons that I teach in your classroom. The audio recordings will be stored in a locked cabinet at the university office and will be destroyed soon after the research process is complete.

One of the most important aspects of this research project is to establish the social validity of the prewriting intervention. At the conclusion of the study, I would like to interview you by asking a few questions. The interview questions are attached to this letter. In addition, I would like to ask you to rank three student essays in terms of their quality.

There are no anticipated risks, compensation or other direct benefits to you as a participant in this interview. You are free to withdraw your consent to participate and may discontinue your participation in the interview at any time without consequence. You must be at least 18 years old to participate in this project.

If you have any questions about this research project, please contact me at (407) 823-2598. My faculty supervisor, Dr. Wilfred Wienke , may be contacted at (407) 823-2402

REVISED 11/20/06

or by email at wwienke@mail.ucf.edu. Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Questions or concerns about research participants' rights may be directed to the Institutional Review Board Office, University of Central Florida, Office of Research & Commercialization, 12201 Research Parkway, Suite 501, Orlando, FL 32826-3246. The telephone numbers are (407) 823-2901 and (407) 882-2276.

Please sign and return this copy of the letter in the enclosed envelope. A second copy is provided for your records. By signing this letter, you give me permission to report your responses anonymously in the final manuscript to be submitted to my faculty supervisor as part of my course work.

Sincerely,

APPROVED BY
University of Central Florida
Institutional Review Board
IRB Designated Reviewer

Todd Sundeen
Ph.D. Candidate
University of Central Florida

____ I have read the procedure described above for the participation in the **research project**.

____ I voluntarily agree to participate in the **research project**.

____ I do not agree to participate in the **research project**.

____ I have read the procedure described above for the post-data collection **interview**.

____ I voluntarily agree to participate in the **interview**.

____ I do not agree to be audio taped during the **interview**.

_____ / _____
Participant Date

_____ / _____
Principal Investigator Date

REVISED 11/2/06 pm

APPROVED BY
University of Central Florida
Institutional Review Board
IRB Designated Reviewer

December 1, 2006

Dear Parent/Guardian:

Your child has been nominated by his/her teacher to participate in a study that is being conducted for research in conjunction with the University of Central Florida, College of Education. Your child's identifying information has not been shared in any way with the researcher at this time. Your child was chosen because he/she meets the criteria for this study and you, as a parent/guardian, are being offered the opportunity to have your child participate.

The research project involves the use of teaching prewriting strategies to high school students. Many students have difficulty writing essays. This skill is especially important for students in high school as they use their writing to demonstrate what they have learned. The researchers want to find out more about how learning prewriting strategies can help high school students improve their writing organization. The results of this study may someday help educators develop instructional practices to help students improve teaching practices in high school.

With your consent, your child will be taught prewriting strategies in their learning strategies class. All students in the class will receive the instruction. The instruction will take place over four class periods. The researcher will be the instructor for only these class sessions. The exact length of the study will depend on the consistency of improvement in the students' writing. The study may last for about six weeks. During the study, all students in your child's learning strategies class will be asked to write short essays at the beginning of each class period for about 15 minutes. Your child's written work will be collected along with the written work of all of the other students in the class. Other than the teacher and the researchers, no one will know that your child will be involved in this study. Your child's name will be removed from their written work. The essays will be stored in a locked cabinet at the university office and will be destroyed soon after the research process is complete.

To help make sure that the lessons are taught in the same way during the study, the researcher will follow checklists that outline the lesson plan. Audio recordings will be made of the four class periods during which prewriting instruction takes place. The audio recordings will be compared with the lesson checklists to make sure that the all parts of the lesson are taught the same way to all students. Your child will not be recorded individually. The audio recordings will be stored in a locked cabinet at the university office and will be destroyed soon after the research process is complete.

At the end of the study, we would like to ask your child a few questions during a short interview. With your consent, your child will be interviewed by the primary researcher, a doctoral candidate at the University of Central Florida. The interview will be held in the school office during non-instructional time and should take less than 30 minutes. Your child will be allowed the right to refuse to answer any questions that make him/her uncomfortable, and he/she may stop participating in this research at any time. Your child will be reminded of this immediately prior to the interview. I have attached a copy of the interview questions for your information.

Your child's name, the names of his/her teachers, and the name of your child's school will be kept confidential and will not be used in any report, analysis, or publication. All identifying information will be replaced with codes (e.g., Student 1, Student 2). Your child may stop participating in this research at any time without any consequence. Your child's participation in this study will not affect their grade in their learning strategies class in any way.

REVISED 11/20/06 sm

You may contact me at 407-823-2598 or email at tsundeen@mail.ucf.edu or the primary investigator on this project, Dr. Wilfred Wienke at 407-823-2402 or by email at wwienke@mail.ucf.edu, for any questions you have regarding the research procedures. Research at the University of Central Florida involving human participants is carried out under the oversight of the Institutional Review Board (IRB). Information regarding your rights as a research volunteer may be obtained from: IRB Coordinator, Institutional Review Board (IRB), University of Central Florida (UCF), 12201 Research Parkway, Suite 501, Orlando, Florida 32826-3246. The IRB telephone number is (407) 823-2901. The hours of operation are 8:00 am until 5:00 pm, Monday through Friday except on University of Central Florida official holidays.

Sincerely,

Todd Sundeen
College of Education
University of Central Florida

APPROVED BY
University of Central Florida
Institutional Review Board
IRB Designated Reviewer

____ I have read the procedure described on the previous page.

____ I have received a copy of this form to keep for my records.

____ I have received a copy of the interview questions for my records.

I voluntarily give my consent for my child, _____, to participate in Todd Sundeen's study entitled, "The Effects of Prewriting Strategy Instruction on the Written Products of High School Students with Learning Disabilities", to be audio recorded as part of lessons taught to his/her learning strategies class, and to be interviewed in the school's office during his/her non-instructional time.

_____ / _____
Parent/Guardian Date

_____ / _____
2nd Parent/Guardian Date

(or Witness if no 2nd Parent/Guardian)

Please sign and return one copy of this page to your child's teacher.

REVISED

ASSENT FORM

PROJECT: Prewriting Strategy Instruction for High School Students
RESEARCHER: Todd Sundeen
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4000 Central Florida Boulevard, Orlando, FL 32816

Please READ this explanation carefully, and ASK any QUESTIONS before signing.

Dear Student,

My name is Todd Sundeen and I am a student at the University of Central Florida. I am interested in learning about how prewriting strategies can help you improve your written work. I am conducting this research as part of my studies at the University of Central Florida.

At first, you will be asked to write a short story about a picture that is printed in a booklet. This will help me to understand more about the way that you write. Next, I will look at how you are writing by asking you to write several essays using prompts similar to those that you have seen on tests.

Next, I will teach you a prewriting strategy that you can use to plan your writing. As I am teaching the lesson to you and your class, I will make an audio recording of the lesson. The recording will only be used to make sure that I follow my lesson plan checklist. I will then ask you to write some short essays to see if the strategies that you learned have helped your writing.

Your name, the names of your teachers, and your school will be kept confidential and will not be used in any report or publication. This means that your name will be removed from written work and will not be shared with anyone else. No one in your classes will know that you are helping with this project since all of the students in your learning strategies class will be taught the same strategies. You will not receive any extra credit or other compensation for helping with this project. Participating in this study will not affect your grade at all. Your help with this project is very important and will help other students to become better writers by helping us to understand which prewriting strategies work best.

APPROVED BY
University of Central Florida
Institutional Review Board
IRB Designated Reviewer

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IF YOU BECOME UNCOMFORTABLE AT ANY TIME, YOU MAY STOP. Your participation is completely voluntary. It is your choice to help with this project and you may decide to stop at anytime.

Sincerely,

APPROVED BY
University of Central Florida
Institutional Review Board
IRB Designated Reviewer

Todd Sundeen, M.A
Doctoral Student
College of Education
University of Central Florida

I agree to take part in this research study and know that I can quit any time I want to.

_____ _____

Signature of Student Date

_____

Student's Printed Name

APPENDIX B: WRITTEN EXPRESSION RUBRIC

Written Expression Rubric (WER)

Score	Description
6	The writing is well ***focused*** and purposeful reflecting insight into the writing situation. The ***organizational pattern*** is clear and provides for a logical progression of ideas. The development of ***supporting details*** is substantial, specific, relevant, and concrete.
5	The writing is focused on the topic and its organizational pattern provides for a logical progression of ideas. The organizational pattern provides for a logical progression of ideas. The support is developed through ample use of specific details and examples.
4	The writing is focused on the topic and includes few, if any loosely related ideas. An organizational pattern is apparent. The support is consistently developed, but it may lack specificity.
3	The writing is focused but may contain ideas that are loosely connected to the topic. An organizational pattern is demonstrated, but the response may lack a logical progression of ideas. Development of support may be uneven.
2	The writing addresses the topic, but may loose focus by including extraneous or loosely related ideas. The organizational pattern usually includes a beginning, middle and ending, but these elements may be brief. The development of support may be erratic and nonspecific, and ideas may be repeated.
1	The writing marginally addresses the topic, but looses focus by including extraneous or loosely related ideas. The response may have an organizational pattern, but it may lack a sense of completeness or closure. There is little, if any, development of the supporting ideas, and the support may consist of generalizations or fragmentary lists.
Unscorable	The paper is unscorable because • the response is not related to what the prompt requested the student to do, • the response is simply a rewording of the prompt, • the response is a copy of a published work, • the student refused to write, • the response is illegible, • the response is written in a foreign language, • the response is incomprehensible (words are arranged in such a way that no meaning is conveyed), • the response contains an insufficient amount of writing to determine of the student was attempting to address the prompt, or the writing folder is blank.

APPENDIX C: FLORIDA WRITES RUBRIC

FCAT Writing Rubric — Grade 10

Score Points in Rubric

The rubric further interprets the four major areas of consideration into levels of achievement.

6 Points The writing is focused and purposeful, and it reflects insight into the writing situation. The organizational pattern provides for a logical progression of ideas. Effective use of transitional devices contributes to a sense of completeness. The development of the support is substantial, specific, relevant, and concrete. The writer shows commitment to and involvement with the subject and may use creative writing strategies. The writing demonstrates a mature command of language with freshness of expression. Sentence structure is varied, and few, if any, convention errors occur in mechanics, usage, punctuation, and spelling.

5 Points The writing is focused on the topic, and its organizational pattern provides for a logical progression of ideas. Effective use of transitional devices contributes to a sense of completeness. The support is developed through ample use of specific details and examples. The writing demonstrates a mature command of language, and there is variation in sentence structure. The response generally follows the conventions of mechanics, usage, punctuation, and spelling.

4 Points The writing is focused on the topic and includes few, if any, loosely related ideas. An organizational pattern is apparent, and it is strengthened by the use of transitional devices. The support is consistently developed, but it may lack specificity. Word choice is adequate, and variation in sentence structure is demonstrated. The response generally follows the conventions of mechanics, usage, punctuation, and spelling.

3 Points The writing is focused but may contain ideas that are loosely connected to the topic. An organizational pattern is demonstrated, but the response may lack a logical progression of ideas. Development of support may be uneven. Word choice is adequate, and some variation in sentence structure is demonstrated. The response generally follows the conventions of mechanics, usage, punctuation, and spelling.

2 Points The writing addresses the topic but may lose focus by including extraneous or loosely related ideas. The organizational pattern usually includes a beginning, middle, and ending, but these elements may be brief. The development of the support may be erratic and nonspecific, and ideas may be repeated. Word choice may be limited, predictable, or vague. Errors may occur in the basic conventions of sentence structure, mechanics, usage, and punctuation, but commonly used words are usually spelled correctly.

1 Point The writing addresses the topic but may lose focus by including extraneous or loosely related ideas. The response may have an organizational pattern, but it may lack a sense of completeness or closure. There is little, if any, development of the supporting ideas, and the support may consist of generalizations or fragmentary lists. Limited or inappropriate word choice may obscure meaning. Frequent and blatant errors may occur in the basic conventions of sentence structure, mechanics, usage, and punctuation, and commonly used words may be misspelled.

FCAT Writing Rubric — Grade 10 (continued)

Unscorable The paper is unscorable because

- the response is not related to what the prompt requested the student to do;
- the response is simply a rewording of the prompt;
- the response is a copy of a published work;
- the student refused to write;
- the response is illegible;
- the response is written in a foreign language;
- the response is incomprehensible (words are arranged in such a way that no meaning is conveyed);
- the response contains an insufficient amount of writing addressing the prompt;
- the response contains an insufficient amount of writing to determine if the student was attempting to address the prompt; or
- the writing folder is blank.

APPENDIX D: PROMPT SCHEDULE

Prompt Schedule

Jan. 8	TOWL Testing
Jan. 9	Some days are really fun or exciting. A great day can happen anywhere or anytime. Think about a great day that you have had or one that you wish you could experience. Describe what happened to make it a great day.
Jan. 10	You have just arrived in a distant place far away. Everyone back home can't wait to hear what it is like. It could be real or imaginary. Write a description of this place to give your readers a clear picture of what it is like in this far away place.
Jan. 11	Think about someone you know who is successful. This person could be someone you know or someone you may have never met. Explain why luck, talent, or hard work is important to success.
Jan. 12	Imagine that you wake up one morning and discover that you are invisible. Explain what happens, who you see, and what you do on your day of invisibility.
Jan. 15	No school
Jan. 16	Imagine all television stations stopped broadcasting for one week. Tell what you would do instead of watching television. Explain how this would change your life for a week.
Jan. 17	The county owns some land that it wants to use to benefit the community. What would you advise the county to do with this land? Describe why your suggestion is a good use of the land and why your suggestion would be beneficial for the community.
Jan. 18	Young people often try to decide what kind of work they would like to be doing as adults. Think of a job that you would enjoy having or that you feel that you could become qualified to do. Describe why you might decide on that job.
Jan. 19	Friendship is very important to most of us. Describe the quality or qualities that are most important in a friend and tell why those qualities are important.
Jan. 22	Describe what you think your community should do to make life more enjoyable for teenagers.
Jan. 23	Think of all the years that you have been in school. Which was your best year in school? Describe some of the reasons that made it your favorite year.
Jan. 24	Explain to a teen from another country what it is like to be an American teenager. Write a paper which describes some of the qualities of a "typical" American teen.
Jan. 25	You have been chosen to be the first high school student to fly on a mission to the moon. You may take one item to leave on the moon. Describe the item and give specific reasons for choosing it.
Jan. 26	Pretend that you could make an event from the past happen again so you could be a part of it. Describe the event and what part you would like to play in it.
Jan. 29	A relative has left you a great deal of money in a will. The money is for you to use doing anything you desire in the year following your high school graduation. Describe what you would do.
Jan. 30	You have been exploring an abandoned house. You discover an old chest and decide to open it. Describe what you see.

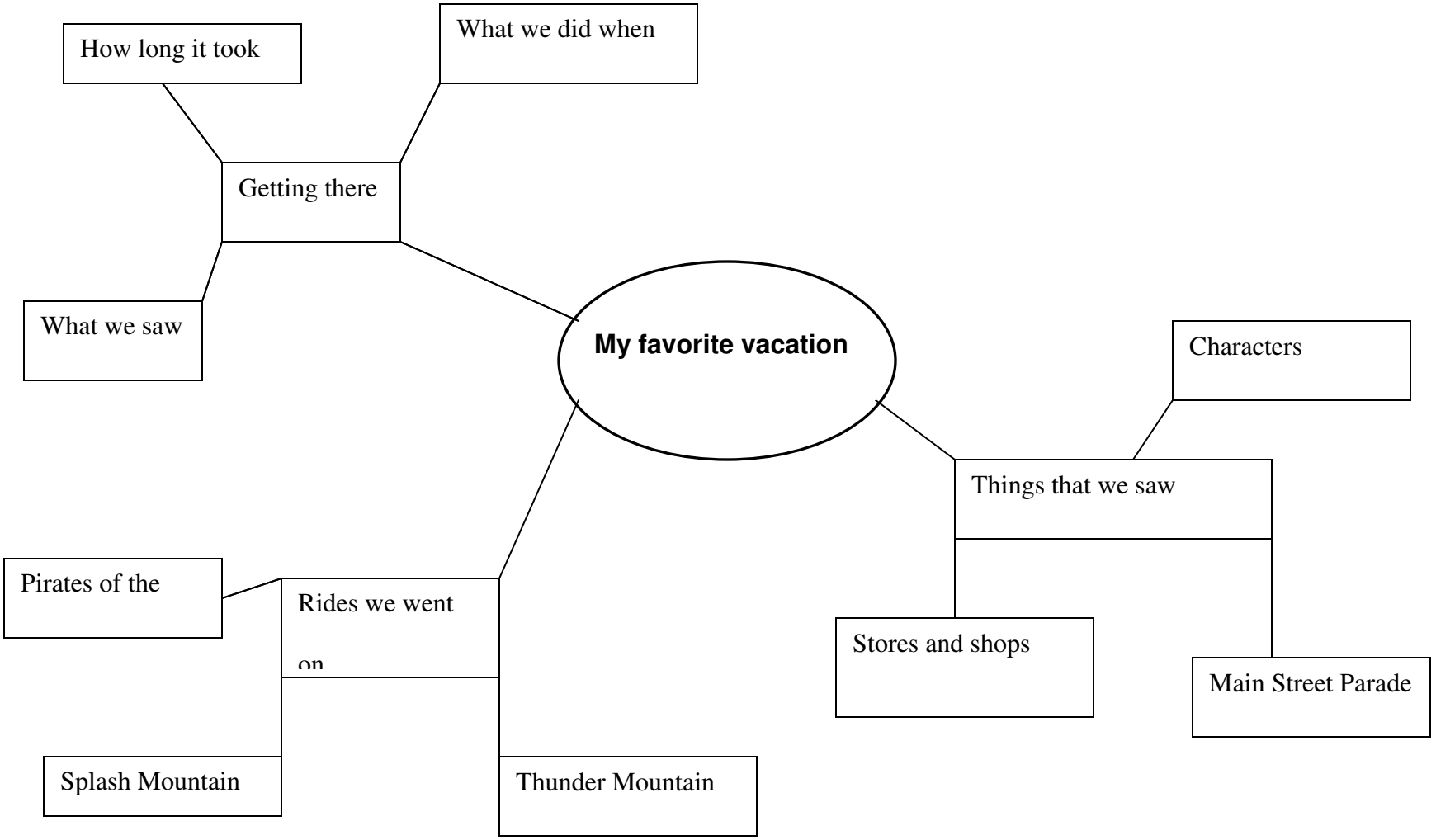
Jan. 31	If you were given the opportunity to spend two hours each week working on a community task of your choice, explain where you would volunteer and why, what you would accomplish, and how it would benefit your environment.
Feb. 1	Describe your perfect vacation. Where would you go and what would you do while you were there? This could be either a vacation you have already taken or a fantasy vacation you would like to take sometime in the future.
Feb. 2	Inventions such as the telephone, television, and the computer have been very important in people's lives. Select any invention that has made a big difference in the way people live. Explain the importance of the invention.
Feb. 5	From time to time, all of us have had to make a difficult choice or decision. Describe a choice or decision you have made and explain how this choice or decision influenced your life.
Feb. 6	What is the biggest problem facing young people today and how can it be solved? Describe the problem and thoroughly explain your solution.
Feb. 7	People have different reasons for liking their favorite kinds of music. Write about your favorite kind of music, explaining why you like it.
Feb. 8	Everyone has a favorite memory. Describe yours and explain why it is your favorite.
Feb. 9	Describe your school or place where you are receiving your high school education. Tell about the building and neighborhood, the students and teachers, or the events that take place in your school.
Feb. 12	Imagine your family is moving to another planet. You are able to take one suitcase. What would you put in it as a reminder of your life on Earth?
Feb. 13	Almost everyone has had at least one teacher who is hard to forget. Think of a teacher you have had that you will remember for a long time. Describe that teacher so clearly that your reader will know just what that teacher is like and what makes him or her so hard to forget.
Feb. 14	Consider what makes some people better leaders than others in areas such as schools, sports or politics. Using examples, explain what you think makes a good leader.
Feb. 15	You are riding down an old road when you see a glow behind a hill. You pull off the road to investigate. Describe what you see.
Feb. 16	You are holding a family photograph. As you look at the photograph, you are suddenly transported back into the time and setting of the picture. Describe the picture and explain the interesting things that happened on the day the picture was taken.
Feb. 19	
Feb. 20	Describe yourself to someone who has never met you. You might include details about your appearance, your personality, or your interests.
Feb. 21	You have received a wonderful surprise package in the mail from someone who cares for you very much. Tell what is inside the package and describe what it looks like. Tell who sent the package and give the reasons you think that person sent it to you.

Feb. 22	Which sense (sight, hearing, touch, smell, taste) do you value most? Explain why.
Feb. 23	Most people think about the future. What do you plan to be doing five years from now and how do you plan to get there?
Feb. 26-Mar 9 FCAT	
Mar.5	Most people living in a particular area make rules or laws. Think about a law that is currently being enforced in your community or school and tell whether it is fair or unfair to the majority of people living there. Does this law make life better or worse for those involved?
Mar.6	Imagine you could select an object to be put in a time capsule to be opened 100 years from now. What object would you select and what would it say about life in the 2000s?
Mar.7	Everyone feels a certain thrill when doing something for the first time, such as riding in an airplane or driving a car. Write a story about a first experience you had, what it was like, and what your feelings were. Tell why you still like to remember it today.
Mar.8	Everyone fears something; for example, snakes, the dark, storms, or growing up. Explain what you fear and why.
Mar. 9-18	**Spring Break**
Mar. 19	A door in your school has always been kept locked. One day, you discover the door is open. Write a story about what happens. Be sure to include descriptive details.
Mar. 20	Everybody makes up excuses. Think of an excuse that you or someone you know has used. Describe the situation and the excuse.
Mar. 21	Most people living in a particular area make rules or laws. Think about a law that is currently being enforced in your community or school and tell whether it is fair or unfair to the majority of people living there. Does this law make life better or worse for those involved?
Mar. 22	What is the most important advice that you could give to another person? Explain why you think this advice is important.
Mar. 23	You are walking along a beach. Looking down at your feet, you see an object in the sand. Using your imagination, identify the object and tell how it came to be in this place.
Mar. 26	It's your 100th birthday. What do you expect that people honoring you at your birthday party will have to say about you?
Mar. 27	Many people wear T-shirts with slogans on them. If you had to choose one slogan for your shirt, what would it say? Think of a slogan that would be appropriate to wear at school. Then, explain why this slogan fits you and why you chose it.
Mar. 28	Clothes are a form of self-expression. Describe how you like to dress and explain why you choose the clothes you do.
Mar. 29	You are accidentally sent back in time a hundred years. What would you miss the most and why?
Mar. 30	Select a job that you think will be important in the next ten years. Explain why this job is needed and what skills are necessary for this job.

April 2	Weather can often have an influence on what happens to us. Write about a time when the weather played a part in an experience that happened to you or to someone you know.
April 3	You have been given an all-expense paid trip to a place or city of your choice. Describe where would you choose to go and explain why?
April 4	Clothes are a form of self-expression. Describe how you like to dress and explain why you choose the clothes you do.
April 5	The school system is frequently accused of not preparing students for the "real world." Choose one area you think the schools need to include and describe to the reader what makes it is a real area of concern.
April 6	No one is perfect! What would you most like to change about yourself or someone you know? Explain why you would make that change.
April 9	We all know people who do something especially well. Think about a special talent you would like to have. Write about what you would like to do well and explain why.
April 10	Think of a character from a book, movie, or television show that you would like to spend a day with. Explain why you chose this character and what you would most like to learn from him/her.
April 11	Everyone is an "expert" at something. Think of something you do well--anything at all. Explain how to do this so clearly and completely that your reader will understand just what it takes to be good at this activity.
April 12	Most people think about the future. What do you plan to be doing five years from now and how do you plan to get there?
April 13	There is much concern for the environment today. In what ways could you help our environment in the future?
	All people have a goal of some kind or something they hope to accomplish in their lives. Describe your goal or something you would like to accomplish, and then explain why it is important to you. **PI**
April 16	Think of a skill you have learned that has made your life more fun, such as participating in sports or playing a musical instrument. Explain what you do, how you learned it, and why you think other people could benefit from it too.
April 17	Stories in books, movies and on television have many interesting characters. Think about a character from a story. Pretend you could be that character for a day. Describe who that person is and why you chose him/her.
April 18	School isn't the only place where we learn. Talk about something you remember learning outside of school. Tell what it was and how you learned it.
April 19	Every now and then, something will happen that teaches you something new or surprising about yourself. Tell about a time when you found out something good about yourself that you had not known. Tell what happened and how it changed you.
April 20	A space ship has just landed on your front lawn. The door opens. Describe what you see.

April 23	Amusing things happen to everyone. Sometimes we do things that are funny or something funny happens to us. Many times we see a comical thing happens to someone else. Describe an incident that happened to you or to someone else that you found very humorous.
April 24	We are a society surrounded with advertisements. Think of a particular advertisement that is your favorite or least favorite and talk about why. Give specific reasons to persuade others to feel the same as you.
April 25	Many events occur in the world each day. Choose one event that gives you the most hope for the future. Explain why you chose the event you did.
April 26	Sometimes we work alone and sometimes we work together. How important is it to be a team player?
April 27	Write about an activity you have completed that made you proud. What steps did you take in planning and carrying out the project? Was the final product worth the effort? Why or why not?
April 30	Think about some of your experiences in elementary school--interests, appearance, friends. Now think about yourself today. Describe how you have changed since you were in elementary school.
May 1	If you could choose to be any animal for forty-eight hours, what would you be? Now explain why you chose this animal. Support your ideas with examples and details.
May 2	Incoming freshman have many things to learn and get used to in high school that are very different from middle school. Explain some of these differences to a freshman so that his or her first year in high school will be successful.

APPENDIX E: MIND-MAPPING EXAMPLE – COMPUTER GENERATED


How long it took
What we did when
Getting there
What we saw
My favorite vacation
Characters
Things that we saw
Pirates of the
Rides we went on
Stores and shops
Main Street Parade
Splash Mountain
Thunder Mountain

APPENDIX F: TOWL-3 SUBTEST 8 STORY CONSTRUCTION SCORE SHEET

TOWL-3 Subtest 8
Story Construction – Pre- Post-test

Items and Scoring Criteria	Score
1. Story beginning 0 = none, abrupt 1 = weak, ordinary, serviceable 2 = interesting, grabbing	
2. Story somehow relates to picture 0 = no 1 = yes	
3. Definitely refers to a specific event occurring before or after the picture 0 = no 1 = yes	
4. Story sequence 0 = none 1 = rambles, but has some sequence 2 = moves smoothly from start to finish	
5. Plot 0 = none, incoherent, statements in random order 1 = weak, meager, spotty 2 = logical, complete	
6. Characters show feelings/emotions 0 = no 1 = some emotion/low-affect story line 2 = strong emotion clearly evident in at least one character	
7. Expresses some moral or philosophic theme 0 = no 1 = yes, but weakly stated, inferred 2 = overtly, clearly stated	
8. Story action or energy level 0 = no action 1 = boring, tedious 2 = run-of-the-mill, predictable 3 = exciting, interesting	
9. Story ending 0 = none, abrupt 1 = weak 2 = logical, definite ending	
10. Prose is 0 = immature 1 = ordinary, serviceable, matter-of-fact 2 = artful, stylish	
11. Story is 0 = dull, merely describes picture 1 = simple, straightforward 2 = interesting, unique, coherent	
Raw Score	

APPENDIX G: TOWL-3 SUBTEST 8 STORY CONSTRUCTION SAMPLE STORY

Story 12: Judy

The Destruction of the Village of Kenoeta

Long ago before civilized man, when people still lived in caves, there was a village called Kenoeta. The people of Kenoeta were warriors. They fought with other villages and took their land. They were the most powerful village in all the valley, for they had fire. Although they were strong and powerful, they were unliked by the other tribes.

One day the head cheif of Kenoeta; Sangasar ordered the men to get ready for battle.

"We will attack and conquer the nearest village east of us, Lansenee," he said.

When the warriors heard this some began to protest.

"I have heard the Lansenee people have special connections with nature Sangasar. We should not fight with them," said one.

"I too have heard stories about that village," said another.

But no matter how much they pleaded, Sangasar had his mind made-up.

"Others have heard horrific stories about us," Sangasar said, "that we kill out own and set each other on fire. That is not true. So are the stories about Lansenee. They are just STORIES. We leave in the morning!"

When the sun was just peaking up above the horizon the next morning, Sangasar and his warriors left. They attacked Lansenee and took over everything in sight. They killed all but one old man who ran into the woods.

At arriving back at home, they were welcomed with a celebration of their victory.

Little did they know, the old man that escaped was the medicine man. He sat on the forest floor and conjured up his all energy. He called to a herd of mammoths. Told them what had happened, then died. The mammoths were enraged and started on their way to Kenoeta. They arrived in the middle of the feasting. The animals attacked fiercely. They fought for days. Many mammoths and men died. Finally the animals prevailed and the village of Kenoeta was no more.

Subtest 6
Contextual Conventions

Score		Items and Scoring Criteria
1	1.	All sentences begin with a capital letter **0** = no **1** = yes
3	2.	Paragraphs **0** = none, 1 **1** = 2 **2** = 3–4 **3** = 5 or more
1	3.	Uses quotation marks (" or ") **0** = no **1** = yes
1	4.	Uses comma to set off a direct quotation **0** = no **1** = yes
0	5.	Uses an apostrophe in a contraction (e.g., isn't) **0** = no **1** = yes
1	6.	Uses a colon, semicolon, or hyphen (:, ;, -) **0** = no **1** = yes
0	7.	Uses a question mark (?) **0** = no **1** = yes
1	8.	Uses an exclamation point (!) **0** = no **1** = yes
2	9.	Capitalizes proper nouns (e.g., Oz, Bob, Italy, Italian, Earth) **0** = no **1** = sometimes **2** = yes, always
2	10.	Overall punctuation and capitalization is **0** = poor **1** = average **2** = good
2	11.	Number of nonduplicated words misspelled **0** = 6 or more **1** = 3–5 **2** = 0–2
2	12.	Spelling is **0** = poor **1** = average **2** = good
16		**Raw Score**

Subtest 7
Contextual Language

Score		Items and Scoring Criteria
0	1.	Fragmentary sentence **0** = yes **1** = no
1	2.	Run-on sentence **0** = yes **1** = no
3	3.	Compound sentences **0** = none **1** = 1 **2** = 2–3 **3** = 4 or more
3	4.	Introductory phrases or clauses **0** = none **1** = 1–2 **2** = 3–5 **3** = more than 5
1	5.	Uses coordinating conjunctions other than *and* (*but, or, nor, for, yet, so*; e.g., "I ran *but* he caught me"; "Do this *or* that") **0** = no **1** = 1–3 **2** = 4 or more
2	6.	Subject–verb disagreements **0** = more than 1 error **1** = 1 error **2** = perfect, no errors
3	7.	Sentences in paragraph(s) **0** = 1 paragraph, 1 sentence **1** = 1 paragraph, 2 or more sentences **2** = 2 or more paragraphs, 2 or more sentences in at least 1 paragraph **3** = 2 or more paragraphs, 2 or more sentences in at least 2 paragraphs
2	8.	Composition is composed of **0** = mostly fragments, run-ons, or badly constructed sentences **1** = mostly simple sentences with prepositional phrases **2** = a variety of simple, compound, and complex sentences complete with embedded clauses
1	9.	Sentences in composition **0** = are random; not well related to each other **1** = contribute to the development of topic or theme
2	10.	Names objects shown in picture **0** = none **1** = 1–3 items **2** = 4 or more items
3	11.	Number of correctly spelled words having seven or more letters (count a word only once) **0** = 0–3 **1** = 4–7 **2** = 8–14 **3** = 15 or more
2	12.	Number of words with three syllables or more that are spelled correctly (count a word only once) **0** = 0–2 **1** = 3–4 **2** = 5 or more
1	13.	Uses *a* and *an* appropriately **0** = uses neither *a* nor *an* **1** = uses *a* appropriately at least once **2** = uses *an* appropriately at least once
2	14.	Vocabulary selection **0** = sparse, immature **1** = more or less adequate **2** = rich, mature
26		**Raw Score**

Subtest 8
Story Construction

Score		Items and Scoring Criteria
2	1.	Story beginning **0** = none, abrupt **1** = weak, ordinary, serviceable **2** = interesting, grabbing
1	2.	Story somehow relates to picture **0** = no **1** = yes
1	3.	Definitely refers to a specific event occurring before or after the picture **0** = no **1** = yes
2	4.	Story sequence **0** = none; a series of random statements **1** = rambles, but has some sequence **2** = moves smoothly from start to finish
2	5.	Plot **0** = none, incoherent, statements in random order **1** = weak, meager, spotty **2** = logical, complete
2	6.	Characters show feelings/emotions **0** = no **1** = some emotion/low-affect story line **2** = strong emotion clearly evident in at least one character
2	7.	Expresses some moral or philosophic theme **0** = no **1** = yes, but weakly stated, inferred **2** = overtly, clearly stated
3	8.	Story action or energy level **0** = no action **1** = boring, tedious **2** = run-of-the-mill, predictable **3** = exciting, interesting
2	9.	Story ending **0** = none, abrupt **1** = weak **2** = logical, definite ending
2	10.	Prose is **0** = immature **1** = ordinary, serviceable, matter-of-fact **2** = artful, stylish
2	11.	Story is **0** = dull, merely describes picture **1** = simple, straightforward **2** = interesting, unique, coherent
21		**Raw Score**

121

Story 12: Judy

APPENDIX H: FLORIDA WRITES SAMPLE ANCHOR SCORING PAPER

Suppose I could spend a day with any person I choose. Who would it be? There is only one person I can think of, and that is my number one most favorite comedian in the world. Her name is Whoopi Goldberg. There are a million reasons why I picked such an incredible woman but not enough paper for me to write them all down, so I will name a couple.

Why did I choose such a remarkable woman? I choose Whoopi Goldberg because she is a fine example of how starting from the bottom doesn't mean you can't reach the top. Whoopi started off a young black female comedian working along side with Billy Crystals and Robin Williams. The trio was a big hit up until the point where Whoopi wanted to fly solo to pursue her acting career. Whoopi reminds me of myself at times because when I was younger I liked to work in groups but as time progresses I found myself wanting to be more independent and working alone. That's one of the reasons why I picked her because she independent.

Another reason why I would want to spend a day with Whoopi is because she has starred or been featured in some of the greatest movies about african-americans. My favorite movie was "The Color Purple". This movie touched my heart because it was about this african-american girl who had a sister she loved dearly. Whoopi played the sister named Seely who wasn't the prettier of the two but who was the braver one. I would have loved to have been on the set of this movie because I would have met Danny Glover and Opran Winfrey. And maybe I could have been Whoopi's sister. Who knows?

Whoopi Goldberg has millions and millions of fans. She has academy awards and nominations. She also has money and a family, but that is not why I would want to spend a day with her. I would like to ask for her advice, I would like to know can I make it in the acting career. Is there something I should focus on. Is there something she focused on. Can I move in with her, no I'm only kidding. I just want to someday actually meet my role model face to face.

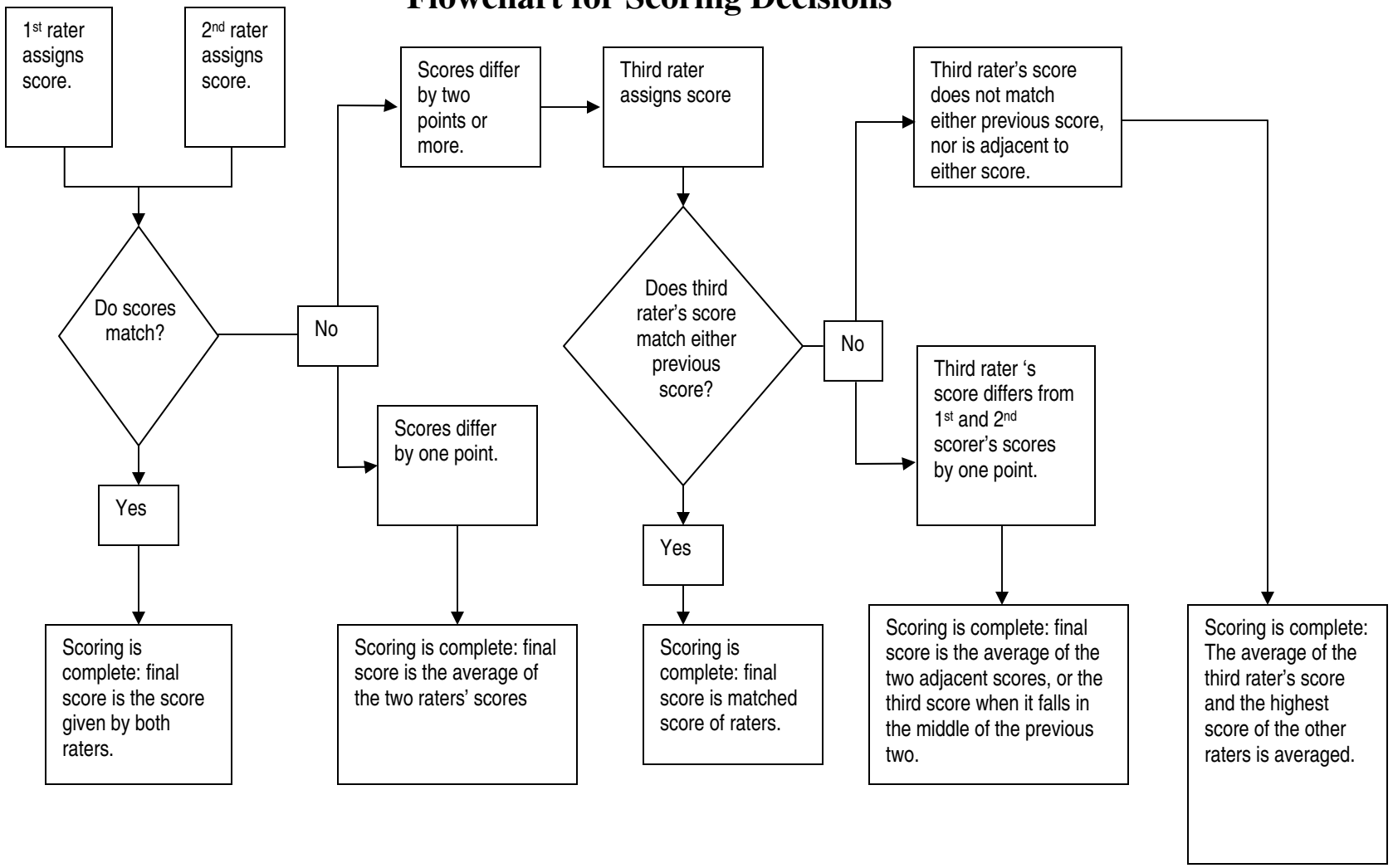
SCORE POINT 4

In this response, the writer has focused on a day with "my number one most favorite comedian in the world." An organizational pattern is apparent, and the support is consistently developed. The writer also shows some involvement with the subject: "Whoopi reminds me of myself at times because when I was younger I liked to work in groups but as time progresses I found myself wanting to be more independent and working alone" and "I would have loved to have been on the set of this movie because I would have met Danny Glover and Oprah Winfrey. And maybe I could have been Whoopi's sister. Who knows?" The third paragraph contains some specificity: "My favorite movie was 'The Color Purple'. This movie touched my heart because it was about this african-american girl who had a sister she loved dearly. Whoopi played the sister named seely who wasn't the prettier of the two but who was the braver one." Word choice is sometimes precise, and sentence structure is varied. Occasional errors in conventions do not interfere with meaning.

To receive a higher score, this response needs more consistent and specific elaboration of support and better control of conventions.

APPENDIX I: FLOWCHART FOR ESSAY SCORING DECISIONS

Flowchart for Scoring Decisions



Adapted from FCAT Handbook-A Resource for Educators 2005, pg. 72.

APPENDIX J: LESSON PLAN OUTLINE CHECKLISTS

Lesson Plan Outline/Checklist - Mind-mapping

1. **Day one**
    a. Objectives
        i. Establish importance of writing
            1. As an essential form of communication
                a. In school
                b. To become hired
                c. For promotions
        ii. Students will demonstrate an understanding of how writing effectively will help them
    b. **Discussion**
        i. Reasons for writing well
        ii. List of jobs (from Bureau of Labor Statistics)
        iii. List ways writing is used on each job
    c. Provide overview of next four days
    d. Assume that everyone is going for a regular diploma
    e. Comments on what I have read so far
    f. Acknowledge that writing is possibly the most difficult form of communication
        i. List reasons why writing is difficult
            1. uses several different parts of the brain
            2. both mental and physical
            3. even more difficult for student whose second language
            4. You have to know how to
                a. construct words and sentences
                b. organize paragraphs and essays
        ii. Kinds of writing
            1. notes
            2. letters to relatives
            3. memos to bosses
            4. essays for college entrance

g. Acknowledge that motivation and self-regulation are often obstacles for student writers
    i. List reasons for lack of motivation
        1. Low self-confidence
        2. Inadequate time to expand writing pieces
        3. Lack of emphasis on organizers
        4. Limited peer collaboration
        5. Insufficient relevance to real life
h. Elicit reasons for learning to write well
i. Review WER
j. Teacher summarizes and reviews main lesson concepts
k. Provide instruction to begin writing
l. Students write a 15 minute essay in response to a written prompt

2. **Day two**
    a. Objectives
        i. Demonstrate a clear understanding of how to interpret several prompts
        ii. Show how to find key words in prompts
        iii. Demonstrate understanding of how to transfer main idea from a prompt onto center circle of a graphic organizer
    b. Relate the goals and benefits of the study
    c. Review prior day
        i. Graduation pending
        ii. Jobs that you want
        iii. Writing is difficult
        iv. Reasons for lack of motivation
    d. Elicit reasons for learning to write well
        i. Get into college
        ii. Get a good job
        iii. Get promoted
        iv. Make more money
    e. Show examples and non-examples of good writing
    f. Discuss elements of good writing
        i. Elicit examples of the elements of good writing
    g. What are common problems for student writers?
        i. Prewriting
        ii. Drafting
        iii. Revising
        iv. Editing
    h. What are strategies that have worked for you?
    i. What are strategies that have not worked for you?
    j. Demonstrate how to underline key words in prompts
        i. Teacher metacognition of process
        ii. Read the prompt using active reading
        iii. Analyze the prompt
        iv. Underline key words
        v. List key words
        vi. Transfer key words to paper
    k. Students read prompt and underline key words
    l. Student share their ideas with peers – THINK, PAIR, SHARE
    m. Students practice analyzing and underlining key words in several prompts and share with peers
    n. Re-READ for errors
    o. Review WER **pass out additional copies**
    p. Teacher summarizes and **reviews** main lesson concepts
    q. Provide instruction to begin writing
    r. Students write a 15 minute essay in response to a written prompt

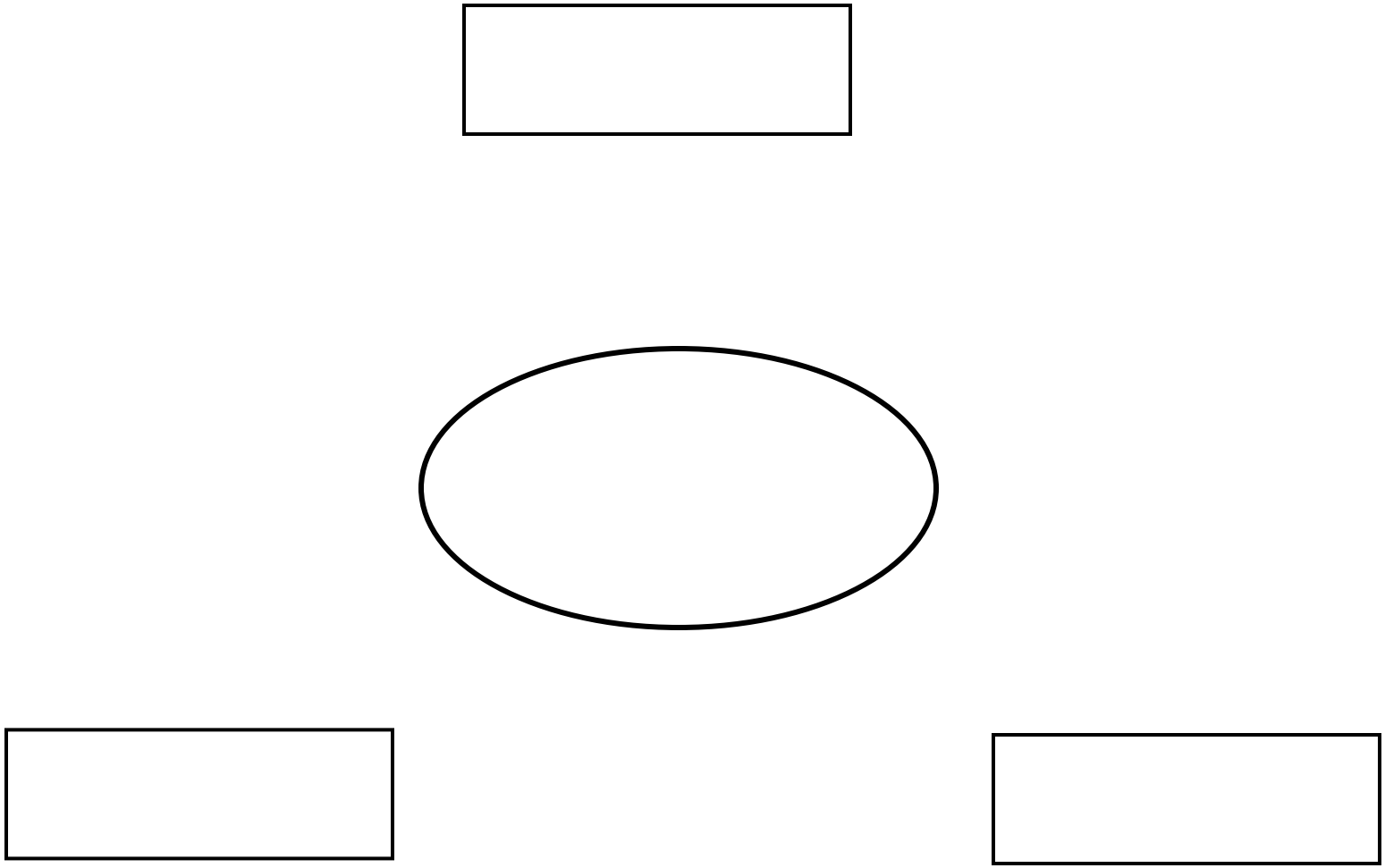
3. **Day three**
    a. Objectives
        i. Students will demonstrate organizing thoughts on a graphic organizer-Mind map
        ii. Students will demonstrate understanding of how to transfer main idea from a prompt onto center circle of a graphic organizer
        iii. Students will add branching details to mind map
    b. Review prior days
        i. Common problems for writers
            1. prewriting
            2. drafting
            3. revising
            4. editing
        ii. Analyzing prompts
            1. read whole prompt
            2. underline key words
            3. identify the topic
    c. Examples of writing
        i. Non-examples
            1. discuss main topic and items that do not match
    d. Organization
        i. Examples
            1. **Intro**, **body**, **conclusion**…since this is not a story, there is no beginning or ending
        ii. Tell you what I am going to tell you…
    e. Teacher demonstrates organization strategy using mind map
        i. Provide example on overhead
        ii. Metacognition of process
            1. take main idea from prompt – what am I writing about?
            2. Three big ideas
            3. **number the ideas on the mind map**
            4. one idea per paragraph
            5. topic sentence in each paragraph
            6. details/evidence to support the topic sentence
    f. Review WER
    g. Teacher **summarizes** and **reviews** main lesson concepts
    h. Provide instruction to begin writing
    i. Students write a 15 minute essay in response to a written prompt

4. **Day four**
    a. Objectives
        i. Students will create several mind maps in response to prompts
        ii. Students will use a mind map to organize the main ideas of a specific writing prompt
    b. Review prior days
        i. Importance of writing well
        ii. Analyzing prompts
        iii. Transferring main idea to graphic organizer
    c. Teacher demonstrates organization strategy using mind map
        i. Provide examples on overhead
        ii. Metacognition of process
            1. take main idea from prompt – what am I writing about?
            2. Three big ideas
            3. **number the ideas on the mind map**
            4. one idea per paragraph
            5. topic sentence in each paragraph
            6. details/evidence to support the topic sentence
    d. Students analyze a prompt and create a mind map
    e. Students share mind map with peers and modify for improvements
    f. Teacher provides feedback to students for their mind maps
    g. Students analyze several prompts and create mind maps
    h. Students share mind maps with peers and modify for improvements
    i. Teacher **summarizes** and **reviews** main lesson concepts
    j. Provide instruction to begin writing
    k. Students write a 15 minute essay in response to a written prompt

APPENDIX K: MIND-MAPPING EXAMPLE USED DURING INTERVENTION

Main
Idea
Numbered
Details

Mind Map



APPENDIX L: OVERHEAD TRANSPARENCIES FOR INTERVENTION

Focus

- How clearly the writing presents and maintains a main idea, theme, or unifying point.

- Staying on the topic.

Organization

- The structure or plan (beginning, middle, and end) and the relationship of one point to another.

Support

The quality of details used to explain, clarify, or define.

- Examples
- Specific details

Introduction

Tell them what you are going to tell them

Body

Tell them

Conclusion

Tell them what you told them

How many *sentences* should be in a *paragraph*?

How many *paragraphs* should be in a short *essay*?

When should transitions be used?

Prompts for Practice

Suppose you could spend a day with any person you choose. Think about why you would choose to spend a day with this person. Now explain why you would choose to spend a day with this person.

Some days are really fun or exciting. A great day can happen anywhere or anytime. Think about a great day that you have had or one that you wish you could experience. Describe what happened to make it a great day.

You have just arrived in a distant place far away. Everyone back home can't wait to hear what it is like. It could be real or imaginary. Write a description of this place to give your readers a clear picture of what it is like in this far away place.

Think about someone you know who is successful. This person could be someone you know or someone you may have never met. Explain why luck, talent, or hard work is important to success.

Imagine that you wake up one morning and discover that you are invisible. Explain what happens, who you see, and what you do on your day of invisibility.

Imagine all television stations stopped broadcasting for one week. Tell what you would do instead of watching television. Explain how this would change your life for a week.

The county owns some land that it wants to use to benefit the community. What would you advise the county to do with this land? Describe why your suggestion is a good use of the land and why your suggestion would be beneficial for the community.

Young people often try to decide what kind of work they would like to be doing as adults. Think of a job that you would enjoy having or that you feel that you could become qualified to do. Describe why you might decide on that job.

Friendship is very important to most of us. Describe the quality or qualities that are most important in a friend and tell why those qualities are important.

Describe what you think your community should do to make life more enjoyable for teenagers.

APPENDIX M: INTERVIEW MATRIX – TEACHER

Interview Matrix – Teacher

1. How did you feel about the study overall?	All for anything, writing especially that would be an advantage to them. Its great for the students. A lot of them don't write unless you make them. For the majority of them, they will not write. When they do write it's the new texting/email kind of slang. (She proctored FCAT Writes)…most students took extended time. Students have a difficult time arranging their thoughts.
2. How do you think the students felt about the study?	At first curious…anything with writing that you give them they kinda complain about it. Some were very eager…saying 'Is this going to help me with my writing? I need help in my writing.' Show me how it can help me and let's see what we can do. Some of them, this is the most writing they've ever done in their life. Some shared their work with other students after they were done. As they went on, after about FCAT, because the time of the year. I know for a fact if it was in the fall, it would have been a little bit different. Focused on FCAT and on the study at the same time and it kind of threw them off a little bit. And right after that was spring break. Once they returned from that they were like…are we still going to write? My second period after you came in they were drawing little things…drawing little circles above. Some asked questions about…how is it he said we were supposed to do? **THS: Did they take a little longer time planning? Think about each group individually.** Second and fourth…yes. With second especially I saw them think in their mind…what am I going to write? Before you came, they didn't do that at all. I didn't see any brainstorming before you came. They spent from 1-5 minutes planning after you came.
3. In what ways, if any, has the mind-mapping instruction helped your students?	They have been a little more conscious of what they are going to write. Instead of some of them, didn't read the prompt carefully. It has helped them look at it…focus on it. The main thing is it helped them get their ideas down. Before, I saw some of them stuck. I can't get it past three sentences. I don't know what else to write. They wrote more than they would have before.
4.How would you describe the effectiveness of the strategy for improving your students' written products?	I love organizers for my students. Its wonderful for my visual students…a lot of them are visual…learners. The majority of them need…this is where I put this and this and this. I believe it helped tremendously.
5. Describe how you feel about the practicality of teaching the mind-mapping strategy in your own classes.	Before you came in I used some of the thinking maps. I am open to whatever. I think that its very practical. It is something that can be used and even transferred into younger or older grades. It should be used in English classes and classes where you write a lot…daily. **Self regulation…did they get the message how important writing is?** They understood that writing does not end at FCAT writes and I stressed that as well. They made the connection to the real world about the importance of writing.
6. Do you plan to teach the strategy to your future classes?	Yes…yes (emphatically). I use a similar organizer. I saw them grasp it (when THS taught)…pretty quickly as far as the concept of the map and actually fill it out. They won't use it if it is difficult to use. I think they really did get the concept.
7. Describe any changes you would make to improve the impact of the mind-mapping strategy instruction.	The only thing I would do, and I know you were on a time line, is add more practice. Practice as a class and practice as individuals. My kids have to do it so many times over and over before they can even use it and remember to use it. Before they would take it into English class and use it there. They need to be doing it off the top of their head. Practice and repetition.
8. Do you think the kids burned out or lost interest?	Yes, but there was a lot going on this semester that had a lot to do with it. Also, from the beginning they were under the impression that it was only going to be so long. We should have said that you will be doing this for the whole semester. Period. You have to take into account spring break, the time of the year…after FCAT they don't think that they should be learning anything after that. I think it went rather well with everything that was going on this semester.

9. What could be done to improve the study?	I would have had it a different time of year…in the fall. The prompts were wonderful…especially as far as the variety of prompts. It was right on target. They loved the fantasy ones. The length of the study. But, that goes back to the time of year. If we had it in the fall, they would have been a little more focused and would have been over in a couple of months. This is something that could benefit 10th graders because that's the year that they take the FCAT writes.
10. Do you think that if we gave them feedback during the process it would have helped?	Yes…(emphatically)…that was the other thing. The students asked how they did…is someone going to tell us a score? I told you I was against that because I didn't want them to get discouraged. (because of the scores). Feedback would have helped as far as motivation. No matter what time of year. Knowing if they are doing better, worse, …

APPENDIX N: INTERVIEW MATRIX – STUDENTS

Interview Matrix - Students									
Student Number	**1. What did you think about participating in the writing study?**	**2. How has learning about the mm writing strategy helped you?**	**3. Have you ever seen a strategy like mm?**	**4. Did you spend more time planning before or after learning mm?**	**5. How do you feel the mm strategy improved your writing?**	**6. How would you describe how easy mm is to use?**	**8. Plan to use for taking writing tests?**	**9. Plan to mm for writing assignments in other classes?**	**10. Anything else?**
4424	It was fun. Good.	It helped me a lot. The web thing helped me a lot with writing paragraphs. Like not forgetting to come from one place to another. It made me stay on topic. Not jumping around.	No…well the web thing. I never really used a web. So it was a new sort of idea to use.	Yes…because then I had things to write about and I learned how to stay on topic. Each little bubble that we had to write something in I talked about that in each paragraph. With the mind map I can look back and see what I wanted to talk about. Like five minutes.	It made me stay on topic.	It was really easy. Because you could think about it right there and when you start writing a new paragraph you just have it there to look at so you won't forget what you have to write about.	Yes	Yes	Nope
4418	5:50 min. It actually helped me. Actually made me open up more. Made me write more because I kept on doing it every day. I was used to it. Sometimes I was lazy. It actually helped me a lot.	It helped me open up and write more. It was a good idea I think. It helped me think about what I was going to write. Actually, put it in order. I knew what was going to come first and second and last.	No I haven't.	Not really.	It has because it made me get used to writing more.	In a way it was kinda like hard because I didn't understand it a little bit at first. I had to think a lot. It was easier to plan after using the strategy.	Yeah	Yes	It was interesting and I liked writing down my stuff. People have to write. Everybody does. It was a good idea. The kids were all lazy at first. But then it was on a roll and everybody was doing it. At the end everybody got lazy again. And now everybody's on a roll.

4420	11:53 min. It was new. I liked trying it out. It helped.	To put on a real topic and stay on topic. I can stay on that certain prompt and not go off and start talking about different things.	I don't think so. No.	No.	Write once and stay on topic. Stay on a certain idea. It helps me draw out what I am already going to write. I like it.	Easy. Its better than what you usually do. I like putting the topic in that little bubble and then drawing the lines. That's what I like the most. Its like what I've always used.	Yes.	Yes.	I liked it. It was cool. I don't like writing. But I like actually having something to write about. Not just write about anything. It was fun.
5535	15:38 min. I believe it will help me graduate from high school and to move on to college or university. It will also help you move up in the grade level. If someone's a junior it can help them be a senior.	I believe it taught us more just in case we didn't know anything about it.	I think I'll say no to that.	No.	I think it was good. It was very good from the prompts write down. It helped me good. It will help me be a better writer in case I want to write something.	Its not that bad. Mostly think about what you want to write first before you write it down.	Oh yeah.	Yup.	Other people may understand your writing better than how it was before that. I think the others thought it was good.
5512	23:00 min. I didn't like it. It was too much work. I only write when I have to. Its hard for me to think about what subject is about.	Not much.	I've seen it. Did not use them.	I don't use it now or after you taught it.	Not much.	I don't know. Medium hard.	I don't know.	If I had to.	No. it was long and boring. I would let them write about what they want.
5532	27:10 min. It was pretty good. I liked it. Some of the prompts were pretty good.	I don't know if it helped a lot but, it helped me writer better sentences and paragraphs.	No.	Yes. 10…15 minutes (extra planning).	I think it improved it a little bit. It helped me get more out of what I was trying to write. You can write down more of what's in your head when you are thinking about the topic.	Its pretty easy.	Yeah.	Yeah.	Not really.

5534	30:20 min. It was educational. I think it improved my writing a little bit. By constant practice.	It helps you think of ideas. Plot out what you are about to write.	Yeah. Bubble maps and stuff like that. They are basically the same.	Yeah I think I did. Maybe five minutes more.	It made it more organized instead of being sloppy.	Its a lot easier. You are more able to write something than just come up with something off the top of your head.	Yeah. Definitely.	Yes.	Not really. You could have had more lessons about it. You could have someone try it out in front of the class. Show it.
6635	34:44 min. I tried to expand my mind and look at things in more literal terms. Very interesting. It showed a more broad way on how students were writing. To understand more than the basics of what we're writing. Its what details we try to throw in. Also the punctuation and stuff.	It makes you think…oh crap I only have that much time. You try to hurry, but then again you concentrate more hard.	Yeah. They were just saying you can talk about this and that and stuff in the 1st paragraph. And then you just brief from what you wrote and you extend it.	Yes. I used to be ahhh I'll just choose that subject and I'll start writing. But, now it actually takes me about 2 or 3 minutes get started. Because I plan it out.	Other's opinions and the way the writing looks. It uplifts your spirit hearing other people complement on your work. You are like yea…I did something right.	Its not really too hard. All you gotta do is set your mind to what you wanna choose. I am then based around one subject with all my writing. Sometimes I use a Venn diagram to plan out. Then other times I use tables. I do both to make sure I am equally set on what choice I want to make.	Yeah.	Oh yeah. It also makes things flow quite a bit easier too. You could get done with your work just as fast as starting it. Numbering the details helps to know which place I'm gonna put it in and what paragraph.	I enjoyed it. I've always had a thing for writing. I look for the more simple way to explain something. Or I will use a simile or metaphor express myself quite a bit more. You clicked for me.
6612	42:40 min. It was good. I got to practice on my writing. I was able to help write about things that I didn't really want to write about. Basically, get more practice.	To organize my thoughts. To write what's going to go down first and everything after that.	No.	Yeah. I re-think everything before I write. I spend 2 to 5 minutes.	It just helped me organize my thoughts instead of putting in different spots on the paper. I think of the intro and then everything comes around it. The details.	It depends how well you know the subject. If you was to tell us to write about history or something that's happened in the past, something we didn't have too much information about. It would be kinda hard.	Yeah…if I have any more in the future.	I wouldn't write it down. But, I'd do it in my head.	It was good practice. Personal experience prompts were best. You kept everything real simple.

6622	48:10 min. It was good. I expressed more things than in public.	I actually understood it more than just writing it down. Like, I knew how to said it from the beginning to the ending.	Yeah. Called it circles maps where you put a circle and then three circles on the bottom. It was a little bit different.	Yes. Before I took 10 and now I only took 5. the five minutes is spent on writing.	Pretty good. My writing is more open.	I can actually understand it more. How to put ideas on paper.	Yes.	Yes.	When I write something I don't want other teachers to get offended. They say "oh why did you write that" and then I get in trouble. I wanna be open and write something and not get in trouble. I would be in groups and then I would write something and then get in trouble. I don't want to do that. I just want to write something and they'll understand it. Liked personal prompts best.
6634	52:45 min. I like writing so…it was kind of different. I never learned it before so…	I don't really plan out things when I write. It just comes to me and then I just write. So I think the mm thing kinda made it harder for me. So I stopped doing that. I was getting a little confused.	Yeah. Bubble maps and stuff.	I tried but then I got confused. So then I just gave up and then I just wrote whatever was on my mind.	I think it confused me. It probably helps a lot of other people. But, it kinda confused me 'cause I'm used to writing just whatever's on my mind. When I plan, I don't think about things the same way as when I'm just writing.	Just write what you are going to talk about and then topics from that topic. That's it.	No.	If it was a really big, a major essay.	Basically we've been taught that same stuff since elementary school. So, we all know it already. I think that's why half the students don't like doing it. They were tired of it after a little while. It was like we were taught one thing in elem. school and then we were told another in middle. And it comes right back in HS we're confused. Liked personal interest prompts best.

APPENDIX O: STATEMENTS FROM SUBJECTIVE EVALUATORS

Mind Mapping Research
Comparison of taped interview and written overview
Completed by: Peggy Schaefer Whitby

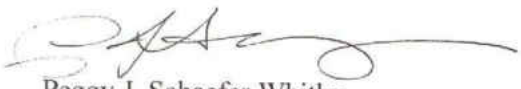
I listened to the entire audiotape and reviewed the write up of the audiotape and the corresponding themes on the Mind Mapping Research project as requested by Mr. Todd Sundeen. I found that the same questions were asked to each student, consistent probes were used with each student if needed and the information presented in written thematic format was very accurate.

Through out the interviews, Mr. Sundeen asked each student the same questions. This process assured that he was getting consistent information from the students. It sounded like the students had a good rapport with Mr. Sundeen. If they were a little nervous, he joked and made them feel at ease. At the beginning of each interview he made the student aware of the process, informed them that this was voluntary and they could discontinue at any time.

Sometimes, it was apparent that the students were not sure of the questions. When this occurred, Mr. Sundeen used consistent probes to help the students understand the questions. Once the students had an understanding they gave clear and accurate information.

The themes on the written report were very consistent with the audiotape. All students expressed a high interest in the strategy and indicated that they would use it in the future. Several of the students indicated that in was similar but more effective than other strategies they had learned in the past.

It is my belief that the written summary of the interviews accurately portrays the audiotape that I reviewed.



Peggy J. Schaefer Whitby
Doctoral Student
University of Central Florida

May 14, 2007

To Whom It May Concern:

This letter is to validate that I listened to the audio recording of the interviews performed by Mr. Todd Sundeen with various students and confirmed that his printed matrix is an accurate representation of what was said.

Sincerely,

Beth Christner

Mrs. Beth Christner

Exceptional Education Doctoral Student

University of Central Florida

bchristn@mail.ucf.edu

From: Sara Aronin
To: tsundeen@mail.ucf.edu
Date: 5/12/2007 12:46:25 PM
Subject: interviews

After reviewing your interviews of students who have used the mind mapping strategy, I beleive that you captured the student responces in your matrix. The questions and answers were almost verbatim of what was said on the CD. I found no inconsistancies of what was being said verse what was written in the matrix. Sara

As a side note, I really like 6635 responces. I smiled several times when listening to it. I am sorry that the phone kept ringing, it is always hard in school settings and I think you did a great job!

APPENDIX P: INTERVIEW QUESTION LIST FOR TEACHER

Teacher Interview Questions

1. How did you feel about the study overall?

2. How do you think the students felt about the study?

3. In what ways, if any, has the mind-mapping instruction helped your students?

4. How would you describe the effectiveness of the strategy for improving your students' written products?

5. Describe how you feel about the practicality of teaching the mind-mapping strategy in your own classes.

6. Do you plan to teach the strategy to your future classes?

7. Describe any changes you would make to improve the impact of the mind-mapping strategy instruction.

8. What could be done to improve the study?

APPENDIX Q: INTERVIEW QUESTION LIST FOR STUDENTS

Student Interview Questions – Student Number

1. What did you think about participating in the writing study?

2. How has learning about the mind-mapping writing strategy helped you?

3. Have you ever seen a strategy like mind-mapping before? Describe it please.

4. Did you spend any extra time planning to write than you did before learning mind-mapping?

5. How do you feel the mind-mapping strategy improved your writing, if at all?

6. How would you describe the ease of using the mind-mapping strategy?

7. Do you plan to use the strategy for taking writing tests?

8. Do you plan to use the mind-mapping strategy to help you with your writing assignments in other classes?

9. Is there anything else that you would like to say about your participation in the writing study?

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