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THE EFFECTS OF SYNCHRONOUS ONLINE COGNITIVE STRATEGY INSTRUCTION
IN WRITING FOR STUDENTS WITH LEARNING DISABILITIES

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Child, Family, and Community Sciences
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ABSTRACT

This study investigates the effects of self-regulated strategy development (Harris, Graham, & Mason, 2009) for cognitive strategy instruction in persuasive writing (POW+TREE) using a synchronous online learning environment for special education students. Participants are four adolescent students with learning disabilities (LD) with low achievement in writing. One undergraduate research assistant delivered instruction using a synchronous online platform (e.g., Adobe Connect) in conjunction with collaborative writing software (e.g., Google Docs word processing). A multiple probe across participants design was used to demonstrate a functional relationship between instruction and number of essay elements (EE). Number of correct minus incorrect word sequences (CIWS) was used as a secondary dependent measure. A non-experimental pre-post design was used to compare the mean performance of holistic writing quality scores and standard scores from the TOWL-3. All four participants gained EE and CIWS from baseline to treatment and demonstrated standard score changes from pre to post-test on the TOWL-3. Implications for writing instruction for students with LD using online learning environments are discussed.

This dissertation is dedicated to my husband, Mark Jacob.

Every time and all the time.

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Teachers have had a strong impact on my life. In second and sixth grade, Miss Gray developed my mindset as an inquisitive thinker. In college, Maria Colavito and Antonio DeNicolas turned my education on its side, giving me the ability to see the limits of my own perspective. During my doctoral studies, a whole committee of educators helped me lift my perspective to think conceptually about education. Lisa Dieker, Wilfred Wienke, and Jeffrey Kaplan each posed questions that I could not brush aside, resulting in stronger methods of research. Both Lisa Dieker and Wilfred Wienke assumed much appreciated roles as mentors, parents, and friends (sometimes all in a five-minute period!). Finally, Trey Vasquez, who spent hours upon hours explaining the minutiae of research design, entertaining my crazy research ideas, and plotting my future career path receives my most heartfelt gratitude. His high expectations pushed me to the edge of the cliff – but his thoughtful nature did not let me fall off!

While my teachers enriched my academic life, my loved ones waited patiently for me to come home. Upon the start of my doctoral studies, a senior doctoral student advised, “Just go ahead and say good bye to your friends and family now, because you will not see them until you have your PhD.” How true that advice was. Thankfully, there were others like me, huddled over statistics books, nursing lattes, and questioning our decisions to take the PhD path. Selma, Jackie, and Tracy provided essential moments of sanity and hilarity. During this time, my family caught fleeting glimpses of me— my mother must have wondered if I would ever have time visit again, and my father, sisters, and stepmother patiently waited for me to surface for air. However, in truth, I could have not completed this dissertation without the patience and support of my husband, who is my cheerleader, life coach, lover, and best friend.

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LIST OF ACRONYMS

AYP – Adequate yearly progress

ASI – Adobe Systems Incorporated

CCSI – Common Core Standards Initiative

CIWS – Correct minus incorrect word sequence

CSI – Cognitive strategy instruction

CSI-W – Cognitive strategy instruction in writing

DARE – Develop topic sentence, Add supporting ideas, Reject argument, End with conclusion

ESEA – Elementary and Secondary Education Act

FCAT – Florida Comprehensive Assessment Test

FLDOE – Florida Department of Education

IDEA – Individuals with Disabilities Education Improvement Act

iNACOL - International Association for Online K-12 Learning

ITPA – Illinois Test of Psycholinguistic Abilities

LD – Learning disabilities

NAEP – National Assessment of Educational Progress

NCLB – No Child Left Behind Act (also known as ESEA)

NCTE – National Council of Teachers of English

NCW – National Commission on Writing

NJCLD – National Joint Committee on Learning Disabilities

OCWE – Online collaborative writing environments

OWL LD – Oral and Written Language Learning Disability

PLAN – Pick goals, List ways to meet goals, And, Make notes

POW – Pick my ideas, Organize my notes, Write and check

POWER – Planning, Organizing, Writing, Editing, Revising

PND – Percentage of nonoverlapping data

PND-P – Percentage of nonoverlapping data of projected trend line

SOCSI-W – Synchronous online cognitive strategy instruction in writing

SRSD – Self-regulated strategy development

STOP – Suspend judgment, Take a side, Organize ideas, Plan more as you write

TOWL-3 – Test of Written Language, 3rd Ed.

TREE – Topic sentence, Reasons (3 or more), Examine Reasons, Ending

USDOE – U.S. Department of Education

WWC – What Works Clearinghouse

CHAPTER ONE: INTRODUCTION

The ability to write is valued by American society. Writing has been described as a “threshold skill”, which opens educational, occupational, and societal doors to opportunity (National Commission on Writing [NCW], 2003, 2004). In school, students earn course grades based on written products. Students entering college are evaluated on the ability to generate quality written compositions (College Board, 2010). Writing is also described as a gateway for employment and promotion (NCW, 2004). In 2004, NCW released survey results from 120 major American corporations with the purpose of evaluating current writing practices in corporations across America. Approximately 70% of businesses reported that two-thirds of their salaried employees have some writing responsibility. Technical reports (59%), formal reports (62%), and memos and correspondence (70%) were reported as “frequently” or “almost always” required in the workplace (p. 4). Over half of companies reported taking writing skills into account when considering employees for promotion. In today’s society, emailing and text messaging have become common means of communication. Lack of writing skills can be a barrier to participation in educational, occupational, and societal activities and opportunities.

In the United States education, including reading and writing skills, is emphasized in the legislation. The country’s largest piece of educational legislation, the Elementary and Secondary Education Act (ESEA), originally authorized by President Johnson, was reauthorized in 2001 by President Bush and renamed the No Child Left Behind Act (NCLB). The change in name was accompanied by increased accountability for public schools in the form of standards-based reform and standardized testing, including assessment of writing.

The NCLB legislation emphasized test score reporting requirements from traditionally underperforming groups, such as students with disabilities, minorities, and students with limited English proficiency. Schools were mandated to make Adequate Yearly Progress (AYP) measured by state-level standardized tests; each state identified standards and assessments to measure student progress. Prior to graduation, students in many states are required to score adequately on standardized writing tests (e.g., writing subtests on Florida Comprehensive Assessment Test[FCAT]). Yet, state level standardized tests may erect barriers to completion for students with disabilities, who often score below their non-disabled peers (College Board, 2010; Florida Department of Education [FLDOE], 2010; Salah-Din, Persky, & Miller, 2008).

Significance of the Problem

Students with disabilities will be increasingly held to higher standards in writing as evidenced by federal legislation. In 2004, the reauthorization of the Individuals with Disabilities Education Improvement Act (IDEA) reaffirmed the rights of students with disabilities to participate in the general education curriculum in the least restrictive environment. Consequently, students with disabilities are tested alongside their peers and must earn adequate scores on standardized tests of writing in order to graduate. New federal initiatives are calling for all graduates to be college or career ready. The Obama administration has released a federal report, A Blueprint for Reform, detailing proposed objectives for the reauthorization of ESEA (United States Department of Education [USDOE], 2010). The proposed objectives call for K-12 education based on college and career ready standards, supported by assessments aligned to

standards, to ensure “that a student will not need to take remedial coursework upon admission to a postsecondary institution” (p.8).

As a means of ensuring students are ready for careers and college upon high school graduation, educators and stakeholders in many states across the nation have joined together to create a common set of educational standards for all students (Common Core Standards Initiative [CCSI], 2011). The CCSI is currently supported by 46 states and the District of Columbia. English Language Arts are highly emphasized and infused across content areas in the Common Core Standards. By graduation, students are expected to demonstrate proficiency in writing for a variety of purposes, including informative/explanatory, persuasive, and narrative genres. Furthermore, students are required to write persuasive and explanatory essays in discipline-specific content areas, such as science and social studies (CCSI, 2011).

The federal focus on college and career ready standards portrayed in the CCSI reflects the national interest in improving student literacy. However, in spite of continued emphasis in the form of national standards and assessment, many students still struggle with writing. American high school students are not meeting societal expectations for effective written communication according to recent reports. Results from the most recent National Assessment of Educational Progress (NAEP) of 2007 revealed that only 24% of high school seniors scored at or above the Proficient level of achievement on writing, while only 5% of high school seniors with disabilities scored at or above the lesser Basic level of achievement (Salahu-Din, Persky, & Miller, 2008). Results from the NAEP suggest that only 1 in 20 high school seniors with disabilities were proficient in writing at the high school level in 2007.

Other standardized assessment results paint a similar picture. Data from 2006, published in 2010, the College Board introduced a writing assessment as part of the SAT achievement test used as an entrance requirement by colleges across America. Since instituting the test in 2006, writing scores have flagged, decreasing 5 points on a 200 to 800 point scale. In 2010, writing scores for students with disabilities were 11 points lower on a 200 to 800 point scale than their peers who did not receive accommodations. The College Board also collected data on students who self-reported “disabling conditions” but did not receive accommodations; students reporting “disabling conditions” scored 26 points lower than students who did not receive accommodations (College Board, 2010). Floridian students with disabilities scored lower in the writing portion of the 2010 FCAT, a standardized test of academic achievement, than peers without disabilities (FLDOE, 2010). Students with Specific LD in Florida, the largest disability category, were provided accommodations, yet still scored 10% lower than their peers without disabilities (2010). While researchers question the validity and reliability of standardized writing assessments for students with special needs (Graham & Harris, 2011), clearly many high school students, especially those with disabilities, are experiencing difficulty developing mastery of written expression skills.

Difficulty in writing can lead to challenges with successfully passing exit exams often required for graduation from high school. Exit exams test subjects such as mathematics, reading, and writing. In tests of writing, students are often required to write persuasive essays on exit exams (Zabala, 2007). In 2008, 26 states required students to take exit exams, including students with disabilities (National Center for Learning Disabilities, 2010).

Results from state and national standardized tests provide impetus for a closer look at current writing instruction practices (College Board, 2010; FLDOE, 2010; Salah-Din et al., 2008). Kiuahara, Graham, and Hawken (2009) conducted a national survey of randomly-sampled secondary teachers of science, social science, and language arts (N = 361). Approximately 43% of language arts teachers reported they were “not adequately prepared” to teach writing, and 71% of all teachers, including science, social science, and language arts teachers, reported they received “no or minimal writing instruction” (p. 153). Although 95% of teachers believed writing was an “essential skill” (p.155) for students after high school, only 56% of teachers reported a belief that students were taught the writing skills in high school needed to be successful in the workplace. Based on survey results from teachers, it appears opportunities for complex writing as required by class assignments were lacking. When questioned about writing activities in school, 41% of teachers reported assigning complex writing tasks, such as persuasive essays, once a year or never. Kiuahara et al. (2009) found teachers were more likely to assign simple writing tasks, such as short answer responses and worksheets, on a weekly basis.

This lack of time spent on writing instruction is reflected in student data as well. In 2007, 59% of twelfth graders taking the NAEP in 2007 reported writing a persuasive essay or letter a few times a year or less (Salahu-Din et al., 2008). Applebee and Langer (2006) analyzed NAEP reports over time (1998 through 2004) and reported that a third of students in grade 12 wrote analytical essays at most a few times a year, stating the lack of time spent writing analytical essays “is problematic since it is this type of more complex writing that is needed for advanced academic success in high school as well as college coursework” (p. 8).

Writing Instruction for Students Who Struggle with Writing

High-quality instruction can support students who struggle with meeting high standards of college- and career-readiness in writing. The reauthorization of ESEA (2001) and IDEA (2004) both emphasized the use of high quality instruction grounded in evidence-based practices. Consequently, federal regulation has created a demand for high quality instruction based on evidence. To facilitate the dissemination of high quality, evidence-based practices, the USDOE commissioned the What Works Clearinghouse (WWC), providing a “central and trusted source of scientific evidence for what works in education” (2011, para. 1). However, the WWC identifies only one instructional strategy that meets the criteria as an effective intervention for struggling writers. The paucity of writing interventions presented by WWC may be due to the stringent requirements for research required for inclusion in the federal database. Nevertheless, researchers have collected a large base of evidence for a variety of struggling writers at varied ages, including students with disabilities (Gersten & Baker, 2001; Graham & Perin, 2007; Rogers & Graham, 2008).

Struggling Writers and Students with Learning Disabilities (LD)

To develop instruction effective for struggling writers, an awareness of the common reasons why students struggle with writing is necessary. Writing is a complex activity, which has been likened to the act of juggling (Berninger, 1999). Effective writers engage in synchronized planning, composing, and revising, activities that may not take place in sequential order (Bos & Vaughn, 2006; Flower & Hayes, 1981; Flower, Schriver, Carey, Haas, & Hayes, 1989). Successful writers effectively orchestrate the acts of planning, composing, and revising

during the writing process (Bos & Vaughn, 2006). In a seminal study, Scardamalia and Bereiter (1987) identified differences between mature and immature writers, finding that immature writers used a *knowledge-telling* approach characterized by memory search and idea-generation based on cues gleaned from the key words of the writing topic with little emphasis on relevancy. In contrast, mature writers used the *knowledge-transforming* approach that embedded the knowledge-telling approach, but expanded on the process by organizing ideas based on relevancy and overall writing goals. Mature writers simultaneously created, revised, or removed goals for writing (Scardamalia & Bereiter, 1987). The challenging act of writing places a heavy cognitive load on writers, requires attention to task, and the ability to self-regulate during the writing process (De La Paz, 2007; Graham & Harris, 1989a; Graham & Harris, 2009; Harris, Graham, & Mason, 2003).

Not surprisingly, some students struggle to meet the complex demands of writing, such as students with LD. The ability to write is one of the major areas impacted for students with LD (Berninger, Garcia, & Abbot, 2009). The mental operations involved in planning, writing, and revising present challenges for students with LD as they attempt to manage the recursive activity of writing (Graham & Harris, 2009). Students with LD have difficulty identifying effective strategies to meet the complex demands of writing; correspondingly, if they become frustrated while writing, they also struggle with using writing strategies to mediate their performance, influencing further motivation for writing (Harris et al., 2003; Graham & Harris, 2009). Students with LD are characterized by not only difficulties with language, but also impairment in attention, executive function, and working memory (Berninger et al., 2009; Wong, 1978).

Students with LD face challenges across the spectrum of writing activities, from higher order cognitive processes involved in planning and composing, to lower order mechanical revisions (Newcomer & Barenbaum, 1991; Wong, Butler, Ficzero, & Kuperis, 1996). From the outset, students with disabilities approach writing tasks differently than their peers without LD. Students with LD generally begin writing as soon as they are given the assignment and do not seem to know the behaviors which typically comprise planning to write (MacArthur & Graham, 1987). Furthermore, even when prompted, struggling writers and students with LD often spend less than one minute planning (MacArthur & Graham, 1987). Students with LD also typically lack an understanding of the structural components common across essay types. For example, when writing persuasive essays, students with LD respond to the posed questions with a “yes” or “no” and provide only a brief explanation, often with no concluding statement (Graham, 1990). Furthermore, this population of students struggle with sequencing and organizing writing, often requiring explicit instruction to develop proficiency (Nelson, Roth, & Van Meter, 2009). Finally, after completing their writing, students with LD generally view the revision process only as an opportunity to fix mechanical errors (Scardamalia & Bereiter, 1987).

As students progress through school, the expectations for written expression increase in complexity; students must transition from learning writing as a core subject in the elementary school years, to using writing as a method for demonstrating knowledge in secondary school (Berninger, 2009). As time dedicated to explicit writing instruction decreases in quantity, students with LD are left to rely on their own strategies as they communicate increasingly complex content knowledge (Berninger, 2009).

Research-based Writing Interventions for Students with LD

Fortunately, writing skills may be shaped and improved-upon with quality instruction (e.g., Englert, Raphael, Anderson, Anthony, & Stevens, 1991; Gersten, Baker, & Edwards, 1999; Graham & Harris, 2003; Graham & Perin, 2007; Rogers & Graham, 2008; Schumaker & Deshler, 2009). The demands of writing tasks increase significantly in fourth grade and above (Berninger, 2009). Furthermore, researchers caution that without quality instruction, students may continue to write at a fourth grade or lower level throughout high school (Warner, Schumaker, Alley, & Deshler, 1980).

One type of instruction with demonstrated positive effects on written compositions of adolescents with LD is explicit strategy instruction (Englert et al., 1991; Harris et al., 2003; Schumaker & Deshler, 2009). Numerous researchers have developed programmatic lines of research into explicit strategy instruction for struggling writers, including those with LD (De La Paz, 1997, 1999; Englert et al., 1991; Englert, Yong, Dunsmore, Collings, & Wolbers, 2007; Harris & Graham, 1985, 1992, 1996; Schumaker & Deshler, 2009). Researchers have developed explicit strategies for planning (De La Paz, 1997; Englert et al., 1991; Graham, MacArthur, Schwartz, & Page-Voth, 1992; MacArthur & Graham, 1987), composing (Welch, 1992; Wong et al., 1996), and revising writing (De La Paz & Graham, 1997; Graham, MacArthur, & Schwartz, 1995; Wong et al., 1996), often time supporting learners through the use of instructional scaffolds (Englert, Manolo, & Zhao, 2004; Englert, Wu, & Zhao, 2005; Englert et al., 2007; Wong, 1980; Wood, Bruner, & Ross, 1976).

Schumaker and Deshler (2009) reviewed findings from 30 years of their research on writing instruction for adolescents with LD. The researchers noted that students with LD, although initially disadvantaged in writing, could achieve writing scores commensurate with their peers without disabilities after explicit strategy instruction. However, they cautioned that outcomes equal to peers without disabilities were achieved in small group instruction that provided ample opportunities for error correction and feedback. When students with LD were instructed in general education settings with less opportunities for error correction and feedback, their writing performance, although significantly different from students in control groups, was lower than that of their peers without disabilities. Schumaker and Deshler cautioned that instruction in general education settings does not allow for the individualized feedback and error correction which can take place in small group or one-on-one settings.

Additionally, instruction in explicit strategies has limited effect on writing outcomes, because factors such as self-motivation and self-regulation are required to execute strategies (Harris et al., 2003). Self-regulated strategy development (SRSD) is one framework that can be used to instruct struggling writers in the use of strategies (Graham & Harris, 2003; Graham & Perin, 2007; Rogers & Graham, 2008). Developed and refined by Harris and Graham (1985, 1992, 1996) the method is comprised of the following steps which can be used with any specific writing strategy: (a) develop background and knowledge for strategy, (b) discuss the purpose and benefits of the strategy, (c) model the strategy, (d) memorize it (steps using mnemonics), (e) support it with teacher or scaffolding in which assistance is provided then gradually reduced and students gradually memorize strategy then use it on their own, and (f) provide independent practice. Simultaneously with instruction, students observe then practice self-regulation actions

such as goal setting and self-talk to reinforce their improved performance (Harris et al., 2003). Each phase within the SRSD approach is well-matched to the characteristics of students with LD, providing supports in the following areas: (a) working memory deficits (e.g., mnemonics and training to fluency), (b) independent practice is provided and supports are gradually faded so that student internalizes the strategy, and (c) specific strategies are taught which make explicit the structure of a well-written essay (Harris et al., 2003).

Technology Supporting Writing Activities of Students with LD

While several students with LD struggle with language impairments in the area of writing, technology is in place today that may support fluent writing. In a review of current technology for writing, MacArthur (2009) indicated word processors with spell-check and grammar-check, word prediction software for severe spelling problems, and text-to-speech generators can support struggling writers. Wood, Bruner, and Ross (1976) defined scaffolding as:

A process that enables a child or novice to solve a problem, carry out a task, or achieve a goal which would be beyond his unassisted efforts. This scaffolding consists essentially of the adult ‘controlling’ those elements of the task that are initially beyond the learner’s capacity, thus permitting him to concentrate upon and complete only those elements that are within his range of competence (p. 90).

Scaffolds can also be provided in the traditional form of tutoring from other people or can be mediated through some type of tool (Pea, 1993; Wood et al., 1976). Examples of scaffolded supports for writing include checklists, mnemonic devices, concept pattern organizers (Marzano, Gaddy, & Dean, 2000), and technology-enabled procedural prompting environments (Englert et al., 2004; 2007).

Matching Strategies and Technologies to Students with LD

One way to enhance writing instruction with technology is to use online environments which capitalize on video-conferencing, synchronous text-based chat features, and real-time editing capabilities (e.g., Adobe Connect video conferencing software and Google Docs collaborative writing software). In Rideout, Foehr and Roberts (2010) *Generation M²* report for the Kaiser Family Foundation, it was estimated 74% of young people have Internet access at home. Furthermore, the online environment is increasingly being used for in K-12 public educational settings. In a study of distance education in K-12 public schools, Zandberg and Lewis (2008) indicated “rapid technological developments and widespread availability of the Internet in public schools has made online education increasingly accessible and common among schools and districts” (p.70). Between 2003 and 2005, the overall estimated number of technology-based distance education courses enrollments increased 60%. In 2004-2005, over one-third of public high schools in the United States had students enrolled in technology-based distance education courses. It seems that online environments are increasingly becoming a part of academic life. Further, online environments provide unique advantages for educators seeking to engage struggling writers in explicit writing instruction: (a) instruction delivered in an

environment which relies heavily on receptive and expressive communication in written form (i.e., online “chatting” which supports video conferencing), (b) first-hand experience with emerging technologies for written communication (i.e., Google Docs), (c) ability to engage students using media-rich instruction to maximize learning, and (d) access to skilled teachers beyond the students’ geographic boundaries.

Over the years, researchers in the field of special education have accumulated a large body of evidence-based practices that have demonstrated positive effect on student writing performance in face-to-face learning environments (Gersten & Baker, 2001; Graham & Perin, 2007; Rogers & Graham, 2008). However, the same research base does not exist for online learning environments (Smith, Clark, & Blomeyer, 2005). Means, Yukie, Murphy, Bakia, and Jones (2009) conducted a meta-analysis evaluating evidence-based practices in online learning for the USDOE and identified only five controlled studies of K-12 online learning between 1996 and 2008, stating the collection comprised “a very small number of studies, especially considering the extent to which secondary schools are using online courses and the rapid growth of online instruction in K-12 education as a whole” (p. 54). Only one study examined the effects of writing instruction in an online environment for K-12 students with LD (Means et al., 2009). Yet, leaders in the field call for increased technology integration with writing. Technology integration is one of four critical issues set forth by the National Commission on Writing (NCW) in the 2003 report *The Neglected R: The Need for a Writing Revolution*. The NCW specifically recommends integrating technology into teaching and learning of writing.

Purpose

Therefore, the purpose of this study was to investigate the effects of strategy instruction in persuasive writing via an online environment on the academic performance of students with LD. Based on recommendations from the NCW (2003) coupled with increased national demands for writing (CCSSI, 2011), emerging technologies were used to support on-demand persuasive writing tasks.

Research Questions

The purpose of this study was to investigate the effects of synchronous online cognitive strategy instruction in writing (SOCSI-W) on the academic performance of students with LD. Based on recommendations from the NCW (2003) coupled with increased national demands for writing (CCSSI, 2011), emerging technologies were used to support on-demand persuasive writing tasks. The writing of students with LD was evaluated using a multiple baseline design across four participants, using essay elements (i.e., the parts of a persuasive essay) as the primary dependent measure, complimented by correct minus incorrect word sequences to determine changes in writing quality. Students with low vision were not included as participants. Self-regulated strategy development was used as the framework for explicit strategy instruction via a video-conferencing software technology.

The research questions were as follows:

1. To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase the number of persuasive essay elements for students with learning disabilities (LD)?
2. To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase number of correct minus incorrect word sequence (CIWS) for students with learning disabilities (LD)?
3. To what extent will SOCSI-W increase performance on a mean holistic quality score of a persuasive essay for students with LD?
4. To what extent will SOCSI-W change standard scores for students with LD as measured by the Test of Written Language – 3?
5. How will students and teachers rate the importance of the goals, procedures, and effectiveness of SOCSI-W?

CHAPTER TWO: REVIEW OF LITERATURE

This literature review examines aspects of writing instruction for students with learning disabilities (LD) in K-12 online learning environments. The literature review is organized in four sections. In the first section, the historical development of writing instruction in the United States is explored, examining a current theoretical framework of writing development. The focus is then turned to students with LD, tracing the historical and etiological origins, and examine the moderating effects of this disability on written expression. In the third section, the explosive growth in K-12 online instruction is considered along with current trends and issues of accessibility, and emphasizing emerging technologies that show promise for supporting online writing instruction for students with LD. The review concludes with a systematic review of the research literature related to online writing instruction for students with LD.

Historical Development of Writing Instruction in the United States

Although the origins of writing can be traced back to ancient Sumerian cuneiform and Egyptian hieroglyphics, the current investigation of writing instruction begins in seventeenth century colonial America. Puritan colonists seeking to achieve a cohesive community guided by ethics and morals educated young children with primers, books written with the purpose of communicating religious and moral values (Harris, 1690; Monaghan, 2005). *The New England Primer*, edited by Harris in 1690, not only served as a religious indoctrination for young children entering society, but also provided a coherent model for the alphabet and spelling. Harris's primer contained among its contents the Lord's Prayer, The Ten Commandments, and an alphabet poem with religiously-themed verses used as a memorization aid for letters, such as "A

is for Adam” (p. 1). Of special importance for writing instructors, the alphabet was printed in its entirety, and common words were displayed, grouped according to number of syllables, making the *New England Primer* the primary source for writing instruction of young children at the time (Applebee, 1974; Monaghan, 2005).

In 1783, the *New England Primer* was joined by another text authored by Noah Webster, a schoolteacher in Orange County, New York. His book *The First Part of a Grammatical Institute of the English Language*, which came to be known as the *Blue-Backed Speller* in reference to its blue cover, was more secular in nature than the *New England Primer*. Webster created the book “to furnish schools in this country with an easy, accurate and comprehensive system of rules and lessons for teaching the English language” (p. viii). Webster dedicated limited space to writing instruction; the only references to writing were made in terms of the correct use of characters such as exclamation points and parentheses. Webster’s *Blue-Backed Speller* was widely used in schoolhouses across America for instruction in writing, as well as reading and spelling (Applebee, 1974; Monaghan, 2005). Other resources for writing were developed, and although the primary focus was on reading instruction, writing instructors used the books as guides for spelling and penmanship (Applebee, 1974). *The McGuffey Eclectic Reader Series* was a six volume basal reading series with an emphasis on reading aloud, and instruction in writing was primarily restricted to spelling and penmanship (McGuffey, 1836).

Although early writing instruction across schools emphasized penmanship, spelling, and grammar, Applebee (1974) opined that the field of writing instruction was relatively young, emerging in its modern form only as recently as the 1890s. Prior to this time, the English

language as a formal study was not recognized, with scholars preferring that students study classical works in Latin or Greek (Applebee, 1974). This emphasis changed in 1874, when Harvard University created the first college entrance exam in English: “A short English composition is required, correct in spelling, punctuation, grammar, and expression...Subject: The story of the Caskets in the *Merchant of Venice*; Or, the story of Shakespeare’s *Tempest*; Or, the story of Rebecca in Scott’s *Ivanhoe*” (p. 215). Consequently, instructors were required to prepare students to write in English.

Although English may have been viewed as less rigorous than its classical Latin and Greek cousins, English teachers still sought to develop quality standards of instruction for the subject of English. Hinsdale, a former school system superintendent, authored the first English teacher preparation text in the United States entitled *Teaching of the Language Arts: Speech, Reading, and Composition* (1895). Hinsdale’s preparation for teachers took the form of general advisement in the area of writing instruction, but offered little in the way of specific strategies for struggling writers beyond strategies for motivation “In composition it is peculiarly important to enlist the interest and pleasure of the pupil” (1895, p. 117). Instead, Hinsdale focused on writing products rather than processes and enumerated four types of composition: narrative, descriptive, exposition, and argumentation (i.e., persuasive essays). Teachers were encouraged to teach young students narrative abilities first, later delving into descriptive types of composition, then argumentation as students matured. Hinsdale’s emphasis was on the final products of the written essay, with limited mention of processes, in which teachers were advised essays should be “a thought-out composition, having a beginning, middle, and an end” (p. 120).

A focus on elements of written products, rather than actual strategies for writing, persisted into the 20th century. Writing experts of popular texts, like Strunk (1918), Strunk and White (1959), and Lucas (1955) offered guidelines for writing in the form of maxims to be followed. To organize one's writing, Strunk (1918) advised "Avoid a succession of loose sentences" (p. 31) and on clarity, Lucas (1955) wrote "...how is clarity to be achieved? Mainly by taking trouble; and by writing to serve people rather than to impress them" (p. 76). Authors of writing instruction manuscripts provided general guidelines for the final products of writing (Lucas, 1955; Strunk, 1918; Strunk & White, 1959); however, the process of planning, composing, and revising was not examined. Struggling writers would not receive guidance on strategies for composing until the latter half of the 20th century, as new thoughts about writing began to emerge.

The face of writing instruction changed after Flower and Hayes (1981) introduced their cognitive process-writing philosophy. The work of Flower and Hayes coincided with the constructivist movement emerging concurrently in educational circles (Graham & Harris, 1994; Resnick, 1987). Constructivism was based on the premise that learners understood and applied knowledge best when actively involved in its construction; as such, learning activities were structured to elicit learner discovery of knowledge and strategies (Resnick, 1987). Cognitive researchers were interested in how learners constructed their knowledge (Flower & Hayes). The innovative think-aloud protocol of Flower and Hayes shed light on the recursive, cognitive processes that writers engaged in while writing. Contending that the act of writing was comprised of complex cognitive processes orchestrated by writers, they questioned the linear model of writing in which writers engaged in distinct stages of pre-writing, writing, and revising,

and proposed an overlapping and recursive model in which the processes of planning and revision were unified with writing. With colleagues, Flower and Hayes refined the cognitive processes model over time, focusing on planning skills used by novice and expert writers. Flowers, Schriver, Carey, Haas, and Hayes (1989) used think-aloud protocols to identify strategies used by writers, finding that expert writers created goals, monitored progress on their goals, and consolidated writing goals and ideas into a freshly integrated whole. Their focus on process over product laid the groundwork for later researchers.

The work of Flower and Hayes fueled the process approach to writing instruction. Process writing, characterized by a constructivist orientation, provided opportunities for students to construct knowledge about writing while conferencing with teachers and peers and often took place in writing workshops (Graham & Harris, 1994; Troia, Lin, Monroe, & Cohen, 2009). Novice writers responded to topics which were meaningful, took part in mini-lessons to learn strategies, used concept pattern organizers (Marzano et al., 2000) to plan their writing, composed many drafts, and generated revisions based on feedback from peers and teachers (Troia et al., 2009). The process writing approach placed the child in the role of professional writer, while simultaneously highlighting the social act of writing (Britton, 1978).

The constructivist, process-writing instructional approach stood in stark contrast to the maxims and rules proffered by writers and teacher educators over a century ago. Writing instruction had expanded from cursory comments in early colonial reading primers, to teaching practices based on theoretical frameworks and research. Furthermore, the process-writing approach gained wide national support and was promoted by the National Writing Project

(Pritchard & Honeycutt, 2005) and researchers of writing (Atwell, 1987; Englert, 1992; Graves, 1983; Hillocks, 1984); however, some special education writing researchers questioned whether the process approach was effective for children with special needs (Graham & Harris, 1994; Troia et al., 2009). Graham and Harris (2000, 2009) proposed a theoretical framework of writing development accounting for processes of writing, informed by almost thirty years of research into writing and writing disabilities. Graham and Harris theorize four components of writing development exist: strategic behavior, skills, knowledge, and motivation (Graham & Harris, 2009). When viewed in unison, these constructs provide a framework through which to view writing and writing disabilities. Each construct will be examined along with the research base supporting its relevancy.

Strategic Behavior

Expert writers are thought to employ high levels of strategic behavior (Graham & Harris, 2000, 2009). Composing is often a self-planned and self-sustained activity in which the individual regulates his or her attention (Graham & Harris, 2000). Cognitive models of writing, such as those presented by Scardamalia and Bereiter (1987), Flower and Hayes (1981) and Flower et al. (1989) suggest that self-regulated, strategic behavior is employed during composing. Scardamalia and Bereiter investigated skilled (e.g., college level) and developing (e.g., elementary level) writers and found differences in ability to describe knowledge of content in writing. They theorized that developing writers used a knowledge-telling approach characterized by memory search and idea-generation based on cues gleaned from the key words in the writing topic. Developing writers generated ideas in a stream of consciousness method

with little emphasis on relevancy. In contrast, skilled writers seemed to rely on a knowledge-transforming approach that embedded the knowledge-telling approach, but expanded on the process by organizing ideas based on relevancy to overall writing goals. As new ideas were encountered in the knowledge-telling process, they simultaneously created, revised, or removed subgoals for writing. Scardamalia and Bereiter (1987) suggested skilled writers engaged in a problem-solving approach as they searched in memory for information, and the structure of the plan for writing changed as goals and subgoals were created, resulting in writing that was more elaborate and organized. This finding was echoed by Flower et al. (1989) who also asserted expert writers strategically create and monitored goal as they write.

Graham and Harris (2000) identified a variety of strategies for writing. These strategies include goal setting and planning (e.g., establishing writing goals and strategies to achieve them), seeking information (e.g., gathering content relevant to the topic), record keeping (e.g., creating notes), organizing (e.g., arranging notes), transforming (e.g., imagining a setting to assist in description), self-monitoring (e.g., checking writing product or actions against goals), reviewing records (e.g., reviewing plans, notes, or text), self-evaluating (e.g., making appraisals of plans or text quality), revising (e.g., making changes to plans or text), self-verbalizing (e.g., saying dialogue aloud while writing or self-talk regarding writing activities), environmental structuring (e.g., adjusting the writing environment to increase ability to write), time planning (e.g., estimating time for planning and writing), self-consequating (e.g., checking social networking websites as a reinforcer for completing a writing task), seeking social assistance (e.g., asking another person to edit the paper), and self-selecting models (e.g., imitating the style of a specific author; Graham & Harris, 2000). However, Graham and Harris (1989b, 2000, 2009) propose

that effective strategy use extends beyond knowledge of the steps of a strategy, to include three major components: (a) knowledge of strategies, (b) knowledge about the use and significance of those strategies, and (c) self-regulation of strategy employment.

To investigate their proposition of the importance of self-regulation, Graham and Harris (1989a) devised a component analysis investigating the incremental effects of strategy self-regulation on the planning and writing of persuasive essays. The acronym TREE (i.e., Topic sentence, Reasons, Examine Reasons, Ending) was used to help students with LD remember the planning strategy. Significant differences were found at pre- and post-intervention levels. Although incremental effects for self-regulation were not found, the researchers noted that they had not compared self-regulation to an *absence* of self-regulation, but rather a comparison had been made between explicit strategy instruction and explicit strategy instruction *plus* self-regulation (due to the school district's request to have no control group). It was noted "the strategy instruction included *implicit* self-regulation information and may thus have induced less formal self-regulation procedures" (p. 360).

Incremental effects of self-regulation were demonstrated in a later study conducted by Sawyer, Graham, and Harris (1992). In this study, students were compared against a control group. Students with LD improved their overall quality of writing when receiving cognitive strategy instruction (.55 effect size), and results were more pronounced for the group receiving cognitive strategy instruction plus self-regulation strategies (.60 effect size; Sawyer, Graham, & Harris, 1992). Consequently, self-regulation became a prominent component in later work conducted by Graham, Harris and colleagues, and was formalized as Self-Regulated Strategy

Development (SRSD), a unified approach to strategy instruction (De La Paz & Graham, 2007; Graham & Harris, 1989b; Harris & Graham, 1996; Harris et al., 2003). SRSD will be discussed later in detail after a discussion of the constructs of writing skills, knowledge, and motivation for writing.

The SRSD instructional model has demonstrated positive effects for students of a variety of ability levels and ages (Graham & Harris, 2003; Graham & Perin, 2007; Rogers & Graham, 2008). Furthermore, SRSD combined with the explicit cognitive strategy for planning and writing persuasive essays (i.e., POW+TREE) also demonstrated positive effects for students with LD and has been used in a developing research line by Graham, Harris, Mason, and colleagues (Graham & Harris, 1989b; Mason, Kubina, & Taft, 2009; Mason & Shriner, 2008; Graham, Harris, & Sexton, 1998). In their early work, Graham and Harris (1989b) investigated the effects of strategy instruction in persuasive writing (i.e., TREE) for secondary students with LD using a multiple probe design. Graham and Harris (1989b) found that students included more structural essay elements and produced better quality writing. Students also learned a planning technique, the precursor to POW, although no mnemonic was associated with the planning steps. Furthermore, after instruction, all students at least doubled their number of functional essay elements on generalization narrative essays. Graham, Harris, and Sexton (1998) replicated the Graham and Harris (1989b) study using similar methods and participants; however, they expanded on the initial study by including a procedure for increasing self-regulation. Student participants generated higher quality texts and included more structural elements. The results from the study provided evidence for the effectiveness of a multi-component strategy instruction

model that included self-regulation procedures, a concept which would become central to the research line of Graham and Harris (1989b, 2000, 2009).

Mason and Shriner (2008) extended the work of Graham and Harris (1989b) and Graham et al. (1998) by investigating SRSD for POW+TREE with elementary students with emotional and behavioral disorders. Results indicated a large effects size, as measured by percentage of nonoverlapping data (PND) points. Scruggs, Mastropieri, and Casto (1987) offered guidelines for effect sizes for single subject design studies: 90% a large effect; 70% to 90%, a medium effect; and 50% to 70%, a small effect. Although the Mason and Shriner (2008) investigation was not specific to students with LD in secondary settings, their work informed two studies conducted later by Mason et al. (2009). In a pair of 2009 studies, students with disabilities, including LD, were taught using the POW+TREE strategy/SRSD model. Students generated more persuasive essay parts and improved writing quality, with a mean PND across both studies of 85.5% (range was 94% PND and 77% PND). Given the effectiveness of POW+TREE/SRSD model for students with LD at the secondary level, the use of the model for CSI in writing is potentially a viable option to assist students with LD in strategies for writing (Graham & Harris, 2003; Graham & Perin, 2007; Rogers & Graham, 2008).

Writing Skills

Writing skills such as spelling, handwriting, and typing are thought to affect one's ability to produce text fluently and are employed during the process of transcription (Graham & Harris, 2000, 2009). Transcription is defined as the process of transforming words the writer wishes to communicate into symbols on the page or word processor screen (Graham & Harris, 2000). The

act of transcription is thought to place considerable demands on developing writers, resulting in a de-emphasis of strategic behaviors during the writing process (McCutchen, 1998). Automated handwriting, spelling, and typing are thought to be advantageous to the writing process, leaving cognitive energies for planning and content generation (Graham & Harris, 2000).

Knowledge

Many types of knowledge for writing exist, including knowledge of content, purpose for writing, audience awareness, and knowledge of the criteria for effective written products (Graham & Harris, 2009). Awareness of genre-specific text structures is also widely recognized as central to the writing process (Englert et al., 1988; Englert & Thomas, 1987; Graham & Harris, 2009; Graham, Schwartz, & MacArthur, 1993; Wong et al., 1996). Requirements for writing vary across purposes (self- or other-directed) and genres (such as narrative, expository, poetry, or journal; Berninger, 2009; Englert et al., 1991; Hinsdale, 1895; Strunk & White, 1959). The knowledge of writing is further developed in the theoretical model through the level of student motivation.

Motivation

Motivation is thought to be central to writing, due to the individualized, self-directed nature of composing (Graham & Harris, 2009). Furthermore, motivation for writing is thought to predict writing performance (Graham, Berninger, & Fan, 2007), has been linked to self-efficacy, and is theorized to increase as writing ability increases (Graham & Harris, 2009). However, Graham and Harris (2009) suggest that there is limited evidence to draw firm conclusions about increased motivation for writing due to increased self-efficacy. Motivation is

not a stable personality characteristic, but is context-dependent (Mayer, 2001); consequently, instructional strategies may affect the motivation of writers (Flowerday, Schraw, & Stevens, 2004). Motivation for writing has been linked to interest in topic (Shippen, Houchins, Puckett, and Ramsey, 2007). Shippen et al. (2007) investigated the preferred writing topics for opinion essays of middle school students. Qualitative methods were used to identify common topics of interest for 205 eighth graders. Topics such as teen issues (e.g., driving and pregnancy), war in Iraq, school (e.g., teachers and rules), politics, and dress code were identified as common interests.

The theoretical framework of writing development offered by Graham and Harris (2009), which is based on earlier cognitive process models of writing (Flower & Hayes, 1980; Scardamalia & Bereiter, 1987), takes into account the myriad processes employed by skilled writers. However, some students face challenges with fluent and coherent language expression, such as those with language-based LD. A specific review on students with LD who struggle with writing is framed in an examination of the historical and etiological origins of LD. The characteristics of LD that significantly influence the writing process are further reviewed.

Although students with LD struggle with writing, researchers have demonstrated practices that have positive effects on the writing processes and products of students with LD. Thus, a further examination of current research and evidence-based practices that have demonstrated positive effects on writing products of students with LD are presented. Finally, the explosive growth of K-12 online instruction and its potential for emerging technologies that may facilitate writing for students with LD is examined as a means of boosting their ability to produce writing at or above grade level.

Learning Disabilities

Students with LD face significant challenges with reading and writing (Bateman, 1974; Berninger, 1999, 2009; Cruickshank, 1975; Deshler & Schumaker, 1986; Fernald, 1943; Gersten & Baker, 2001; Gillingham & Stillman, 1940; Graham & Perin, 2007; Hinshelwood, 1904; Kirk; 1963; National Joint Committee on Learning Disabilities [NJCLD], 1990; Orton, 1928; Orton & Gillingham, 1923; Schumaker & Deshler, 2009; Troia & Graham, 2002). Learning disability is defined in the Individuals with Disabilities Education Improvement Act (2004):

The term "specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using written or spoken language which may manifest itself in an imperfect ability to listen, think, speak, write, spell, and do mathematical calculations. Disorders include: perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, and inability to speak or understand language. Disorders not included are: learning problems resulting from other things such as visual, hearing, motor disabilities, mental retardation, emotional disturbance, or economic, cultural, or environmental disadvantage. (Definitions, para. 30)

With the issuance of the 1975 Education for All Handicapped Children Act (PL 94-142) provisions were made for students with LD to receive specialized services relating to education. These educational rights included free and appropriate public education (FAPE) in the least-restrictive environment (LRE), with educational services outlined in an individualized education plan created jointly by parents and schools. Public Law 94-142, as the law came to be known, was the culmination of a variety of court cases in which advocates of children with disabilities

and children from minority groups were assured access to FAPE. Tracing its roots back to 1954 in *Brown v. Topeka Board of Education*, in which separate educational facilities for minority groups were deemed unconstitutional, PL 94-142 was grounded in the idea that all children had the right to equal access to a quality, FAPE. As the services outlined in PL 94-142 gained momentum, more and more children were identified with LD. Twenty-two percent of educational services provided to students with disabilities were for students with LD in 1976-1977. By 2005, the number of students identified with LD had increased to 45%, in spite of the inclusion of five new categories of disability since that time (U.S. Department of Education, 2007).

The federal definition has changed little since its codification into federal law in PL 94-142 in 1975. However, because the definition does not clearly state the etiology of LD, there has been considerable debate over the identification and treatment of LD (Bateman, 1974; Cruikshank, 1974, 1983; Myklebust, 1973; Ysseldyke, Shinn, & Epps, 1980). Over the years, experts in the field have developed a consensus that LD is a neurological disorder (Bateman, 1974; Cruikshank, 1974, 1983; Hynd, Marshall, & Gonzalez, 1991; Myklebust, 1973, 1980; NJCLD, 1991; Rourke, 2005; Waber et al., 2003). This consensus was expressed in the joint statement issued in 1990 by the NJCLD. The committee was comprised of representatives from the American Speech-Language-Hearing Association, Association on Handicapped Student Services Programs in Postsecondary Education, Council for Learning Disabilities, Division for Children with Communication Disorders, Division for Learning Disabilities, International Reading Association, Learning Disabilities Association of America, National Association of

School Psychologists, and Orton Dyslexia Society. The NJCLD adopted a joint definition of learning disability:

Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviors, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although learning disabilities may occur concomitantly with other handicapping conditions (for example, sensory impairment, mental retardation, serious emotional disturbance), or with extrinsic influences (such as cultural differences, insufficient or inappropriate instruction), they are not the result of those conditions or influences. (NJCLD, 1990, p.1)

As described above, LD is a result of central nervous system dysfunction which manifests in a variety of ways; however, for the purpose of this narrative, discussion will be restricted to those impairments that affect language-based academic achievement, primarily focusing on writing. The investigation begins with the earliest researchers who noticed the connection between language and nervous system functioning, and trace the emerging understanding of the impact of learning disabilities on the act of writing.

Franz Joseph Gall was one of the first individuals to identify the relationship between brain injury and behaviors, based on his work with brain-injured soldiers (Gall & Spurzheim,

1835). He theorized a localization of brain functioning suggesting disorganized behaviors resulted from injury to the brain. Wernicke (1874) investigated the impact of brain injury on the language capabilities of ten patients, identifying a specific area in the left temporal lobe that affected language generation when injured. The connection between reading and LD was recognized in 1877, when Kussmaul, a German neurologist, observed the condition of “word-blindedness”, describing individuals who contained all the normal faculties, but lacked the ability to discriminate written text. Although early cases of language-based disability were theorized to be caused by injury to the brain (Hinshelwood, 1904), later researchers would view the dysfunction as a neurological impairment resulting from genetic origins rather than environmental causes (Cruickshank, 1974).

As researchers at the turn of the century continued to investigate patients with brain impairments, two distinct lines of inquiry began to emerge: (1) remediation of deficits in academic skills, such as reading, writing, and mathematics (Fernald, 1943; Monroe, 1932; Orton, 1928; Orton & Gillingham, 1933) and (2) impaired perceptual motor abilities (Strauss, 1933; Strauss & Lehtinen, 1947; Werner & Strauss, 1939). However, both camps derived their original foundations from the work of European researchers, such as Gall and Wernicke in the 1800s, studying language-related behavior and cognitive processes of injured individuals. Werner and Strauss (1939) conducted functional analyses “of mentally deficient children” (p. 37) at the Wayne County Training School, and developed a theory which described mental deficiency as originating from a dysfunction in perceptual motor abilities (Werner & Strauss, 1939). A student of Strauss and Werner, Cruickshank expanded their work from the Wayne County Training School by replicating their investigations with a new population: children with cerebral palsy

(Dolphin & Cruickshank, 1951). Dolphin and Cruickshank (1951) found that the children had difficulty distinguishing primary figure and background images, similar to the children from previous studies (Werner & Strauss, 1939); he similarly concluded the difficulty was caused by distraction from “extraneous stimuli” (p. 231). As a result of his inquiries, Cruickshank (1961) advocated for specifically designed instruction to meet the needs of individuals with difficulty learning. This theme of individualized instruction would be taken up by later researchers and applied to writing instruction for students with LD (De La Paz, 1997; Deshler & Schumaker, 1986; Graham & Harris, 1989b).

During the first half of the twentieth century another line of research developed, emphasizing the impact of neurological impairment on the ability to read, write, and perform mathematical calculations. At the time, the act of reading was of primary interest to researchers, who addressed written expression only in passing. Based on his work with children who had difficulty learning to read, Orton (1928) contended that specific reading disabilities existed, as evidenced by a discrepancy between one’s ability to read and his or her other intellectual capacities. To lend objectivity to his findings, Orton utilized scores from the Stanford-Binet IQ test. Further, Orton posited that individuals suffered from the condition of a specific reading disability that he termed “strephosymbolia” (twisted symbols) and recommended phonics remediation using kinesthetic training. Orton’s work informed and underscored later language-focused instruction for students with LD.

Arguably one of the most influential figures in the field of LD, Samuel Kirk was uniquely poised at the crossroads of the field. His own work, informed by Orton and Cruickshank, focused

on systematic instruction of reading using phonics and multi-sensory approaches. His focus gravitated to the identification and prevention of reading difficulties, and he eventually came to believe that there existed distinct differences between children who possessed “mental retardation” and those with a “learning disability” as noted in his text *Educating Exceptional Children* (Kirk, 1962). This idea quickly gained support from parents who heard him speak at *The First Annual Conference on Exploration into the Problems of the Perceptually Handicapped Child* (Kirk, 1963); however, researchers have argued that his actions had the effect of doubly stigmatizing the group of children identified with mental retardation (Danforth, Slocum, & Dunkle, 2010). The stigmatization would be addressed by Kirk in 1963 during his seminal speech to parents of children who had been identified with problems learning.

Kirk provided a unifying vision when he described LD at the 1963 conference, and his subsequent line of research focused on identification and instruction of students with LD. As a means of diagnosing and prescribing education for children who struggled with learning, he developed the Illinois Test of Psycholinguistic Abilities (ITPA; Kirk & McCarthy, 1961). Further, his heavy influence on the field of LD can be seen by the connection between his definition of LD in his special education textbook, *Educating Exceptional Children* (1962) and the federal definition of LD.

Cruickshank (1974) vehemently disagreed with the proposed federal definition of LD based on the 1962 definition as set forth by Kirk, citing the federal definition was exclusionary in nature and did not explicitly state the characteristics of individuals with LD. Cruickshank preferred what he viewed as a more explicit term “perceptually handicapped children” (1974, p.

500), arguing that “learning disability is essentially a problem of perception and perceptual disorder” (p. 499). Although researchers offered differing theories of the origins of LD (Cruickshank, 1974; Kirk, 1962; Myklebust, 1973, 1980), the number of students identified with LD continued to grow. Aud et al. (2010) reported the number of students with LD receiving special education grew from 21.5% of all students with disabilities in 1977, peaking at 46.3% in 1996, and slowly declining to 39% in 2008. In 2008, students with LD comprised about 13% of the entire school population.

As discussed above, the general underlying condition of LD is identified as an impaired ability to express and receive language (Nelson et al., 2009). Currently, researchers have a variety of terms used to classify overarching types and subsets of LD. Nelson et al., (2009) use the term *specific language impairment* to describe the impairment in language development that is not consistent with cognitive development. Scott (2002) proposed the term *language learning disability*, noting an overlap in the identification of language impairment (often found in young children) and LD (found in later years as academics become increasingly language-based). Terminology may also vary across countries, as evidenced by the interchangeable terms specific language impairment and *dysphagia* used in some places in Europe and Canada (Dockrell, Lindsay, & Connelly, 2009). However, the unifying characteristic is thought to be central nervous system dysfunction.

Although LD affects many components of language ability, such as those needed for interpreting mathematical symbols and the ability to successfully engage in discourse (e.g., pragmatics), writing is one of the major areas impacted by language impairments (NJCLD,

1990). Berninger et al. (2009) proposed a classification schema for LD which would account for the varied processes of oral and written language based on approximately 20 years of systematic research into the processes of production and reception of language (e.g., orthographic, phonological, and morphological systems). Deficits in the orthographic system manifest as an impaired ability to write and spell, often termed *dysgraphia*, as evidenced by poor handwriting and spelling. Phonological deficits result in disorders of reading and writing, commonly known as *dyslexia*; rapid naming of letters and numbers may also be undermined by phonological deficits. As means of emphasizing the overarching nature of morphological deficits, Berninger and colleagues proposed the term *Oral and Written Language Learning Disability* (OWL LD) to highlight the impact of potential deficiencies in morphological processes (the understanding that words can be broken into meaningful units, such as suffixes and prefixes). More globally characterized than specific deficits, such as those found in cases of dysgraphia and dyslexia, OWL LD extends to include general difficulties with the morphology of oral and written language that may also have an orthographical and phonological basis. Learners with OWL LD are characterized by difficulties with language.

Learning Disability and Its Moderating Effects on Written Expression

Writing is one sub-facet of language, which is comprised of separate but interlaced systems. Language systems develop in various forms, such as language by ear (listening), language by mouth (talking), language by eye (reading), and language by hand (writing; Berninger, 2009). To compose written text, students must coordinate the above language systems (Berninger, 2009) and additionally develop abilities in the areas of strategic behavior for

writing, skills, knowledge, and motivation towards writing (Graham & Harris, 2009). Students with LD struggle with the complex demands of writing, and problems range from lower order mechanical problems to higher order cognitive and metacognitive problems (Newcomer & Barenbaum, 1991; Wong et al., 1996).

Strategic behavior of students with LD. When planning, skilled writers generally create and revisit goals for writing, but in contrast, writers with LD tend to jump directly into the writing phase, spending less than one minute planning (MacArthur & Graham, 1987). Students with LD generally write shorter essays with fewer words than their counterparts without LD (Englert & Thomas, 1987; Graham et al., 1995) and overall writing quality is poor compared to writing of their peers without LD (Englert & Thomas, 1987; Newcomer & Barenbaum, 1991; Schumaker & Deshler, 2009; Wong et al., 1996). Students with LD revise infrequently when compared to their peers, focus on mechanics rather than overall quality, and often approach revising like a housecleaning task in which neatness in penmanship, spelling, and grammar are overemphasized (Graham et al., 1995).

Writing skills of students with LD. Graham and Harris (2009) indicated a strong evidence base to support the role of transcription skills in writing development. Graham, Berninger, Abbott, Abbot, and Whitaker (1997) found that handwriting and spelling skills accounted for about 40% of the variance in composition quality and fluency (amount of text written in a specific time period) in the intermediate grades. Furthermore, when eliminating the necessity to transcribe by using text-to-speech generators, students with LD produced qualitatively better stories (MacArthur & Graham, 1987). Problems with transcription are

thought to affect the writing process for writers with LD in three ways: (a) switching attention from content generation to mechanical concerns may cause writers to lose ideas in working memory, (b) slow or cumbersome transcription skills may cause writers to lose ideas because their skills cannot keep pace with their idea generation, and (c) cognitive resources used for transcription concerns cannot be allocated to thoughtful expression of ideas (Graham & Harris, 2009).

Knowledge of writing of students with LD. In order to compose effective essays, students require knowledge of content and of text structures related to genres of writing (Englert & Thomas, 1987; Scribner, 1997). Benton, Corkill, Sharp, Downey, and Khrantsova (1995) found that knowledge of topic predicted thematic maturity of text in written products of ninth grade students. Students with LD may have deep knowledge of topic content, yet they typically lack an understanding of the structural components common across essay types, unlike their peers without LD who are able to integrate and utilize structural components more quickly (Bui, Schumaker, & Deshler, 2006; Englert & Thomas, 1987; Englert et al., 1991). In early work analyzing ability to recognize varied text structures, Englert and Thomas (1987) found that students with LD were less able to recognize structures within text. Building upon her 1987 findings, Englert and colleagues (1991) investigated the effects of knowledge of expository (i.e., explanatory) text structure on overall writing quality of students with LD. Students were taught expository text structure and provided with scaffolds to help students remember and employ their knowledge of text structures when writing. The findings of this seminal piece demonstrated positive effects for instruction in cognitive strategies in writing supported by scaffolding of text structures.

Students with LD typically place undue emphasis on the form of their writing (e.g., penmanship, spelling) over their writing processes (Graham et al., 1995), and Graham & Harris (2000) hypothesized that this results from challenges with transcription. Wong (1997) found that students with LD believed that “good essays” were those without spelling errors. Graham et al. (1995) found that 70% of revisions made by students with LD, when prompted, were surface level in nature, with only 16% impacting overall meaning.

Motivation for writing for students with LD. Graham and Harris (2009) indicated that motivation for writing was a significant component of the writing process, and that students with LD were generally more negative about writing than peers without disabilities were. However, it is interesting to note that intermediate level students with LD perceived they wrote as well as their peers without LD. Although this over-confidence may seem like a benefit for self-esteem of students with LD, in actuality, it may result in frustration when teacher scores of writing quality do not parallel student beliefs, leading to further negative feelings about writing (Graham & Harris, 2009; Harris et al., 2003).

Moderating the effects of motivation toward writing can be accomplished in a number of ways. Providing choice is one method of increasing engagement in tasks (Kern, Bambara, & Fogt, 2002), and providing choice has demonstrated increased engagement in writing tasks for undergraduates (Flowerday et al., 2004). Mason et al. (2009) provided choice of topic and stance in a study of SRSD for writing. Harris et al. (2003) suggest another method for increasing motivational stance toward writing is self-reinforcement for objectives achieved during the writing task (e.g., marking performance on a chart after each writing session). Positive

reinforcement of desired behaviors is a well-established method for increasing the frequency of an academic behavior whether administered by teachers or parents (Atkeson & Forehand, 1979).

Shifting focus from the characteristics of writers with LD, the discussion now turns to investigate writing instruction that can support their writing. Researchers have suggested that without instruction, students with LD write on average at a 4th grade level throughout high school (Warner et al., 1980). Fortunately, evidence suggests students with LD can improve writing processes and products when taught explicit strategies for writing (Deshler & Shumaker, 1986; Gersten & Baker, 2001; Graham & Harris, 1989b; Graham & Perin, 2007; Rogers & Graham, 2008; Shumaker & Deshler, 2009).

Research Base of Writing Instruction for Students with LD

The first systematic attempt at synthesizing writing instruction research was commissioned in 1963 by the National Council for Teachers of English (NCTE), and this study was not restricted to participants with LD. Braddock, Lloyd-Jones, and Shoer (1963) conducted an examination of extant research on writing instruction, restricting the survey to only those studies employing scientific methods. From over 1,000 studies, the researchers found only five studies of merit (Braddock et al., 1963). The 1963 NCTE report revealed that English instructors seeking research-based guidance were left with a limited body of knowledge (Sherwin, 1964).

Revisiting general methods of writing instruction, Hillocks (1984) conducted a meta-analysis to determine which treatments produced the greatest gains in writing. Results from the meta-analysis indicated that the presentation model, characterized by Hillocks as teacher-

directed instruction in which the teacher imparted knowledge to passive students, was less effective than the natural process writing approach in which students write for and receive comments from peers. While the natural process model was found to be more effective than the presentation model, Hillocks described an “environmental model” which was estimated to be at least three times as effective as the other models. The environmental model incorporated a balanced approach to teacher, student, and materials in the classroom environment and consisted of purposeful writing with clear objectives in response to a problem. Later researchers would note the importance of clear objectives when writing (Graham & Harris, 1989b; Graham, et al., 1995; Graham, MacArthur, Schwartz, & Page-Voth, 1995).

As the cognitive model of writing gained popularity (Flower & Hayes, 1981; Scardamalia & Bereiter, 1987), researchers moved past investigating the characteristics of writers with LD, and began devising and testing interventions to support cognitive processes involved in their writing (Deshler & Schumaker, 1986; Graham & Harris, 1989b; Schumaker, Nolan, & Deshler, 1985). Cognitive strategy instruction (CSI), also referred to as explicit strategy instruction, was thought to support the cognitive processes of writing and demonstrated strong effects across a variety of research settings, populations, and methodologies. As research lines have converged, the cognitive strategy approach has emerged as the primary focus of research for students with LD (De la Paz, 2007; Gersten & Baker, 2001; Graham & Perin, 2007; Rogers & Graham, 2008).

One of the first researchers to investigate the effect of cognitive supports for students with LD was Bernice Wong. Her seminal work on prompting, although originally intended to support reading comprehension (Wong, 1978), has been successfully incorporated into

procedural facilitation strategies which continue to be investigated by contemporary writing researchers (e.g., Baker, Gersten, & Scanlon, 2002; Englert et al., 2007). Wong (1980) found that the use of a question/prompt procedure significantly increased understanding and memory of content for students with LD.

Early research was also conducted at the University of Kansas Institute for Research on Learning Disabilities, a national center funded to investigate strategies for adolescents with LD. In 1985, Deshler and Schumaker published a set of explicit strategies targeted to adolescents with LD who struggled with increasing academic demands in secondary settings. One such strategy for revision consisted of an 11-step, highly prescriptive error-monitoring strategy (Schumaker et al., 1985). Students with LD detected and corrected significantly more errors in written products after the intervention and also generated less errors (close to zero) after the intervention was delivered.

As explicit strategy instruction gained momentum, a variety of research-based practices for students with LD were produced. Many mnemonic devices to help students remember strategies for planning and writing were developed, such as POW+TREE (Harris, Graham, & Mason, 2002), STOP + DARE (De La Paz, 1999) and POWER (Englert et al., 1991). Table 1 provides examples of cognitive strategies.

Table 1: Examples of Cognitive Strategies

Cognitive Strategies for Writing		
Harris et al., 2002	De La Paz, 1999	Englert et al., 1991
P – Pick my ideas	S – Suspend judgment	P – Planning
O – Organize my notes	T – Take a side	O – Organizing
W – Write and say more	O – Organize ideas	W – Writing
	P – Plan more as you write	E – Editing
T – Topic sentence		R – Revising
R – Reasons (3 or more)	D – Develop topic sentence	
E – Explain reasons	A – Add supporting ideas	
E – Ending	R – Reject argument for other side	
	E – End with a conclusion	

CSI has evolved over time as researchers have gained a better understanding of writing processes. In a 2007 review and component analysis of CSI, De la Paz characterized 5 typical features: (a) teachers provide think-aloud demonstrations, much like typical teacher-led instruction; (b) instruction is initially teacher-led with eventual fading of supports or prompts; (c) students work collaboratively and then independently; (d) responsibility for strategy regulation shifts from teacher to students; and (e) students memorize a mnemonic device to assist with text structure or for each step of the writing process strategies employed.

Social Nature of Writing

While CSI gained popularity, other researchers were also emphasizing the social nature of writing and studying the effects of incorporating dialogue into writing instruction (Englert et al., 1991; Wong et al., 1994; Wong et al., 1996). Researchers such as Englert and Wong proposed that interactive dialogues would also demonstrate positive effects on writing quality

(Englert et al., 1991; Wong et al., 1994; Wong et al., 1996). Interactive dialogues, or elaborated dialogues, are discussions that occur between the student and teacher or a peer in which appropriate questions are used to shape and scaffold the learning (Wong et al., 1996).

“Instruction is embedded in the continual process of questioning and answering between teacher and students” (p. 198). In her study, students were paired in a writing workshop format in which the student-critic indicated perceived ambiguities in arguments and the student-writer defended his argument verbally then revised the writing to reflect his or her position. It was hypothesized that the peer interactions would create a sense of audience for the student-writer. The intervention occurred in three phases: (1) planning which was supported by a prompt sheet, (2) writing which was supported by the use of a word processor, and (3) revision supported by a strategy. Phases one and two included an elaborated dialogue session with peers. After the three-component instruction, students with LD showed an increased clarity and cogency in essays, and levels were maintained over time. In a similar study, Wong et al. (1994) compared students with other students versus students with teachers. Both student-led and teacher-led structured revisions processes were effective in improving writing performance.

Self-regulatory Nature of Writing

While various forms of CSI with or without a social component gained widespread popularity for students with LD, some researchers argued that students with LD needed to master self-regulation of the strategies in order to write effectively (Graham & Harris, 1989b). Self-regulated strategy development, conceptualized and refined by Harris and Graham (1985, 1992, 1996) is a multi-faceted approach to developing strategy acquisition in which the user is taught

how to regulate newly acquired strategies. SRSD is comprised of six phases that incorporate research-based practices in a variety of areas (Harris et al., 2003). Each phase within the SRSD approach is well matched to the characteristics of students with LD, providing supports in the areas of deficits described earlier. The SRSD framework is comprised of the following components which can be used with any specific writing strategy: (a) develop background and knowledge for strategy, (b) discuss the purpose and benefits of the strategy, (c) model the strategy, (d) memorize it (steps using mnemonics), (e) support it with teacher or scaffolding in which assistance provided then gradually reduced and students gradually memorize strategy then use it on their own, and (f) provide independent practice. Students observe then practice self-regulation actions such as goal setting and self-talk to reinforce performance improvements as instruction occurs.

Process Writing Approach

Although researchers have accumulated a repertoire of effective writing strategies for students with LD, an exploration of writing instruction would not be complete without reference to the process writing approach mentioned earlier, characterized by the use of student-teacher conferencing (Troia et al., 2009). Berninger (2008) wrote “although the process writing movement exerted great influence on instructional practices in writing, it is not an evidence-based writing approach to writing instruction” (p. 216). Troia and colleagues (2009) found that the process writing approach did not demonstrate positive effects for good or poor writers, although positive effects were shown on students’ motivational stance toward writing. Troia and colleagues attributed results to the lack of two essential elements for improved writing outcomes

– especially for struggling writers: (1) systematic teaching of transcription skills and (2) focus on self-regulation of the newly acquired strategies. Currently, some researchers seek to embed explicit CSI within a process-writing framework for students with special needs (Englert et al., 2007; Troia et al., 2009).

Scoring Writing Products

There are multiple methods for scoring writing products. In their meta-analysis of writing interventions for adolescents, Graham and Perin (2007) reported that overall quality is one of the most common methods used to evaluate writing. Espin et al. (2008) suggest CIWS as a curriculum-based measure of monitoring student growth in writing. Their findings suggested that the number of CIWS sequences for tenth grade students, yielded the highest reliability and validity coefficients over words written and correct word sequences. Espin et al. (2008) reported that number of words written and words spelled correctly were not sensitive to group differences and result in only low to moderate correlations with criterion measures of writing. Measure of writing related to demonstrating mastery of specific strategies can also be used to evaluate writing growth. Mason et al. (2009) used number of elements included in the essay as a measure or writing progress for students with LD.

Syntheses of Writing Research

As the research base for writing instruction of students with LD has grown over the years, researchers synthesized the literature to draw conclusions about effective practices. Wolf (1978) recommended that data should also be collected to identify the participants' perceptions of the value of the intervention as a means of establishing its value to society. As founding editor of

the *Journal of Applied Behavior Analysis*, Wolf argued that measures of social validity should be included in all research designs, and that the researchers themselves were not qualified at judging whether or not an intervention was socially valid, stating social importance was “a subjective value judgment that only society was qualified to make” (Wolf, 1978, p. 206). Gersten and Baker (2001) examined 13 experimental studies investigating writing instruction for students with LD and recommended explicit teaching of three components that should be included in any writing instruction program: (a) steps of the strategy being instructed, (b) genre-specific critical dimensions of the text, and (c) structured feedback from teachers or peers. Swanson (2001) conducted a review of interventions (not limited to writing instruction) for students with LD and found that direct instruction combined with strategy instruction had stronger effects than either instructional approach delivered in isolation. However, specific results regarding social validity were not presented.

Graham and Perin (2007) conducted a meta-analysis of writing instruction for adolescent students restricting their search to quasi-experimental and experimental studies. They located 123 documents that yielded 154 effect sizes for quality of writing. The authors calculated an average weighted effect size (presented in parentheses) for the following 11 interventions ranked in order of effect: strategy instruction (0.82), summarization (0.82), peer assistance (0.75), setting product goals (0.70), word processing (0.55), sentence combining (0.50), inquiry (0.32), prewriting activities (0.32), process writing approach (0.32), study of models (0.25), and grammar instruction (– 0.32). Graham and Perrin found evidence to suggest that studies

employing self-regulated strategy development (SRSD) demonstrated the strongest effects on measures of writing. Social validity results were also not presented in Graham and Perrin's meta-analysis.

Rogers and Graham (2008) performed a thorough literature search of single subject design writing intervention research and found 88 studies that met criteria as set forth by Horner et al. (2005). Their meta-analysis used only single subject designs that established experimental control in at least three instances, included a baseline phase with three stable data points, and delineated data points that could be used to calculate a percentage of nonoverlapping data (PND), a measure of effect size for single subject design. Their search also included sources of peer-refereed and non-peer-refereed journals to reduce publication bias (e.g., studies with no effect are rarely published). Furthermore, calculations of PND effect size were only conducted if four studies existed within a subcategory. Teaching students planning/drafting strategies had a large effect on inclusion of elements, productivity (amount of words written), and overall quality, and effects were maintained over time. The search conducted by Rogers and Graham yielded over 88 quality single subject studies, while the Graham and Perin (2007) search yielded 123 quality studies of quasi-experimental and experimental design, totaling over 200 studies to inform writing instruction. These results represent a significant increase over the findings from Braddock (1963) literature search conducted almost 50 years ago, from which only 5 quality studies of writing instruction were found. While the effectiveness of interventions for writing have been examined by a variety of researchers interested in improving writing instruction, the social validity of interventions has not been presented.

Over the past three decades, CSI has emerged as the predominant method of effective writing instruction for adolescent students with LD. These findings have been replicated with various ages, settings, and genres of writing, through experimental, quasi-experimental (Gersten & Baker, 2001; Graham & Perin, 2007), and single subject research methodologies (Rogers & Graham, 2008). Over time, the focus of research on writing of students with LD shifted from the investigation of mechanical skills in the early 1980s and 1990s to awareness of text structure and metacognitive processes for writing in the 1990s. Today, research is conducted into strategies used for instruction in writing processes coupled with technological supports for writing (Gersten & Baker, 2001; Kennedy & Deshler, 2010; MacArthur, 2009). While students with LD may still struggle to integrate new writing strategies into their repertoire, technology is in place today that supports writing processes. Graham et al. (1992) used technology to support CSI. They used the SRSD model and the PLAN mnemonic (i.e., Pick goals, List ways to meet goals, And, make Notes) for four elementary students with LD, and all writing was composed using a word processor. Based on the results from a multiple baseline across participants design all four students improved in the areas that had been identified by individual goals for improvement: including all basic essay components, increased length, and presenting a convincing argument. Although evidence of transfer to another genre (i.e., narrative) was mixed, students did maintain the performance levels up to 15 weeks after instruction.

In another study using technology to support CSI in writing, MacArthur, Graham, Schwartz, and Schaffer (1995) used the SRSD model with validated planning and revision strategies supported by word processing. Both the experimental and control groups made positive gains at the end of the study, but gains for the experimental group were twice as large as

gains for the control group. MacArthur et al. (1995) noted that word-processing can “ease the physical burdens involved in writing and editing” (p. 280). The utilization of computers for facilitating the writing process is supported by research literature. In a meta-analysis of computer usage versus pencil and paper for writing, Goldberg, Russell, and Cook (2003) found that K-12 students generally wrote more ($d = .50$, $n = 14$) and earned higher scores ($d = .41$, $n = 15$) when using the computer. However, MacArthur (2009) cautioned that simple use of word processing software as compared to handwritten composition did not lead to more revision. MacArthur (2009) synthesized results from three studies investigating writing instruction using word processing technology, stating the results support a “general principle that technological tools by themselves have little impact on learning, especially for struggling learners; rather, learning depends on a combination of the technology and instruction designed to help students take advantage of the capabilities of the technology” (p. 94).

Englert and colleagues have developed a line of research that thoughtfully integrates CSI and technology, using computer software to aid in prompting students to text structures (Englert et al., 2004; 2005; 2007). In 2004, Englert et al. compared three methods of composing personal narratives of elementary students: traditional paper and pencil, a computer without procedural supports for composition (e.g., typical word processing software), and a computer with procedural supports for composition (specialized software which prompted students for text structure). Results indicated that students generated longer texts and included more genre-specific text structures on the procedural supported method.

In a follow up study, Englert et al., (2005) replicated the Englert et al. (2004) study with students with LD in a resource room setting. Researchers evaluated the effects of the scaffolds on performance in three conditions: scaffolded computer software, un-scaffolded word processing software, and paper and pencil. Again, results revealed that the procedural support method significantly improved students' abilities to compose organized texts. To more closely control for possible limitations which may have arisen when comparing interventions across multiple modalities, Englert et al., (2007) compared procedural supports on the computer with similar procedural supports (i.e., concept pattern organizers) on pencil and paper. In addition, previous research (Englert et al., 2004; 2005) had been conducted with small sample sizes using alternating treatment designs in which the students served as their own controls. Englert et al. (2007) designed the study to control for extraneous variables and conducted the study with a larger sample size; the study investigated the effects of scaffolding students' writing performance through the employment of two different conditions that were exactly similar with the exception of the online scaffolding environment (computerized or pencil and paper). The results of the quasi-experimental study revealed significantly higher scores for overall writing quality and length of writing for students in the web-based scaffolding condition (Englert et al., 2007).

As researchers continue to explore the use of technology to support writing processes, MacArthur's (2009) caution to use technology that is integrated with proper instructional practices, rather than reliance on technology alone without thought to instructional implications, can provide a guiding vision. In the past, new technologies for delivering instruction have been compared with traditional methods (e.g., online instruction versus face-to-face instruction) to determine if the new technology is effective.

In a seminal article, Clark (1994) posited that instructional design, rather than type of technology, influenced learning outcomes. He argued comparison studies could only be conducted if instructional design could be held constant across conditions, a futile act which would ultimately result in equivalent learning experiences and, consequently, learning results (Clark, 1994). Kozma (1994) refuted Clark's (1994) claims, and argued that media are inextricable from instructional design, due to the unique characteristics of each type of media. Further, Kozma suggested that new media offered instructional interactions between learners and content or teachers that had not previously been possible. Vasquez (2009) illustrated Kozma's point by describing the features of reading instruction via a radio versus reading instruction via a computer conferencing system that afforded real time two-way audio and video. The video conferencing system would allow for interactivity and visual presentation of material, while the radio would prohibit such features of instruction. "If media can hinder instruction (relative to face-to-face), there may be ways that media may afford instructional opportunities not available in face-to-face instruction" (Vasquez, 2009, p. 12). Nevertheless, thoughtful evaluation and integration is necessary. Kennedy and Deshler (2010) recommended: "(a) technology can be useful in promoting literacy learning for students with LD, and (b) existing evidence-based practices for literacy instruction may be of benefit to teachers and students if repackaged and delivered using technology" (p. 290). Thoughtful integration of technology encompasses the utilization of the Internet for education. MacArthur (2009) advised "Research in [online instruction] is extremely limited, but it is critical to teach our students to use online communication tools because of the increasing importance of the Internet in contemporary society" (p.93). Yet, although a large research base exists for evidence-based instructional

practices in writing for students with LD (Gersten & Baker, 2001; Graham & Perin, 2007; Rogers & Graham, 2008), there is limited knowledge about what strategies are effective in online environments (MacArthur, 2009).

Why be concerned with strategies for online instruction? Online environments are increasingly becoming a part of the schools. In a 2008 National Center for Education Statistics longitudinal study, the most recent study of national online education in public schools, Zandberg and Lewis stated:

Findings from the 2002–03 and 2004–05 surveys suggest that technology-based distance education has established its presence in the nation’s public schools. Rapid technological developments and widespread availability of the Internet in public schools has made online education increasingly accessible and common among schools and districts. (p.70)

In 2004-2005, approximately 39% of public high schools in the United States enrolled students in technology-based distance education courses (i.e., courses in which the students and teacher were in different locations and instruction was delivered via the Internet, video, or audio recordings; Zandberg & Lewis, 2008). Of those students, approximately 78% were enrolled in courses delivered by a public K-12 entity, such as state or district virtual schools. Between 2003 and 2005, the overall estimated number of enrollments increased 60% from 317,070 to 506,950 (Zandberg & Lewis, 2008). These findings point towards embracing of online instruction, including operating virtual schools to meet the educational needs of students.

Further, it is apparent that more students continue to enroll in distance education courses. Of those schools with students enrolled in distance education, 71% of school administrators planned to expand distance course offerings (Zandberg & Lewis, 2008). Although a perception exists that students access courses from home, in actuality, a large majority (86%) of students enrolled in online distance education courses accessed the course from school (Zandberg & Lewis, 2008). However, access to technology from the home must be taken into account. In 2004, approximately 62% of families owned computers in the home, with one in five reporting high-speed Internet access (U.S. Department of Commerce, 2004). Recent reports estimate 74% of students have Internet in the home (Rideout et al., 2010). The Obama Administration plans to increase access to broadband technology, a priority as demonstrated by the establishment of the National Broadband Plan (Federal Communications Commission, 2011). Currently, approximately two-thirds of American adults (66%) have a broadband internet connection at home (Smith, 2010). This access to technology has increased the use of the Internet, and its impact can be seen in the growth of online schooling.

Enrollment in K-12 distance education is increasing (Zandberg & Lewis, 2008), but how do students with special needs fit into the growth of distance education and online schooling? Some researchers suggest that virtual schools are uniquely positioned to meet the needs of students with special needs (Rose & Blomeyer, 2007). Virtual schools provide benefits such as the ability to offer individualized instruction to meet specific needs of learners, flexibility in location and scheduling, and expanded accessibility for students who are not able to attend traditional schools (Kellogg & Politoski, 2002). Archambault et al. (2009) surveyed 22 virtual schools across 14 states to learn about current practices for at-risk students and found that 46%

of respondents reported more than half of students were classified at-risk (including those with disabilities). This number stands in contrast to the perception that online schooling is predominantly used for highly motivated, highly skilled students (Barbour, 2009). Conservative estimates of students with special needs taking online courses vary from 10% to 17% (Shah, 2011).

Platforms for Online Writing Instruction for Students with LD

Although it appears that students with disabilities are enrolling in online courses in a pace at least equal their peers without disabilities, research into the effectiveness of online instruction for students with LD is scarce (MacArthur, 2009). While a large research base exists for writing strategies for students with LD in face-to-face settings, online writing instruction for students with LD has received less attention. One promising platform for delivering online writing instruction is the use of synchronous web-based, video conferencing coupled with collaborative online writing software, also known as synchronous online writing instruction. Hewett (2006) describes synchronous online writing instruction as real-time, conference-based instruction that occurs through online media, including both teacher- and tutor-based activities. This instructional environment may have the same benefits of face-to-face settings, with the added convenience of flexibility in location, a standard feature of distance education. Instructors of writing have opportunities to employ evidence-based practices of instruction, while capitalizing on the best features of technology (Hewett, 2006).

Synchronous online instructional environments may provide avenues to translate face-to-face evidence-based practices to online settings. Returning to De La Paz's (2007) conception of

CSI, students can be exposed to all five components of CSI while in a synchronous online environment. Teachers can: (a) use video conferencing to provide think-aloud demonstrations; (b) use online forms to provide prompts and insert mark-up comments as scaffolds; (c) use video conferencing and collaborative writing environments to work collaboratively with others; (d) take responsibility for strategy regulation through the use of online spreadsheets and chart-makers which can be used for visual feedback of progress; and (e) chat boxes, online quizzes, or real-time video conferencing can be used to help students remember mnemonic devices for strategy employment. Assistive technologies supporting CSI can be found on Table 2.

Table 2: Related Assistive Technologies for CSI

Components of Cognitive Strategy Instruction (De La Paz, 2007)	Assistive Technologies to Support CSI Components
Teachers provide think-aloud demonstrations, much like typical teacher-led instruction	Video conferencing to provide think-aloud demonstrations
Instruction is initially teacher-led with eventual fading of supports or prompts	Online forms (prompts) and insert mark-up comments (scaffolds)
Students work with peers collaboratively and then independently	Video conferencing and collaborative writing environments
Responsibility for strategy regulation shifts from teacher to students	Online spreadsheets and chart-makers which can be used for visual feedback of progress
Students memorize a mnemonic device to assist with text structure or for each step of the writing process strategies employed	Chat boxes, online quizzes, or real-time video conferencing

An emerging technology platform that is highly promising for synchronous online cognitive strategy instruction in writing is an online collaborative writing environment (e.g., Google Docs and ZohoWriter). Online collaborative writing environments (OCWE) provide a writing platform via a fully online word processing software system that is available to all participants in real-time. Along with word processing files, other file types are supported, such as spreadsheets, presentations, and drawings. Online access is required by all parties, and a variety of service providers offer free accounts. Individuals using OCWE can create or upload files, share files with others, and edit files. Once files are shared with other users, editing changes are visible in real time by all parties, which makes OCWE especially suited for the collaborative writing process. OCWE word processing software is similar to other computer-based software; capabilities include the ability to insert images, footnotes, hyperlinks, highlighting, special characters, comments, as well as make formatting changes to text size, font, and color. OCWEs also provide translation and dictionary options, as well as word count tools and the ability to download documents to a hard drive.

Aside from collaborative writing, OCWEs also support the use of prompting or scaffolds, a feature of high-quality writing instruction for students with LD (Englert et al., 2004, 2005, 2007; Wong, 1980). Writers and reviewers can highlight text and insert comments to communicate about writing with the benefit of using visual supports. In real-time, users can highlight sections of text and post comments that appear in the margin. The highlighted text and comments remain visible in the document and include the name of the user who posted the comment, offloading some of the cognitive demands onto the technology scaffold (Pea, 1993). The highlighting tool provides the added benefit of allowing all parties to see specific text as it is

highlighted. An example of highlighting and comment insertion can be seen in Figure 1, in which the topic sentence of a sample essay has been highlighted and a comment has been inserted indicating that sentence highlighted is the topic sentence.

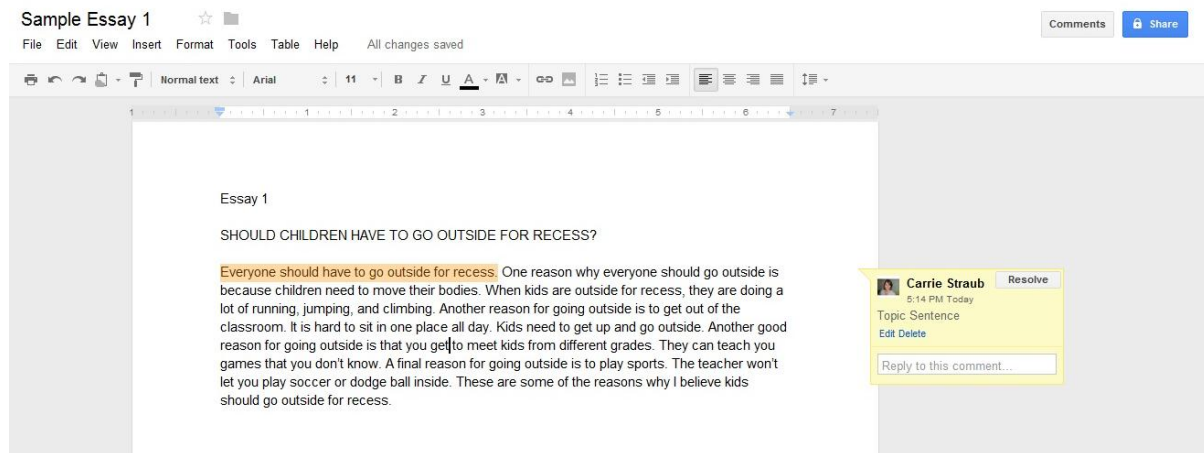


Figure 1: Highlighting and Comment Insertion

Highlighting and comment insertion can be utilized as a visual support for discussion to draw attention to specific structural elements, phrases, or words (Englert & Thomas, 1987); for example, when learning how to write topic sentences, students can highlight possible topic sentences in the composition, and the instructor is able to provide immediate corrective feedback. As students correctly identify, highlight, and insert comments for each sentence in a text, a visual scaffold is created to support text structure knowledge. Highlighting and comment insertion is one possible way of thoughtfully integrating technology into the writing process to support students with LD as they write.

Accessible Online Instruction for Students with LD

When considering delivering education in online environments, equal access to education must be a protected right for students with disabilities (IDEA, 2004). As new technologies bring education online, students are increasingly enrolling in online environments (Zandberg & Lewis, 2008), and schools are required to provide equal access to students with disabilities to ensure they can access the curriculum, whether online or face to face (IDEA, 2004). As more instruction occurs online, teachers and teacher educators must be sure they are delivering curriculum that is not only accessible, but also evidence-based (ESEA, 2001). Furthermore, evidence-based practices, when delivered online, should be carefully designed and integrated with technology to ensure access (Kennedy & Deshler, 2010). Kennedy and Deshler (2010) propose the repackaging of face-to-face research practices, coupled with technology. A systematic analysis of the evidence related to synchronous online cognitive strategy instruction in writing (SOCSI-W) for students with special needs, including those with LD, is provided below.

Systematic Review of Literature on SOCSI-W for students with LD

The purpose of this systematic literature review is to examine the current research base for SOCSI-W for students with LD using a systematic procedure, which compliments the research literature review for writing instruction of students with LD presented above. The systematic methods for this review of literature will be outlined below. This systematic review of the literature seeks to answer the following research question: what research base exists

examining the effectiveness of online writing instruction on the academic achievement of K-12 students with special needs?

Methods

Numerous searches were conducted across platforms such as electronic databases, federal websites, and organizational websites. Only empirical peer-reviewed articles were selected for inclusion. Empirical articles were defined as articles pertaining to studies in which the data was measured and analyzed quantitatively (e.g., experimental, quasi-experimental, single subject research designs). Articles were located by: (a) a formal search of the following electronic databases: the Education Resource Information Center (ERIC), PsychINFO, MAS-Ultra School Edition, Middle Search Plus, Primary Search, Education Full Text, and Education Index Retro; (b) exploration of federal websites, including What Works Clearinghouse, Doing What Works, Department of Education, and Office of Special Education Programs (OSEP); (c) examination of websites of national and international organizations related to online learning, including the United States Distance Learning Association and the International Association for Online K-12 Learning (iNACOL); and (d) references from three recent meta-analysis of research on online instruction.

The formal search consisted of four levels (see Appendix A for a list of the search terms by level used in the electronic database searches). Varied search terms within each category with the purpose of conducting the most inclusive searches were identified. Level one searches included mode of instruction terms (e.g., online instruction) crossed with special education terms and yielded 585 records. The level two searches included the previous search terms in level one,

plus additional terms related to participant age level and yielded 45 records. The level three searches included the previous search terms, plus additional terms related to writing instruction, yielding four records. The level four searches were conducted by hand and the criterion of student achievement data was applied. Thus, four records from electronic databases were identified that met criteria. One record was eliminated upon closer inspection because the subject matter was not relevant to the search criteria.

In addition, searches were conducted using three sources of research-based practices: federal websites, international and national organizations dedicated to online learning, and meta-analyses of online instruction. Websites were searched for the What Works Clearinghouse, Doing What Works, the USDOE, and OSEP. A search for “writing achievement” on What Works Clearing House yielded two research studies showing effects for writing outcomes, one of which demonstrated potentially negative effects. The other study was shown to have potentially positive effects on writing for students with LD. Neither programs had online components, so both were excluded from the analysis. Next, the United States Distance Learning Association and the International Association for Online K-12 Learning, both organizations related to online learning, were searched. Those websites contained studies already discovered in earlier searches; however, three meta-analyses (Cavanaugh, Gillian, Kromery, Hess, & Blomeyer, 2004; Means et al., 2009; Smith et al., 2005) and three studies with writing outcomes not included in previous searches were identified, although participants were at the post-secondary level. In conclusion, the searches yielded no additional records.

Next a hand search of research articles published in special education journals within the last year was conducted. For each of the following journals, the last four issues were examined for peer-reviewed research on online writing instruction with student achievement data for K-12 students with special needs: *Exceptional Children*, *Journal of Special Education Technology*, *Learning Disability Quarterly*, *Learning Disabilities Research and Practice*, and *Remedial and Special Education*. The hand searches yielded no additional records. Finally, a hand search of the reference lists of the three articles that discovered previously was conducted. The search yielded one additional record.

Article Coding

Articles were coded by mode of technology used to deliver instruction as either synchronous or asynchronous. Synchronous was defined as the transfer of information without delay via the Internet. Examples of synchronous instruction included online chatting and online video conferencing via the use of software (e.g., Adobe Connect, Elluminate, or other customized software). Asynchronous was defined as two-way delayed communication via the Internet in which there was a delay in the transmission and receipt of information. Examples of asynchronous communication included websites with static text, discussion boards, and electronic mail. Articles were included only if they used asynchronous or synchronous educational technology to deliver writing instruction and had special education participants in the K-12 range. More specifically, the broad search terms defining mode of instruction (level one)

were crossed with those defining the grade level (level two) and content of instruction (level three) with special education to establish the set of online education articles concerned with K-12 special education writing instruction.

The articles were organized into categories using specific coding variables. First, type of technology used to deliver instruction was coded as synchronous, asynchronous, or other. Synchronous was defined as instruction that occurred via the Internet without delay in transfer of information. Online education examples of synchronous instruction included audio and video transmitted “live” between instructors or instructional software and students via the Internet. Asynchronous was defined as instruction that occurred via two-way communication via the Internet with a substantial delay between when a message was sent (or recorded) and when it was received. Online education examples of asynchronous communication included static text on websites, email, voicemail, discussion boards and so forth. All other instructional media were categorized as other. Second, participant grade level was coded as elementary or secondary. Third, instructional content in the study was coded as writing instruction or other. Finally, methodological characteristics were coded to identify the outcome measures for each article. In order to identify if the article reported student achievement data.

Literature Review Results

After examining each study for relevancy to the search, four peer-reviewed research studies of online writing instruction for K-12 students with special needs reporting student achievement data were identified. Two of the articles delivered instruction asynchronously, while the other delivered synchronous instruction. Two of the studies were at the secondary

level, while one was at the elementary level. All four studies contained instruction in writing and included empirical measures of student achievement data. The results of the systematic review of literature are presented in Table 3 as the number of peer-reviewed articles with student achievement data.

Table 3: Number of Peer-Reviewed Articles with Student Achievement Data

	Elementary	Secondary
Asynchronous	2	1
Synchronous	0	1
Total	2	2

Next, each of the articles are examined individually to establish gather information on research design, participants, methodology, results, and implications.

Johnson-Glenberg (2005) conducted a quasi-experimental within-subject research study with 20 middle school students. Students were identified as poor readers. While in the treatment condition, students were exposed to embedded strategies comprised of verbal and visual activities while reading delivered via a web-based application. Students received automated, immediate feedback for both verbal and visual activities. In the control condition, students unscrambled four anagrams to maintain instructional time at similar levels. Student performance was assessed using brief written responses to question prompts. Student performance results were also correlated to the number of times students voluntarily reread text as evidenced by the number of *scrollbacks* using the mouse. Johnson-Glenberg found that students using online embedded-learning strategies scored higher on written essays as measured by both human raters

and an automated essay-scoring algorithm. In addition, students rereading was higher for students with lower scores, leading the research to theorize that students with poor comprehension skills learned during the immediate feedback to employ the additional rereading strategy.

Igo, Riccomini, Bruning, and Pope (2006) conducted a sequential quantitative and qualitative study with 15 middle school students. Eleven of the students were diagnosed with LD, two were diagnosed with emotional/behavioral disorders, and two were diagnosed with other health impairments. Their quasi-experimental, counterbalanced design, similar to the design by Johnson-Glenberg (2005), investigated three methods of web-based note writing with or without technology support: (a) hand-written, (b) typed, and (c) copy and paste. In all three conditions, students were provided with a cued recall chart that served as a scaffold; the cue chart was provided on paper for the hand written condition and online for the other two conditions. Students rotated through all three conditions, and responded to both a multiple-choice test and a cued recall test. Results indicated that the type of note-taking condition accounted for 17% of the variance as calculated by eta squared. Subsequent analyses revealed that students with special needs performed best on the multiple-choice tests while employing the copy and paste method. Researchers hypothesized student learning was maximized because students employed similar search and select strategies for learning and assessment. Students with special needs scored poorly on both tests when exposed to the typing and handwriting condition. Researchers found that students wrote surface-level notes, and did not employ the more sophisticated learning strategy of summarizing content. Furthermore, students with special needs performed best when using the copy and paste method, results which ran counter to results

from an earlier study with general education students conducted by Igo, Bruning, McCrudden, and Kauffman (2003). In the Igo et al. (2003) general education students performed at higher rates when using the typing or writing method, while the copy and paste method had yielded poorer scores. Researchers hypothesized that general education students employed a more sophisticated summarizing note-writing strategy that enabled them to understand content at a deeper level. In the 2006 Igo et al. study, qualitative data analysis revealed that students with special needs preferred the copy and paste method because it was not laden with spelling, writing, or typing demands. Researchers hypothesized that students could focus cognitive energies on selection of appropriate text and proper placement of text within the scaffolded cue charts.

Englert et al. (2005; 2007) conducted a pair of studies with students with LD, mentioned earlier in this review of research literature. Both experiments investigated the effects of scaffolding text structure knowledge using asynchronous online technologies for elementary students with LD. In the 2005 quasi-experimental study, 12 students with LD were grouped into 3 conditions and rotated among all conditions in a counter-balanced fashion: (a) word processing with scaffolded supports, (b) word processing without scaffolded supports, and (c) paper and pencil. Text structure scaffolds were “embedded in the very fabric of the writing task and the structural organization of the text itself” (2005, p.194) as opposed to being removed from the writing activity (e.g., wall charts or cue cards). Englert et al. found that students’ performance in the word processing and scaffolded condition was significantly higher, but noted that students’ prior knowledge of text structure and familiarity with the online system navigation facilitated the instructional activity.

In a 2007 quasi-experimental group study, Englert et al. compared student performance of 35 elementary students with disabilities in experimental, asynchronous scaffolded conditions to students in control conditions with paper and pencil scaffolded support. Students in the experimental conditions produced longer and higher quality texts. Englert et al. hypothesized that the cognitive load required for writing was “distributed between the student and technology” (p. 25).

All four of the above studies used online technology to support cognitive processes for writing. In each case, the online environment provided a high level of support by embedding scaffolding directly into learning activities. The unique characteristics of the online environment afforded opportunities for procedural facilitation that would be otherwise impossible in a typical face-to-face environment. As such, the media employed provided specific advantages for delivering instruction (Kozma, 1994) rather than merely serving as bare conduit for instruction (Clark, 1994). The online environment provided space for embedded learning strategy activities (Johnson-Glenberg, 2005), procedural facilitation cue sheets (Igo et al., 2006), and embedded text structure supports (Englert et al., 2005, 2007). In each case, researchers identified features of the online environment that provided opportunities for online instruction.

Another common feature among all of the studies explored in this literature review was that of research design. Each study employed a quasi-experimental design to investigate the effects of the intervention on writing performance. In three of the four designs (Englert et al., 2005; Igo et al., 2005; Johnson-Glenberg, 2005) a counterbalanced design was used. Carryover effects are a potential limit of counterbalanced designs, resulting in threats to the internal validity

of the experiment. Future research should address the investigation of strategy-based writing instruction and scaffolded supports in online environments through the lens of single-subject research design, which controls for more threats to internal validity of the findings than quasi-experimental design (Gast, 2010).

Conclusions

Due to the limited number of studies located in this systematic review of the literature, further investigation into the efficacy of synchronous online cognitive strategy instruction in writing for students with LD is warranted. The current investigations centered on the effects of strategy instruction in persuasive writing via an online environment on the academic performance of students with LD. Based on recommendations from the NCW (2003) coupled with increased national demands for writing (CCSSI, 2011), emerging technologies have been used to support on-demand persuasive writing tasks. SRSD was used as the framework for explicit strategy instruction in persuasive writing via a video-conferencing software technology.

CHAPTER THREE: METHODS

The purpose of this study was to investigate the effects of synchronous online cognitive strategy instruction in writing (SOCSI-W) on the academic performance of students with LD. Merriam-Webster (2012) defines writing as the formation of characters or symbols on a surface with an instrument; however, writing can be widely defined as new technologies for writing develop regularly (e.g., text-to-speech generators). For the purposes of this study writing will be defined as the formation of characters on a computer screen using transcription with a keyboard, excluding accommodations such as a scribe or text-to-speech generators. Based on recommendations from the National Commission on Writing (2003) coupled with increased national demands for writing (CCSSI, 2011), emerging technologies should be used to support on-demand persuasive writing tasks. Self-regulated strategy development was used as the framework for explicit strategy instruction via a video-conferencing software technology. The research questions were as follows:

1. To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase the number of persuasive essay elements for students with learning disabilities (LD)?
2. To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase number of correct minus incorrect word sequence (CIWS) for students with learning disabilities (LD)?
3. To what extent will SOCSI-W increase performance on a mean holistic quality score of a persuasive essay for students with LD?

4. To what extent will SOCSI-W change standard scores for students with LD as measured by the Test of Written Language – 3?
5. How will students rate the importance of the goals, procedures, and effectiveness of SOCSI-W?

Participants and Setting

This study included two types of participants: student participants and an undergraduate writing instruction tutor. Four student participants were chosen to participate in this study and met the following criteria: (a) student participants were in secondary school and (b) prior diagnoses with a learning disability that affected their language skills. Student participants were solicited for participation through a local school and disability category was identified through the cumulative record. The TOWL-3 Form A was used prior to the intervention to establish that the students were at or below the 30th percentile of the normative sample, and students above the 30th percentile were excluded. Students with visual impairments or those who could not read above sixth grade level were not included due to reading requirements of the prompts. From the collective pool of potential student participants, the final student participants formed a homogeneous sample based on individual characteristics (e.g., similar grade levels, LD, and similar pre-test scores). The students' teacher confirmed that each child had a language-based disability which affected his or her ability to generate written composition. There were four participants. Damon was a 14 year old, 8th grade Caucasian male with LD. Carson was a 15 year old, 9th grade Caucasian male with LD. Jake was a 16 year old, 10th grade Caucasian male with LD. Monica was a 13 year old, 6th grade Caucasian female with LD. All students were

receiving instruction from the same English teacher with over four years of experience teaching English. The curriculum used was teacher-created and students continued to receive class instruction, as the intervention was characterized as a supplement to traditional instruction. All participating students were required to have school time access to high-speed broadband Internet connection that supported video-conferencing, a computer with a digital video camera, microphone, and headphones. Students accessed the system from school during a study hall period immediately after lunch. None of the students received additional writing instruction during the research study. The second type of participant was the undergraduate research assistant who was trained to use the online system and deliver the cognitive strategy instruction prior to commencement of the study. The research assistant had prior online technology expertise gained from playing online, multi-user video games that provided a depth of technology troubleshooting competencies for video and audio delivered online. The research assistant however, had no prior experience in teaching writing, but had been a tutor of Biology for high school students in a face-to-face setting.

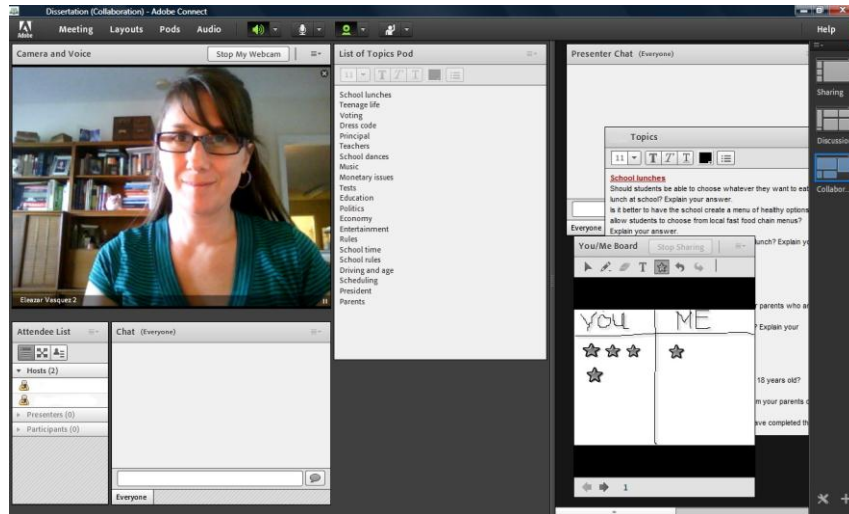
The intervention took place via an online clinic through the university. Cognitive strategy instruction in writing occurred in a synchronous online environment via a secure Internet video-conferencing system called Adobe Connect©. The researcher facilitated the intervention being delivered, provided immediate feedback on fidelity of treatment to the undergraduate tutor using online synchronous chat tools, scored student participants' assessments, and conducted Interobserver agreement checks.

Independent Variable

Synchronous Tutoring System

One trained undergraduate student who had completed required college freshman English courses delivered the independent variable over the online system. The tutor had experience had experience troubleshooting online video and audio conferencing due to three years of online gaming experience. Tutor selection was based on tutor's experience using video and audio conferencing in online environments, which eliminated an extensive need for training in hardware and software for online instruction. No formal assessment of technology skills was conducted. The hardware and software required to deliver synchronous online tutoring was a Macintosh or PC computer with a web camera and an audio connection with binaural headset with microphone. The Adobe Connect program was loaded onto the computer's web browser to create a virtual classroom environment. Adobe Connect provided both a dedicated Web meeting room at a fixed web address and telephone conferencing for up to 95 participants. It supported web cameras and worked with Macs as well as PCs (Adobe Systems Incorporated [ASI], 2011). Adobe Connects' capabilities include real-time communication (i.e., audio, video, text, and graphics), and document sharing within a virtual tutoring room. The Adobe Connect environment allowed the tutor and students to see and interact with each other simultaneously (ASI, 2011). See Figure 2 for a screenshot of the Adobe Connect interface that provide the learning environment for the students and tutors.

Figure 2: Adobe Connect Platform



Adobe Connect provided the video and audio feed for the instruction, as well as the platform to show any visual aids for learning. Although Adobe Connect provided document-sharing services, based on findings from an earlier pilot study similar to the current study, the technology was not sufficient to allow for real-time, collaborative writing. When using the interactive whiteboard feature to engage in collaborative writing, the data did not stream continuously, but rather lagged with a slow response time. Consequently, the platform was not sufficient for real-time, collaborative writing activities, a critical component of current intervention.

As an alternative for real-time collaborative writing activities, Google Docs was used to serve as writing tool in place of Adobe Connect's collaborative writing tool. The word processing functionality of Google Docs was more robust than that of the document sharing within the Adobe Connect virtual room. Adobe Connect provided video and audio feed to

establish instructional presence, while Google Docs provided a fully online, free word processing software system that was available to all participants in real-time (Google, 2011), allowing researcher, tutor, and participants to view the same writing space. Individual users created, shared, and edited files with others; those with access to shared documents viewed writing and editing in real time by all parties on the same document. Software features were similar to other computer-based word processing software, including the ability to insert images, footnotes, hyperlinks, highlighting, special characters, comments, as well as making format changes to text size, font, and color. Google Docs generated during the composition process were password protected and all documents were downloaded to a hard drive. Documents were stored online at no charge. Other file types were also supported, such as spreadsheets, presentations, and drawings (Google, 2011).

A limited number of studies were located in the systematic review of the literature investigating online writing instruction for students with LD. Further, no studies were located which delivered synchronous online cognitive strategy instruction in writing (SOCSI-W). Based on recommendations from the NCW (2003) coupled with increased national demands for writing (CCSSI, 2011), emerging technologies should be used to support on-demand persuasive writing tasks. Because no research studies were identified during the review of literature investigating the effects of SOCSI-W for students with LD, a treatment package was created replicating components of a study conducted by Mason et al. (2009) in which students with disabilities, including LD, learned a strategy for writing a persuasive essay (POW+TREE) using the SRSD instructional model in a face to face setting. Self-regulated strategy development for POW+TREE was delivered using the Adobe Connect video-conferencing system, and Google

Docs word processing software was used for collaborative writing in real-time. The total treatment package of SOCSI-W consisted of: (1) the synchronous online system and (2) the instructional curriculum of SRSD for POW+TREE.

Curriculum

SOCSI-W consisted of the SRSD for POW+TREE to teach student participants planning and writing strategies for persuasive essays (Mason et al., 2009). With SRSD, students were systematically and explicitly taught writing and planning strategies, emphasizing memorization, performance to mastery, and self-regulation (Harris & Graham, 1996; Harris et al., 2003). In SRSD, students learned and memorized the steps of the targeted strategy with the support of a mnemonic device memorization aid (e.g., POW+TREE). Instruction continued on each of the strategy steps until the student demonstrated mastery. Responsibility for regulation of the strategy was slowly transferred from instructor to student through the gradual fading of scaffolded supports. Self-regulation of the strategy was supported by procedures that include goal setting, self-monitoring, self-instructions, and self-reinforcement (Harris et al., 2003; Harris & Graham, 1996).

As conceptualized by Harris et al. (2003), the SRSD framework was used as a basis for instructional sessions. In the current study, student participants learned two strategies – one for planning and one for writing. Student participants learned a modified version of POW, based on feedback from pilot participants, for planning essays (Mason et al., 2009; Graham et al., 1998): P – Pick idea, O – Organize TREE, and W – Write and check. Student participants learned a

modified TREE strategy for writing persuasive essays (Mason et al., 2009; Graham et al., 1998):

T – Topic sentence, R – Reasons (3 or more), E – Examples, E – Ending.

Lesson 1. Develop background knowledge: In the first lesson, the tutor developed background knowledge by identifying the elements of the persuasive essay (e.g., topic sentence, at least three reasons with explanations, and an ending) in a sample work and in their own essay from baseline. Discuss It: The POW+TREE strategy was introduced and the tutor and student participants discussed the how the strategies could be used in a variety of classes and in life. They also discuss the idea of strategy self-regulation.

Lesson 2. Model it: The student participant viewed a pre-recorded think-aloud (Flower & Hayes, 1981) in which the researcher modeled the steps of writing a persuasive essay. The tutor paused the video throughout and asked questions about essay elements of the student participant, providing automatic corrective feedback. Memorize it: The student participant memorized the steps to 100% proficiency as demonstrated by a question and answer assessment session with the tutor.

Lesson 3. Support it: With the tutor, the student participant wrote a persuasive essay including all of the elements using the Google Docs collaborative writing platform. The student participant received formative feedback during the writing process. Memorize it: The student participant continued to memorize the steps to 100% proficiency as demonstrated by an online assessment with the tutor.

Lesson 4. Independent Practice: Working independently, the student participant wrote a persuasive essay. After completing the essay, the student participant reviewed the essay of the tutor and provided feedback regarding the elements of the essay. The tutor provided feedback to the student participant regarding inclusion of all the essay elements.

Lesson 5. Independent Practice: Working independently, the student participant again wrote a persuasive essay. After completing the essay, the student participant and tutor reviewed the each other's essays and provide feedback regarding the elements of the essay. This additional lesson provided opportunity for the student participant to improve areas where he or she might be encountering trouble, as well as improve their clarity and voice based on reader feedback from the instructor (Wong et al., 1994). Student participants who had not reached criterion at this stage received additional lessons daily in the same format as Lesson 5 until criterion was reached.

Writing Prompts

Choice has been demonstrated to have positive effects on student task engagement (Kern et al., 2002). When considering writing prompts which are accessible to students with diverse experiences and background knowledge, Mason and Shriner (2008) recommended giving a choice of writing prompts which are (1) devoid of academic content knowledge and (2) topics which have the potential to promote debate among adolescents (e.g., Should students be allowed bring cell phones to class?). Student participants were provided a choice in writing to one of two prompts as well as selecting their argument stance for their response in order to moderate the effects of (1) lack of content background knowledge and (2) motivation for writing.

To moderate for the effects of content knowledge and interest in topics for secondary students a pool of writing prompts was developed based on findings of preferred writing topics for opinion essays of middle school students from Shippen, et al. (2007). Shippen et al.'s list of topics was used to generate writing prompts for the current study (see Appendix B for a complete list of topics and corresponding writing prompts). The writing prompts were evaluated using the Microsoft Word Readability Statistics feature. The Flesch-Kincaid grade level readability statistics of the probes reveal a mean score of 4.3 grade level with a range of grade levels 2.1 through 6.9.

After a student participant has chosen his or her preferred topic from the lists generated from the Houchins et al. (2007) study, the tutor randomly selected and removed a prompt from the pool of prompts related to the topics. In this manner, students had their choice of topics, without seeing potential prompts. This procedure controlled for two sources of variability attributed to motivation for writing: (1) choice of topic and (2) interest in topic (Flowerday, Schraw, & Stevens, 2004). Students did not have access to prompts before the data was collected to prevent students from pre-writing to prompts. Student participants were not given a time limit for planning and writing of responses to the prompt.

During all conditions, the following protocol for delivering prompts was used. The tutor: (1) said "Please choose a topic from this list of topics; (2) randomly selected and removed a prompt from the pool of prompts available based on the student's choice; (3) displayed the prompt to the student; (4) said "Please follow along as I read the prompt to you" while simultaneously highlighting the prompt using the Google Docs highlighting feature as it was

read; (5) said, “Please read the prompt back to me; (6) said, “Now you will plan and write your response. Be sure to use everything you have learned about writing”; (7) said, “Please tell me when you are ready to begin planning by saying ‘Ready to plan’ and tell me when you are ready to begin writing by saying ‘Ready to write’ (8) recorded the length of time spent planning and writing, and (9) thanked the students for working hard. Writing prompts used as data probes were administered at the beginning of each session to get a “cold” read on student participants’ writing abilities.

To bolster student motivation, individualized reinforcers were used throughout intervention conditions. Vasquez (2009) used preference assessments to establish reinforcers to which could be used for supplementary online instruction. Reinforcement was used to reinforce behaviors related to signing on to the SOCSI-W system and completing the writing tasks. Prior to commencing the study, the researcher and participant met to determine possible reinforcers that parents agree to provide on a weekly basis. A preference assessment was used to develop a list of reinforcers students selected from to maintain motivation for the participant engaging in a high demand tasks (see Appendix C). Reinforcers were items valued at two dollars or less or activities that both the child and the teacher agreed were desirable. Each reinforcer was awarded a one point value. Student participants could earn one point at the end of each lesson during intervention. The point was earned if the student participant won the You/Me Game (Vasquez, 2009). The You/Me Game was a competitive game engaged in by the tutor and the student participant during each lesson, which has been found to be reinforcing to students learning in online environments (Vasquez, 2009). Throughout the lesson, the student participant would earn stars for procedures using a variable –ratio schedule of reinforcement for correct responses.

Incorrect responses resulted in the tutor earning a star. At the end of the lesson, the tutor and the student participant tallied up their number of stars and the individual with the most stars won the You/Me Game for the lesson and earned a point which could be exchanged for one reinforcer (Vasquez, 2009). The tutor communicated with the teacher assigned to sign-on procedures at the school and the teacher administered the reinforcers. At the commencement of each session the tutor asked the students to confirm that the reinforcer had been delivered as planned.

Instruction occurred via the SOCSI-W system and lasted a minimum of four to five sessions ranging between 40 and 45 minutes in length (Mason & Shriner, 2008). Instruction continued until mastery was achieved; mastery was defined as student participants remembering all steps of a strategy and including all essay elements in their essay responses (De La Paz & Graham, 1997; Lienemann & Reid, 2006; Mason & Shriner, 2008; Graham et al., 1998).

Tutor Training

One trained undergraduate student who had completed required college freshman English courses delivered the independent variable over the online system. The tutor received four hours of instruction in applying the instructional procedures of the SOCSI-W system and SRSD for POW+TREE. Mastery was determined by 100% completion of the step-by-step checklist for each lesson (See Appendix D). The tutor also received formative feedback regarding fidelity of procedural implementation during baseline and treatment conditions to ensure high treatment fidelity. The formative feedback was delivered using two methods: 1) written communication via the synchronous chat box feature that was out of the view of the student participant and 2) video conferencing communication after the termination of each lesson once the student

participant had logged off of the Adobe Connect© system. If treatment fidelity fell below 80%, feedback was provided to the tutors by reviewing treatment fidelity for each step of the checklist in Appendix D. For more information regarding treatment fidelity procedures, see Assessment of Treatment Integrity section below.

Assessment of Treatment Integrity

Four procedures were in effect to ensure procedural fidelity. First, all sessions were recorded using the SOCSI-W system archival recording feature. Second, the tutor used a step-by-step procedural fidelity checklist and checked each step as completed during the instructional training, ensuring that instructional procedures were being followed (Mason et al., 2009). Third, the researcher provided formative feedback during and after each session to deliver information about procedural fidelity. Fourth, 30% of sessions were also evaluated by the researcher and a trained research assistant for inter-observer agreement using the point-by-point method comparing planned procedures to actual procedures (Gast, 2010). If treatment fidelity fell below 80%, feedback was provided to the tutor by reviewing treatment fidelity for each step of the checklist in Appendix D.

Dependent Variable

This study measured the dependent variable of writing performance through three common measures of writing performance: (a) number of essay elements, (b) correct minus incorrect word sequence (CIWS) and (b) holistic quality score. The primary dependent measure was the number of essay elements included in the persuasive essay response, a common primary

measure of writing performance in educational research (Graham et al., 1998; Lienemann & Reid, 2008; Mason & Shriner, 2008; Mason et al., 2009; Thompson-Jacobson & Reid, 2010). Mason et al. (2009) used the number of essay elements included as the primary measure and to establish criterion performance. The number of essay elements was measured by points awarded for each element included and extra points were awarded for each additional reason and explanation, resulting in a potential score of eight points or more (Mason et al., 2009). The current investigation followed the format for scoring used by Mason et al. (2009); consequently, students scored a minimum of eight points to reach criterion performance level (See Appendix E). Because the SOCSI-W system required all writing to be generated in typed format, essays did not need to be corrected for handwriting. Two trained raters received instruction in how to accurately score essay elements prior to commencement of the study. During initial training, raters scored sample persuasive essay responses until achieving 95% agreement over 10 responses (Mason & Shriner, 2008). To control for threats to internal validity due to instrumentation, interobserver agreement was calculated with the point-by-point method (Gast, 2010) as seen in Figure 3:

$$\frac{\textit{Agreements}}{\textit{Agreements} + \textit{Disagreements}} \times 100 = \textit{Percent Agreement}$$

Figure 3: Point-by-point method

Scoring reliability was established as a point-by-point agreement for each measure dividing the raters' agreements by the total number of agreements plus disagreements. Inter-rater reliability was calculated for exact agreement (Mason et al., 2009). Finally, for disagreements,

the score of the researcher was used. To meet What Works Clearinghouse evidence standards of *strong evidence* of causal relations, each dependent variable must be measured systematically over time by more than one rater on at least twenty percent of the data points in each condition (e.g., baseline, intervention) and the inter-assessor agreement must meet minimal thresholds, defined as .80 to .90 (on average) as measured by percentage agreement (Kratochwill et al., 2010). The researcher independently scored essay elements and evaluated 100% of permanent products using a trained evaluator to establish inter-rater reliability.

Espin et al. (2008) suggested CIWS as a curriculum-based measure of monitoring student growth in writing. CIWS was used as a secondary measure of writing growth to capture changes in student frequency of spelling, punctuation, and grammatical errors. CIWS coupled with number of essay elements provided a more robust picture of the writing product. As with the primary measure, scoring reliability was established as a point-by-point agreement for each measure (e.g., line of text) dividing the raters' agreements by the total number of agreements plus disagreements.

In their meta-analysis of writing interventions for adolescents, Graham and Perin (2007) reported that overall quality is one of the most common methods used to evaluate writing. Consequently, the tertiary measure of writing quality was a holistic quality scale (De La Paz & Graham, 1997; Graham & Harris, 1989b; Mason et al., 2009; Graham et al., 1998) with a score of 6 representing the highest quality and a score of 1 representing the lowest quality. The scoring instrument was the FCAT holistic grading scale (FLDOE, 2011). The FCAT Writing scale (see Appendix F) was used because it has been provided with accompanying anchor sets

specific to persuasive writing essays. The anchor sets provided models of writing at each level of the 6-point scale and were used to train raters when evaluating overall essay quality. The researcher scored overall quality using the grade 10 FCAT writing scale (see Appendix F), a standardized achievement test for Florida students (FLDOE, 2011). The researcher randomly selected three essays from each condition for each participant for holistic scoring. Inter-rater reliability was calculated by assigning 100% of the randomly selected permanent products to be evaluated by a trained research assistant. As with the essay elements measure, because the SOCSI-W system requires all writing to be generated in typed format, essays did not need to be corrected for handwriting. Raters were instructed to award a holistic quality score based on overall impression taking into account word choice grammar, sentence structure, and organization (De La Paz & Graham, 1997). Scoring reliability was established as a frequency ratio for each measure dividing the smaller mean of three baseline holistic measures by the larger mean of three baseline holistic measures as scored by two independent raters (Kazdin, 1982) as seen in Figure 4:

$$\frac{\textit{Smaller mean}}{\textit{Larger mean}} \times 100 = \textit{Frequency Ratio}$$

Figure 4: Frequency ratio

A standardized measure of writing performance was used to assess generalization (Walker, Shippen, Alberto, Houchins, & Chiak, 2005) as well as difference in scores pre- and post-intervention. The Spontaneous Writing portion of the TOWL-3 (Hammill & Larsen, 1996) was administered before and after the intervention. In the Spontaneous Writing (SW) portion of

the TOWL-3, student participants responded to a picture prompt within a 15-minute time limit. The written response was evaluated using three scoring methods as indicated in the directions, yielding three separate subscores covering the following constructs: (1) spontaneous writing quotient, (2) syntactic maturity, (3) contextual spelling, (4) thematic maturity, (5) contextual style, and (6) contextual vocabulary and inter rater reliability for SW scores is reported as .92. Form A was used prior to the intervention to establish that the students are at or below the thirtieth percentile of the normative sample and Form B was administered after the intervention. Form B was used to compare results to Form A as well as to provide a measure of generalization. The TOWL-3 scores were reported as quotient scores with a mean of 100 and a standard deviation of 15 points. The quotient scores were defined as follows: very superior (131–165), superior (121–130), above average (111–120), average (90–100), below average (80–89), poor (70–79), and very poor (35– 69). As with the primary measure, scoring reliability was established as a point-by-point agreement for each measure dividing the raters' agreements by the total number of agreements plus disagreements.

Finally, social validity and demographic data were collected. Social validity information was collected using an online questionnaire with items measured on a Likert Scale (1 = “Strongly Disagree”, 2 = “Disagree”, 3 = “Neither Agree nor Disagree”, 4 = “Agree”, and 5 = “Strongly Agree”). Wolf’s framework was used as a basis for creating the items on the instrument: (a) social significance of goal: I think improving my writing is important and useful, (b) social appropriateness of procedures: I think the procedures for receiving online instruction in writing were appropriate, and (c) Social importance of effects: I am satisfied with the results of

my learning after receiving online instruction. Student participants were also asked to describe any instances in which they had found the strategy to be useful other than the research setting.

Length of an essay, time spent planning, and time spent writing are indirect measures of writing quality (Graham et al., 1998; Thompson-Jacobson & Reid, 2010). Therefore, in the current investigation, data was collected on number of words written, time spent planning, and time spent writing. The number of words written was determined using the Word Count feature of the Google Docs word processing program. Inter-rater reliability data was taken on this measure. The time spent planning was recorded by the tutor and researcher in terms of the number of seconds spent planning an essay (Graham et al., 1998; Thompson-Jacobson & Reid, 2010) and time was recorded by using a digital stopwatch. Time spent planning began after the student participant stated “ready to plan” and no writing time was included in this time. The tutor and researcher also recorded the number of seconds spent writing an essay (Graham et al., 1998; Thompson-Jacobson & Reid, 2010) and time was recorded by using a digital stopwatch. Time spent writing began after student states “ready to write” and no planning time was included in this time. Number of words written, time spent planning, and time spent writing were displayed on a graph for the researcher to use to inform decision-making related to phase changes and stability in data levels. Although these measures are not the primary measure, they provided a more robust picture for data analysis.

Procedures, Experimental Design, and Conditions

The primary research question: “To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase number of persuasive essay elements for students with learning disabilities (LD)?” was addressed with a multiple probe across participants design, which is appropriate for interventions in which the behavior being observed cannot be unlearned, such as a writing strategy (Gast, 2010). The design employed inter-subject replication across four subjects to address threats to internal validity (Gast, 2010). A multiple probe design was selected over multiple baseline design based on feedback from participants in a pilot study conducted previously. Participants reported that daily 10-minute writing probes void of corrective feedback were aversive. In addition, in the pilot study it was noted that the data points for the primary measure of essay elements did not vary more than 10% in either direction for any participant during baseline conditions; consequently, in the current investigation, student participants in baseline conditions were probed for writing performance on a periodic, usually weekly, basis. A multiple probe design allowed for a trend in data to be established in baseline using less data collection, therefore collection of fewer data points did not affect the ability to establish experimental control.

The current investigation meets WWC established criteria for single case designs that *meet evidence standards*, and meets additional criteria needed in order to be established as *strong evidence of causal relation*. The experimental design was a multiple probe across participants design in which student participants were systematically measured on their writing performance over time and a trained research assistant collected inter-rater data across twenty percent of data points in each condition. To meet WWC standards a multiple baseline design must have a

minimum of six phases with at least five data points per phase. The current investigation demonstrated replication of effect over an estimated ten phases with at least five data points per phase (Kratochwill et al., 2010). See Appendix G for a comparison of WWC standards and the current investigation.

The secondary research question: “To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase number of correct minus incorrect word sequence (CIWS) for students with learning disabilities (LD)?” was addressed using a multiple probe design.

The third research question: “To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase number of persuasive essay elements for students with learning disabilities (LD)?” was addressed with a non-experimental pre-test/post-test design evaluating the mean scores of essays written pre- and post-intervention.

To address the fourth research question: “To what extent will SOCSI-W change standard scores for students with LD as measured by the Test of Written Language – 3?” the current investigation used a non-experimental pre-test/post-test design.

To address the fifth research question: “How will students and teachers rate the importance of the goals, procedures, and effectiveness of SOCSI-W?” the current investigation used a non-experimental post-test design to collect data post-intervention.

Initial Participant Assessment and Training

After approximately 10 potential student participants were identified by the school research site, the researcher administered the TOWL-3. Student records were reviewed with the teacher to establish that students had an Individualized Education Program (IEP) that included goals for language skills. Four students who met the selection criteria were invited to participate in the study.

Prior to intervention, student participants took part in a variety of activities to ensure optimal performance during the experiment. First, all student participants and their teacher were trained to proficiency using the SOCSI-W system. Next, student participants were administered a preference assessment (see Appendix C) to determine positive reinforcers to be used throughout intervention conditions. Three students (Damon, Monica, and Jake) chose a similar reinforcer as a result of the preference assessment, a two dollar coupon to purchase lunch for each point earned. Carson initially chose the same reinforcer, but later requested a change to accrue two dollars per session to use to purchase a game.

Baseline

All four student participants began in the baseline condition. During baseline, each participant was administered a persuasive essay prompt daily for the first three to five days resulting in a single data point for each day. These assessments took place online using the Adobe Connect© platform. Students did not receive supplemental online writing instruction; however, they did continue to receive their traditional writing instruction. During baseline condition, student participants produced three to five consecutive data points (e.g., daily for five

days) in response to an essay probe (Kratochwill et al., 2010). All four students received three writing probes for data analysis, and the two students with the most stable data were administered an additional two writing probes in order to identify the first participant for intervention. Students continued to receive writing instruction from other sources as usual during baseline and treatment conditions because the SOCSI-W is supplementary to each student's normal writing instruction. Reinforcement procedures were not in effect during baseline, as reinforcement only occurred during instruction for correct responses and following procedures correctly.

Intervention

A female, trained undergraduate student delivered the writing curriculum as described above. Assessment continued as in the baseline phase. The instruction in the intervention took place over five to eight consecutive days. The tutor delivered the SOCSI-W intervention as prescribed using the step-by-step checklists developed for each lesson (Appendix D).

Phase Changes

Prior to implementing synchronous online writing for participant 1, the researcher and inspected the baseline trends for the primary dependent measure for all student participants and determine if data was stable and predictable. To identify the first participant to change conditions from baseline to treatment, Gast (2010) recommends determining the level of stability of baseline data by considering the range in data point values within a series, indicating that data are generally accepted as stable if 80% of the data points fall within 20% range of the median level of all data points within a condition. In the case of the current investigation 20% data

variability is 1.6 data points in either direction, which has been rounded to 1 point in either direction. The level of data stability was considered using Gast's (2010) guideline, and the participant with the most stable individual baseline data over three consecutive data points commenced treatment first. To change conditions in multiple probe designs, Gast (2010) recommends setting a performance criterion-level. The student participant demonstrated mastery of all steps of the writing strategies as evidenced by essays that include all eight functional elements (Mason et al., 2009; Graham et al., 1998) to meet performance criterion-level. After performance level criterion was met, the participant demonstrated mastery over three consecutive data points before terminating instruction. Upon termination of instruction, the student participant moved into post-instruction phase, in which conditions were the same as baseline (Mason et al., 2009; Graham et al., 1998).

Instruction was not started for the second participant until the first participant met the performance criterion-level. After the participant in leg one of the treatment condition completed part one of the performance criteria, all other participants received writing probes to establish the stability of data. The participant with the most stable data level over the most recent three consecutive data points was identified and moved into treatment condition. These criteria were used as general guidelines rather than absolutes. Identical procedures were used when initiating and terminating all instruction. Maintenance probes were administered weekly after terminating instruction until all student participants had completed instruction. Consequently, the number of maintenance data points varied across student participants.

Post Test

After completion of the study, the researcher administered the TOWL-3 Form B online. The social validity questionnaire was also administered to student participants. As mentioned above, three post-instruction essays from each participant were randomly selected and evaluated using the holistic scale. All three scores were averaged together to result in an overall mean score post-instruction.

Experimental conditions related to all five research questions can be seen in Table 4.

Table 4: Experimental Conditions

Procedures (in sequential order)	Conditions				
	Pre-Study	Baseline	Instruction	Maint.	Post-Study
Traditional classroom writing instruction.	✓	✓	✓	✓	✓
SOCSI-W training for parents	✓				
SOCSI-W training for participants	✓				
Preference assessments.	✓				
TOWL-3 Form A	✓				
Reinforcement procedures			✓	✓	
SOCSI-W Treatment (4-5 Lessons)			✓		
Maintenance Probes				✓	
TOWL-3 Form B					✓
Procedural Fidelity Checks	✓	✓	✓	✓	✓
Interobserver Agreement Checks	✓	✓	✓	✓	✓

Data Analysis Procedures

A variety of methods were used for data analysis, depending upon the experimental design used to collect data. Data were also collected on number of words written, number of seconds spent planning, and number of seconds spent writing to be analyzed when assessing potential confounding factors of treatment.

Visual Data Analysis of Multiple Probe Design

Visual analysis of the primary dependent measure data (graphed after each session) was used to evaluate the functional relationship between the independent variable and dependent variables. Analysis of single-subject research traditionally uses systematic visual analysis of data within and across conditions (Gast, 2010). In the current investigation, the researcher considered changes in: (a) mean level, (b) trend line slopes, and (c) variability (Gast, 2010).

Percentage of non-overlapping data points. Scruggs et al. (1987) offered guidelines for measuring the effect of single subject design studies by calculating the percentage of non-overlapping data points (PND): 90% a large effect; 70% to 90%, a medium effect; and 50% to 70%, a small effect. For behaviors that were intended to increase because of instruction, PND is calculated by examining the number of data points in the treatment phase that exceed the highest data point in the baseline condition. The resulting number is divided by 100 to yield a percentage score.

Analysis of Pre- and Post-test Data

Holistic Essays. All participants wrote essays before and after the intervention. Three essays were randomly selected from participant responses pre- and post-intervention. The essays were scored using the holistic scale and a mean score for pre- and post-intervention were generated. Differences between the mean pre- and post-test scores were calculated for each participant.

TOWL-3. All participants were assessed using the TOWL-3 before and after the intervention. TOWL-3 scores were reported as quotient scores. Differences between the pre- and post-test scores were calculated for each participant.

Expert Reliability

A special education teacher responsible for delivering English content at the secondary level reviewed the writing prompts and determined that the prompts were appropriate writing topics for secondary students. The Flesch-Kincaid Reading Level for each prompt was also reviewed and determined to be appropriate by the special education teacher.

Social Validity

Responses to questions related to social validity of procedures were collected using a questionnaire. Descriptive statistics were used to communicate results of student participants' responses to the social validity questionnaire.

CHAPTER FOUR: RESULTS

The purpose of this study was to investigate the effects of synchronous online cognitive strategy instruction in writing (SOCSI-W) on the academic performance of students with LD.

The research questions guiding the investigation were as follows:

1. To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase the number of persuasive essay elements for students with learning disabilities (LD)?
2. To what extent will synchronous online cognitive strategy instruction in writing (SOCSI-W) increase number of correct minus incorrect word sequence (CIWS) for students with learning disabilities (LD)?
3. To what extent will SOCSI-W increase performance on a mean holistic quality score of a persuasive essay for students with LD?
4. To what extent will SOCSI-W change standard scores for students with LD as measured by the Test of Written Language – 3?
5. How will students rate the importance of the goals, procedures, and effectiveness of SOCSI-W?

This study consisted of a multiple baseline across four participants in an urban area of the southeast United States. The multiple baseline graphs which are presented throughout this chapter illustrate number of essay elements (see Figures 4 and 5). Pseudonyms have been used throughout the text to maintain the confidentiality of the participants.

Interobserver Agreement

Interobserver agreement (IOA) data across all dependent measures and fidelity of treatment delivery checklists can be found on Table 5.

Table 5: Interobserver Agreement for All Dependent Measures

Dependent Measure	Mean	Range
Number of essay elements (point-by-point agreement)	85.9	25-100
Correct minus incorrect word sequence (point-by-point agreement)	93.2	66-100
Holistic quality	97.2	94.4-100
TOWL – 3 Spontaneous Writing Score (point-by-point agreement)	72.9	67.6-81.0
TOWL – 3 Assessment Delivery Fidelity (point-by-point agreement)	100	100
Treatment Procedural Fidelity Checklist (point-by-point agreement)	98.2	96.4 -100

Interobserver agreement (IOA) was calculated on all dependent measures. Overall, on the number of essay elements there was a mean agreement of 85.9% between two independent observers (range 25 – 100) for point-by-point IOA. The low score of 25 IOA was an outlier which resulted from disagreements on one specific subset of the instrument (i.e., reasons and explanations) and occurred at the very beginning of the study. The research assistant reversed the operational definitions when scoring the essay. After the low IOA was identified, the research assistant was retrained on all of the operational definitions. For Correct Minus Incorrect Word Sequence (CIWS) there was a mean agreement of 93.2% between two independent observers (range 66-100). The low score of 66 in this range also triggered follow-up training to identify errors in scoring. In the case of this low score, it was the result of errors in calculating word sequences. For holistic quality scores a frequency ratio method was used by two

independent raters with 97.2% (range 94.4-100) IOA. On the TOWL – 3, there was a mean agreement of 72.9% between two independent observers (range 67.6-81.0) using the point-by-point method of calculating IOA.

Interobserver agreement was also calculated on checklists of TOWL-3 assessment delivery fidelity and treatment procedural fidelity as seen on Table 5. The TOWL-3 assessment delivery had 100% agreement of fidelity during both pre- and post-test administrations.

Treatment Fidelity

Treatment procedural fidelity was assessed using the step-by-step treatment fidelity checklists (see Appendix D) and was assessed at 98.2% (range 96.4 -100), indicating a high level of fidelity. Further, the tutor research assistant required no comprehensive re-training to deliver the instruction, because procedural fidelity did not fall below 80%. The hidden chat pod feature was used to provide formative feedback as the researcher assessed the tutor's fidelity of implementation. The hidden chat pod was a text based chat box which was out of view of the student participant, but could be viewed by the tutor and the researcher collecting fidelity of treatment data. Specific data was not collected on the utilization of the hidden chat pod, but it was used to deliver one to two sentence statements that provided corrective feedback to the tutor. The researcher did not plan to use the chat pod during any of the sessions, but the the tutor initiated a question regarding procedures at the outset of the study using the chat pod. Because the primary researcher was collecting data on fidelity of implementation, the primary researcher was available to respond to questions raised by the tutor. Once the chat pod had been established as a useful tool for delivering treatment to fidelity, it was used at least once per session.

Although specific data was not collected on frequency of usage, the chat pod did seem to be more frequently used in the supported writing tasks during the first intervention legs; however, the researcher noted that the tutor communicated via the chat pod less during the last two legs of the intervention. Toward the end of the study, the hidden chat pod was rarely used.

Technology Issues

Brief intermittent audio and video feeds were a common occurrence, especially if the student's computer was receiving the Internet signal through a wireless connection rather than an Ethernet connection, which provided a smoother transmission of video and audio feed. Pauses in signal delivery generally lasted between 3 and 5 seconds. Longer delays resulted in both the student and the tutor signing off and back on to the system. Days in which the video or audio system experience longer delays were noted as a part of data collection. No changes in trend or level were noted after longer delays. On one occasion, there was no audio signal although the video was functioning, so the student and tutor communicated by phone to replace the lost audio feed. Again, there were no changes in trend or level after the modified audio delivery. On three separate days, the Internet was not operating during the scheduled time which prevented student participants from signing on to the online system, and consequently over the course of the study there were three separate sessions in which the intervention could not be delivered due to technical issues. However, there was no noticeable change in trend or level after the missed instructional sessions.

Multiple Probe Across Participants

Number of essay elements (EE) in each phase is presented in Figure 5 and correct minutes incorrect word sequence (CIWS) is presented in Figure 6. The EE measure was a direct measure of the instruction in increasing essay elements, but EE does not reflect errors that may occur in the writing product. However, CIWS does provide a valid and reliable method for scoring writing errors and number of words written (Espin et al., 2008). Taken together, EE and CIWS provide a more complete view of the quality of the essay by indicating the number of elements as well as the number of correct minus incorrect word sequences. Each measure alone can only provide a partial view of the writing product. For the purpose of this study, EE was used for decision making within the multiple probe design because it most closely aligned with the majority of instructional content (e.g., TREE). The final step of POW (e.g., Write and check) provided explicit instruction in correcting errors and was evaluated using CIWS.

Visual analysis of Figure 5 demonstrates the change in slope of number of essay elements (EE) when presented with supplemental synchronous online cognitive strategy instruction in writing (SOCSI-W). Damon's mean number of EE during baseline was 1.83 with a decreasing slope of 0.61 EE. Given 11 sessions of SOCSI-W, his EE changed noticeably in both level and slope. Damon had an intervention phase mean of 6 EE and an increasing slope of 0.74 EE. Damon's mean EE score in maintenance was 6.5 over 2 data points. Damon's first data point collected during maintenance was lower than his final data point collected during the intervention. After Damon completed his self-regulation procedures by scoring his maintenance essay and graphing his results he stated that he was upset that he had forgotten to include all eight parts and made it his goal to include all eight parts at his next session, which he achieved at

the next session. Damon's PND for EE was 80%. PND of projected trend line (PND-P) was also calculated to account for trends in baseline (Vasquez, 2009). PND-P was calculated by examining the number of data points in the treatment phase that exceed the projected trend line of the baseline condition, and the resulting number was divided by 100 to yield a percentage score. Damon's PND-P was 100%.

Monica's mean EE during baseline was 4.57 with a decreasing slope of 0.15. Given nine sessions of supplementary SOCSI-W, her EE changed visibly in both level and slope. Monica had an intervention phase mean of 7.38 EE and an increasing slope of 0.73 per session. Monica's PND for EE was 63%. Monica's PND-P was 100%.

Carson's mean EE during baseline was 4.6 with a decreasing slope of 0.42. Given five sessions of supplemental SOCSI-W, his EE changed visibly in both level and slope. Carson had an intervention phase mean of 9.25 EE and an increasing slope of 0.82. Carson's PND for EE was 80%. Carson's PND-P was 100%.

Jake's mean EE during baseline was 4.4 with a decreasing slope of 0.33. Given six sessions of supplemental SOCSI-W, his EE changed visibly in both level and slope. Jake had an intervention phase mean of 7.2 EE and an increasing slope of 0.78. Jake's PND for EE was 40%. Jake's PND-P was 100%.

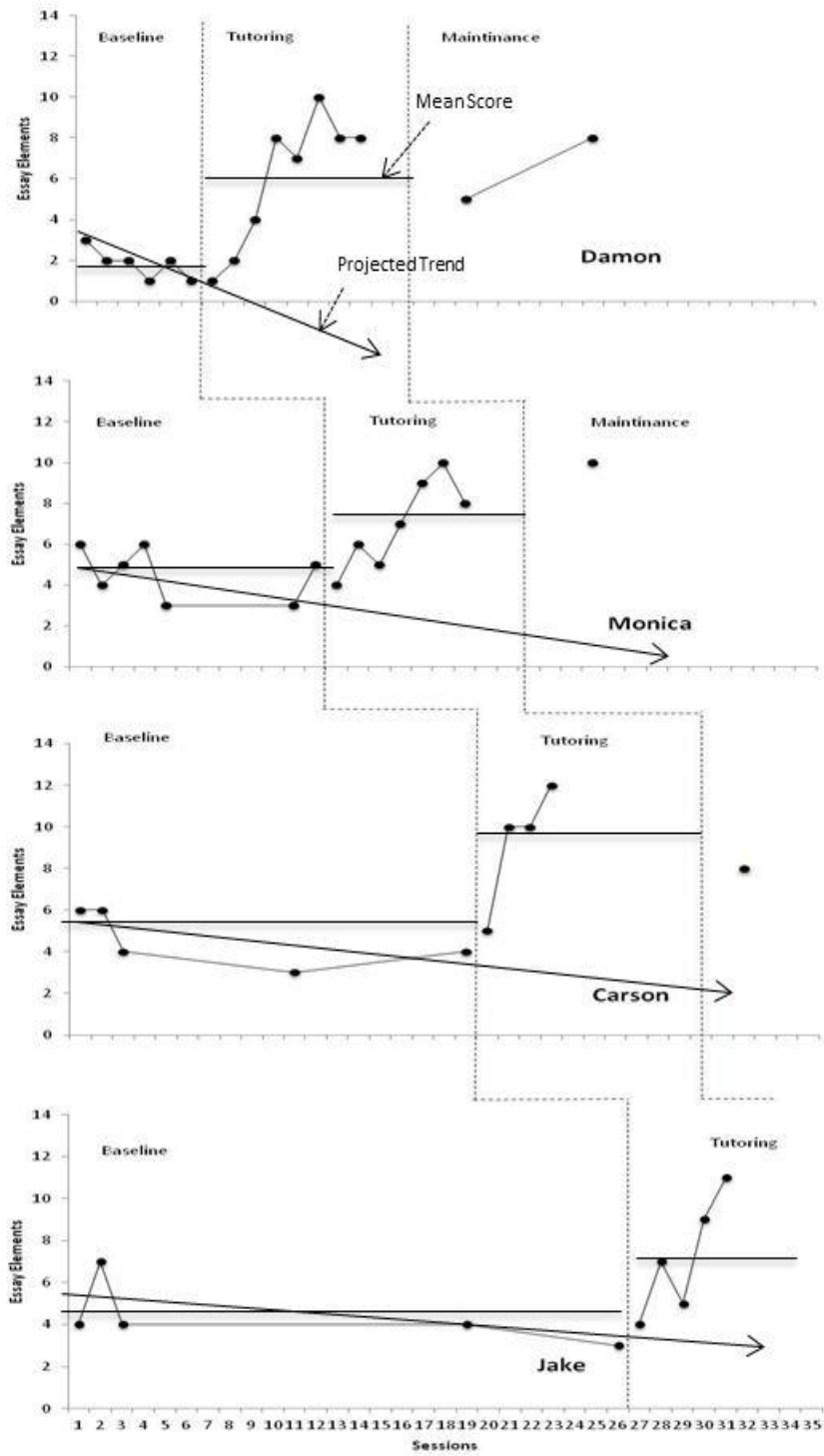


Figure 5: Effects of SOCSI-W on Essay Elements

Correct Minus Incorrect Word Sequence

Visual inspection of Figure 6 highlights the results of SOCSI-W on the secondary measure, correct minus incorrect word sequence (CIWS). Damon's mean number of CIWS during baseline was 9.33 with a decreasing slope of 0.41. Given 11 sessions of supplemental SOCSI-W, his CIWS changed visibly in both level and slope. Damon had an intervention phase mean of 77.5 CIWS and an increasing slope of 0.81. Damon's mean CIWS score in maintenance was 108.5 over 2 data points. Damon's PND for CIWS was 80%. Damon's PND-P was 88 %.

Monica's mean number of CIWS during baseline was 61.14 with a decreasing slope of 0.27. Given nine sessions of supplemental SOCSI-W, her CIWS changed visibly in both level and slope. Monica had an intervention phase mean of 125.14 CIWS and an increasing slope of 0.84. Monica's CIWS score in maintenance was 143 on one data point. Monica's PND for CIWS was 71%. Monica's PND-P was 83%.

Carson's mean number of CIWS during baseline was 65.6 with a decreasing slope of 0.72. Given five sessions of supplemental SOCSI-W, his CIWS changed visibly in both level and slope. Carson had an intervention phase mean of 132.75 CIWS and an increasing slope of 0.75. Carson's did not have a maintenance score due to technical issues on one scheduled session (i.e., the Internet was not operating at his school) and scheduling constraints related to end of semester activities at his school. Carson's PND for CIWS was 60%. Carson's PND-P was 100%.

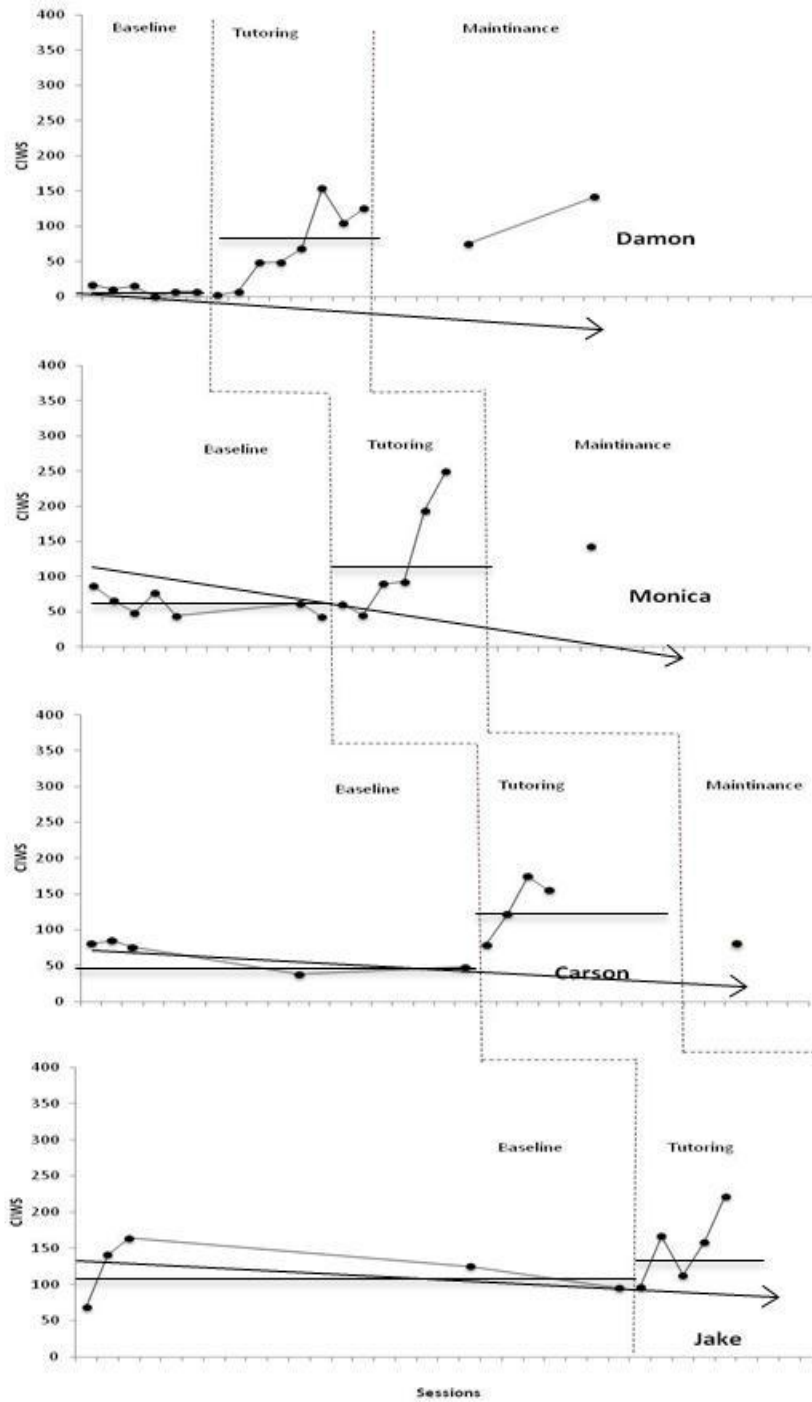


Figure 6: Effects of SOCSI-W on Correct Minus Incorrect Word Sequence

Jake's mean number of CIWS during baseline was 118.8 with an increasing slope of 0.05. Given six sessions SOCSI-W, his CIWS changed visibly in both level and slope. Jake had an intervention phase mean of 151.4 CIWS and an increasing slope of 0.61. Jake did not have a maintenance score due to the research completion timeline. Jake's PND for CIWS was 40%. Jake's PND-P was 80%.

Visual analysis of both trends and slopes for all participants in Figure 6 reflect improvement. Three out of four participants had decreasing slopes in baseline, yet treatment trends reflected increasing trends in treatment scores across all four participants. The PND for both EE and CIWS scores were similar on both measures across all students, indicating that the writing measures used were appropriately matched for demonstrating progress in writing. The mean PND score for EE was 66%, a small to medium effect, while the mean PND-P score was 100%, a large effect. The mean PND score for CIWS was 63%, a small effect, while the mean PND-P score was 88%, a medium to large effect.

Non-experimental Pre- and Post-Test

Mean Holistic Quality Score

An experienced writing instructor conducted a blind holistic scoring of three consecutive essays written prior to commencing treatment (i.e, baseline essays) and the three of the final essays written during intervention for each student. The final three essays were chosen to capture a fair representation of the students' performance. In baseline, the final three data points

require stability before moving participants from baseline into treatment phase. In treatment phase the three final data points resulted from writing that occurred after the student had learned both strategies. If the writing products had been used from earlier in the treatment, the product would not be a fair representation of the students' knowledge and mastery of the strategy, as it had not been learned yet (e.g., POW is not learned until the second session during treatment). The instructor was not aware of the conditions under which the essays were written (e.g., baseline, intervention). Overall, all four students' scores increased from pre-intervention to intervention phase. Table 6 presents changes in scores. The mean gain in holistic score was 1.98 with a range of 0.7-2.6. Jake's mean holistic score increased the least at only 0.7 of a point.

Table 6: Pre and Post Mean Holistic Quality Score

Participant	Holistic Score		Overall Change
	Pre	Post	
Damon	1	3.3	+2.3
Monica	1.7	4	+2.3
Carson	1.7	4.3	+2.6
Jake	2	2.7	+0.7
Mean Total	1.6	3.58	+1.98

TOWL-3

All four students were administered the TOWL-3. Form A was administered at pre-test, while Form B was administered at post-test. All four students' scores increased on the Spontaneous Writing subscore (SW) of the TOWL-3 from pre-test to post-test (see Table 7). The changes in SW indicated the participants' writing improved when compared with a normed sample of students. Further, changes in the participants' knowledge resulting from the

intervention may not be reflected in student scores on the standardized tests because of the three significant differences in writing tasks between the intervention and TOWL-3 assessment sessions: 1) participants were required to hand-write responses on paper, 2) the writing prompt was provided as a picture rather than the written format which was used in the current study, and 3) the TOWL-3 prompt was designed to elicit a story rather than persuasive essay. Therefore, the administration of TOWL-3 can also be viewed as a measure of task generalization. Table 7 presents changes in standard quotient scores follows: very superior (131–165), superior (121–130), above average (111–120), average (90–100), below average (80–89), poor (70–79), and very poor (35– 69).

Table 7: Standard Score Change on TOWL-3

Participant	TOWL-3		Overall Change
	Pre	Post	
Damon	72	74	+2
Monica	72	87	+15
Carson	74	98	+24
Jake	66	79	+13
Mean Total	71	84.5	+13.5

The mean gain in SW was 13.5 with a range of 2 to 24. Although students varied on the amount of exposure to treatment (range 11-6 sessions), all 4 students made gains from pre- to post-test. Carson made the greatest gains (increase of 24 SW) while Damon made the smallest gain (2 SW). Further, it was noted that on the post-test, Jake used a planning strategy to plan his answer and Monica structured her essay using the essay elements taught with the TREE strategy.

All four students spent the entire time writing or revising during the post-test; however this was not the case during the pre-test.

Time Spent Planning and Writing

Data were also collected on the number of seconds spent planning and writing. A median score was calculated for each student during baseline and intervention phases so that data would be less sensitive to outliers (see Table 8 for results of time spent planning in seconds).

Table 8: Time Spent Planning in Seconds

Participant	Baseline Median	Treatment Median	Overall Change
Damon	1.5	51	+49.5
Monica	11	14	+3
Carson	21.5	96.5	+75
Jake	0	0	0
Total	34	161.5	+127.5

Carson’s median time spent planning increased the most of all participants, increasing by 75 s. Jake’s median time spent planning did not increase at all when comparing median scores; however in the last two treatments Jake spent 383 s and 386 s planning, a significant increase. Overall, students’ median time spent planning increased 127.5 s. However, increases in the median number of seconds students spent writing were more pronounced (see Table 9 for results of time spent writing in seconds).

Table 9: Time Spent Writing in Seconds

Participant	Baseline Median	Treatment Median	Overall Change
Damon	110	1296	+1186
Monica	186	520	+334
Carson	689.5	1575	+885.5
Jake	547	588	+41
Total	1532.5	3979	+2466.5

Damon’s time spent writing increased the most, with a 1186 s change from baseline to treatment. Jake’s mean time spent writing increased the least at 41 s.

Social Validity Questionnaire Results

Social validity information was collected at the end of the study using an online questionnaire with items measured on a Likert Scale (1 = “Strongly Disagree”, 2 = “Disagree”, 3 = “Neither Agree nor Disagree”, 4 = “Agree”, and 5 = “Strongly Agree”). Table 10 provides data on student participant perceptions of social significance of the intervention goal, social appropriateness of procedures, and social importance of effects. All four students responded to the questionnaire. Overall, the student participants’ reported that the social significance of the intervention goal, social appropriateness of procedures, and social importance of effects were beneficial. Specifically, 75% of student participants reported online tutoring was a good way to deliver instruction, that it was easy to write over the system, and that they saw improvement in their writing skills. However, only 50% of student participants reported enjoying writing over the system and that they would recommend online tutoring to others.

Table 10: Social Validity Outcomes for Student Participants

Measure	Percent who responded "yes"
<i>Social Significance of Intervention Goal</i>	
Is online tutoring a good way to deliver writing instruction?	75%
Was your progress shown and explained?	100%
Did you enjoy writing over the system?	50%
Did you build a good relationship with the tutor?	100%
<i>Social Appropriateness of Procedures</i>	
Was it easy to hear and see the tutor over the system?	100%
Was it easy to write using the system?	75%
<i>Social Importance of Effects</i>	
Did you see improvement in your writing skills?	75%
Has your teacher or parent said your writing improved?	50%
Would you recommend online tutoring to others?	50%

Student participants were also asked to describe any instances in which they had found the writing strategies to be useful other than the research setting. One student reported that he was using the strategies to write a book. Two students reported using the strategies in class. One student reported never using the strategies outside of the research setting. Student participants

and the tutor research assistant both reported that the ability to write collaboratively using the synchronous Google Docs platform aided in the writing process. Students were able to observe the tutor model the writing process while the tutor wrote and spoke aloud. Students also reported that the ability to highlight portions of the text in order to identify essay elements was helpful. The tutor reported that participants seemed to enjoy using the highlighting tool as it allowed them to focus in on specific elements of the paper, making the text structure more explicitly apparent once highlighted. For example, when students highlighted each sentence of the text and identified it as one of the elements of a persuasive essay, they were able to see redundant phrases as well as the functional parts of the essay.

The tutor research assistant and the school employee who was assigned to sign-on procedures completed a modified social validity questionnaire to collect feedback. The tutor research assistant provided detailed feedback about instruction over the online system, reporting that certain features did not function properly all of the time. For instance, the highlighting feature in Google Docs caused problems with the cursor placement on an intermittent basis. Also, the tutor suggested features which might have made the system more user-friendly. For instance, when students made a mistake on their end of the system in Google Docs, the tutor did not have access to an “undo” feature. Students who were not yet adept at highlighting and adding comments sometimes deleted large portions of text, and the tutor could not correct the error. Also, in Adobe Connect, the tutor reported it would have been helpful to determine if students had activated the audio on their end of the system, to assist the tutor in troubleshooting issues arising around sound feed. Another feature which would have been helpful was an easy access menu which would allow the tutor to pull up a history of pods which had been used.

During instruction, this feature would have been convenient. Finally, the think aloud video which showed the students how to write a persuasive essay could not be controlled by the tutor using the system, so the video could not be heard or paused by the tutor in order to ask questions, making the video experience less interactive. The tutor also reported that the visual scaffolds for POW+TREE were helpful because they contained text and image mnemonic devices; it was mentioned that students used the visual of a tree to understand the concept of a strong essay, and once the concept was understood, students began using the vocabulary which corresponded with persuasive essay (e.g., the trunk represented main idea or Topic Sentence, branches represented Reasons, leaves represented Examples of reasons, and roots represented Ending).

The on-site employee agreed that online tutoring was a good way to deliver writing instruction, and that it was easy to see and hear the tutor over the system. It was also noted that classroom teachers had commented that students were showing improvements in their writing assignments. He also reported that he would recommend online tutoring to others and that the school was considering hiring tutors to deliver writing instruction using a similar format so that specialist could be brought in on a part time basis. Further, he reported observing all four students use the planning strategies while writing for other classes.

Students reported that all reinforcers had been delivered as planned. However, one student's preference assessment had to be readministered because he reported that he was not motivated to complete the first lesson of SOCSI-W because he did not value the reinforcement more than his time in study hall. Consequently, the preference assessment for Carson's reinforcers was delivered again to establish an appropriate reinforcer for Carson's participation.

Carson changed his preference from two dollar for a coupon for lunch to two dollar to be accumulated with each point to purchase a video game approved by his teacher. Carson then signed on to his sessions without prompting when the new reinforcer was in place.

Summary

Overall, students receiving supplementary synchronous online cognitive strategy instruction in writing (SOCSI-W) increased their number of essay elements and correct minus incorrect word sequences. All four students had marked changes in trend and level demonstrating experimental control. For the primary measure of Essay Elements, all four students had decreasing trends in baseline, contrasted with increasing trends during treatment. Although PND analysis indicated small to moderate effects, 100% of the participants made standard score changes from pre-post test. Two of the four participants' PND for EE indicated medium effects and one indicated small effects based on guidelines from Scruggs et al. (1987). Two of the four indicated medium effects on CIWS and one indicated small effects. One participant, due to high baseline scores, indicated a low effect (.40 for EE and CIWS). When calculating PND using the projected trend in baseline, all four participants showed strong effects in the primary dependent measure of EE, and all four participants showed medium effects on CIWS. Further, all four students showed increases on the TOWL-3 Spontaneous Writing subtest (SW), a standardized measure of writing in a generalized writing task.

Student participants and the tutor research assistant both reported that the ability to write collaboratively using the synchronous Google Docs platform aided in the writing process. However, social validity results indicated that only half of the students enjoyed writing over the system, yet 75% of the students reporting noting improvements in their own writing.

CHAPTER FIVE: DISCUSSION

This study investigated the effects of synchronous online cognitive strategy instruction in writing (SOCSI-W) on the academic performance of students with LD. Recommendations from the National Commission on Writing (2003), national standards for writing (CCSSI, 2011), and emerging technologies were used to support on-demand persuasive writing tasks. Self-regulated strategy development was used as the framework for explicit strategy instruction via a video-conferencing software technology. After SOCSI-W, participants' scores increased in the number of essay elements used and the number of correct minus incorrect word sequences. A significant increase in trend and level did not corresponded with the introduction of the treatment, but occurred within three sessions of introduction of the treatment across all participants. While the lack of immediate change could be interpreted as a lack of experimental control the results are similar to those encountered by Graham et al.'s (1998) findings that the largest increases in essay elements (EE) occurred only after the strategies had been explicitly taught. Participants in the current studied had not learned all of the strategies until Lesson 2 was completed, which corresponds to the increase in data after the first two data points in treatment. Although minor problems with technology arose throughout the research study, experimental control was not lost based on analysis of data points collected while limited connectivity occurred. Further, all students also showed improvement in holistic quality scores of writing and all students made improvements in standardized scores of writing.

Technical Demands and Challenges

Synchronous online instruction delivered entirely via the Internet is heavily reliant upon technology. Potential issues with technology may arise at a variety of junctures within the system: (a) the Internet connection (Wired Local Area Network (LAN) versus wireless network), (b) computer equipment hardware (including connections between monitor, hard drive, and camera), (c) software (e.g., updated to the most recent Flash Player version needed to run Adobe Connect platform), (d) headphones and microphone (during installation and settings for each use), (e) Google Docs platform (e.g., passwords, tools for writing online, and other troubleshooting needed for using Google Accounts), and (f) Adobe Connect Platform (e.g., passwords, system updates, and location of online resources for teaching, such as PowerPoint Presentations, Chat Pods, and You/Me board).

When one component of this complex system is not operating correctly, the users at both ends are required to run through a series of troubleshooting procedures to determine where a breakdown has occurred. For this reason, it is highly recommended that individuals using an online system have been trained to troubleshoot each piece of technology and a task analysis is conducted on the required components needed to operate the system to identify potential trouble spots. In this study, the tutor research assistant had prior experience with components A through D (e.g., Internet, computer equipment, software, and microphone and headphones) listed above, so training was only required for components (f) and (e) (e.g., Adobe Connect and Google Docs platforms). However, the students and the staff assigned to supervise sign-on did not have competencies in all of the components of the system, so at times, troubleshooting system errors was a challenge.

Environmental Demands and Challenges

SOCSI-W was delivered to students via a desktop computer stationed in a quiet room with few distractions from outside sources. One employee at the school was trained in the sign-on procedures for SOCSI-W and was responsible for ensuring students signed on during study hall after the lunch period. When the employee was not at the school, a 5 to 10 minute delay in sign-on often occurred. Procedures for when students did not sign on dictated that the tutor research assistant wait five minutes and then contact the school secretary who would in turn contact the teacher. The student would then be sent to the computer station. Student participants who did not arrive on time without prompting from staff presented the greatest challenge in terms of the environment. For example, Carson reported that he was not motivated to complete the first lesson of SOCSI-W because he did not value the reinforcement more than his time in study hall. Consequently, the preference assessment for reinforcers was delivered again to establish an appropriate reinforcer for Carson's participation. Carson then signed on to his sessions without prompting when the new reinforcer was in place.

Vasquez (2009) reported that "controlling student behavior at a distance" was a challenge when delivering supplementary tutoring via an online system. This challenge was also experienced in the current study. When the on-site employee who was responsible for student sign-on was not present on campus due to job related responsibilities, students did not come to the session at the same frequency level without prompting. A further discussion of reinforcement for signing-on to the system follows.

The school employee responsible for to sign-on procedures reported that he often had to remind the students of their reinforcers in order for them to leave study hall and participate in the lesson. However, this resistance to the lesson was not experienced by the tutor research assistant; once the student participants signed on for the lesson, they were compliant with positive attitudes and to the task. There was not one instance of non-compliance and all students responded positively to the social validity question regarding the relationship with the tutor. Further, Damon, a student who was noted by teachers for his non-compliant behavior in face-to-face classes at the school, was compliant for 100% of SOCSI-W sessions, as reported by the tutor after each session. He required no prompting for sign-on, was on task throughout all 11 of his lessons, and increased his writing time from an average of 2 min in baseline phase to an average of 19 min. In Damon's instance, teachers reported that they were surprised he stayed on-task writing for that length of time, as they had not seen him dedicate similar efforts in his face-to-face classes. Overall, the students were attentive and focused on the lesson objectives.

One factor which may have increased student motivation for the lesson was the employment of a token economy for reinforcers coupled with a competitive game (i.e., the You/Me Game). This competitive game reinforced on-task behavior during the lesson and student participants all commented they enjoyed "winning" the game against the tutor research assistant (Vasquez, 2009). While reinforcement procedures were in effect in the intervention phase, students' were on task and generally did not report that writing was aversive. However, during baseline when reinforcement procedures were not in effect, student participants often commented that writing was an aversive task and they spent less time writing, as evidenced by increases in mean scores from baseline to intervention phase.

Treatment Fidelity

This study was based on the premise that a supervised tutor could deliver high-quality writing instruction over a synchronous online system. The data on fidelity of treatment indicated that a trained undergraduate with no experience in delivering writing instruction and a high level of online technical ability could deliver instruction with high fidelity. Although the tutor did not require additional training, it is of special interest to note that the tutor and researcher were able to communicate via a chat pod hidden from the student participant. The tutor research assistant reported that the chat pod was highly valuable as providing a resource to clarify procedures. The chat pod feature was an unanticipated benefit for delivering the intervention at high rates of fidelity, because it allowed the researcher to provide corrective feedback regarding procedures. This feature could easily be adapted to use as a training scaffold for online teachers who are teaching new and challenging content. The high procedural fidelity supported the premise that a supervised tutor could deliver high-quality writing instruction over a synchronous online system. Data was not collected on the use of the chat pod, but future research could investigate its effects on treatment fidelity and tutor training.

Corrective Feedback in the Writing Process

Student participants and the tutor research assistant both reported that the ability to collaboratively write using the synchronous Google Docs platform aided in the writing process. Students were able to observe the tutor model the writing process while the tutor wrote and spoke aloud. Students also reported that the ability to highlight portions of the text in order to identify essay elements was helpful. The tutor reported that participants seemed to enjoy using

the highlighting tool as it allowed them to focus in on specific elements of the paper, making the text structure more explicitly apparent once highlighted. The tutor was able to correct misconceptions and provide options in real time as the students engaged in the writing process.

Yet, both the researcher and the tutor research assistant noted that students did not employ the planning techniques as instructed, as evidenced by the lack of significant increases in planning time from baseline to intervention phases and essays with weak lines of reasoning. While students seemed to have internalized the text structure, as evidenced by their inclusion of all of the parts of the functional elements essay, they did not spend time planning out supporting reasons and examples, but rather seemed to maintain planning behaviors consistent of students with LD, often spending less than one minute planning even when prompted (MacArthur & Graham, 1987). Providing a digital scaffold for the text structure similar to the structure provided by Englert et al. (2007) might have increased students' planning time and facilitated a clearer line of reasoning throughout the essay.

Social Validity

Student research participants reported their perceptions of social validity on methods and outcomes of the study. Student perceptions indicated that writing instruction delivered via an online system was an effective method of instruction, yet all students did not enjoy writing over the system and only 50% of the students indicated they would recommend online writing instruction to someone else. The school employee attributed this to the perceptions that students reported of writing as an aversive task. He reported that students often resisted sessions at first,

reporting that they did not feel like writing. The tutor research assistant and the school employee assigned to sign-on procedures reported that writing instruction delivered via an online system seemed to be an effective method of instruction. Further, the school administration was seeking a method of replicating the instructional model and online system to hire a part time writing instruction specialist. Results indicate that SOCSI-W, although effective with four students, was not necessarily a positive experience.

Relationship to Prior Research

The theoretical framework of writing development proposed by Graham and Harris (2000, 2009) included four components of writing development: (a) strategic behavior, (b) skills, (c) knowledge, and (d) motivation. This research addressed strategic behavior and skills for writing, while employing procedures to controlling for the moderating effects of knowledge of writing and motivation for writing. In the area of strategic behavior, students with LD were instructed in the use of strategies for writing (e.g., POW+TREE). However, Graham and Harris (1989b, 2000, 2009) proposed that effective strategy use extended beyond knowledge of the steps of a strategy, to include three major components: (a) knowledge of strategies, (b) knowledge about the use and significance of those strategies, and (c) self- regulation of strategy employment. The unique features of the online environment allowed the tutor insight into how strategies were used by the students during writing. The act of writing is often a solitary process, but the synchronous capabilities of Google Docs and Adobe Connect allows writers to open their solitary processes to other individuals. In effect, this allowed the tutor to observe and give real-time feedback while the students were engaged in the process of writing. Further, to address

skills for writing, students were taught to efficiently use the spell check and grammar check features of the Google Doc during the final stage of the writing process (e.g., “Write and check”). Consequently students’ CIWS, a measure of errors in writing, showed improvements across all four students.

The positive effects of cognitive strategy instruction (CSI) in writing are consistent with findings in the research literature for a variety of ages, types, and levels of learners (Gersten & Baker, 2001). Further, the use of the self-regulated strategy development (SRSD) model for CSI was a viable option to assist students with learning disabilities (LD) in strategies for writing, consistent with previous research (Graham & Harris, 2003; Graham & Perin, 2007; Rogers & Graham, 2008). Mason et al. (2009) found secondary students with LD using the POW+TREE strategy/SRSD model generated more persuasive essay parts and improved writing quality, findings that are consistent with the current research. However, the effects for Mason et al. were more pronounced; the PND for Mason et al. was 85.5% in a pair of studies (range 94% - 77%) in comparison to a mean PND of 66% in the current study, in spite of the fact that the procedures for the current study were a systematic replication of those used by Mason and colleagues. However, when calculating PND-P, accounting for the projected trend of performance in baseline, the effect of the treatment in the current study was 100% PND-P. One reason for the difference between PND scored by the traditional method might be that instructors for Mason et al. had prior experience with SRSD instruction and higher education levels (e.g., graduate student and special education teacher), while the tutor for the current study was an undergraduate psychology major with no prior experience teaching writing or with SRSD. Another possible reason for the difference might be delivery mode of instruction, which will be explored below.

Although a large research base exists for evidence-based instructional practices in writing for students with LD in face-to-face settings, there is limited knowledge about what strategies are effective in online environments (MacArthur, 2009). Clark's (1994) claim that media are neutral and instruction can be delivered over a variety of formats was supported by the current study because CSI in writing, proven successful in face-to-face settings, was also successfully delivered in a synchronous online format. However, the current study also supports the counterargument perspective provided by Kozma (1994) that media were not neutral vehicles for instruction, but provided a unique set of assets that could be advantageous to specific instructional objectives. In the case of the current study, the unique features of the synchronous online environment provided an environment uniquely suited to writing instruction, specifically the video and audio feed for student and tutor supported by presentation of visual aids in Adobe Connect coupled with the real-time editing capabilities of Google Docs. The current study provides evidence for effective strategies for students with LD learning in online environments as called for by MacArthur (2009).

In terms of research specific to online instruction for students with special needs, the findings of the current study support findings of the four studies identified in a systematic review of the literature. Johnson-Glenberg's (2005) findings that automated, immediate feedback for both verbal and visual activities improved performance of students with poor reading comprehension skills, was paralleled in the results of the current study. Students with LD received immediate, corrective feedback about their use of planning and writing strategies from an online tutor and improved their performance across multiple measures for writing.

Igo et al. (2006) investigation of methods for note-taking indicated that students with special needs preferred the copy and paste method because it was not laden with spelling, writing, or typing demands. Researchers hypothesized that students could focus cognitive energies on selection of appropriate text and proper placement of text within the scaffolded cue charts. The scaffolding used in the current study supported strategic writing by enabling students to highlight and insert comments to identify text elements that are often difficult for students with LD to recognize, thus alleviating some of the cognitive demands of writing (Wood et al., 1976). While the highlighting and comment insertion was helpful as reported by the tutor, it was also noted by the tutor that a pre-formatted digital scaffold might have increased students' planning time and facilitated a clearer line of reasoning throughout the essay, thus permitting the students to distribute the cognitive load (Englert et al., 2007).

Limitations

The current study utilized a multiple probe across participants design and employed inter-subject replication across four subjects to address threats to internal validity (Gast, 2010). Experimental control was demonstrated across four independent legs. Multiple probe designs demonstrate experimental control when a dramatic change in the level of the dependent variable (DV) occurs immediately after the introduction of the independent variable (IV) in the treatment phase. In the case of the current study, the increase of the DV did not occur immediately after the introduction of IV, but instead the first data point collected during treatment was at similar levels to data in baseline for each participant.

While the lack of a significant increase in trend and level is a limitation to the interpretation of experimental control, the results are similar to those encountered by Graham et al. (1998). Graham et al. found the largest increases in essay elements (EE) occurred only after the strategies had been explicitly taught and students had taken part in the collaborative writing/independent practice instruction session. The researchers suggested that SRSD model must be employed in full and that “Scaffolded, collaborative use of the strategy appears to be critical to realizing the full potential of writing strategies for students who experience severe difficulties with writing” (Graham et al., 1998, p. 310). The results for EE were similar to those of correct minus incorrect word sequences (CIWS), providing additional evidence that the full SRSD model must be employed to deliver significant improvements in writing quality.

Further, there was a variance in participant skill level at the outset of the study. Although the multiple probe design accounted for individual variability across legs of the study, varied skill level may result in variance in ability to adopt and employ the new writing strategies. In terms of replicating the study, the complexity of the instruction may also be a challenge for replication. It is important to note that the research assistant tutor had advanced technology skills that were an asset when delivering online instruction. However, it is also important to note that the tutor had limited training in writing instruction, which is a complex process. Replication of this study would need to take into account both factors of knowledge (e.g., technology and writing instruction).

Implications

The results of the current study indicate that cognitive strategy instruction in writing can be delivered using synchronous online technology, resulting in a variety of benefits for students, parents, tutors, and schools. Students benefit by receiving one on one instruction from specialists who might not otherwise be available in their local area. The entire instructional package including assessment and instruction could be delivered online, allowing students access to high quality instruction where it might not otherwise be available. Further, 100% of student participants reported they built a good relationship with the tutor even though they never met in person. Parents could also benefit by having increased convenience and participation in their students academics. If SOCSI-W is delivered as supplementary instruction in the home rather than at school, parents could benefit from the convenience of having their child receive tutoring in the comfort of their own home. Additionally, parents can supervise the sign on process and converse with the tutor about student progress, replacing the role of the on-site employee responsible for student sign on at school. Further, parents could be debriefed on the progress the student was making in the form of weekly or daily frequency probes on writing. This interaction would increase parental involvement and awareness of student academic progress, although the home would need to be equipped with technology necessary for SCOSI-W (e.g., a personal computer that supports Internet and video-conferencing, a digital video camera, microphone, and headphones). The Adobe Connect platform would be purchased by the tutoring entity or school, and as such parents would not incur and additional cost.

One of the most interesting implications for tutors is the ability to receive real-time feedback while delivering instruction. The tutor research assistant and researcher were able to

communicate via a chat pod hidden from the student participant during instruction. This feature allowed the tutor to maintain a high level of fidelity to the procedure. Trainers of tutors could use the hidden chat feature as a means to deliver-behind-the-scenes, real-time coaching. This corrective feedback, out of view of the students, has the capacity to increase fidelity and effective teaching practices.

Underscoring the implications of the current research, schools can benefit from online instruction for students with LD on a large scale. For example, there is a well-documented critical shortage of special education teachers (Smith, Robb, West, & Tyler, 2010), but this shortage might be mitigated with specialists who can provide targeted services at a distance. Also, students enrolled in home-based schooling due to disability or illness can access high-quality instruction through synchronous online technology. It is important to note that tutor in this study was not a certified special education teacher, but was able to be trained to proficiency in an evidence-based model for writing instruction and reinforcement which yielded improved results on standard scale scores of writing quality for students with disabilities. Therefore, this research model might provide one avenue for schools to train tutors to deliver high quality instruction. In the case of this study, administrators at the school research site made plans to hire a part time tutor to use the instructional model and online system to deliver writing instruction to their students in a one-on-one online setting. In this research model, the research tutor had the support of an expert writer via the online chat box feature, and this support may have been critical to the tutor's high fidelity of treatment delivery.

Although technology might be a barrier to schools, the equipment used in this research study can readily be found in most schools (e.g., a personal computer that supports Internet and video-conferencing, a digital video camera, microphone, and headphones) with the additional purchase of Adobe Connect software. The Google Docs online platform is free. Consistent Internet access and firewalls might prove to be the biggest barriers to deploying the SOCSI-W system. The equipment could be used for other academic activities such as school projects, writing assignments, and video conferencing with families or school personnel. This research project may be scaled up by providing paired student or small group instruction online to determine if results are successful.

Generalizability

With single subject designs, establishing the internal validity of results is paramount, and control of variables may lead to loss of external validity, or generalizability of results. However, establishing potential levels of generalizability of specific variables is possible with caution. Table 11 delineates possible levels of generalizability across four variables of technology, student population, student grade level, and content area.

Table 11: Generalizability of Results

Variable	High	Medium	Low
Technology	Other collaborative writing software; Other video conferencing software	Older computers; Slower Internet Connections	Eliminating video conferencing technology
Student Population	Similar students with LD; General Education	Students with disabilities with no writing IEP goals	Students with severe disabilities
Student Grade Level	6 th -12 th grade	3 rd -5 th grade	K-2 nd grade
Content	CSI in other content areas		

In the area of technology a high degree of generalizability of results might be expected if other collaborative writing software was used (e.g., ZohoWriter in place of Google Docs) or video conferencing software (e.g., Skype in place of Adobe Connect). In some cases, decreased cost may be an added benefit which makes alternative technologies worth exploring. However, older computers with slower processing speeds might increase lags in video signals resulting in a poorer quality of video feed. Finally, in some cases, the video-conferencing software may be replaced altogether with a telephone line with speakerphone capabilities, but rapport may suffer if the video component is not included.

Generalizability to other student populations would likely be similar to the generalizability of cognitive strategy instruction (CSI) across levels and disability types. Students with disabilities that do not have IEP goals for improving writing would likely gain similarly to the students in this study. As is with the case with CSI in general, students with

severe disabilities may have difficulty with the complex task of using cognitive strategies to support the writing of a persuasive essay.

Additionally, generalizability across content areas would likely be high due to the multimedia capabilities of the Internet supported by video conferencing software, especially in areas in which written communication is expressed with alphabetic symbols. However, it is important to identify specialized software that would allow mathematics concepts to be expressed by both tutor and student using proper notation.

Conclusion

Students with LD are increasingly being held to higher college- and career-ready standards in writing for K-12 education. At a more basic level, writing difficulty can lead to challenges with successfully passing exit exams often required for graduation from high school. Consequently, this study delivered high-quality instruction to support students with LD who struggle with meeting today's high standards of college- and career-readiness in writing. Self-regulated strategy development was used as the framework for explicit strategy instruction to students with LD via a video-conferencing software technology and scores of writing quality increased in spite of problems with technology that arose throughout the research study. The results of the study suggest promising practices, yet there is limited research investigating the growing area of online instruction. Vasquez and Slocum (2012) investigated the effects of synchronous online instruction in reading for students at-risk of reading failure, and also found

positive effects. Yet, research validated practices have not kept pace with the explosive use of online instruction in K-12 schools (Means et al., 2009).

Future Questions for Investigation

The results of this research illuminate further questions for investigation. Although the results indicated positive effects for a handful of students with LD, how well does this system translate to use with a large group of subjects in one school or spread across multiple sites? Additionally, how will synchronous online cognitive strategy instruction translate to other content areas, such as science or mathematics? Initial results from Vasquez and Slocum (2012) and the current research project indicate that reading instruction can occur successfully in synchronous online environments. Will these results generalize to other content areas with specialized written characters, such as mathematics?

Improved results might be achieved by providing a more formalized digital scaffold for the text structure similar to the structure provided by Englert et al. (2007). In between 5 to 11 lessons, students seemed to adopt the planning strategies, but a more formalized visual scaffold similar to the one used by Englert et al. (2007) might have provided an additional boost, offloading more of the cognitive demands of writing onto the technology tool. Future research should include digital scaffolding tools to offload some of the cognitive demands onto the technology scaffold (Englert, 1991; Pea, 1993).

Summary

Synchronous online cognitive strategy instruction in writing capitalizes on technologies in video-conferencing, synchronous text-based chat features, and real-time editing capabilities (e.g., Adobe Connect video conferencing software and Google Docs collaborative writing software). Online environments provide numerous benefits for struggling K-12 writers, including an instructional environment which relies heavily on communication in written form, first-hand experience with emerging technology and media-rich instruction, and access to skilled teachers beyond students' geographic boundaries. Synchronous online cognitive strategy instruction has the potential to provide high quality instruction in writing for students with learning disabilities and those who struggle with writing.

APPENDIX A: LITERATURE REVIEW SEARCH TERMS

List of Literature Review Search Terms

Level 1: mode of instruction: e-learning, online education, online learning, online training, online course, virtual learning, virtual training, virtual course, internet learning, internet training, internet course, web-based learning, web-based instruction, web-based course, web-based training, distributed learning.

Level 2: age level: high school students, secondary school students, high schools, secondary schools, secondary education, elementary school students, middle school students, elementary schools, secondary schools, middle schools, elementary education.

Level 3: content area of instruction: writing instruction, writing composition, expository writing, essays, writing.

Level 4: educational status: special education, exceptional persons, disabilities, disability, at risk persons, remedial programs, special needs students, academic failure, supplementary education, compensatory education, developmental studies programs, educationally disadvantaged, learning disabilities, learning problems, emotional problems, hyperactivity, language impairments, minimal brain dysfunction, aphasia, neurological impairments, attention deficit disorders, perceptual impairments, reading difficulties, communication disorders, developmental disabilities, remedial reading, writing difficulties, attention deficit hyperactivity disorder, dyslexia.

APPENDIX B: LIST OF TOPICS AND WRITING PROMPTS

List of Topics and Writing Prompts

Topics	Flesch-Kincaid Reading Level	Writing Prompts
School lunches	3.6	Should students be able to choose whatever they want to eat for lunch at school? Explain your answer.
	5.8	Is it better to have the school create a menu of healthy options or allow students to choose from local fast food chain menus? Explain your answer.
	3.4	Should students be able to leave campus for lunch? Explain your answer.
Teenage life	3.9	Should high school seniors have a curfew during the school week? Explain your answer.
	4.3	Is it better to have parents who are married or parents who are divorced? Explain your answer.
	3.1	Is it better to have siblings or be an only child? Explain your answer.
Voting	3.0	Should teens be able to vote before they turn 18 years old? Explain your answer.
	3.6	Is it better to learn about whom to vote for from your parents or your teachers? Explain your answer.
	6.2	Should felons be allowed to vote after they have completed their punishment? Explain your answer.
Dress code	3.8	Should students have to follow a dress codes decided by the school? Explain your answer.
	3.0	Is it better to choose what you want to wear to school or have a school uniform? Explain your answer.
	3.2	Should the school be able to set dress code rules to decide how long male students can wear their hair? Explain your answer.
Principal	3.2	Should your principal go to all of the football games? Explain your answer.
	3.9	Is it better for your principal to be friendly or strict? Explain your answer.
	4.1	Should your principal have to teach a class every year? Explain your answer.
Teachers	5.4	Should your teachers be allowed to use social networking sites with students? Explain your answer.
	3.8	Is it better to have an easy teacher or a hard teacher? Explain your answer.
	3.6	Should teachers have summers off? Explain your answer.

School dances	4.2	Is it better to go to a school dance or a social event that is not organized by the school? Explain your answer.
	3.8	Should student or school employees get to choose music at school dances? Explain your answer.
	3.0	Should students from other schools be allowed to come to your school dance? Explain your answer.
Music	6.4	Should music have warnings for explicit lyrics? Explain your answer.
	4.2	Is it better to study when you are listening to music or when the room is quiet? Explain your answer.
	4.6	Should schools play music in the hallways while students are changing classes? Explain your answer.
Monetary issues	4.2	Should teens have to do work around the house for an allowance or should they earn allowance with no work? Explain your answer.
	3.1	Is it better to save your money in a bank or keep it in a box in your bedroom? Explain your answer.
	3.1	Should teens have to pay for their own vehicles or should their parents have to pay for them? Explain your answer.
Tests	4.6	Is it easier to write an essay or take a multiple-choice test? Explain your answer.
	2.3	Should students have to take annual state tests (like the FCAT)? Explain your answer.
	2.9	Should you tell your teacher that you saw a classmate cheating on a test? Explain your answer.
Education	4.2	Should you be able to lose your driver's license until 18 if you drop out of school? Explain your answer.
	5.8	Is it better to go to school online or in a regular classroom?
	4.5	Should students have to learn Algebra? Explain your answer.
Politics	4.5	Should teens learn about politics from teachers or from parents? Explain your answer.
	4.8	Is it fun to talk about national politics with your friends? Explain your answer.
	6.7	Should students have to get involved in student government to learn about politics? Explain your answer.
Economy	6.5	Should illegal immigrants be able to work in the United States? Explain your answer.
	6.4	Should the United States spend money to fight terrorism in other countries or create jobs in the United States? Explain your answer.
	6.2	Should the United States give money to other countries while our country has national debt? Explain your answer.
Entertainment	4.8	Should performers be allowed to lip synch music at their

		concerts? Explain your answer.
	3.9	Is it better to listen to hip-hop or country music? Explain your answer.
	4.8	Should famous movies stars be paid millions of dollars to act? Explain your answer.
Rules	3.1	Is it better for parents to choose a bedtime for teens? Explain your answer.
	3.6	Should parents allow teens to eat whenever they want or wait for meal times? Explain your answer.
	2.9	Should teens be able to play video games for as long as they want? Explain your answer.
School time	2.8	Should school days be shorter or longer? Explain your answer.
	2.1	Should teachers give homework? Explain your answer.
	3.7	Is it better to go to school year round for shorter days or get summers off with longer days? Explain your answer.
School rules	2.2	Should students be able to use cell phones or not in school? Explain your answer.
	3.7	Should attendance count toward your grade or not? Explain your answer.
	6.2	Is it better to have detention or do community service if you get in trouble? Explain your answer.
Driving and age	5.8	Should new drivers have to take a harder driving test that would require more challenging driving to prove they are ready? Explain your answer.
	5.7	Is it better to learn to drive on an automatic or a stick-shift transmission? Explain your answer.
	3.8	Should new drivers have to wait one year before earning their license? Explain your answer.
Scheduling	3.8	Is it better to start school early or later in the morning? Explain your answer.
	5.4	Should classes meet every day for 45 minutes or a couple of days a week for longer? Explain your answer.
	4.5	Is it better to have a longer lunch and leave school later in the day or have a shorter lunch and leave school early? Explain your answer.
President	5.2	Should the President of the United States send his children to public school? Explain your answer.
	6.4	Should the President of the United States have vacation during his time in office? Explain your answer.
	5.9	Is it better to be President or Vice President of the United States? Explain your answer.
Parents	2.6	Should parents be allowed to choose your friends? Explain your answer.

	5.0	Is it more important to listen to your parents' advice or your friends' advice? Explain your answer.
	6.9	Should parents have access to your accounts (like email and Facebook)?

Mean score of probes: 4.3

Range: 2.1 through 6.9

APPENDIX C: PREFERENCE ASSESSMENT

Preference Assessment

Points Program

To increase your motivation we want you to earn points for correct answers! Each time you beat the instructor in the You/Me game, you will earn a point. You can collect your points to cash them in for the following things:

(Items and points will be assigned at parent conference meeting).

Student Signature

Date

APPENDIX D: STEP-BY-STEP CHECKLIST FOR LESSONS

Lesson 1:

Lesson Overview

Develop background knowledge: In the first lesson, the tutor will develop background knowledge by identifying the elements of the persuasive essay (e.g., topic sentence, at least three reasons with explanation, rejection of a counterargument, and conclusion) in a sample work and in their own essay from baseline. *Discuss It:* The POW+TREE strategy will be introduced and the tutor and student participants will discuss the how the strategies can be used in a variety of classes and in life. They will also discuss the idea of strategy self-regulation. Reinforcement procedures will be in effect using the You/Me Game. *Context for instructions are printed in italics.* **Verbal statements are bolded.**

Student Objectives

1. Student will orally state the parts of a good essay as in TREE.
2. Student will identify essay parts included in a sample essay and one of his or her baseline essays.
3. Student will graph the number of parts found in his or her own essay.

Materials

TREE Chart

Sample essay 1 (including TREE note checklist)

Student essay written that day (including TREE note checklist)

Graphing Chart for Words Written and Essay Parts

Date:
Student:
Session:
Tutor:

Before online session:

1. Have written copy of script to follow.
2. Have headphones ready.
3. Have appointment book ready.
4. Sign into Google Docs account: <https://mail.google.com/>
 - a. Username: <info withheld>
 - b. Password: <info withheld>
 - c. Go to Google Docs and click on Create>Document. Title the document with student initials, session number and your initials (JW1CS). Click on Share and share document with StudentFirstNameUCFwritinglab@gmail.com
5. Sign into Adobe Connect platform (<https://ucf.adobeconnect.com/<info withheld>/writing/>) with username: <info withheld>password: <info withheld>
 - a. Set up in Collaboration layout.
 - b. Have **Student X Topics Pod** ready on right side.
 - c. Have **You/Me Pod** ready and blank on right side.
6. When student signs on, click on **Meeting>Record>** and name session with student initials, session number and your initials (JW1CS).
7. If student does not answer phone or is more than 5 minutes late to session, contact parent on cell phone and document on data sheet. If no one answers, attempt contact twice and document. If parent answers, ask them to accompany student to sign online and stay with student until you have student successfully signed online.

<input checked="" type="checkbox"/>	IOA	Procedures
Session Opening		
		<i>When participant enters, click on participant name >Enable Video & Enable Audio</i>
		<i>Confirm with parent student has audio and video. Parent may leave the session.</i>
		<i>Ask student to put headphones on.</i>
During Session		
		<i>Establish rapport by using positive behavioral momentum (three high-p yes responses) – the third request or question will be</i> Okay, I'd like you to go ahead and clean off your desk area.
		Okay, today you are going to plan and write a persuasive essay. You have the choice of your topic as well as the position you would like to take. Can you see the topics pod in the center of your Adobe Connect Screen? <i>(Drag Student X Topics Pod to center of Adobe Connect Platform. Support student until he or she finds Student X Topics Pod).</i> Type the topic you would like to write about in the Chat Pod on the bottom left of the screen. <i>Note the student's topic in the space below:</i> <i>Student's topic: _____</i> <i>Once student has chosen one topic, randomly select and "cut" the prompt from the pool of prompts available based on the student's choice; if it is the last prompt on that topic, let the student know. Paste the prompt onto a new Google Doc.</i>
		Now go to your Google Docs Platform and open the new document I have shared with your prompt for today. <i>(Support student until he or she can sign into the Google Docs account, which may include logging out of another existing Gmail account. To sign out go to the top right of the screen and click on the arrow to the left of the gear. Then click on Sign out. When you sign back in, do not check the box that says "Stay signed in.").</i> Your username is: StudentFirstNameUCFwritinglab and your password is GoUCF Please follow along as I read the prompt to you. <i>Simultaneously highlight the prompt using the Google Docs highlighting feature as it is read. Please read the prompt back to me.</i> Now you will plan and write your response. Be sure to use everything you have learned about writing. Please tell me when you are ready to begin planning by stating 'Ready to plan' and tell me when you are ready to being writing by saying 'Ready to write'. <i>Record the length of time spent planning and writing.</i> Seconds spent planning: _____ Seconds spent writing: _____
		"Good work" or "all done" or "nice job" <i>(When student has finished, give general praise but do not comment on writing).</i>

	<p>Okay – today we are going to learn the parts of a good persuasive essay. We are going to do things a little bit differently while I am teaching you. Remember the Points Program that you set up with your parents? We’ll begin that today. What are the things that you are going to earn for your work? <i>(Prompt student to talk about reinforcers)</i></p>
	<p>The way that you will earn points to exchange is by playing the You/Me Game. Basically, every time you answer a question <i>correctly</i> or follow a procedure <i>correctly</i>, you earn a star. Every time you answer something <i>incorrectly</i> or follow a procedure <i>incorrectly</i>, I earn a star. At the end of the lesson, we’ll tally up all the stars and whoever has the most stars wins the game and earns the point for that day.</p> <p>I’ll keep a record of the stars on this score board on the Adobe Connect Platform. Can you see it? <i>(Drag the You/Me Pod to the center of the Adobe Connect Platform).</i></p>
	<p>Let’s give it a practice run. What type of essays are you going to be writing? <i>(Student should answer persuasive essay or similar answer. Place a star on the You/Me Pod to indicate correct answer or prompt until student has correct answer, then place the star).</i></p> <p><u>Procedures for You/Me Game:</u> <i>When student gets answer correct or follows correct procedure, place star on student side and say “good job” or “correct”. When student gets answer wrong, say “Oops” and place gold star on tutor side.</i></p> <p>Good job! You are already ahead. So, let’s get started.</p>
REINFORCEMENT PROCEDURES IN EFFECT FROM THIS POINT FORWARD	
<i>Discuss It</i>	
	<p>First of all, I want to thank you for all of the effort you have been putting forth in your writing. Your essays have a lot of great ideas – and after reading all of your essays, I can tell you’ll easily pick up the writing tricks I am going to teach you. In this session, we are going to start learning about good persuasive essays.</p>
	<p>We are going to learn how to write strong persuasive essays. One of the first things that I want to cover with you is WHY being able to write a persuasive essay is important. <i>(Respond positively to any logical answer or acknowledge the student’s response and go on.)</i></p>
	<p>Another reason is that here in Orlando you have to be able to write a persuasive essay for the FCAT exam or the SAT college entrance exam.</p>
<i>Develop background knowledge</i>	
	<p>Now that we know WHY we need to learn how to write persuasive essays, let’s learn all of the parts of a good essay.</p> <p>Do you have any ideas about the parts of a good persuasive essay? <i>Respond positively to all student answers; in chat box, type any answers that correspond to the essay parts, such as main idea, reasons, examples, arguments, end, etc. Prompt as necessary. Don’t forget to award stars for all correct answers.</i></p>
	<p>When we talk about essays and the parts that make up an essay there are specific parts we should always include. These parts are – Topic sentence, Reasons (3 or more), Examine Reasons, Ending.</p>
	<p>Here is the writing trick that I was telling you about. It will help you remember all the parts of the persuasive essay.</p>

	<p><i>Uncover the TREE chart one step at a time and read it aloud.</i></p> <p>Topic sentence Reasons (3 or more) Examine Reasons Ending</p> <p>What word does that spell? <i>Remember student earns star for correct answer.</i></p>
	<p>Let's review the parts of a good persuasive essay and we'll play the You/Me game. This time I don't expect you to know all of the answers already, but you can earn stars for trying to answer each question. Remember, if you don't try, I earn the stars.</p> <p>What was the word we used to help us remember the essay parts? <i>TREE –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the parts of TREE? <i>Provide corrective feedback, verbal praise, and star for each question you ask. Student should have many stars by the end of this session. Encourage student and remind him or her about winning You/Me game and exchanging points.</i></p>
	<p>OK. Let's move on to a sample essay with all of the right parts. We are going to move to the Google Docs platform for this, but I will continue keeping score of the Me/You game on the Adobe Connect Platform. You can always check your score by switching to the Adobe Connect Platform.</p> <p><i>Share the sample essay with the student. At the top of the essay, make sure the TREE Note is visible on the right margin as a Note.</i></p>
	<p>I want you to read the essay out loud. When you think you have read one of the TREE parts, you'll insert a comment using the Google Docs feature.</p> <p><i>Show student Insert>Comment. Respond positively & provide encouragement as you go along. Award Points for You/Me Game. Be sure to name each part using the same word as the one in the TREE.</i></p>
	<p>Great job! Let's review the parts of a good persuasive essay again and we'll play the You/Me game. This time you can earn stars for answering each question correctly. Remember, if you are incorrect I earn the star.</p> <p>What was the word we used to help us remember the essay parts? <i>TREE –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the parts of TREE? <i>Provide corrective feedback, verbal praise, and star for each question you ask. Student should have many stars by the end of this session. Encourage student and remind him or her about winning You/Me game and exchanging points.</i></p>
	<p>OK. Let's take a look at one of the essays that you wrote so we can identify parts that you are already using. Eventually you will use all of the parts needed for a good essay.</p> <p>We are going to move to the Google Docs platform for this, but I will continue keeping score of the Me/You game on the Adobe Connect Platform. You can always check your score by switching to the Adobe Connect Platform.</p> <p><i>Share the student's essay to the student. At the top of the essay, make sure the TREE Note is visible on the right margin as a Note.</i></p>
	<p>I want you to read the essay out loud. When you think you have read one of the TREE parts, you'll insert a comment using the Google Docs feature.</p>

		<i>Respond positively & provide encouragement as you go along. Award Points for You/Me Game. Be sure to name each part using the same word as the one in the TREE</i>
<i>Self-regulation</i>		
		Our final step before we tally up the You/Me stars is to review our progress and set a goal for ourselves tomorrow. It is really important that we do this so we know how we are doing. Plus, you get a sense of achievement for all of the hard work that you have done when you achieve your personal goals and see your scores improving over time.
		Let's take a look at our Progress Chart. Go to the Google Doc Platform, and check for a new document I shared with you called "Student Name Progress Chart." Orient the student to the chart. Discuss how the chart will be used to keep record of the student's current number of essay parts, plus goals for tomorrow. Let's go ahead and place the number of parts you had on the essay you wrote today. Then, let's make a goal for tomorrow. Guideline: Student's goal should be at least 1.5 times the parts written today.
		Good job! You worked very hard today. Let's see who won the You/Me game. <i>Tally up scores and award point to student.</i>
		Well. It looks like we are done for the day. If your teacher is around, I would like to confirm our next appointment. <i>Use appointment book to confirm upcoming tutoring session. Report results of You/Me game, number of essay parts and any other general comments. Get parent email if you do not already have it.</i>

After the session:

1. Email student data to <info withheld>
2. Email teacher the results of You/Me game and the number of essay parts included.
3. Prepare for the next session if it is within the next 30 minutes.

Lesson 2:

Lesson Overview

Develop it: In the second lesson, the tutor will develop background knowledge by discussing the steps of the writing process. *Model it:* The student participant will view a pre-recorded think-aloud in which the researcher will model the steps of writing a persuasive essay. The tutor will pause the video throughout and ask questions about essay elements of the student participant in a multiple-choice quiz format, providing automatic corrective feedback. *Memorize it:* The student participant will memorize the steps to 100% proficiency as demonstrated by an online assessment with the tutor. They will also discuss the idea of strategy self-regulation. Reinforcement procedures will be in effect using the You/Me Game. *Context for instructions are printed in italics. Verbal statements are bolded.*

Student Objectives

1. Student will orally state the parts of the writing strategy POW.
2. Student will identify steps in the writing process of a pre-recorded sample essay as it is written.
3. Student will graph the number of parts found in his or her own essay.

Materials

POW Chart

Think aloud Essay Recording

Student essay written that day

Graphing Chart for Words Written and Essay Parts

Date:
Student:
Session:
Tutor:

Before online session:

1. Have written copy of script to follow.
2. Have headphones ready.
3. Have appointment book ready.
4. Sign into Google Docs account: <https://mail.google.com/>
 - a. Username: <info withheld>
 - b. Password: <info withheld>
 - c. Go to Google Docs and click on Create>Document. Title the document with student initials, session number and your initials (JW1CS). Click on Share and share document with StudentFirstNameUCFwritinglab@gmail.com
5. Sign into Adobe Connect platform (https://ucf.adobeconnect.com/<info_withheld>/writing/) with username: <info withheld> password: <info withheld>
 - a. Set up in Collaboration layout.
 - b. Have **Student X Topics Pod** ready on right side.
 - c. Have **You/Me Pod** ready and blank on right side.
 - d. Have **Think Aloud Link Pod** ready on right side.
6. When student signs on, click on **Meeting>Record** and name session with student initials, session number and your initials (JW1CS).
7. If student does not answer phone or is more than 5 minutes late to session, contact parent on cell phone and document on data sheet. If no one answers, attempt contact twice and document. If parent answers, ask them to accompany student to sign online and stay with student until you have student successfully signed online.

<input checked="" type="checkbox"/>	IOA	Procedures
Session Opening		
		When participant enters, click on participant name >Enable Video & Enable Audio
		Confirm with parent student has audio and video. Parent may leave the session.
		Ask student to put headphones on.
During Session		
		Establish rapport by using positive behavioral momentum (three high-p yes responses) – the third request or question will be Okay, I'd like you to go ahead and clean off your desk area.
		Okay, today you are going to plan and write a persuasive essay. You have the choice of your topic as well as the position you would like to take. Can you see the topics pod in the center of your Adobe Connect Screen? (Drag Student X Topics Pod to center of Adobe Connect Platform. Support student until he or she finds Student X Topics Pod). Type the topic you would like to write about in the Chat Pod on the bottom left of the screen. <i>Note the student's topic in the space below:</i> <i>Student's topic: _____</i> <i>Once student has chosen one topic, randomly select and "cut" the prompt from the pool of prompts available based on the student's choice; if it is the last prompt on that topic, let the student know. Paste the prompt onto a new Google Doc.</i>
		Now go to your Google Docs Platform and open the new document I have shared with your prompt for today. (Support student until he or she can sign into the Google Docs account, which may include logging out of another existing Gmail account. To sign out go to the top right of the screen and click on the arrow to the left of the gear. Then click on Sign out. When you sign back in, do not check the box that says "Stay signed in.".) Your username is: StudentFirstNameUCFwritinglab and your password is GoUCF Please follow along as I read the prompt to you. Simultaneously highlight the prompt using the Google Docs highlighting feature as it is read. Please read the prompt back to me. Now you will plan and write your response. Be sure to use everything you have learned about writing. Please tell me when you are ready to begin planning by stating 'Ready to plan' and tell me when you are ready to being writing by saying 'Ready to write'. Record the length of time spent planning and writing. Seconds spent planning: _____ Seconds spent writing: _____
		"Good work" or "all done" or "nice job" (When student has finished, give general praise but do not comment on writing).

	<p>Okay – today we are going to begin learning how to write persuasive essays, now that we know all of the parts of a good persuasive essay. Let’s go over the rules of the You/Me game so you can beat me today and earn a point at the end of the lesson. Remember, every time you answer a question <i>correctly</i> or follow a procedure <i>correctly</i>, you earn a star. Every time you answer something <i>incorrectly</i> or follow a procedure <i>incorrectly</i>, I earn a star. At the end of the lesson, we’ll tally up all the stars and whoever has the most stars wins the game and earns the point for that day.</p>
	<p>I’ll keep a record of the stars on this score board on the Adobe Connect Platform. Can you see it? <i>Drag the You/Me Pod to the center of the Adobe Connect Platform).</i></p> <p><u>Procedures for You/Me Game:</u> <i>When student gets answer correct or follows correct procedure, place star on student side and say “good job” or “correct”. When student gets answer wrong, say “Oops” and place gold star on tutor side.</i></p>
REINFORCEMENT PROCEDURES IN EFFECT FROM THIS POINT FORWARD	
<i>Memorize It</i>	
	<p>Let’s review the parts of a good persuasive essay and we’ll play the You/Me game. Since this is a review from yesterday, I don’t expect you to know all of the answers already, but you can earn stars for trying to answer each question. Remember, if you don’t try, I earn the stars.</p> <p>What was the word we used to help us remember the essay parts? <i>TREE –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the parts of TREE? <i>Provide corrective feedback, verbal praise, and star for each question you ask. Student should have many stars by the end of this session. Encourage student and remind him or her about winning You/Me game and exchanging points.</i></p> <p>Good job! I know that you are going to pick this up quickly.</p>
<i>Develop background knowledge</i>	
	<p>Now that we have reviewed the TREE parts of the essay, we are going to learn how to write the essay.</p> <p>Do you know what the steps for writing are? <i>Respond positively to all student answers; in chat box, type any answers that correspond to the steps of writing, such as planning, organizing, writing. Prompt as necessary. Don’t forget to award stars for all correct answers.</i></p>
	<p>When we talk about writing essays there are specific steps we should always take. These steps are – Pick my idea, Organize my notes, and Write and check.</p>
	<p>Here is the writing trick that I was telling you about. It will help you remember the steps for writing the persuasive essay.</p> <p><i>Uncover the POW chart one step at a time and read it aloud.</i></p> <p>Pick my ideas Organize my notes Write and check</p>

		What word does that spell? <i>Remember student earns star for correct answer.</i>
<i>Model it</i>		
		<p>OK. Let's move on to watch a video of an essay being written using all of the writing steps included in POW. Pay attention, because as you watch it, I'll be pausing it to quiz you. I'll keep score on the Me/You game.</p> <p><i>Watch the video with the student. Pause at the pause points and ask the questions embedded in the video.</i></p>
		<p>OK. Let's take a look at the essay you wrote today so we can identify parts that you are already using. Let's see if you included more parts needed for a good essay.</p> <p>We are going to move to the Google Docs platform for this, but I will continue keeping score of the Me/You game on the Adobe Connect Platform. You can always check your score by switching to the Adobe Connect Platform.</p> <p><i>Share the student's essay to the student. At the top of the essay, make sure the TREE Note is visible on the right margin as a Note.</i></p>
		<p>I want you to read the essay out loud. When you think you have read one of the TREE parts, you'll insert a comment using the Google Docs feature.</p> <p><i>Respond positively & provide encouragement as you go along. Award Points for You/Me Game. Be sure to name each part using the same word as the one in the TREE</i></p>
<i>Self-regulation</i>		
		<p>Our final step before we tally up the You/Me stars is to review our progress and set a goal for ourselves tomorrow. It is really important that we do this so we know how we are doing. Plus, you get a sense of achievement for all of the hard work that you have done when you achieve your personal goals and see your scores improving over time.</p>
		<p>Let's take a look at our Progress Chart. Go to the Google Doc Platform, and check for a new document I shared with you called "Student Name Progress Chart." Orient the student to the chart. Discuss how the chart will be used to keep record of the student's current number of essay parts, plus goals for tomorrow.</p> <p>Let's go ahead and place the number of parts you had on the essay you wrote today. Then, let's make a goal for tomorrow. Guideline: Student's goal should be at least 1.5 times the parts written today.</p>
		<p>Good job! You worked very hard today. Let's see who won the You/Me game.</p> <p><i>Tally up scores and award point to student.</i></p>
		<p>Well. It looks like we are done for the day. If your teacher is around, I would like to confirm our next appointment.</p> <p><i>Use appointment book to confirm upcoming tutoring session. Report results of You/Me game, number of essay parts and any other general comments. Get parent email if you do not already have it.</i></p>

After the session:

1. Email student data to <info withheld>

2. Email teacher the results of You/Me game and the number of essay parts included.
3. Prepare for the next session if it is within the next 30 minutes.

Lesson 3:

Lesson Overview

Support it: With the tutor, the student participant will write a persuasive essay including all of the elements using the Google Docs collaborative writing platform. The student participant will receive formative feedback during the writing process. *Memorize it:* The student participant will continue to memorize the steps to 100% proficiency as demonstrated by an online assessment with the tutor. They will also discuss the idea of strategy self-regulation. Reinforcement procedures will be in effect using the You/Me Game. *Context for instructions are printed in italics.* **Verbal statements are bolded.**

Student Objectives

1. Student will write a persuasive essay collaboratively with tutor.
2. Student will graph the number of parts found in his or her own essay.

Materials

Student essay written that day

Graphing Chart for Words Written and Essay Parts

Date:
Student:
Session:
Tutor:

Before online session:

1. Have written copy of script to follow.
2. Have headphones ready.
3. Have appointment book ready.
4. Sign into Google Docs account: <https://mail.google.com/>
 - a. Username: <info withheld>
 - b. Password: <info withheld>
 - c. Go to Google Docs and click on Create>Document. Title the document with student initials, session number and your initials (JW1CS). Click on Share and share document with StudentFirstNameUCFwritinglab@gmail.com
5. Sign into Adobe Connect platform (<https://ucf.adobeconnect.com/<info withheld>/writing/>) with username: <info withheld> password: <info withheld>
 - a. Set up in Collaboration layout.
 - b. Have **Student X Topics Pod** ready on right side.
 - c. Have **You/Me Pod** ready and blank on right side.
6. When student signs on, click on **Meeting>Record**> and name session with student initials, session number and your initials (JW1CS).
7. If student does not answer phone or is more than 5 minutes late to session, contact parent on cell phone and document on data sheet. If no one answers, attempt contact twice and document. If parent answers, ask them to accompany student to sign online and stay with student until you have student successfully signed online.

<input checked="" type="checkbox"/>	IOA	Procedures
Session Opening		
		<i>When participant enters, click on participant name >Enable Video & Enable Audio</i>
		<i>Confirm with parent student has audio and video. Parent may leave the session.</i>
		<i>Ask student to put headphones on.</i>

During Session		
		<p><i>Establish rapport by using positive behavioral momentum (three high-p yes responses) – the third request or question will be</i></p> <p>Okay, I'd like you to go ahead and clean off your desk area.</p>
		<p>Okay, today you are going to plan and write a persuasive essay. You have the choice of your topic as well as the position you would like to take. Can you see the topics pod in the center of your Adobe Connect Screen? <i>(Drag Student X Topics Pod to center of Adobe Connect Platform. Support student until he or she finds Student X Topics Pod).</i></p> <p>Type the topic you would like to write about in the Chat Pod on the bottom left of the screen. <i>Note the student's topic in the space below:</i></p> <p><i>Student's topic: _____</i></p> <p><i>Once student has chosen one topic, randomly select and "cut" the prompt from the pool of prompts available based on the student's choice; if it is the last prompt on that topic, let the student know. Paste the prompt onto a new Google Doc.</i></p>
		<p>Now go to your Google Docs Platform and open the new document I have shared with your prompt for today. <i>(Support student until he or she can sign into the Google Docs account, which may include logging out of another existing Gmail account. To sign out go to the top right of the screen and click on the arrow to the left of the gear. Then click on Sign out. When you sign back in, do not check the box that says "Stay signed in.").</i></p> <p>Your username is: <i>StudentFirstNameUCFwritinglab</i> and your password is <i>GoUCF</i></p> <p>Please follow along as I read the prompt to you. <i>Simultaneously highlight the prompt using the Google Docs highlighting feature as it is read. Please read the prompt back to me.</i></p> <p>Now you will plan and write your response. Be sure to use everything you have learned about writing.</p> <p>Please tell me when you are ready to begin planning by stating 'Ready to plan' and tell me when you are ready to being writing by saying 'Ready to write'. <i>Record the length of time spent planning and writing.</i></p> <p>Seconds spent planning: _____</p> <p>Seconds spent writing: _____</p>
		<p>"Good work" or "all done" or "nice job" <i>(When student has finished, give general praise but do not comment on writing).</i></p>
		<p>Okay – today you are going to plan and write a persuasive essay with minimal help from me. Let's go over the rules of the You/Me game so you can beat me today and earn a point at the end of the lesson. Remember, every time you answer a question <i>correctly</i> or follow a procedure <i>correctly</i>, you earn a star. Every time you answer something <i>incorrectly</i> or follow a procedure <i>incorrectly</i>, I earn a star. At the end of the lesson, we'll tally up all the stars and whoever has the most stars wins the game and earns the point for that day.</p>

	<p>I'll keep a record of the stars on this score board on the Adobe Connect Platform. Can you see it? <i>Drag the You/Me Pod to the center of the Adobe Connect Platform).</i></p> <p><u>Procedures for You/Me Game:</u> <i>When student gets answer correct or follows correct procedure, place star on student side and say "good job" or "correct". When student gets answer wrong, say "Oops" and place gold star on tutor side.</i></p>
REINFORCEMENT PROCEDURES IN EFFECT FROM THIS POINT FORWARD	
<i>Memorize It</i>	
	<p>Let's review the parts of a good persuasive essay and we'll play the You/Me game. You should know all of the parts of a good persuasive essay, so you'll earn stars for each answer you get correct.</p> <p>What was the word we used to help us remember the essay parts? <i>TREE –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the parts of TREE? <i>Provide corrective feedback, verbal praise, and star for each question you ask. Student should have many stars by the end of this session. Encourage student and remind him or her about winning You/Me game and exchanging points.</i></p> <p>What was the word we used to help us remember the steps for writing? <i>POW –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the steps in POW? <i>Provide corrective feedback, verbal praise, and star for each correct response. Encourage student and remind him or her about winning You/Me game and exchanging points. Keep working with student until all steps of POW and TREE are stated.</i></p> <p>Good job! Looks like you are well on your way.</p>
<i>Self-regulation</i>	
	<p>OK. Let's take a look at the essay you wrote today so we can identify parts that you are already using. Let's see if you included more parts needed for a good essay.</p> <p>We are going to move to the Google Docs platform for this, but I will continue keeping score of the Me/You game on the Adobe Connect Platform. You can always check your score by switching to the Adobe Connect Platform.</p> <p><i>Share the student's essay to the student. At the top of the essay, make sure the TREE Note is visible on the right margin as a Note.</i></p>
	<p>I want you to read the essay out loud. When you think you have read one of the TREE parts, you'll insert a comment using the Google Docs feature.</p> <p><i>Respond positively & provide encouragement as you go along. Award Points for You/Me Game. Be sure to name each part using the same word as the one in the TREE</i></p>
<i>Self-regulation</i>	
	<p>So, let's review our progress and set a goal for ourselves tomorrow. It is really important that we do this so we know how we are doing. Plus, you get a sense of achievement for all of the hard work that you have done when you achieve your personal goals and see your scores improving over time.</p>

	<p>Let's take a look at our Progress Chart. Go to the Google Doc Platform, and check for a new document I shared with you called "Student Name Progress Chart." <i>Orient the student to the chart. Discuss how the chart will be used to keep record of the student's current number of essay parts, plus goals for tomorrow.</i></p> <p>Let's go ahead and place the number of parts you had on the essay you wrote today. Then, let's make a goal for tomorrow. <i>Guideline: Student's goal should be at least 1.5 times the parts written today.</i></p>
<i>Support it</i>	
	<p>Now we are going to write an essay together using the Google Docs platform.</p>
	<p>Okay, you have the choice of your topic as well as the position you would like to take. Can you see the topics pod in the center of your Adobe Connect Screen? <i>(Drag Student X Topics Pod to center of Adobe Connect Platform. Support student until he or she finds Student X Topics Pod).</i></p> <p>Type the topic you would like to write about in the Chat Pod on the bottom left of the screen. <i>Note the student's topic in the space below:</i></p> <p><i>Student's topic: _____</i></p> <p><i>Once student has chosen one topic, randomly select and "cut" the prompt from the pool of prompts available based on the student's choice; if it is the last prompt on that topic, let the student know. Paste the prompt onto a new Google Doc.</i></p>
	<p>Now go to your Google Docs Platform and open the new document I have shared with your prompt for today. <i>(Support student until he or she can sign into the Google Docs account, which may include logging out of another existing Gmail account. To sign out go to the top right of the screen and click on the arrow to the left of the gear. Then click on Sign out. When you sign back in, do not check the box that says "Stay signed in.").</i></p> <p>Your username is: StudentFirstNameUCFwritinglab and your password is GoUCF</p> <p>Please follow along as I read the prompt to you. <i>Simultaneously highlight the prompt using the Google Docs highlighting feature as it is read. Please read the prompt back to me.</i></p>
	<p>Now let's plan and write the essay together. You take the lead, and I'll support you as you need it. Be sure to use everything you have learned about writing. <i>Be sure student engages in all steps of POW and uses all TREE parts. At the end of writing the essay, (part of W – Write and check), have student go back through document and check for spelling and grammar errors, then check for all TREE parts.</i></p>
	<p>Good job! You worked very hard today. Let's see who won the You/Me game. <i>Tally up scores and award point to student.</i></p>
	<p>Well. It looks like we are done for the day. If your teacher is around, I would like to confirm our next appointment.</p> <p><i>Use appointment book to confirm upcoming tutoring session. Report results of You/Me game, number of essay parts and any other general comments. Get parent email if you do not already have it.</i></p>

After the session:

1. Email student data to <info withheld>
2. Email teacher the results of You/Me game and the number of essay parts included.
3. Prepare for the next session if it is within the next 30 minutes.

Lesson 4:

Lesson Overview

Independent Practice: Working independently, the student participant will write a persuasive essay. After completing the essay, the student participant will review the essay of the tutor and provide feedback regarding the elements of the essay. The tutor will also provide feedback to the student participant regarding inclusion of all the essay elements. They will also discuss the idea of strategy self-regulation. Reinforcement procedures will be in effect using the You/Me Game. *Context for instructions are printed in italics.* **Verbal statements are bolded.**

Student Objectives

1. Student will write a persuasive essay independent of tutor with help only during final check.
2. Student will graph the number of parts found in his or her own essay.

Materials

Student essay written that day

Graphing Chart for Words Written and Essay Parts

Date: Student: Session: Tutor:

Before online session:

1. Have written copy of script to follow.
2. Have headphones ready.
3. Have appointment book ready.
4. Sign into Google Docs account: <https://mail.google.com/>
 - a. Username: <info withheld>
 - b. Password: <info withheld>
 - c. Go to Google Docs and click on Create>Document. Title the document with student initials, session number and your initials (JW1CS). Click on Share and share document with StudentFirstNameUCFwritinglab@gmail.com
5. Sign into Adobe Connect platform (<https://ucf.adobeconnect.com/<info withheld>/writing/>) with username: <info withheld> password: <info withheld>
 - a. Set up in Collaboration layout.
 - b. Have **Student X Topics Pod** ready on right side.
 - c. Have **You/Me Pod** ready and blank on right side.
6. When student signs on, click on **Meeting>Record>** and name session with student initials, session number and your initials (JW1CS).
7. If student does not answer phone or is more than 5 minutes late to session, contact parent on cell phone and document on data sheet. If no one answers, attempt contact twice and document. If parent answers, ask them to accompany student to sign online and stay with student until you have student successfully signed online.

<input checked="" type="checkbox"/>	IOA	Procedures
Session Opening		
		<i>When participant enters, click on participant name >Enable Video & Enable Audio</i>
		<i>Confirm with parent student has audio and video. Parent may leave the session.</i>
		<i>Ask student to put headphones on.</i>

During Session		
		<p><i>Establish rapport by using positive behavioral momentum (three high-p yes responses) – the third request or question will be</i></p> <p>Okay, I'd like you to go ahead and clean off your desk area.</p>
		<p>Okay, today you are going to plan and write a persuasive essay. You have the choice of your topic as well as the position you would like to take. Can you see the topics pod in the center of your Adobe Connect Screen? <i>(Drag Student X Topics Pod to center of Adobe Connect Platform. Support student until he or she finds Student X Topics Pod).</i></p> <p>Type the topic you would like to write about in the Chat Pod on the bottom left of the screen. <i>Note the student's topic in the space below:</i></p> <p><i>Student's topic: _____</i></p> <p><i>Once student has chosen one topic, randomly select and "cut" the prompt from the pool of prompts available based on the student's choice; if it is the last prompt on that topic, let the student know. Paste the prompt onto a new Google Doc.</i></p>
		<p>Now go to your Google Docs Platform and open the new document I have shared with your prompt for today. <i>(Support student until he or she can sign into the Google Docs account, which may include logging out of another existing Gmail account. To sign out go to the top right of the screen and click on the arrow to the left of the gear. Then click on Sign out. When you sign back in, do not check the box that says "Stay signed in.")</i></p> <p>Your username is: <i>StudentFirstNameUCFwritinglab</i> and your password is <i>GoUCF</i></p> <p>Please follow along as I read the prompt to you. <i>Simultaneously highlight the prompt using the Google Docs highlighting feature as it is read. Please read the prompt back to me.</i></p> <p>Now you will plan and write your response. Be sure to use everything you have learned about writing.</p> <p>Please tell me when you are ready to begin planning by stating 'Ready to plan' and tell me when you are ready to being writing by saying 'Ready to write'. <i>Record the length of time spent planning and writing.</i></p> <p>Seconds spent planning: _____</p> <p>Seconds spent writing: _____</p>
		<p>"Good work" or "all done" or "nice job" <i>(When student has finished, give general praise but do not comment on writing).</i></p>
		<p>Okay – today today you are going to plan and write a persuasive essay with my support only during the final check. By now, you should know the rules of the Me/You game. Let me know if you have any questions.</p>
		<p>I'll keep a record of the stars on this score board on the Adobe Connect Platform. Can you see it? <i>Drag the You/Me Pod to the center of the Adobe Connect Platform).</i></p> <p><u><i>Procedures for You/Me Game:</i></u> <i>When student gets answer correct or follows correct procedure,</i></p>

		<i>place star on student side and say “good job” or “correct”. When student gets answer wrong, say “Oops” and place gold star on tutor side.</i>
REINFORCEMENT PROCEDURES IN EFFECT FROM THIS POINT FORWARD		
<i>Discuss It</i>		
		<p>Let’s review the parts of a good persuasive essay and we’ll play the You/Me game. You should know all of the parts of a good persuasive essay, so you’ll earn stars for each answer you get correct.</p> <p>What was the word we used to help us remember the essay parts? <i>TREE –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the parts of TREE? <i>Provide corrective feedback, verbal praise, and star for each question you ask. Student should have many stars by the end of this session. Encourage student and remind him or her about winning You/Me game and exchanging points.</i></p> <p>What was the word we used to help us remember the steps for writing? <i>POW –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the steps in POW? <i>Provide corrective feedback, verbal praise, and star for each correct response. Encourage student and remind him or her about winning You/Me game and exchanging points. Keep working with student until all steps of POW and TREE are stated.</i></p> <p>Good job! Looks like you are well on your way.</p>
<i>Support it</i>		
		Now you are going to write an essay using the Google Docs platform. I’ll help in the last step of POW as you check your work. I’ll also be letting you know when you are earning stars as you do things correctly.
		<p>Okay, you have the choice of your topic as well as the position you would like to take. Can you see the topics pod in the center of your Adobe Connect Screen? <i>(Drag Student X Topics Pod to center of Adobe Connect Platform. Support student until he or she finds Student X Topics Pod).</i></p> <p>Type the topic you would like to write about in the Chat Pod on the bottom left of the screen. Note the student’s topic in the space below:</p> <p><i>Student’s topic: _____</i></p> <p><i>Once student has chosen one topic, randomly select and “cut” the prompt from the pool of prompts available based on the student’s choice; if it is the last prompt on that topic, let the student know. Paste the prompt onto a new Google Doc.</i></p>

	<p>Now go to your Google Docs Platform and open the new document I have shared with your prompt for today. <i>(Support student until he or she can sign into the Google Docs account, which may include logging out of another existing Gmail account. To sign out go to the top right of the screen and click on the arrow to the left of the gear. Then click on Sign out. When you sign back in, do not check the box that says “Stay signed in.”)</i></p> <p>Your username is: <i>StudentFirstNameUCFwritinglab</i> and your password is <i>GoUCF</i></p> <p>Please follow along as I read the prompt to you. <i>Simultaneously highlight the prompt using the Google Docs highlighting feature as it is read. Please read the prompt back to me.</i></p>
	<p>Now plan and write the essay. You take the lead, and I’ll help you check at the end. Be sure to use everything you have learned about writing. You’ll earn points for using POW and TREE. <i>Be sure student engages in all steps of POW and uses all TREE parts. At the very end of writing the essay, (part of W – Write and check), have student go back through document and check for spelling and grammar errors, then check for all TREE parts.</i></p>
<i>Self-regulation</i>	
	<p>OK. Let’s take a look at the essay you wrote today so we can identify parts that you are already using. Let’s see if you included more parts needed for a good essay.</p> <p>We are going to move to the Google Docs platform for this, but I will continue keeping score of the Me/You game on the Adobe Connect Platform. You can always check your score by switching to the Adobe Connect Platform.</p> <p><i>Share the student’s essay to the student. At the top of the essay, make sure the TREE Note is visible on the right margin as a Note.</i></p>
	<p>I want you to read the essay out loud. When you think you have read one of the TREE parts, you’ll insert a comment using the Google Docs feature.</p> <p><i>Respond positively & provide encouragement as you go along. Award Points for You/Me Game. Be sure to name each part using the same word as the one in the TREE</i></p>
<i>Self-regulation</i>	
	<p>So, let’s review our progress and set a goal for ourselves tomorrow. It is really important that we do this so we know how we are doing. Plus, you get a sense of achievement for all of the hard work that you have done when you achieve your personal goals and see your scores improving over time.</p>
	<p>Let’s take a look at our Progress Chart. Go to the Google Doc Platform, and check for a new document I shared with you called “<i>Student Name Progress Chart.</i>” <i>Orient the student to the chart. Discuss how the chart will be used to keep record of the student’s current number of essay parts, plus goals for tomorrow.</i></p> <p>Let’s go ahead and place the number of parts you had on the essay you wrote today. Then, let’s make a goal for tomorrow. <i>Guideline: Student’s goal should be at least 1.5 times the parts written today.</i></p>
	<p>Good job! You worked very hard today. Let’s see who won the You/Me game.</p> <p><i>Tally up scores and award point to student.</i></p>
	<p>Well. It looks like we are done for the day. If your teacher is around, I would like to</p>

	<p>confirm our next appointment.</p> <p><i>Use appointment book to confirm upcoming tutoring session. Report results of You/Me game, number of essay parts and any other general comments. Get parent email if you do not already have it.</i></p>
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After the session:

1. Email student data to <info withheld>
2. Email teacher the results of You/Me game and the number of essay parts included.
3. Prepare for the next session if it is within the next 30 minutes.

Lesson 5:

Lesson Overview

Independent Practice: Working independently, the student participant will write a persuasive essay. After completing the essay, the student participant will review the essay of the tutor and provide feedback regarding the elements of the essay. The tutor will also provide feedback to the student participant regarding inclusion of all the essay elements. They will also discuss the idea of strategy self-regulation. Reinforcement procedures will be in effect using the You/Me Game. *Context for instructions are printed in italics.* **Verbal statements are bolded.**

Student Objectives

1. Student will write a persuasive essay independent of tutor with help only during final check.
2. Student will graph the number of parts found in his or her own essay.

Materials

Student essay written that day

Graphing Chart for Words Written and Essay Parts

Date:
Student:
Session:
Tutor:

Before online session:

1. Have written copy of script to follow.
2. Have headphones ready.
3. Have appointment book ready.
4. Sign into Google Docs account: <https://mail.google.com/>
 - a. Username: <info withheld>
 - b. Password: <info withheld>
 - c. Go to Google Docs and click on Create>Document. Title the document with student initials, session number and your initials (JW1CS). Click on Share and share document with StudentFirstNameUCFwritinglab@gmail.com
5. Sign into Adobe Connect platform (<https://ucf.adobeconnect.com/<info withheld>/writing/>) with username: <info withheld> password: <info withheld>
 - a. Set up in Collaboration layout.
 - b. Have **Student X Topics Pod** ready on right side.
 - c. Have **You/Me Pod** ready and blank on right side.
6. When student signs on, click on **Meeting>Record>** and name session with student initials, session number and your initials (JW1CS).
7. If student does not answer phone or is more than 5 minutes late to session, contact parent on cell phone and document on data sheet. If no one answers, attempt contact twice and document. If parent answers, ask them to accompany student to sign online and stay with student until you have student successfully signed online.

<input checked="" type="checkbox"/>	IOA	Procedures
Session Opening		
		<i>When participant enters, click on participant name >Enable Video & Enable Audio</i>
		<i>Confirm with parent student has audio and video. Parent may leave the session.</i>
		<i>Ask student to put headphones on.</i>

During Session		
		<p><i>Establish rapport by using positive behavioral momentum (three high-p yes responses) – the third request or question will be</i></p> <p>Okay, I'd like you to go ahead and clean off your desk area.</p>
		<p>Okay, today you are going to plan and write a persuasive essay. You have the choice of your topic as well as the position you would like to take. Can you see the topics pod in the center of your Adobe Connect Screen? <i>(Drag Student X Topics Pod to center of Adobe Connect Platform. Support student until he or she finds Student X Topics Pod).</i></p> <p>Type the topic you would like to write about in the Chat Pod on the bottom left of the screen. <i>Note the student's topic in the space below:</i></p> <p><i>Student's topic: _____</i></p> <p><i>Once student has chosen one topic, randomly select and "cut" the prompt from the pool of prompts available based on the student's choice; if it is the last prompt on that topic, let the student know. Paste the prompt onto a new Google Doc.</i></p>
		<p>Now go to your Google Docs Platform and open the new document I have shared with your prompt for today. <i>(Support student until he or she can sign into the Google Docs account, which may include logging out of another existing Gmail account. To sign out go to the top right of the screen and click on the arrow to the left of the gear. Then click on Sign out. When you sign back in, do not check the box that says "Stay signed in.").</i></p> <p>Your username is: StudentFirstNameUCFwritinglab and your password is GoUCF</p> <p>Please follow along as I read the prompt to you. <i>Simultaneously highlight the prompt using the Google Docs highlighting feature as it is read. Please read the prompt back to me.</i></p> <p>Now you will plan and write your response. Be sure to use everything you have learned about writing.</p> <p>Please tell me when you are ready to begin planning by stating 'Ready to plan' and tell me when you are ready to being writing by saying 'Ready to write'. <i>Record the length of time spent planning and writing.</i></p> <p>Seconds spent planning: _____</p> <p>Seconds spent writing: _____</p>
		<p>"Good work" or "all done" or "nice job" <i>(When student has finished, give general praise but do not comment on writing).</i></p>
		<p>Okay – today today you have written a persuasive essay with my support only during the final step as you "check". By now, you should know the rules of the Me/You game. Let me know if you have any questions.</p>
		<p>I'll keep a record of the stars on this score board on the Adobe Connect Platform. Can you see it? <i>Drag the You/Me Pod to the center of the Adobe Connect Platform).</i></p>

		<i>Procedures for You/Me Game: When student gets answer correct or follows correct procedure, place star on student side and say “good job” or “correct”. When student gets answer wrong, say “Oops” and place gold star on tutor side.</i>
REINFORCEMENT PROCEDURES IN EFFECT FROM THIS POINT FORWARD		
<i>Discuss It</i>		
		<p>Let’s review the parts of a good persuasive essay and we’ll play the You/Me game. You should know all of the parts of a good persuasive essay, so you’ll earn stars for each answer you get correct.</p> <p>What was the word we used to help us remember the essay parts? <i>TREE –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the parts of TREE? <i>Provide corrective feedback, verbal praise, and star for each question you ask. Student should have many stars by the end of this session. Encourage student and remind him or her about winning You/Me game and exchanging points.</i></p> <p>What was the word we used to help us remember the steps for writing? <i>POW –provide corrective feedback, verbal praise, and star.</i></p> <p>What are the steps in POW? <i>Provide corrective feedback, verbal praise, and star for each correct response. Encourage student and remind him or her about winning You/Me game and exchanging points. Keep working with student until all steps of POW and TREE are stated.</i></p> <p>Good job! Looks like you are well on your way.</p>
<i>Self-regulation</i>		
		<p>OK. Let’s take a look at the essay you wrote today so we can identify parts that you are already using. Let’s see if you included more parts needed for a good essay.</p> <p>We are going to move to the Google Docs platform for this, but I will continue keeping score of the Me/You game on the Adobe Connect Platform. You can always check your score by switching to the Adobe Connect Platform.</p> <p><i>Share the student’s essay to the student. At the top of the essay, make sure the TREE Note is visible on the right margin as a Note.</i></p>
		<p>I want you to read the essay out loud. When you think you have read one of the TREE parts, you’ll insert a comment using the Google Docs feature.</p> <p><i>Respond positively & provide encouragement as you go along. Award Points for You/Me Game. Be sure to name each part using the same word as the one in the TREE</i></p>
<i>Self-regulation</i>		
		<p>So, let’s review our progress and set a goal for ourselves tomorrow. It is really important that we do this so we know how we are doing. Plus, you get a sense of achievement for all of the hard work that you have done when you achieve your personal goals and see your scores improving over time.</p>

	<p>Let's take a look at our Progress Chart. Go to the Google Doc Platform, and check for a new document I shared with you called "Student Name Progress Chart." Orient the student to the chart. Discuss how the chart will be used to keep record of the student's current number of essay parts, plus goals for tomorrow.</p> <p>Let's go ahead and place the number of parts you had on the essay you wrote today. Then, let's make a goal for tomorrow. Guideline: Student's goal should be at least 1.5 times the parts written today.</p>
	<p>Good job! You worked very hard today. Let's see who won the You/Me game. Tally up scores and award point to student.</p>
	<p>Well. It looks like we are done for the day. If your teacher is around, I would like to confirm our next appointment.</p> <p><i>Use appointment book to confirm upcoming tutoring session. Report results of You/Me game, number of essay parts and any other general comments. Get parent email if you do not already have it.</i></p>

After the session:

1. Email student data to <info withheld>
2. Email teacher the results of You/Me game and the number of essay parts included.
3. Prepare for the next session if it is within the next 30 minutes.

APPENDIX E: ESSAY ELEMENTS SCORING SHEET

Essay Elements Scoring Sheet				Rater 1	Rater 2	Point by Point IOA
Belief/topic sentence: 1 point maximum: Student must write a belief and make reference to the topic.						
Reason: 1 point for each new supporting reason—no maximum limit <ul style="list-style-type: none"> ▪ Reason must support position stated in belief. ▪ A reason can be stated in its own sentence. ▪ One sentence can include multiple reasons. ▪ Do not count the same reason more than once. ▪ Count items that fall under one category as one reason; but if the list contains items that could fall into different categories, then count the number of categories as reasons. ▪ If a reason supports opposing position, give 1 point for counterargument (see below). 						
Explanation: 1 point for each new explanation—no maximum limit <ul style="list-style-type: none"> ▪ Explanation must clarify why or how the reason supports the student’s argument ▪ If the same explanation is used more than once, only count one time. ▪ The explanation may be tagged at the end of the reason sentence. ▪ The explanation may be its own sentence. ▪ A student can give two explanations for one reason. 						
Ending Statement: 1 point maximum <ul style="list-style-type: none"> ▪ Ending statement clearly indicates that the response has ended and restates belief on the topic. 						
Total:						
Holistic Score:	Words Written:	Time Planning:	Time Writing:			IOA:

Comments:

Developed by Elizabeth Benedek-Wood (Mason, Kubina, & Taft, 2009).

APPENDIX F: FCAT WRITING SCALE

FCAT Writing Scale

Student Initials: _____ **Essay Number:** _____ **Assessor Initials:** _____

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.

Unscorable: The paper is unscorable because: a) the response is not related to what the prompt requested the student to do; b) the response is simply a rewording of the prompt; c) the response is a copy of a published work; d) the student refused to write; e) the response is illegible; f) the response is written in a foreign language; g) the response is incomprehensible (words are arranged in such a way that no meaning is conveyed); h) the response contains an insufficient amount of writing addressing the prompt; i) the response contains an insufficient amount of writing to determine if the student was attempting to address the prompt; or j) the writing folder is blank.

**APPENDIX G: COMPARISON OF WWC STANDARDS WITH CURRENT
STUDY**

Comparison of WWC Standards with Current Study

WWC Criteria for Single Case Designs Which Meet Evidence Standards and Have a Strong Evidence of Causal Relation (Kratochwill et al., 2010).	How Current Study Meets WWC Criteria for Single Case Designs Which Meet Evidence Standards and Have a Strong Evidence of Causal Relation.
The independent variable (i.e., the intervention) must be systematically manipulated, with the researcher determining when and how the independent variable conditions change.	The experimental design is a multiple probe across participants design.
Each outcome variable must be measured systematically over time by more than one assessor, and the study needs to collect inter-assessor agreement in each phase and on at least twenty percent of the data points in each condition (e.g., baseline, intervention) and the inter-assessor agreement must meet minimal thresholds.	The researcher will systematically measure dependent variables over time and a trained research assistant will collect inter-rater data across twenty percent of data points in each condition. Inter-rater data will meet minimum thresholds of .80 to .90 percent agreement (Kratochwill et al., 2010) or both raters will take part in training until minimum threshold are met.
The study must include at least three attempts to demonstrate an intervention effect at three different points in time or with three different phase repetitions.	The study demonstrates replication of effect over at least three participant baselines.
To Meet Standards a multiple baseline design must have a minimum of six phases with at least five data points per phase.	The study demonstrates replication of effect across eight phases and with at least five data points per phase.

APPENDIX H: INSTITUTIONAL REVIEW BOARD LETTER



University of Central Florida Institutional Review Board
 Office of Research & Commercialization
 12201 Research Parkway, Suite 501
 Orlando, Florida 32826-3246
 Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: UCF Institutional Review Board #1
 FWA00000351, IRB00001138
 To: Carrie L. Straub
 Date: November 16, 2011

Dear Researcher:

On 11/16/2011, the IRB approved the following minor modifications to human participant research that is exempt from regulation:

Type of Review: Exempt Determination
 Modification Type: Study title changed from: "The Effects of Supplementary Synchronous Online Instruction Containing Research-Based Elements of the Instructional Cycle on the Academic Performance of Students in an Online Learning Environment," study location changed from Florida Virtual School to Lawton Chiles Preparatory Academy. Revised Informed Consent has been approved for use.
 Project Title: The Effects of Supplementary Synchronous Online Instruction on the Academic Performance of Students in an Online Learning Environment
 Investigator: Carrie L. Straub
 IRB Number: SBE-11-07468
 Funding Agency:
 Grant Title:
 Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 11/16/2011 12:47:34 PM EST

IRB Coordinator

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