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Exploring the effects of online instructional models on the writing achievement of high school students with and without disabilities

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EXPLORING THE EFFECTS OF ONLINE INSTRUCTIONAL MODELS ON THE
WRITING ACHIEVEMENT OF HIGH SCHOOL STUDENTS WITH AND
WITHOUT DISABILITIES

by

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A dissertation submitted in partial fulfillment
of the requirements for the

Doctor of Philosophy Degree in Special Education
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Doctor of Philosophy in Special Education

Examination Committee Chair

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ABSTRACT

Exploring the Effects of Online Instructional Models on the Writing Achievement of High School Students With and Without Disabilities

by

Bradley Jon Kaffar

Dr. Susan Miller, Examination Committee Chair
Professor of Special Education
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The purpose of the study was to investigate the effectiveness of three online models for teaching a paragraph writing strategy to students with and without disabilities. A learning strategist instructor implemented *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) using three treatment groups that included the following online models: (a) Power Point media, (b) streaming video, and (c) multimedia (Power Point and video). Participants were 121 high school students in grades 9 through 12 enrolled in an online charter school program; there were 27 students with disabilities and 94 students without disabilities. Data were collected to answer five research questions related to the effectiveness of the three online models for teaching the strategy. Two assessments were used as pre- and posttest measures: *The Oral and Written Language Scales* (OWLS) (Carrow-Woolfolk, 1996) and a Curriculum-Based Paragraph Writing Assessment from *The Paragraph Writing Strategy*. The effects of the intervention were analyzed using a 3 x 2 x 2 mixed-model analysis of variance (ANOVA). To further

analyze the data paired-samples *t*-tests were conducted. Results indicate that there were significant differences between the pre- and posttest scores from both assessments for all students, but there were no significant interactions or main effects related to student achievement and the online instructional models used. The *t*-test analyses revealed that students with disabilities demonstrated significant improvement, as measured by the Curriculum-Based Paragraph Writing Assessment, when Power Point media was used. Students without disabilities demonstrated significant improvement, as measured by the OWLS and Curriculum-Based Paragraph Writing Assessment, when Power Point media and multimedia (Power Point and video) was used. Also, students without disabilities demonstrated significant improvement, as measured by the Curriculum-Based Paragraph Writing Assessment, when streaming video was used. Further analysis revealed that online instruction did not reduce the difference in writing achievement between students with disabilities and students without disabilities, because both student types made equivalent achievement gains. Results of this research indicate that high school students benefited from online instruction, but further investigation of online models specific to high school students with and without disabilities is important.

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CHAPTER 1

INTRODUCTION

The growth of online instruction for all levels of education has been substantial. Online education programs range from basic courses, where students download information, to fully interactive virtual classrooms (Silverman, 2001). Once a college-level instructional practice, online learning is becoming much more common in high schools across the country (Emeagwali, 2004). In a 2001 report, the Distance Learning Resource Network reported that approximately 50,000 kindergarten through twelfth grade students were enrolled in some kind of online course (McLester, 2002) and it was predicted that within five years, every high school student in the nation would have taken some kind of online course (Silverman). In 2002, 12 states had active online school programs; additionally, five states were developing online options, 25 states were permitting the creation of online charter schools, and a total of 32 states had initiatives related to online education (Ronsisvalle & Watkins, 2005). In 2005, Podoll and Randle reported that some form of online learning was offered in 41 percent of elementary and secondary schools. Responding to the need for alternative education, 2,400 publicly funded, Internet-based charter schools and state and district virtual schools within 37 states offered online education to more than 50,000 students (Pape, 2005).

Clearly, online education has become increasingly prevalent in the K-12 sector and as more students become aware of the opportunities provided through online

education, growth in this area is expected to continue. Additionally, educators will continue to look for ways to provide innovative learning tools to all students within these online environments (Pape, 2005). Researchers and educators note that web-based courses have evolved into communities of learners, interactively communicating and constructing knowledge (Siegle, 2002). Also noted is that online instruction is being used to increase the school-related performance of students with disabilities (Smith & Meyen, 2003). Due to the benefits of online course instruction, entire schools, called virtual high schools, are now providing online curricula to a large number of students. Initially, virtual schools offered advanced placement or remedial courses addressing both ends of the learning spectrum. Today, virtual schools attract students by providing a full curriculum of courses and electives in addition to advanced placement and remedial courses (Mupinga, 2005; Pape, 2005).

Benefits of an Online Education

Online education offers several benefits to the students enrolled in online courses. For example, online learning offers flexibility of time and space. This allows classes to be available twenty-four hours-a-day, seven days a week (Donlevy, 2003). Also, students have the ability to review presented content and take classes outside regular school hours (Nitkin, 2005). Students select online education to suit their social and work commitments. Podoll and Randle (2005) report that students appreciate the freedom to choose when to work on classes rather than having to work on them at a specific time. This alternative to the traditional classroom environment allows students to attend and participate when it is convenient for them to do so (Siegle, 2002). Students have the

opportunity to work at their own pace. Because of the flexibility related to online instruction, many students with special needs benefit from distance education programs (Mupinga, 2005). The asynchronous format of online courses allows the student more time to think, reflect, and formulate answers as they interact with teachers and other class participants (Podoll & Randle, 2005).

Because online learning offers equal access to the content being taught, a diverse range of learners benefit from the individualized format online learning provides. Through online education, academic classes can be designed to meet a variety of learning styles and needs (Pape, 2005). Therefore, online learning is enjoyed by rural students, sick or hospitalized children, gifted children, traveling families, and students who have been faced with problems in traditional classrooms. Smith and Meyen (2003) suggest that the online environment allows for increased access to the general education curriculum for students with disabilities. Furthermore, students who perform poorly in a traditional classroom may do better in an online class (Podoll & Randle, 2005). As a result, an online education has the potential to result in a student-centered learning environment that promotes high levels of student engagement.

An online education offers students opportunities to sharpen skills for lifelong learning and success outside school. Many schools offer Advanced Placement courses online enabling students to explore topics in greater depth than the typical classroom schedule permits. Therefore, students have opportunities to take ownership over and direct their own learning (Podoll & Randle, 2005). Students become active participants in the learning process through use of self-help and self-assessment tools to improve their

skills. Also, students improve their ability to work independently and manage their time (Nitkin, 2005).

Pape (2005) explains that an online education harnesses the power of technology and capitalizes on students' interest in it. Student motivation is enhanced because online learning can involve a variety of multimedia activities (Mupinga, 2005). The ability to use technology with a high level of skill will provide online high school graduates an advantage over their peers. Students gain technology skills that will improve their individual marketability as they enter the work force or higher education (Donlevy, 2003).

Challenges Facing Online Education

In addition to the benefits associated with online education, there also are several challenges. Because students may not attend a traditional school daily, there are fewer opportunities for socialization and person-to-person interaction (Donlevy, 2003). Students may have feelings of isolation (Podoll & Randle, 2005). Therefore, students need to have a high level of self-direction. Online learning requires self-discipline and time management skills. It requires active participation in the learning process along with good reading and writing skills (Siegle, 2002). Students in special education frequently benefit from interpersonal contact in the classroom and by exposure to social and emotional learning experiences (Donlevy, 2003). Also, Donlevy suggests that students with low reading abilities and problems with motivation may be challenged to maintain interest in accomplishing the assigned learning activities. Typically, a high level of daily involvement in online courses is a challenge for students. Finally,

prerequisite technical skills are needed for students to be successful and independent learners within an online environment.

The Historical Evolution of Online Education

Online education, including courses, programs, and virtual schools, has evolved from various forms of distance education (Schlosser & Anderson, 1994). Distance education is a broad category of education in which the instructor and students are separated by time, location, or both (Blomeyer, 2002). Distance education is more than 150 years old and dates back to the 1800s (Schlosser & Anderson). Rumble (2001) identifies four technology-based phases that chronicle the history of distance education: (a) correspondence education, (b) broadcast-based education, (c) multimedia education, and (d) online education. Each of these phases played a significant role in the advancement of distance education and ultimately led to the current state-of-the art online education.

Correspondence Education

From 1840 to 1940, distance education involved teaching and learning through correspondence (Rumble, 2001; Schlosser & Anderson, 1994). Developed to address the educational needs of individuals located in agricultural or other isolated regions, correspondence education utilized postal services to distribute printed course materials. Correspondence education occurred when a student completed course assignments on an independently-arranged time schedule. The emergence of correspondence education in Europe and later, in the United States, encouraged studies at home and targeted groups of adults with occupational, social, and family commitments (Schlosser & Anderson). Anna

Ticknow, a resident of Boston, was instrumental in establishing correspondence education programs. During a 24-year period, Ticknow provided this type of learning program to more than 10,000 students using printed materials sent through the mail (Verduin & Clark, 1991).

In 1891, correspondence courses began to be offered by universities such as Illinois Wesleyan and the University of Wisconsin (MacKenzie, Christensen, & Rigby, 1968). In the early 1900s, correspondence education was offered at elementary, secondary, post-high school, and vocational levels. Throughout the years in which correspondence education evolved, the individuality of learning and the flexibility of both time and place of study were emphasized benefits of learning from a distance (Verduin & Clark, 1991).

Broadcast-based Education

From 1940 until the 1970s, development in distance education involved use of broadcasting to support isolated individuals and remote classrooms (Rumble, 2001; Schlosser & Anderson, 1994). Combining correspondence instruction with radio programming was pioneered at institutions such as The University of Iowa, California State University, Florida State University, Indiana State University, and Nebraska State University (Sherow & Wedemeyer, 1990). Initially, in the broadcast phase of distance education, radio was used extensively. In the late 1950s, television emerged as the newer and more effective tool. This led to the emergence of college credit courses offered via broadcast television (Schlosser & Anderson). Western Reserve University was the first to offer full credit courses via television in 1951. Some broadcast-based systems used telephone as a means of providing contact and feedback (Rumble). The use of this

communication technology supplemented print-based education through instructional tutorials and group sessions. Educational programming and audio conferencing enabled real time communication without geographical restrictions.

Despite the popularity of broadcast-based education, Dirr (1983) cited the following barriers to this type of education: (a) lack of appropriate radio or audio courses, (b) poor radio or audio reception, (c) poor broadcast times, and (d) insufficient notice of broadcast courses. These noted barriers, however, did not prevent the advancement of distance education being offered in this manner. By the early 1980s, television courses were offered by 10,000 universities nationally (Tate & Kressel, 1983). The Public Broadcasting Service (PBS), through their Adult Learning Service, provided approximately six courses each semester to 500 colleges and universities (Dirr, 1983).

Multimedia Education

Beginning in 1970, the multimedia phase of distance education revealed the use of text, video, and audio technology (Rumble, 2001). Attempts to integrate technology and print resources came to the forefront (Willis, 1993). The emergence of cable and satellite technology enabled the rapid spread of instructional television (Schlosser & Anderson, 1994). During this phase, educational methods included use of audiocassettes and videotapes (Rumble). A disadvantage of this type of instruction was the lack of two-way communication between teacher and student.

For 20 years, multimedia distance education improved rapidly and increased course availability for many students (Rumble, 2001). Beginning in the late 1980s, interactive television courses (ITV) provided two-way audio and video instruction and allowed for immediate interaction between the student and teacher. In an interactive

television classroom, students at remote sites could see, hear, and interact with students and instructors at a host site (Minoli, 1996). The development of ITV courses benefited the educational needs of off-campus, place-bound students.

Online Education

Beginning with development of personal computers during the mid-1980s and growth of the Internet, online education has been the most recent phase of distance education (Harasim, 2000; Rumble, 2001; Uhlig, 2002). Modern computer hardware and software have provided several technological options for instructional delivery (e.g., interactive audioconferencing, one-and-two way video, computer conferencing, audio graphic systems) that enable students and instructors to see, hear, interact, and receive prompt feedback from one another (Willis, 1993). As a variety of hardware and communication tools became available, two-way distance education programs emerged. E-mail in the early 1980s, and the invention of the World Wide Web in 1992, made online education more accessible and enabled new instructional models to be adopted at all levels of education including K-12 schools (Harasim, 2000). In some cases, individual courses are taken online; in other cases, students enroll in programs that are offered entirely online. Since 1996, online education has been provided at the K-12 level beginning with The Concord Consortium's Virtual High School and the Florida Virtual School (McLester, 2002). The Florida Virtual School's aim was to relieve the strain of overcrowded schools, meet the demands for high-needs courses, and make honors and advanced placement courses available to students in small, rural districts. The Internet provides the flexibility to increase student interaction and instructional feedback within the online environment (e.g., class conferencing, discussion groups, virtual chat rooms,

and e-mail). Currently, online courses are available to students anywhere and anytime through the Internet. These new models for instructional delivery offer increased flexibility to individuals. During this time period, the networked classroom allowed new educational approaches to emerge, particularly within the writing curriculum (Harasim). Joint writing projects, which connected students cross-culturally and facilitated information exchange, were some of the first classroom activities launched in the new, global learning community (Harasim). Two-way communication and dialogue within the educational process provided support to the student by facilitating information exchange. The growth of online learning communities, along with increasing access to computers, led to many experimental and exploratory applications in a new field: online education (Harasim). A variety of instructional media and methods are now available through online education, allowing the instructor to provide students with multiple ways to access content.

Throughout the 1990s and 2000s, a substantial amount of research has been conducted related to the general effectiveness of online instruction. Most of these studies (O'Neal, 2003; Smith, Smith, & Boone, 2000; Tucker, 2001; Wegner, Holloway, & Garton, 1999) involve comparisons of the effectiveness of online instruction to the effectiveness of traditional instruction among university students. Based on this body of literature, it appears that online instruction and traditional instruction are, for the most part, similar in terms of effectiveness. Research related to the effectiveness of online instruction among school-aged students has just begun (Roblyer, 2000). Refinement of this research to include investigations related to specific interventions and specific technology models within critical content areas such as writing is needed.

Increased Demands Related to Writing Performance

Although strategies to improve writing achievement have received less research attention than strategies to improve reading and arithmetic skills, proficient writing skills remain among the highest academic priorities. For example, schools must meet federal mandates for academic improvement within the No Child Left Behind (NCLB) Act of 2001 (P.L. 107-110) and writing components are being added to or expanded within state-mandated tests. The writing process is often a challenge encountered by students with disabilities in general education settings. In order to compensate for such challenges, students with disabilities require well-designed instruction designed to their needs so written communication skills can be improved (Sitko, Laine, & Sitko, 2005). The demands for proficient writing continue to emerge; beginning in 2005, the Scholastic Assessment Test (SAT) (Scholastic Assessment Test, 2005) college entrance exam requires students to write an essay and the American College Test (ACT) (American College Test, 2005) includes an optional essay component ("Writing: The Neglected R Returns," 2005). On both assessments, students are presented with a writing prompt. Students are asked to take a position and support it in a handwritten format. Student scores are based on their skills in the areas of organization, sentence structure, language use, and content.

Writing is a complex process that involves planning, composing, and revising ("Writing: The Neglected R Returns," 2005). Therefore, teachers must instruct students how to organize thoughts, develop ideas, and revise their writing for clarity. Grammar instruction should be incorporated into the process. The use of technology has potential for improving the writing achievement of students with disabilities (Sitko, Laine, &

Sitko, 2005). The combination of powerful technology tools and evidence-based writing programs has the potential to increase student achievement in this high-demand subject area.

Improving Writing Achievement Through Strategy Instruction

Studies suggest that teaching students with disabilities to use strategies to improve their learning is beneficial (Deshler, 2005). In the past, strategies to improve students writing achievement have received considerable research within traditional, face-to-face settings, but limited research exists within online settings. Writing strategies fall under two general categories: cognitive strategies and process strategies. Cognitive strategies provide students with routines for managing the complexities of writing tasks and accomplishing writing tasks with greater attentiveness (Troia, 2002). Cognitive strategies may enhance the student's metacognitive awareness; this is the student's awareness of the knowledge, skills, and strategies for effective and efficient task performance (Troia). Also, cognitive strategies may incorporate self-regulation procedures; these include goal setting, self-monitoring, self-evaluation, and self-reinforcement that enable the student to reflect on his or her writing. Process strategies provide students with task-specific skills that include planning, organizing, composing, evaluating, and revising their writing (Torrance, Thomas, & Robinson, 2000). Studies have shown that teaching cognitive strategies along with process strategies for writing is an effective approach for many students (Torrance et al.).

Cognitive Strategy Models for Writing Instruction

Several cognitive strategy models have emerged to improve the writing achievement of students. Three lines of research involving cognitive strategy instruction are: (a) the Cognitive Strategy Instruction Writing program, (b) the Self-Regulated Strategy Development model, and (c) the Strategic Instruction Model.

Cognitive strategy instruction writing. Englert and her colleagues at the Institute for Research on Teaching have developed and measured the effectiveness of Cognitive Strategy Instruction Writing (CSIW). The purpose of the CSIW program is to promote self-regulation and internalization of the process involved in writing (Miller, 2002). Students are provided *Think-Sheets* to use while implementing the cognitive strategy steps of the mnemonic device POWER (i.e., Plan, Organize, Write, Edit/Editor, Revise). The *Think-Sheets* include questions and prompts to guide students through the cognitive strategy steps (Englert, 1990). Research shows improvement in areas such as length, organization, paragraph structure, and development of voice in writing among students with and without disabilities using the CSIW approach (Hallenbeck, 1996; Englert, Raphael, & Anderson, 1992; Englert, Raphael, Anderson, Anthony & Stevens, 1991).

Self-regulated strategy development model. Graham, Harris, and their colleagues developed the Self-Regulated Strategy Development (SRSD) model to facilitate use of specific strategies during the writing process (Miller, 2002). This model includes eight stages: (a) preskill development, (b) initial conference with student to set goals, (c) discussion of the strategy, (d) modeling of the strategy, (e) collaborative practice, (f) independent performance, (g) generalization, and (h) maintenance (Graham, Harris, MacArthur, & Schwartz, 1991). Students learn process strategies along with self-

regulatory procedures, such as goal setting, self-instruction, and self-monitoring, to write effectively. Studies revealed that students improved their writing in both quantity and quality using this model of instruction (De La Paz & Graham, 1997, Graham, MacArthur, & Schwartz, 1995; MacArthur, Schwartz, Graham, Molloy, & Harris, 1996).

Strategy instruction model. Deshler, Schumaker, and their colleagues at the University of Kansas Center for Research on Learning have developed the Strategy Instruction Model (SIM) that includes a comprehensive curriculum of cognitive strategies to improve student achievement. Their model includes eight instructional stages (i.e., Pretest, Describe, Model, Verbal Practice, Controlled Practice, Independent Practice, Posttest, and Generalization) designed to promote acquisition and generalization of the strategy steps (Deshler & Schumaker, 1993; Deshler, Ellis, & Lenz, 1996). Several strategies (e.g., *Fundamentals in the Sentence Writing Strategy*, *Proficiency in the Sentence Writing Strategy*, *The Paragraph Writing Strategy*, *The Error Monitoring Strategy*, *Fundamentals in the Theme Writing Strategy*) within the *Learning Strategies Curriculum* have been specifically designed to help students express themselves in writing (Schumaker & Deshler, 2003; Schumaker & Lyster, 1993; Schumaker, Nolan, & Deshler, 1985; Schumaker & Sheldon, 1998; Schumaker & Sheldon, 1999). Enabling students to learn and perform independently is the overriding goal of the Strategic Instruction Model developed and field-tested at the University of Kansas Center for Research on Learning (KU-CRL). More than 25 years of research and field-testing related to SIM supports its use with students who have academic difficulties (Miller, 2002). Because many high school students with learning disabilities have experienced a

long history of school failure, using an instructional process that results in high levels of success and subsequent motivation is very important (Deshler & Schumaker, 1986).

The Paragraph Writing Strategy

The Paragraph Writing Strategy (Schumaker & Lyster, 1993) is one of the learning strategies within the *SIM Learning Strategies Curriculum* that has been used effectively to increase the ability of students to perform independently with success. *The Paragraph Writing Strategy* facilitates written expression and demonstration of competence and has been particularly useful for low-achieving students and students with learning disabilities. *The Paragraph Writing Strategy* provides students with an efficient and effective way to improve performance on written tasks in a variety of situations.

The Paragraph Writing Strategy enables students to write well-organized paragraphs. Students learn how to write a variety of topic, detail, and clincher sentences and integrate these in several types of paragraphs (Schumaker & Deshler, 2003). A structured step-by-step process is used to help students learn and remember the various components involved in writing a good paragraph. This structured process is particularly helpful for students who experience difficulties in written expression.

Statement of the Problem

Based on the No Child Left Behind Act of 2001, the Individuals with Disabilities Education Improvement Act of 2004, and recent revisions to high stakes testing, it is clear that educational stakeholders are putting increased emphasis on the writing achievement of all school-aged students, including those with disabilities. Agreement seems to exist among educators, policy makers, and researchers that a student's success

in high school and beyond is contingent upon adequate writing achievement. In addition to educational stakeholders noting the importance of writing achievement in traditional, face-to-face settings, the importance of strong writing skills in online settings also has been noted. Specifically, Uhlig (2002) stated that the online student must be able to express ideas in writing comfortably and accurately because most communication in online settings is dependent upon writing ability.

Due to the increased emphasis on writing skills, researchers have focused on the development of evidence-based strategies to improve student performance in this area (Hallahan, et al., 2005). Although these strategies have been validated within traditional, face-to-face settings, little is known about their effectiveness within online environments. This is problematic due to the large increase in school-aged students enrolled in online education. Online education has emerged as a viable option for high school students, but limited data exist to document its overall academic effectiveness (Emeagwali, 2004). More specifically, data to justify various models used for instructional purposes are limited (Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004). Furthermore, limited data exist related to online learning and students with disabilities (Kinash, Crichton, & Kim-Rupnow, 2004) especially related to specific writing strategies. It should not be assumed that providing online instruction is the same as instructing in a face-to-face environment (Mupinga, 2005). Likewise, it should not be assumed that learning online is the same as learning in face-to-face environments (Mupinga). Clearly, the potential of online writing instruction using a variety of models needs to be explored more thoroughly.

The purpose of this study was to investigate the effectiveness of three online models for teaching a paragraph writing strategy to students with and without disabilities.

The following research questions were identified to address this purpose:

1. Is online instruction using multimedia (Power Point and video) more effective for increasing the writing achievement of students with and without disabilities than Power Point media or streaming video alone?
2. Is online instruction using Power Point media effective for increasing the writing achievement of students with and without disabilities?
3. Is online instruction using streaming video effective for increasing the writing achievement of students with and without disabilities?
4. Is online instruction using multimedia (Power Point and video) effective for increasing the writing achievement of students with and without disabilities?
5. Does online learning strategy instruction reduce the difference in writing achievement between students with disabilities and students without disabilities?

Significance of the Study

This research is important for several reasons. Because of the growth of online learning as an option for high school students, it is important to know the benefits and challenges of online education (Mupinga, 2005). This study contributed to the developing knowledge base concerning the effectiveness of online instruction in writing. Because virtual schools are still relatively new, evidence on whether online education is improving student achievement is just beginning to be collected (Pape, 2005). Studies on the effectiveness of teaching complex learning strategies to high school students online

have not been conducted in the past. Smith and Meyen (2003) offer a challenge to continue to examine ways to best integrate online education for the benefit of students with disabilities. Online learning strategy instruction may be one way to address this challenge. This study extended previous research involving writing strategies by measuring the effectiveness of online instruction on student's achievement using *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993). Schumaker and Lyster report the effectiveness of *The Paragraph Writing Strategy* in various settings; however, the effectiveness has not been documented for students enrolled in online instruction of the strategy. Moreover, research related to different online models is limited and needs to be investigated to determine which model is most effective for students with and without disabilities.

Limitations of the Study

This study had several limitations. First, this study was limited to a unique online high school program in the Southwestern United States. The participants attended a charter school, so the results may not generalize to other programs. Second, only three online instructional models were studied. Findings may not generalize to other online formats implemented at the secondary level. Third, the participants are a limitation of the study. Participants had access to distinct online technology. This study included students with and without disabilities in grades 9 to 12. The findings should not be generalized to dissimilar student populations or to students in grades lower than ninth grade. Fourth, this study addressed the writing achievement of the students studied. Therefore, the findings should not be generalized to other academic areas.

Definition of Terms

The following terms and definitions were used in this study.

Advanced practice stage of instruction. A stage in the learning process where students apply a strategy under conditions similar to those experienced in general education courses (Schumaker & Lyster, 1993).

Charter School. A public school of choice which operates independently of the local school district. Charter schools are allotted per-pupil tax dollars for operating revenue and generate additional funding through private and corporate donations as well as state and federal grants.

Controlled practice stage of instruction. A stage in the learning process where students practice a strategy under controlled conditions to become confident and fluent with the procedures required of the strategy (Schumaker & Lyster, 1993).

Describe stage of instruction. A stage in the teaching process that includes the delivery of definitions, rationales, and examples to encourage student learning (Schumaker & Lyster, 1993).

Face-to-face delivery. Instruction consisting of teacher-to-student and student-to-student interaction in the same geographical location, typically a classroom setting.

Hybrid course design. An instructional model that uses a combination of traditional, face-to-face teaching sessions and online learning methods.

Internet. A technology-based network of communication and connectivity that allows for the free flow of information by way of computers and telecommunications equipment within the United States and other nations (Collins, 2001; Gardner & Wissick, 2005).

Learning strategies. Techniques, principles or rules, which enable a student to learn to solve problems and complete tasks independently (Deshler & Schumaker, 1986; Schumaker & Lyster, 1993). This approach includes how a student thinks and acts when planning, executing, and evaluating performance on a task (Deshler & Schumaker, 1986).

Model stage of instruction. A stage in the teaching process that includes demonstration of the thinking processes and behaviors involved in performing the skill (Schumaker & Lyster, 1993)

Multimedia. Using multiple forms of communication to combine text with images, sound, video, or animation (Allan & Slatin, 2005; Willis, 1993).

Online course. A course taught via the Internet in which students access course materials and complete assignments from a computer.

Online education. Online education is instruction where access to course materials and interaction occurs via the Internet (Rumble, 2001). Distance, time, or both separate the instructor and student.

Online instruction. A form of distance education where course materials, instruction, assessments, and person-to-person interaction are accessed via the Internet. The online student may access course materials, instruction, assessments, and communicate with teachers at their convenience.

Online instruction using Multimedia (Power Point and video). A series of multimedia (Power Point and video) lessons derived from *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) instructor's manual; lessons are annotated with features such as writing, pointing, highlighting, and drawing by using specialized video

recording software. Lessons are uploaded to the web for students to view online.

Assignments and practice activities are delivered and completed online.

Online instruction using Power Point media. A series of Power Point media lessons derived from the instructional stages and lessons within *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) instructor's manual. Power Point lessons are uploaded to the web for students to view online. Assignments and practice activities are delivered and completed online.

Online instruction using streaming video. A series of streaming video lessons derived from *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) instructor's manual. Streaming video lessons are uploaded to the web for students to view online. Assignments and practice activities are delivered and completed online.

Online student. A student who participates in an online course.

Power Point media. A presentation method that organizes information into a sequence of slides available for viewing by the individual.

Streaming video. A sequence of moving images (prerecorded video and media) that are sent in compressed form over the Internet and displayed by the viewer as they arrive. Streaming video is read, heard, and viewed while it is being delivered.

Students with Disabilities. Students who qualify for specialized services or educational accommodations according to the Individuals with Disabilities Education Improvement Act of 2004 or Section 504 of the Rehabilitation Act of 1973.

Students without Disabilities. Students who do not qualify for specialized services or educational accommodations according to the Individuals with Disabilities Education Improvement Act of 2004 or Section 504 of the Rehabilitation Act of 1973.

Tegrity. Specialized, multimedia software that enables students to view streaming video synchronized with the instructor's notes from Power Point media along with captured annotations (e.g. writing, drawing, pointing, highlighting).

The Paragraph Writing Strategy. A learning strategy used by students to organize and write paragraphs in order to be able to respond successfully to the writing demands of secondary settings (Schumaker & Lyster, 1993).

Upload. A procedure that allows a file to be transferred from a computer to the Internet.

Verbal practice stage of instruction. A stage in the teaching process that involves memorization of definitions and steps required to apply a strategy independently (Schumaker & Lyster, 1993).

World Wide Web ("Web" or WWW). The information and data that are contained on Web sites and Web pages; Web sites are connected to one another all over the world via the Internet (Gardner & Wissick, 2005).

Summary

As online instruction continues to become more commonplace in secondary education, ensuring that students receive the most effective online instructional model is critical to their rate of success. Deshler and Schumaker (1986) explain that adolescents who "learn how to learn" in secondary schools will be in a much better position to learn new skills and to respond to rapidly changing information and conditions in the future. The Internet offers many opportunities for the school-related performance of students with disabilities to be positively impacted (Smith and Meyen, 2003). The combination of

online instruction and writing strategies has the potential to help secondary students meet challenging and changing academic demands.

A learning strategies instructional approach requires students to accept major responsibility for their learning and progress (Deshler & Schumaker, 1986). Likewise, an online education puts much of the responsibility for learning in the hands of the student. Online technology can be used to extend the learning experiences and academic engagement of students with disabilities (Smith and Meyen, 2003). This study lends information to determine if learning strategies assist students with their role as online, independent learners. As the online environment continues to expand its accessibility and scope, the possibilities that exist for students with and without disabilities are enhanced.

CHAPTER 2

REVIEW OF LITERATURE

There are two purposes for this chapter. The first is to summarize and analyze existing professional literature related to online education. The second purpose is to summarize and analyze existing professional literature related to writing strategy instruction. Knowledge of these two literature bases is needed to understand online instructional models for writing strategy instruction. The chapter begins with the literature review procedures and selection criteria used for experimental studies related to online education. A review and analysis of studies related to online education follows. Next, the literature review procedures and selection criteria used for experimental studies related to writing strategy instruction are explained. A review and analysis of studies related to writing strategy instruction follows. Finally, a summary and synthesis of the research about online education and writing strategy instruction is provided.

Literature Review Procedures Related to Online Education

Studies included in this review were located through a comprehensive search of studies from the following data-bases: Academic Search Premier, Elton B. Stephens Company (EBSCO), Education Resources Information Center (ERIC), and Digital

Dissertations. The following descriptors were used: online education, online learning, online high school, online instruction, virtual high school, distance education, high school, secondary education, special education, learning disabilities, and disabilities. Also, a manual search through selected journals, and an ancestral search through the reference lists of obtained articles was conducted.

Selection Criteria Used for Studies Related to Online Education

Studies were included in this review of literature if: (a) the research examined distance education in the form of online education, (b) the participants were secondary or post-secondary students or teachers, (c) the purpose of the study was to explore the effectiveness of online education or the characteristics of online students. Studies were excluded from this review if: (a) a form of online education was not explored, (b) the participants were not students, teachers, or in some way related to the education field, (c) data or results of the study did not provide information related to online education or the characteristics of online students.

Review and Analysis of Studies Related to Online Education

Online programs are now offered at most post-secondary institutions and are increasingly becoming available at the secondary level of education nationwide. In 2002, there were more than 50,000 kindergarten through grade 12 students enrolled in online programs (McLester, 2002). Podoll and Randle (2005) report that 41% of kindergarten through grade 12 schools offered online learning in some form. Within online education, the participant communicates, accesses coursework, and completes assessments at his or

her convenience. Online education is defined in the literature as a form of distance education in which the primary mode of accessing course materials and person-to-person interaction is via the Internet (Rumble, 2001).

As online education availability and enrollment continues to grow, the impact of the medium on student learning must be explored (Neuhauser, 2002; Tucker, 2001). Fortunately, such investigations have begun at the post-secondary level, but the effects of online education on student learning at the kindergarten to grade 12 levels has yet to be thoroughly explored.

Student Achievement in Online Environments

Recent research indicates that student achievement in online courses is comparable to student achievement in traditional or face-to-face courses (Schutte, 1998; Chyung, 2001). Schutte studied the effects of online instruction on student achievement in a social statistics course. The study involved 33 post-secondary students separated into two groups. Traditional instruction was provided to 17 students; online instruction was provided to 16 students. The traditional class met on-campus weekly and turned in assignments on a weekly basis. All students were responsible for weekly statistic reports, weekly responses to discussion topics, weekly homework, and weekly participation in peer chats.

At the beginning of the course, students completed a questionnaire to determine information about experience with computers, math, and statistics. At the end of the course, students completed another questionnaire with items designed to evaluate the degree of peer interaction in the class, time spent doing class work, perceived degree of flexibility, understanding of class material, and feelings toward the class, computers, and

math. Student scores on two exams were used to examine achievement in the course. The data were analyzed by tallying questions by question type. Comparisons between the online course and the traditional course were conducted. Results were analyzed and the mean for each condition was calculated.

Results from the two exams demonstrate that scores were significantly higher for the online group when compared to the traditional group. Online students scored an average of 20 points higher on both tests than the students in the traditional class. Data from the questionnaire administered at the end of the course showed marginal significant differences between the two groups. Online students communicated more with peers, and online students reported more time spent on class work than the traditional students.

Schutte (1998) concluded that student collaboration is integral in an online course to increase achievement. Schutte reports that further research needs to be done to determine the specific online instructional techniques that may impact student achievement in an online course. Additional research should address larger groups of students and other course topics. Also, research at other academic levels (e.g., high school) would broaden the scope of this research.

Wegner, Holloway, & Garton (1999) conducted a study involving a traditional university course and a Web-based curriculum design and evaluation course. The purpose of the study was to find out if there were differences in student achievement as measured by teacher-prepared tests. A second purpose was to evaluate the perceptions of the students about their learning opportunities as measured by surveys and evaluation instruments.

Part-time graduate students involved in the study selected either a traditional class or a Web-based class. The enrollment in the traditional class was 17; these students received traditional lecture, question-answer, and small-group activities during four three-hour periods. The enrollment in the Web-based class was 14; these students did not attend on-campus classes except to present final products.

Differences in student achievement were measured by giving both groups an identical final exam comprised of objective, short answer, and essay questions. The exam was conducted and scored by the instructor. For both groups, the means for this exam were similar.

No statistical difference in student perceptions of their learning opportunities was found. Students in the Web-based class had more positive feelings about the course. Wegner, Holloway & Garton (1999) concluded that a Web-based class appeared to have no negative effect on student achievement or perception of learning. A larger population of participants would strengthen the study. Further investigation is needed to generalize the findings to other settings.

Diaz (2000) compared the achievement of students enrolled in an online health education course to a traditional health education course at the post-secondary level. Participants were 231 students in two courses; an online course had 96 students and 135 students were in a traditional course. The online course received instruction and submitted assignments online. The online students communicated with the instructor by e-mail. The traditional course received instruction and submitted assignments at weekly on-campus sessions. Both groups received instruction using the same course outline, textbook, lecture material, and tests.

Descriptive statistics, using data from four tests, were used to compare the achievement of students in the online and traditional course. Results indicated that students enrolled in the online course had higher performance than students enrolled in the traditional course. The mean scores on the semester exams were higher for the online students. Students enrolled in the online course received more grades of A and fewer grades of D or F. The results indicated students enrolled in an online course were as successful as students enrolled in a traditional course.

Diaz (2000) suggested that additional research should be conducted to compare the achievement of students in online courses to students in traditional courses. Furthermore, Diaz suggests that future research should analyze the characteristics of successful online students.

Smith, Smith, and Boone (2000) conducted a study to evaluate whether traditional classroom methods remained effective within an online environment. In this study, 58 preservice elementary and secondary education majors were randomly assigned to online and traditional courses.

Pretests and posttests were completed by students that covered the following three instructional methods: (a) lecture, (b) guided instruction, and (c) collaborative discussion. Traditional and online instruction was developed for the three instructional methods. Pre- and posttests were administered to students; data were analyzed using *t*-tests and a repeated measures ANOVA for each of the three instructional methods.

Results of this study indicated that students receiving online instruction performed as well as students receiving traditional instruction. Academic improvement between pretest and posttest increased significantly for both groups receiving instruction. The

findings indicate that traditional methods of instruction can be effectively used in an online environment. Smith, Smith, and Boone (2000) concluded that lectures, guided instruction, and collaborative discussion are as effective within an online environment as in a traditional class. The participant size and data analysis procedures are strengths of this study, but further research across a variety of disciplines is needed to generalize to a variety of post-secondary settings.

Tucker (2001) investigated the performance of 47 students enrolled in a post-secondary business technologies course. A total of 47 students enrolled in either the online or traditional, face-to-face version of the course. Specifically, 23 students were enrolled in the traditional course and 24 students were enrolled in the online course. The same instructor taught both courses to ensure that the information covered, requirements, and grading criteria were identical.

Pre- and posttest scores, homework grades, research paper grades and final course scores of the two groups were compared. Comparisons of means using *t*-tests were conducted to compare the results of the two groups on the pre- and post-test scores, homework grades, research paper grades, and final course scores. There were no significant differences between the two groups in pre-test scores homework grades, research paper grades, or final course grades, but the online students scored significantly higher in post-test scores and on final exam scores.

Tucker (2001) maintained that this did not necessarily mean that online education was superior to traditional education, but that it was a viable alternative. Tucker recommended that further study be done to determine if students taking more than one

course online, including those taking an entire online education program, learned as much as those taking traditional classes.

A strength of this study was using the same instructor for both the online and traditional course. This provided control for teacher effects. Another strength of this study was the use of multiple performance measures rather than a simple pre- and posttest. This allowed the researcher to determine whether differences in student performance were task related.

In a similar study, Chyung (2001) analyzed the achievement of 134 students enrolled in online computer education courses. This researcher analyzed the achievement of students over a period of nine academic quarters. Enrollment in each course ranged from 12 to 20 students; all instruction was delivered online.

Pretest and posttest data were used to evaluate student achievement. Data were analyzed using *t*-tests to determine if there was a difference between the pretest and posttest scores. Results indicated that there was a significant difference between the pretest and posttest; the results were consistent over the course of the nine academic quarters.

Chyung (2001) concluded that students in online computer education courses demonstrated higher achievement on posttests than on pretests. Chyung suggested that future research should focus on identifying factors for improving online courses. Additionally, the attrition rate of students enrolled in online courses should be evaluated. The length of this investigation and the large number of students involved are indicators that the results of this study are viable.

O'Neal (2003) investigated the efficacy of using Web-based instruction as an appropriate method for disseminating information and teaching undergraduate students enrolled in a teacher preparation course. Data were collected related to student achievement, student satisfaction, and quality and quantity of discussions.

Participants in the study were 22 students enrolled in the Web-based section of the course and 22 students enrolled in the traditional section. The Web-based section accessed the course through computers. The traditional section met in a classroom at the university.

Academic achievement was measured through a pre- and posttest. A one-way analysis of variance was conducted. The analysis indicated that both groups of students gained knowledge from their method of instruction. A survey was used to measure students' perceptions of the course content, experience, and learning outcomes. Three paired sample *t*-tests were conducted related to the survey results. The data collected from both groups indicated that there was a positive outcome. An evaluation of the discussions from both groups was conducted to measure the quantity and quality of discussions. The results of this analysis indicated that both groups had similar discussions related to course content.

O'Neal (2003) concluded that the results of the study indicate that Web-based instruction is as effective as traditional instruction for undergraduate students. A strength of the study is the three types of outcome data that were evaluated. Future research should be conducted to determine whether the outcomes generalize to other courses at both the university and high school levels.

In summary, it appears that student achievement within online courses is comparable to student achievement in traditional courses (Shutte, 1998; Wegner, Holloway, & Garton, 1999; Diaz, 2000, Smith, Smith, & Boone, 2000; Tucker, 2001; Chyung, 2001; O'Neil, 2003). Also, research suggests that the instructional design and techniques used in online courses impact student achievement and satisfaction (Shutte, 1998; Smith, Smith, & Boone, 2000). Recommendations for future research include the need to identify factors for improving online courses, the characteristics of successful online students, and the attrition rate of students enrolled in online courses (Shutte, 1998; Smith, Smith, & Boone, 2000; Diaz, 2000).

Learner Characteristics and Online Instruction

Roblyer (2000) studied the factors that motivate community college and virtual high school students to choose online or traditional, face-to-face course formats. The study was designed to provide information on whether factors and characteristics exist that predict students' choice of course delivery: either online or face-to-face. Measures developed to examine this issue included a survey and interview questions. Using the survey along with postinstruction interviews, data were gathered from students enrolled in distance learning courses in one of two settings: (a) a virtual high school system, and (b) a two-year community college. Surveys were completed from 27 high school students and 33 community college students.

Quantitative data analyses were used to examine students' responses. Using a *t*-test for independent samples to analyze community college data, the hypotheses were only partially supported. Results revealed that two factors were significant contributors to decisions to choose online or face-to-face courses: (a) control over the pace and timing of

learning, and (b) personal interaction with instructors and students. Using a paired samples *t*-test to compare responses of online high school students, results showed the need for control over pace and time of learning was significantly important.

Qualitative data analyses were used to examine responses to an open-ended survey question and interview data. Findings indicate that, for students who chose online learning, control over pace and timing of learning was most important. For students who chose traditional course formats, interaction with instructors and students was most important. This study offers support for giving students a choice related to course delivery format.

A strength of this study was the use of both a survey and interview because interviews frequently provide additional insight that is not readily evident in a survey. Also, the involvement of high school and post-secondary students is a strength. Future research should broaden the sample of students surveyed to determine if findings hold true for students at other levels and in other content areas. Also, other online course formats should be examined.

Roblyer and Marshall (2003) created the Educational Success Prediction Instrument (ESPRI) for the purpose of investigating predictions related to student success in secondary online courses. A total of 135 students enrolled in online education participated in the study. The hypothesis was that high scores on the ESPRI indicated that the students believed they were good students. The scores on the ESPRI were then correlated with student achievement as measured by student grades in their online courses. The researchers reported that there was a statistically significant correlation.

between student confidence in their academic ability and achievement in these online education classes.

A strength of this study involves the practical implications that emerged from the findings. Based on the results of this study, guidance may be provided to students concerning their possible chances for success in online courses based on their academic ability and confidence prior to enrolling in online education programs. This may contribute to increased student success within their coursework. A weakness of the study was the lack of analysis related to the correlation between academic ability and online success.

Neuhauser (2002) examined learning style and its effect on student learning in online and face-to-face instructional settings. The purpose of the study was to determine if students enrolled in online or traditional courses differed significantly in their learning styles as measured by a learning modality preference inventory developed for the study. The inventory was administered at the beginning of the course and learning outcomes were measured by test scores and final grades.

Students in two sections (online and face-to-face) of the same undergraduate management course taught by the same instructor participated in the study. The instructor used similar learning activities in each course. Twenty-five students were enrolled in the traditional course and 27 students were enrolled in the online course. The students self-selected into the two courses.

A *t*-test comparison of means for test scores and final grades indicated that there were no significant differences between the groups. However, the online students scored slightly higher than the face-to-face students on test scores and on final grades. In a post-

course survey, 96% of the online students reported believing that they had learned as much or more than if they had taken the course face-to-face.

Neuhauser (2002) concluded that equivalent learning activities can be taught equally well in online and traditional courses and that student learning style had no effect on student outcomes in either the traditional or online courses. Neuhauser recommended that the results of the study not be generalized to all online courses because the online course in this study had a high level of student-instructor interaction. Neuhauser believes that further study is needed that focuses on a variety of online education mediums (e.g., asynchronous, synchronous, and hybrid courses).

Summary of Research Related to Online Education

Based on this review of literature, it appears that online instruction, in general, is similar to traditional face-to-face instruction in terms of student achievement (Chyung, 2001; Diaz, 2000; Schutte, 1998; Smith, Smith, & Boone, 2000). It also appears that most of the studies related to online instruction and student achievement have involved comparisons of various student work samples within a single model of online instruction. Research related to the comparison of student performance in a variety of online models appears to be missing from the literature. As online education continues to develop at the kindergarten through grade 12 level, it is important for research to be conducted that is specific to these groups of students. Research should explore factors related to student's success when learning online. More specifically, research should address the academic outcomes among diverse groups of students served at these levels of education (e.g., students with and without disabilities).

It is important to identify the factors that contribute to a student's success in online education. The research in this study will contribute to the expanding field of study concerning secondary online education, including online education for students with disabilities. Through an understanding of the online instructional models that produce positive results for high school students with and without disabilities, online education will be better prepared to serve the needs of diverse student groups.

Literature Review Procedures Related to Writing Strategy Instruction

Studies included in this review were located through a comprehensive search of studies from the following data-bases: Academic Search Premier, Elton B. Stephens Company (EBSCO), Education Resources Information Center (ERIC), and Digital Dissertations. The following descriptors were used: writing, written expression, writing strategy, writing intervention, learning strategy, high school, secondary education, special education, learning disabilities, disabilities, online education, online learning, and online instruction. Also, a manual search through selected journals, and an ancestral search through the reference lists of obtained articles was conducted.

Selection Criteria Used for Studies Related to Writing Strategy Instruction

Experimental studies were included in this review if they: (a) involved subjects at the middle school or high school level, (b) explored implementation of a writing intervention, and (c) included a clear description of the subjects involved, research settings, research design used, and how the data were analyzed. Particular emphasis was placed on finding studies related to the following three strategy models: Cognitive

Strategy Instruction Writing (CSIW), Self-Regulated Strategy Development (SRSD), and Strategic Instruction Model (SIM). Also, studies were included if they examined technology use in support of high school students' writing. Finally, studies were included if they pertained to students with disabilities. Studies were excluded from this review if: (a) the study involved subjects in levels lower or higher than middle or high school, or (b) implementation of a learning strategy did not focus on writing.

Review and Analysis of Studies Related to Writing Strategy Instruction

Wong (1997) describes three years of genre-specific writing strategy intervention that involved students with learning disabilities; two separate studies are reviewed here. Students in this research were taught to write with a word-processing program on computers. The procedures spanned several stages: keyboard stage, planning, writing, and revising. The keyboard stage spanned three weeks to ensure that students had adequate word processing skills prior to receiving instruction in the writing process. The planning phase involved intensive modeling of the process and writing plans using plan sheets that were designed for the essay type. The writing stage involved independent essay writing using computers and word processing. The revising stage occurred through conferencing and an interactive dialogue technique. Students received instruction three times a week for approximately 50-minute periods. Participants in Study One included 18 students in a trained group and 13 students in an untrained group; students were in grades 8 and 9. Participants in this study learned the strategy for reportive essays. Participants in Study Two included 18 students in a trained group and 20 students in an

untrained group; students were in grades 8 and 9. Participants in this study learned the strategy for persuasive essays.

Data were analyzed for each study using a multivariate analysis of variance with follow-up univariate analyses of variance. The results indicate that students with training improved significantly in the quality of their compositions. Students' gains from pretest to posttest on target dependent measures in each intervention were statistically significant. Wong (1997) attributes the success of the writing intervention to three sources: (a) the genre-specific strategies, (b) the focused and intensive writing instruction, and (c) the use of interactive dialogues in conferences.

Wong (1997) concluded that the intervention research validated writing strategies and enhanced the quality and quantity of students' writing. Strengths of the research are the use of computers to assist students through the writing process and the duration of the studies to fully evaluate writing improvement. Future research should investigate the use of the strategies in other content areas and maintenance of the strategies across the content.

Wong, Butler, Ficzero, and Kuperis (1997) conducted a study to investigate the efficacy of a genre-specific writing strategy for use with compare-and-contrast essays to enhance the quality of adolescents' writing. The participants were 21 students in grades 9 and 10; there were 13 boys and 8 girls. Fourteen students were identified with learning disabilities and seven were low achieving as identified by report card grades. The students attended a junior high school in a large, suburban area. Participants completed pretest, posttest, and maintenance compare-and-contrast essays. Writing strategy training consisted of three phases: planning, writing, and revision. During planning, students

worked collaboratively and were provided planning sheets designed for compare-and-contrast essays. During the writing phase, students utilized personal computers to write independently. The revision phase was achieved through interactive dialogues with partners. Each phase of training involved explicit and elaborate teacher modeling. Three teacher-researchers were involved in the instruction.

A repeated measures multivariate analysis of variance was run simultaneously on the three essay characteristics targeted for instruction in the study: clarity, aptness, and organization. The results indicated significant differences in essay quality. Follow-up repeated measures univariate analyses of variance run on the three variables separately also revealed significant changes over time. Repeated measures ANOVAs were run on each of the variables or compare pretest scores to posttest scores and posttest scores to maintenance scores, separately. The results indicated that changes occurred between pretest and posttest and no changes were observed between posttest and maintenance test. Thus, the data showed that the quality of compare-and-contrast essays improved significantly from pretest to posttest, and the data showed that improvements were maintained.

This study (Wong, Butler, Ficzero, & Kuperis, 1997) indicates that writing strategy instruction resulted in improved compare-and-contrast essays. Further research should examine if similar results can be achieved when students write other essay types. Also, further research should investigate if the results generalize to other types of students and other settings.

Cognitive Strategy in Writing (CSIW)

The Cognitive Strategy Instruction Writing (CSIW) model was developed to promote self-regulation and internalization of the process involved in writing (Miller, 2002). The strategy involves the use of *Think-Sheets* and a mnemonic device to improve the writing achievement of students with and without disabilities.

Hallenbeck (1996) conducted a study that involved adapting the Cognitive Strategy in Writing (CSIW) program to junior high and high school students with learning disabilities. The CSIW program was originally intended for elementary-age students.

Participants were seven students from a rural secondary school in the Midwest United States. The students, all White, were in grades 7, 10, 11, and 12; three females and four males participated. All participants were enrolled in a resource room program and were identified with learning disabilities. The CSIW curriculum materials were used for strategy instruction. The strategy was utilized during the course of one school year.

Assessment measures used in the study were two types of expository writing samples that were given by means of pretest and posttest essays. Scoring of pretest and posttest papers focused on key elements of each of the two types of expository writing. Papers received ratings for the following elements: (a) a holistic rating for overall quality, (b) a primary trait score, (c) number of words, and (d) a reader sensitivity score. A comparison of pretest and posttest means from the two types of writing assessments indicated improvement by every student in every scoring category.

Hallenbeck (1996) concluded that the CSIW program resulted in dramatic improvement for one group of adolescents with learning disabilities. However, this

research could be extended in several ways. A larger group of students and a broader student population should be studied to generalize the results. The CSIW program might be a useful approach for students in regular classrooms. Further, maintenance of CSIW instruction should be assessed over time. Also, the success of CSIW with secondary students suggests the approach might be extended to other learners.

In a subsequent study, Hallenbeck (2002) examined how Cognitive Strategy Instruction in Writing could be used to enable adolescents to take responsibility for their writing and scaffold one another's writing development. Participants were 4 seventh-grade students with learning disabilities. Two participants were boys and two were girls; all participants were white. The setting was a rural school in the upper Midwest. The students participating in the study were scheduled into a resource room for the same class period and were the only students assigned during that period. Strategy instruction included mini-units on paragraph and narrative writing as well as CSIW strategy instruction over the course of one school year. The students collaboratively wrote two papers in pairs during the course of the year.

Pretest papers were written in September, and posttest papers were completed in May; papers were scored using rubrics developed for this purpose. Pretest and posttest analysis revealed significant growth by 3 of the 4 participants. Qualitative analysis suggested that the students had internalized the processes modeled by the teacher and were able to incorporate these processes in their writing and scaffolded the writing of their partners.

Hallenbeck (2002) concluded that based on the pretest/posttest analysis, students demonstrated the capacity to employ the writing strategy and take responsibility for their

writing achievement. These findings cannot be generalized beyond this single case. Further research is needed to broaden the types of students and settings where this intervention can be successfully implemented.

Self-Regulated Strategy Development (SRSD) on the Writing Process

The Self-Regulated Strategy Development (SRSD) model was developed to facilitate use of specific strategies along with self-regulatory procedures to promote achievement in writing (Miller, 2002). Studies reveal that students improved their writing in both quantity and quality using the SRSD model.

MacArthur, Graham, Schwartz, and Schafer (1995) studied the effectiveness of writing instruction that integrated word processing, the Self-Regulated Strategy Development model, and a process approach. Teachers were provided a curriculum guide that included a structure and sequence of activities for the school year. Teachers organized the curriculum into a series of units or writing projects to focus on the writing process, strategy instruction, and word processing throughout the duration of the study.

The experiment was implemented for a full school year in 12 classes with 113 students with learning disabilities. Control classes consisted of 10 classes with 94 students with learning disabilities. Class sizes ranged from 8 to 15 students. Students who did not meet learning disability eligibility criteria received instruction, but they were excluded from the data collection. Each classroom in the experimental group was equipped with four to six computers with word processing software that included a spelling checker.

Measures included both narrative and informative papers that were written by students in experimental and control classes at pretest and posttest. Two narrative and

two informative prompts were counterbalanced between pretest and posttest. Pretest results were analyzed to determine whether the prompts in each genre were equivalent in length and quality. Separate one-way analyses of variance by prompt were carried out for length and quality of narrative and informative papers. All comparisons were nonsignificant.

Half of the experimental students used a word processor for posttesting. To determine whether this condition affected the results, analysis of covariance with pretest results as the covariate was used to compare the compositions written with and without word processing. Separate analyses were conducted for posttest scores on quality, length, and proportions of spelling, capitalization, and punctuation errors. No significant differences were found for any of these measures, so the two subgroups were combined for all further analyses.

The effect of the treatment on the outcome measures was evaluated using separate analyses for narrative and informative compositions for overall quality, length, and proportions of errors in spelling, capitalization, and punctuation. A significant effect was found for quality on both narrative and informative compositions. Follow-up *t*-tests were used analysis to test whether each group improved from pretest to posttest. The experimental group demonstrated significant gains on both the narrative and the informative writing tasks. A significant effect was found for length of composition for narrative writing, but not for informative writing. Follow-up *t*-tests were used to determine whether length changed for each group from pretest to posttest. The experimental group demonstrated significant increases in length on the narrative and informative writing tasks. Separate regression analyses were conducted for proportions

of spelling, capitalization, and punctuation errors. No significant effects for group were revealed using these measures. To determine whether the absence of significant differences was due to lack of progress or equivalent improvement, *t*-tests were conducted for each group. Significant decreases in spelling errors were found for the experimental group on narrative and informative compositions, and for the control group on the narrative composition, but not the informative composition. No significant differences were found on capitalization and punctuation for either group on either writing task.

MacArthur, Graham, Schwartz, and Schafer (1995) concluded that the study demonstrated the overall effectiveness of an instructional model that integrated a process approach to writing, instruction in planning and revising strategies, and support from word processing because students in the experimental classes made greater gains than control students in the quality of both narrative and informative writing. Strengths of the study include the use of experimental and control groups, the large number of students with learning disabilities involved, and the duration of treatment which led to significant writing improvement. A weakness of the study is that it does not differentiate which components of the model were critical to its effectiveness. However, it demonstrates the overall effectiveness of integrating word processing, strategy instruction, and a process approach to writing.

De La Paz (1999) used the Self-Regulated Strategy Development approach to teach middle school students with and without learning disabilities. Participants in the study were 22 students in seventh- and eighth-grade. Eight students had identified learning disabilities. The study took place in two middle schools in the Southeast and

involved three general education teachers. All students received instruction in general education classes. The task chosen for investigation was expository essays and teachers used scripted lessons and instructional materials from the SRSD model of instruction. Twelve to 16 class periods were required for instruction over approximately a four-week period.

Using a multiple-baseline with multiple probes in baseline design, the following conditions were in effect during the study: (a) baseline essay probes, (b) instruction, (c) postinstruction essay probes, and (d) maintenance essay probe. Baseline, postinstruction, and maintenance writing probes were given to all students using identical procedures. Students wrote on the prompts in the same order, allowing comparisons across classes of students.

During the baseline condition, the majority of participants demonstrated little or no planning. Only 7% of the baseline essays included plans. Baseline essays contained a small number of words and ideas. The quality of essays during baseline was poor. During the instruction condition, students did not complete essay probes. During the postinstruction condition, all of the participants generated plans in advance of writing. All of the students improved their writing as measured by the length and functional elements included in their essays. Quality ratings for essay writing after learning the strategy improved as well. Evidence of strategy use showed that all students used the strategy to develop essays. The maintenance essay probe that was administered four weeks after strategy instruction showed students with learning disabilities maintained the gains observed during postinstruction, and all students showed maintenance of the strategy.

De La Paz (1999) reported that positive results were found for students with and without learning disabilities; students' papers were longer, more complete, and showed improved quality. Changes in writing performance and behavior were maintained over time.

Chalk, Hagan-Burke, and Burke (2005) examined the effects of the Self-Regulated Strategy Development (SRSD) model on the writing performance of high school sophomores with learning disabilities. Unlike previous studies that examined the SRSD model with elementary-aged students, this study focused on high school students in a special education resource setting.

Participants were selected from grade 10 technical language arts classes for students in special education; fifteen students with learning disabilities met the selection criteria. Of the 15 participants, 4 were female and 11 were male. All participants were Caucasian. For all participants, writing performance was delayed by at least two years.

The study took place in a large high school in the southeastern part of the United States. Although some students were integrated into general education classes through an inclusion model, the participants in this study received small-group academic instruction in special education resource programs.

Students were taught to apply SRSD model as a strategy for planning and writing essays and to self-regulate their use of the strategy and the writing process. Lessons consisted of five sessions taught during 50-minute instructional periods. The SRSD strategy consisted of the following six steps: (a) develop background knowledge, (b) initial conference: strategy goals and significance, (c) modeling of the strategy, (d)

memorization of the strategy, (e) collaborative practice, and (f) independent practice.

Data were collected through writing probes that were scored based on length and quality.

To analyze data based on length, a repeated-measures analysis of variance was conducted and a significant main effect for conditions was found. Follow-up trend analysis and pair-wise tests using least-significant difference (LSD) procedures were conducted to determine which conditions were significantly different. A significant linear trend was observed indicating a relationship between conditions and number of words written with time accounting for 92% of the variance. None of the three baseline conditions were significant, verifying that baseline was an accurate indication of student performance before treatment. With the exception of a pre-skills condition, each of the subsequent intervention, maintenance, and generalization conditions were significant when compared with baseline conditions. The pre-skills condition was significantly different from each of the subsequent conditions. Modeling was significant with each condition except for one of the two independent practice conditions. Controlled practice was not significant with the post-instruction probe. However, significant differences were observed for both the maintenance and generalization probes.

To analyze data based on quality, a repeated-measures ANOVA was conducted to examine differences between points in time. Like the results for length, the repeated ANOVA revealed a significant main effect, indicating that quality improved over time.

Strengths of this study are that it focused on the written expression of high school students and added to the research supporting use of strategy instruction to improve the writing performance of students with learning disabilities. Several limitations of this study are noted. First, there was no control group, and neither random sampling nor

random assignment occurred. Next, pre- and post standardized measures of writing and written expression may have strengthened the results. Lastly, further research across a broader range of student types would improve the ability for the results to be generalized.

Strategic Instruction Model (SIM)

The Strategic Instruction Model (SIM) utilizes specific instructional stages along with mnemonic devices to enable students to learn and perform independently (Miller, 2002). Several research studies have been conducted to determine the effects of the individual writing strategies within the SIM *Learning Strategies Curriculum*.

In a study on the effects of the *Sentence Writing Strategy* (Schumaker & Sheldon, 1998; Schumaker & Sheldon, 1999), Kline, Schumaker, and Deshler (1991) studied three groups of teachers and their students with learning disabilities. Participants were 24 teachers and 54 students with learning disabilities in grades 4 to 12. All teachers received instruction in how to teach the *Sentence Writing Strategy* and were provided materials to teach their students. One group of teachers was taught how to give feedback to students using an elaborated feedback sequence. A second group of teachers was taught how to give elaborated feedback and how to teach students to accept the feedback. The third group of teachers was instructed to give feedback as specified in the instructor's manual for the *Sentence Writing Strategy*; this group was referred to as the comparison group.

The measures used in this study were teachers' implementation of the feedback routines and student acceptance of the feedback, student trials to mastery within the instructional sequence for learning to write sentences, and number of errors made by students on their learning sheets within six error categories. A multiple-baseline-across-teachers design was used to show that the teachers in the two elaborated feedback groups

learned how to implement elaborated feedback in conjunction with the *Sentence Writing Strategy* (Schumaker & Sheldon, 1998; Schumaker & Sheldon, 1999) quickly and easily. A 3 x 3 factorial design was used for the trials to mastery data, and analyses of variance were conducted to compare student performance of four lesson sets across the three groups of students. Significant differences were found in the average number of trials required to reach mastery across the groups. The comparison students required the largest number of trials to reach mastery. Significant differences were found between the average number of trials to mastery required by the comparison students and the average number of trials to mastery required by the other two groups. No significant differences were found between the two elaborated feedback groups. A 3 x 3 x 2 repeated measures factorial design was used to analyze the error results. Students in the two elaborated feedback groups had fewer errors on the second trial than the first trial in all error categories across the lesson sets; students in the comparison group did not. Students in the comparison group required more practice trials to meet mastery.

Kline, Schumaker, and Deshler (1991) concluded that students with learning disabilities can learn to write sentences and can reach mastery within two trials when their teachers provide elaborated feedback after practice attempts. This study utilized several measures to analyze learning outcomes for both students and teachers. Additional research with other student types and settings would strengthen the results.

In a study focused on *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993), Moran, Schumaker, and Vetter (1981) taught three adolescents with learning disabilities in grades 8 and 9. The students were taught to use *The Paragraph Writing Strategy* to write three types of paragraphs: (a) enumerative, (b) sequential, and (c)

compare and contrast. Students met mastery on one paragraph type before proceeding to instruction in another. For each type of paragraph, students were taught to write a topic sentence, detail sentences, and a clincher sentence. Students were taught in one-hour periods per day.

A multiple-baseline-across-paragraph-types design was used to show the effects of the instruction for each student. Average paragraph writing scores improved from 59% to 95% for enumerative paragraphs. Average paragraph writing scores improved from 50% to 90% for sequential paragraphs. Average paragraph writing scores improved from 44% to 87% for compare-and-contrast paragraphs.

In a follow-up experiment, Moran, Schumaker, and Vetter (1981) used *The Paragraph Writing Strategy* (Schumaker & Lyerla, 1993) to teach five students with learning disabilities in grades 7 to 10. A multiple-baseline-across-students design was combined with the multiple-baseline-across-paragraph-types design. The second experiment followed the same procedures as the first experiment, except students received instruction in two-hour periods per day.

Average paragraph writing scores improved from 49% to 92% for enumerative paragraphs. Average paragraph writing scores improved from 49% to 87% for sequential paragraphs. Average paragraph writing scores improved from 38% to 91% for compare-and-contrast paragraphs. The results of the second experiment showed that improvements in paragraph writing occurred only in conjunction with instruction in the first paragraph type.

Moran, Schumaker, and Vetter (1981) concluded instruction in *The Paragraph Writing Strategy* (Schumaker & Lyerla, 1993) was equally effective in one- and two-

hour periods. Also, the strategy was effective for a variety of students. A strength of this study was the follow-up experiment that demonstrated similar results to the first experiment. A weakness of the study is the small number of students involved and only students with learning disabilities were included. A broader sample of student types is needed to generalize the results.

Schumaker, Deshler, Alley, Warner, Clark, and Nolan (1982) studied students' ability to find and correct errors in their writing by using the *Error Monitoring Strategy* (Schumaker, Nolan, & Deshler, 1985); this strategy was designed to help students eliminate the following four categories of writing errors: capitalization, punctuation, appearance, and spelling errors. Participants were nine students with learning disabilities in grades 8 to 12.

After students had received instruction to describe, model, and memorize strategy steps, the students practiced using the strategy on teacher-generated passages in which errors had been inserted. Students were scored on their ability to find and correct errors within each passage. Next, students practiced finding and correcting errors in their student-generated passages.

Results of a multiple-baseline-across-students design showed that students found and corrected substantially more errors after learning the *Error Monitoring Strategy* (Schumaker, Nolan, & Deshler, 1985). Specifically, before instruction, students corrected an average of 25% of the errors in teacher-generated passages; after instruction, students corrected an average of 96% of errors.

Schumaker, Deshler, Alley, Warner, Clark, and Nolan (1982) concluded that students with learning disabilities can detect and correct a variety of errors made in

writing. This study would be strengthened if a larger sample of students had been involved. Also, research to evaluate the ability of students without disabilities to monitor for errors in writing would be beneficial.

Schmidt, Deshler, Schumaker, and Alley (1988/89) studied *The Paragraph Writing Strategy* (Schumaker & Lysterla, 1993) to evaluate the effects of four different generalization procedures on students' use of writing strategies in written products. Participants were 7 students with learning disabilities in grades 10, 11, and 12. The setting was a high school resource room. The teacher within the resource room setting provided the instruction in small groups.

During the study, students were taught *The Paragraph Writing Strategy* (Schumaker & Lysterla, 1993) through a sequence of instructional lessons and three generalization conditions: (a) a review condition, (b) a transfer condition, and (c) a self control condition. Measures included scoring student's paragraphs for format, complete sentences, a topic sentence, detail sentences, and a clincher sentence.

Using a multiple baseline design, it was evident that students' performance on written products improved immediately after training, and all students mastered the strategy. After training was terminated, no student met the mastery criterion on written products. After the review condition was implemented, the students' scores on written products improved; however, no student sustained mastery level performance under the review condition. When the transfer condition was implemented with five students, four of them sustained mastery level performance on written products. When the self-control condition was used with the one student who did not sustain mastery level performance

during the transfer condition, this student exceeded and sustained mastery level performance.

Schmidt, Deshler, Schumaker, and Alley (1988/89) maintained that their study demonstrated that students with learning disabilities can learn *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) and achieve mastery performance under generalization conditions. The small number of participants included in the study is a weakness. Further research should explore whether students consistently generalize learning strategies across a broad range of settings.

Schmidt (1985) studied *The Sentence Writing Strategy* (Schumaker & Sheldon, 1998; Schumaker & Sheldon, 1999) to evaluate the effects of four different types of generalization procedures on students' use of complete and complicated sentences in written products. The participants in this study were seven students with learning disabilities; the students were in grades 10, 11, and 12. The setting was a high school resource room. The teacher within the resource room setting provided the instruction in small groups.

During Schmidt's study (1985), a multiple baseline design was used. The instructor taught the strategy using scripted lessons from the *Sentence Writing Strategy* (Schumaker & Sheldon, 1998; Schumaker & Sheldon, 1999). These lessons were followed with the addition of four generalization conditions: (a) a review condition, (b) a transfer condition, (c) a self control condition, and (d) a cooperative-planning condition. The study included two measures: (a) a complete sentences measure, and (b) a complicated sentences measure. The complete sentences measure analyzed the percentage of complete sentences that appeared in written samples collected in both resource room and general

education classes. Complete sentences included simple, compound, complex, and compound-complex sentences. The complicated sentences measure analyzed the percentage of complicated sentences in written samples collected in resource room and general education classes. Complicated sentences included compound, complex, and compound-complex sentences.

Before training in sentence writing, students averaged 70% complete sentences and 18% complicated sentences in written products. During implementation of the *Sentence Writing Strategy* (Schumaker & Sheldon, 1998; Schumaker & Sheldon, 1999), students averaged 92% complete sentences and 44% complicated sentences in written products. Improvement in written products occurred only after implementation of the strategy was instituted in each case. After strategy implementation was terminated, students averaged 80% complete sentences and 20% complicated sentences in written products. When the review condition was implemented, the students wrote an average of 89% complete sentences and 39% complicated sentences in written products. After the transfer condition was implemented, students wrote an average of 92% complete sentences and 48% complicated sentences in written products. The self-control condition was implemented with two students who had lower than mastery performance on sentence writing. One additional student experienced the cooperative planning condition. All three students' performances within these conditions showed sustained use of the strategy at acceptable levels.

A strength of this study was the emphasis on generalization which led to the addition of a three-phase generalization step to the acquisition and generalization process included in the *Sentence Writing Strategy* (Schumaker & Sheldon, 1998; Schumaker &

Sheldon, 1999). The small number of participants included in the study is a weakness, and further research should examine outcomes in a broader range of settings.

In a study that integrated computer and a learning strategy, McNaughton, Hughes, and Ofiesh (1997) focused on the detection and correction of spelling errors through use of a computerized spellchecker and strategy instruction. The *InSPECT Strategy* (McNaughton & Hughes, 1999) was taught to three high school students with disabilities; the students attended a learning support program for some of their academic day. The high school was located in the Northeastern United States. During instruction, students were taught to use the *INSPECT Strategy* in conjunction with a word processing spellchecker program. Instruction was provided by the lead researcher.

The effects of the instruction were evaluated using a multiple-baseline-across-students design that included three phases: baseline, intervention, and maintenance. Data were collected on strategy use, spelling error correction rates, and final error rates during probes in all three phases. Maintenance of the strategy was measured one, two, and four weeks after instruction ended.

The results showed that the students used an average of 39% of the strategy steps during baseline, 79% during instruction, and 86% during maintenance. Before instruction, 7.6% of the words in students' compositions contained spelling errors, and 41% of spelling errors were corrected. After instruction, an average of 3% of the words in compositions contained spelling errors, and 75% of the spelling errors were corrected. This level of performance is comparable to students without spelling disabilities. McNaughton, Hughes, and Ofiesh (1997) concluded that students with disabilities can learn a strategy for using a spellchecker to eliminate spelling errors in their writing and

perform at a level comparable to students without disabilities. A weakness of the study is that it only investigates one aspect of the editing and revising process. Students with disabilities also need learning strategies to make other revisions to their writing work. Also, student without disabilities were not included in this study.

Summary of Research Related to Writing Strategy Instruction

Based on this review of literature, it appears that writing strategy instruction has the potential to increase the achievement of students with and without disabilities (De La Paz, 1999; Hallenbeck, 2002; Kline, Schumaker, & Deshler, 1991; MacArthur, Graham, Schwartz, & Schafer, 1995; McNaughton, Hughes, & Ofiesh, 1997; Schumaker, Deshler, Alley, Warner, Clark, & Nolan, 1982). Limited research involving writing strategy instruction has been conducted at the secondary level. Therefore, there is a need for more research on how to improve the written language skills of high school students. It also appears that most of the studies related to writing strategy instruction have been done within traditional settings. Research related to writing strategy instruction that utilizes computer technology is limited within the literature. Therefore, there is a need for research that involves the use of technology related to writing strategy instruction. As online education continues to develop at the kindergarten through grade 12 level, it is important for research to be conducted that will address the needs of struggling writers. Research should explore factors related to student's success when provided writing strategy instruction online. More specifically, research should address the academic outcomes among diverse groups of students served at these levels of education (e.g., students with and without disabilities).

It is important to identify the factors that contribute to a student's success when provided online writing strategy instruction. The research in this study will contribute to the field of study concerning writing strategy instruction at the secondary level for students with and without disabilities. Through an understanding of the online writing strategy instruction for high school students with and without disabilities, online education will be better prepared to serve the needs of diverse student groups.

Literature Review Summary

There were two purposes for this chapter. The first was to summarize and analyze existing professional literature related to online education. The second purpose was to summarize and analyze existing professional literature related to writing strategy instruction. Knowledge of these two literature bases is needed to understand online instructional models for writing strategy instruction.

From this literature review, it is evident that additional research that involves teaching students to be more strategic in their writing is warranted at the high school level. Furthermore, exploring the effectiveness of several online instructional models is needed to determine how to best provide learning opportunities to high school students. Writing strategy instruction, combined with effective online instructional models, may help students with and without disabilities meet their achievement potential.

CHAPTER 3

METHODOLOGY

The purpose of this study was to investigate the effectiveness of three online models for teaching a paragraph writing strategy to students with and without disabilities. All students were taught *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993). This chapter is organized into eight sections related to the methodology for this study. The sections are as follows: (a) research questions, (b) participants, (c) setting, (d) instrumentation, (e) design and procedures, (f) interscorer reliability, (g) interobserver reliability, and (h) treatment of data.

Research Questions

The research questions are:

1. Is online instruction using multimedia (Power Point and video) more effective for increasing the writing achievement of students with and without disabilities than Power Point media or streaming video alone?
2. Is online instruction using Power Point media effective for increasing the writing achievement of students with and without disabilities?

3. Is online instruction using streaming video effective for increasing the writing achievement of students with and without disabilities?
4. Is online instruction using multimedia (Power Point and video) effective for increasing the writing achievement of students with and without disabilities?
5. Does online learning strategy instruction reduce the difference in writing achievement between students with disabilities and students without disabilities?

Participants

The participants in this study were high school students with and without disabilities enrolled in a charter high school in the Southwestern United States. A learning strategist instructor employed at the school implemented all instruction in this study.

Participant Pool

The instructor's January 2006 total student enrollment in all sections of online courses was 165 students; the student enrollment was distributed across 10 course sections. Of the 165 students, 24 students had been identified with disabilities under the Individuals with Disabilities Education Improvement Act (IDEA, 2004) eligibility criteria. Six students were eligible for educational accommodations under requirements set by Section 504 of the Rehabilitation Act of 1973. All 30 students with disabilities were provided special education services and support within general education course sections.

Specific participation criteria for this study included the following: (a) enrolled in the charter high school, (b) enrolled in grades 9 through 12, (c) able to access online instruction from a location other than school, (d) informed consent signed by the participant's parent, and (e) assent to participate in research signed by the student. A concerted effort was made to recruit participants whose gender, ethnicity, and grade placement matched that of the school. Online group assignment was accomplished through random assignment of 10 online course sections. All students enrolled in the online course sections received instruction; only students meeting the participation criteria were included in the study.

Participant Demographics

The required participation criteria were met by 121 students from the charter high school. Due to attrition of participants during the study, data from 104 students were analyzed to answer the research questions. There were 25 students with disabilities and 79 students without disabilities. The students were in grades nine through 12. Student demographic data are displayed in Tables 1 and 2.

Setting

The charter high school, located in the Southwestern United States, serves students who live within the boundary of the local school district. The high school operates as an independent entity under the charter school laws and distance education regulations of the state. The school has classrooms on its campus where students are required to attend one day a week for four hours. During the four hours, students receive face-to-face instruction in study skills and strategies for two hours. The remaining two

hours are spent in a homeroom setting where teachers track student progress in the online learning environment, answer individual questions, and develop a mentor-like relationship with students. Outside of the four-hour attendance block, students

Table 1

Demographic Information for Participants with Disabilities

Treatment Group	Group 1: Online PowerPoint	Group 2: Online streaming video	Group 3: Online multimedia
Grade			
9	3	1	1
10	3	2	5
11	1	2	3
12	2	2	0
Gender			
Male	6	4	5
Female	3	3	4
Ethnicity			
European American	6	6	7
African American	2	0	2
Asian	1	0	0
American Indian	0	1	0
Hispanic	0	0	0

Treatment Group	Group 1: Online PowerPoint	Group 2: Online streaming video	Group 3: Online multimedia
IDEA Eligibility			
Specific Learning Disability	6	4	6
Emotional Disturbance	1	1	0
Autism	0	0	1
Section 504 Eligibility			
Attention Deficit Disorder	1	2	1
Learning Disability	1	0	0
Health Impairment	0	0	1
Writing Achievement ^a			
Mean	23.43	23.71	43.40
Standard Deviation	19.81	13.93	22.68

^aNational Percentile Rank (NPR) from *Iowa Tests of Educational Development (ITED)*:

Revising Written Materials subtest

Table 2

Demographic Information for Participants without Disabilities

Treatment Group	Group 1: Online Power Point	Group 2: Online streaming video	Group 3: Online multimedia
Grade			
9	5	10	12
10	13	3	5
11	12	5	5
12	3	1	5
Gender			
Male	16	9	10
Female	17	10	17
Ethnicity			
European American	24	16	19
African American	3	0	0
Asian	1	1	2
American Indian	1	0	1
Hispanic	4	2	5
Mean Writing Achievement^a			
Mean	50.81	45.29	52.54
Standard Deviation	23.39	29.16	29.89

^aNational Percentile Rank (NPR) from *Iowa Tests of Educational Development (ITED)*:

Revising Written Materials subtest

communicate with teachers via e-mail or telephone. All assignments are posted on course websites within the school's online instructional delivery system. Each course website provides students with instruction, assignments, and grade reporting information.

Within the school's online instructional delivery system, three distinct online settings were used for the purposes of this study. The first online setting involved the use of Power Point media. In this setting, students viewed Power Point presentations of the instructional lessons. The second online setting involved the use of streaming video. In this setting, students viewed online video presentations of the instructional lessons. The third online setting involved the use of multimedia (Power Point and video). In this setting, students viewed presentations that incorporated streaming video along with Power Point media.

Instrumentation

Standardized Assessment

The Written Expression Scale of *The Oral and Written Language Scales* (OWLS) (Carrow-Woolfolk, 1996) was used as a pre- and posttest measure. The OWLS Written Expression Scale is an assessment of written language for children and young adults. The scale is designed to measure the following writing skills: (a) the ability to use conventions, (b) the ability to use linguistic forms, and (c) the ability to communicate meaningfully. The writing skill areas are referred to as conventions, linguistics, and content. This assessment tool has a mean of 100 and a standard deviation of 15. The author of the OWLS reports a mean internal reliability of .87 for the Written Expression

Scale with a standard error of measurement of 5.5. Test-retest reliability is reported to be .87. See Appendix A for sample items from the OWLS.

Curriculum-based Paragraph Writing Assessment

The Paragraph Writing Strategy (Schumaker & Lyster, 1993) includes a pretest to determine a student's current habits with regard to writing paragraphs. The pretest consists of a list of six potential writing topics; they are: (a) My Favorite Sport, (b) The Problems of Old Age, (c) The Life of a Teenager, (d) The Perfect Job, (e) The "Musts" for a Healthy Body, and (f) The Best Season of the Year. The students select one of the topics and write a paragraph six sentences in length. The student is evaluated on whether he/she uses a topic sentence, detail sentences, and a clincher sentence. Also the student's writing is evaluated on sentence sequence, use of appropriate transition words, and consistent use of point of view and tense throughout the paragraph. *The Paragraph Writing Strategy* also includes a posttest that serves as a means of measuring a student's progress in learning the strategy. Posttest evaluation measures and procedures are the same as those employed for the pretest.

Materials and Instructional Program

The Paragraph Writing Strategy (Schumaker & Lyster, 1993) consists of two associated manuals: (a) an instructor's manual with 35 scripted lessons and related instructional materials, and (b) a student lessons volume with activities for practice. See Appendix B. The instructor developed online lessons derived from the two manuals. Students use the strategy to organize and write paragraphs in order to more effectively meet writing demands in a variety of secondary settings. The strategy was designed to

teach students the basic principles involved in constructing paragraphs. Instruction in the strategy involved teaching students to: (a) list ideas related to a topic, (b) plan the point of view and verb tense to be used in the paragraph, (c) plan the sequence in which ideas will be expressed, and (d) write a variety of Topic, Detail, and Clincher Sentences.

Instruction included teaching students two mnemonic devices: PENS and SCRIBE. The mnemonic devices remind students of the steps that they are to follow as they write paragraphs. For a list of the steps associated with the PENS and SCRIBE mnemonic devices, see Appendix C. Structured practice and mastery criteria ensured that students learned the strategy to an automatic level. Instruction was sequenced so students received the practice needed to write several types of sentences and paragraphs.

Design and Procedures

There were four phases in this study. These phases were as follows: (a) study preparation, (b) pretest, (c) strategy implementation, and (d) posttest.

Phase One: Study Preparation

Obtaining research approvals. Permission for the study was obtained from the University of Nevada, Las Vegas Office for the Protection of Research Subjects (OPRS), and from the charter high school. Prior to beginning the study, an explanation of the study was provided to students during their face-to-face attendance at the school. Letters detailing the study along with parent consent and student assent forms were sent home with the students. Only data from students with signed consent and assent forms were included in the study.

Developing online instruction. The researcher prepared instruction for each of three online treatment groups. The three online treatment groups consisted of the following: (a) online instruction using Power Point media, (b) online instruction using streaming video, and (c) online instruction using multimedia (Power Point and video). Each website was developed to look identical, and within each website, students followed the same procedures to view the lessons. The instruction was developed so that each treatment group was given the same assignments and practice activities to complete online.

To develop online instruction for Treatment 1, online instruction using Power Point media, the content of 35 scripted lessons from *The Paragraph Writing Strategy* (Schumaker & Lyerla, 1993) instructor's manual was adapted to this instructional mode. A series of Power Point media lessons correlated with the instructional stages and lessons within the instructor's manual were developed. The Power Point media lessons were evaluated for readability level; the average reading level for the lessons was grade 6.0.

To develop online instruction for Treatment 2, online instruction using streaming video, a series of 35 streaming video lessons adapted from *The Paragraph Writing Strategy* (Schumaker & Lyerla, 1993) instructor's manual were developed. The content from the Power Point media group's lessons were used as the script for developing streaming video lessons. Four procedures were followed to develop each of the lessons: (a) a digital video recording of the lesson was made, (b) the digital video recording was captured onto a computer with video editing software, (c) the video was exported into a compressed streaming file type (.wmv), and (d) the video was uploaded to the web for students to view online.

To develop online instruction for Treatment 3, online instruction using multimedia (Power Point and video), a series of 35 multimedia (Power Point and video) lessons were developed. Using specialized video recording software, called Tegrity (Tegrity, Inc., 2004), and each of the Power Point lessons, a video recording that incorporated the Power Point media was developed. While the instructor was video recorded, the Power Point lessons were annotated with features such as writing, underlining, and drawing. Then, the recording was processed and uploaded for students to view online.

Group assignment. The 10 course sections, which included students with and without disabilities, were randomly assigned to one of three treatment groups: (a) online instruction using Power Point media, (b) online instruction using streaming video, or (c) online instruction using multimedia (Power Point and video). To randomly assign the course sections to groups, the numbers 1-10, which coincided with the course sections, were written on slips of paper that were folded and placed in a container. Then, the slips of paper were individually drawn from the container and assigned to a treatment group. The first section number drawn was assigned to online instruction using Power Point media. The second section number drawn was assigned to online instruction using streaming video. The third number drawn was assigned to online instruction using multimedia (Power Point and video). This routine was repeated until all slips of paper had been drawn. In addition to randomly assigning the 10 course sections to the three treatment groups, the researcher administered all instruction to help control for teacher effect.

Participant recruitment. The participants for this study were recruited using both online and face-to-face announcements of the research study. Consent and student assent forms that described the study were distributed to students during on-site attendance sessions. See Appendix D. The consent and student assent forms included a description of the study along with general expectations of the students who chose to participate. Students were reminded to return the two forms via e-mail. The forms included the e-mail address and phone number where parents could contact the researcher concerning questions about the study.

Phase Two: Pretest

Both The Written Expression Scale of *The Oral and Written Language Scales* (OWLS) (Carrow-Woolfolk, 1996) and the Curriculum-Based Paragraph Writing Pretest from *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) were administered to students prior to beginning strategy implementation. The assessments were administered during face-to-face sessions on the school campus.

The Written Expression Scale of The Oral and Written Language Scales (OWLS). The OWLS pretest was administered in small groups of approximately 15 students. Students were told that they were being tested on their written expression. Students were told to respond in meaningful, appropriate sentences with correct capitalization, punctuation, and grammar. In addition, students were told they would be given credit for using descriptive words and phrases and constructing complex, interesting sentences. Administration of the OWLS pretest takes between 26 and 58 minutes for the age group that was assessed. Each Written Expression Scale was scored after all participants had been administered the test.

Curriculum-based paragraph writing pretest. The purpose of the Curriculum-Based Paragraph Writing Pretest was to obtain a measure of students' ability to write paragraphs. Students were allowed 50 minutes to write a paragraph from a list of topics. Students were instructed to make notes about the topic on a sheet of paper. Using computers located within the classroom and word processing software, students were instructed to write a paragraph consisting of at least six sentences. Students were reminded to use a variety of sentence types. Students printed a hard copy of the paragraph for scoring purposes. Once each participant had completed his or her paragraph, it was evaluated using guidelines and score sheets provided in *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) instructor's manual. Test results were communicated to each student individually during face-to-face sessions on the school campus.

Phase Three: Strategy Implementation

Instruction in *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) consisted of four parts: (a) Topic Sentences, (b) Detail Sentences, (c) Clincher Sentences, and (d) Whole Paragraphs. In Part 1, students were taught how to write three types of Topic Sentences: General, Clueing, and Specific. In Part 2, students were taught to make a plan for writing a paragraph, writing Detail Sentences, and integrating these skills with the skill of writing Topic Sentences. In Part 3, students were taught to write three types of Clincher Sentences: General, Clueing, and Specific. Parts 1 through 3 proceeded through the following instructional stages: (a) Describe, (b) Model, (c) Verbal Practice, and (d) Controlled Practice and Feedback. In Part 4, students were taught a strategy for integrating all the skills learned in Parts 1 through 3 and how to apply the strategy when

writing a variety of paragraph types. Students were taught to write nine types of paragraphs: (a) Narrative, (b) Step-by-Step, (c) Descriptive, (d) Fact, (e) Reason, (f) Example, (g) Compare, (h) Contrast, and (i) Compare and Contrast. Part 4 proceeded through the following instructional stages: (a) Describe, (b) Model, (c) Verbal Practice, and (d) Advanced Practice and Feedback. For a list of the four parts, instructional stages, and associated lessons, see Appendix B. Students received daily online instruction and assignments within their online treatment group for a period of ten weeks. Specific, individualized feedback was provided to students via e-mail. Lessons from the instructor's manual and associated practice assignments taken from the student lessons volume of *The Paragraph Writing Strategy* were used during the strategy implementation phase. Precise teaching methods and cues were scripted for each instructional stage. The instructional materials and online practice activities were consistently assigned across the three treatment groups. This writing strategy was selected because of its logical, clear, and succinct instructional methods; these were conducive to the development of online instructional sessions.

The previously discussed instructional content was delivered within three online treatment groups. The three online treatment groups consisted of the following: (a) online instruction using Power Point media, (b) online instruction using streaming video, and (c) online instruction using multimedia (Power Point and video). Each treatment group received identical assignments and practice activities; the only difference between treatment groups was the instructional mode used for the delivery of lessons.

Treatment 1: Online instruction using Power Point media. This treatment group's instruction was delivered in the form of online Power Point media. Students

accessed the instruction from the course website. The content of 35 scripted lessons from the instructor's manual was adapted to this instructional mode during Phase One: Study Preparation. The average readability level of the content was grade 6.0. Assignments and practice activities were delivered and completed online. See Appendix E.

Treatment 2: Online instruction using streaming video. This treatment group's instruction consisted of a series of 35 streaming video lessons adapted from the instructor's manual. Students accessed and viewed the instruction from the course website. The content of 35 scripted lessons from the instructor's manual was adapted to this instructional mode during Phase One: Study Preparation. Students completed assignments and practice activities delivered online. See Appendix E.

Treatment 3: Online instruction using multimedia (Power Point and video). This treatment group's instruction consisted of a series of 35 multimedia (Power Point and video) lessons adapted from the instructor's manual. Using specialized video recording software, called Tegrity (Tegrity, Inc., 2004), and each of the Power Point lessons, a video recording that incorporated the Power Point media was developed during Phase One: Study Preparation. Assignments and practice activities were delivered and completed online. See Appendix E.

Phase Four: Posttest

Both posttests, The Written Expression Scale of *The Oral and Written Language Scales* (OWLS) (Carrow-Woolfolk, 1996) and the Curriculum-Based Paragraph Writing Posttest from *The Paragraph Writing Strategy* (Schumaker & Lysterla, 1993), were administered to students after strategy implementation was complete. The assessments were administered during face-to-face sessions on the school campus.

The Written Expression Scale of The Oral and Written Language Scales (OWLS).

The OWLS posttest was administered in small groups of approximately 15 students. Students were told that they were being tested to measure their progress in written expression. Students were told to respond in meaningful, appropriate sentences with correct capitalization, punctuation, and grammar. In addition, students were told they would be given credit for using descriptive words and phrases and constructing complex, interesting sentences. Posttest administration of the OWLS takes between 26 and 58 minutes for the age group that was assessed. Each Written Expression Scale was scored after all participants had been administered the test.

Curriculum-based paragraph writing posttest. The purpose of the curriculum-based posttest was to obtain a measure of students' progress in writing paragraphs. Students were allowed 50 minutes to plan and write a paragraph from a list of topics. Students were instructed to plan their paragraph on a diagram provided. Using computers within the classroom and word processing software, students were instructed to create a paragraph consisting of at least six sentences. Students were reminded to use a variety of sentence types. Students edited the paragraph and printed a hard copy for scoring purposes. Once each participant completed his or her paragraph, it was evaluated using guidelines and score sheets provided in *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) instructor's manual. Test results and paragraph writing progress were communicated to each student individually during face-to-face sessions on the school campus.

Interscorer Reliability

The researcher scored each student's performance on the pretest and posttest assessments. Additionally, a research assistant independently scored 20% of the pretest and posttest assessments to determine reliability of the scoring systems. An agreement was tallied when both observers recorded the same score for a given answer. The percentage of agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Interscorer reliability for the OWLS assessment was 95% and interscorer reliability for the Curriculum-Based Paragraph Writing Assessment was 93%.

Fidelity of Treatment

Two research assistants independently accessed and reviewed 20% of the online instructional sessions for the three treatment groups. Prior to this evaluation of the instructional content, the researcher provided a training session for the research assistants. During this session, an overview of *The Paragraph Writing Strategy*, including the instructional sequence and critical instructional procedures prescribed within the instructor's manual, was provided. Interobserver reliability was measured using the Fidelity of Treatment Checklist developed for this purpose (See Appendix F). Evaluating the instructional sessions of each of the three online treatment groups in this manner ensured that each group received the same content. Also, interobserver reliability assessment ensured that the instructional sequence and instructional procedures were equal across the three online treatment groups. The percentage of agreement was calculated by dividing the number of agreements by the number of agreements plus

disagreements and multiplying by 100. Interobserver reliability was 96% for Power Point media, 92% for streaming video, and 96% for multimedia (Power Point and video).

Treatment of Data

Research Question 1: Is online instruction using multimedia (Power Point and video) more effective for increasing the writing achievement of students with and without disabilities than Power Point media or streaming video alone? Two data sets were used to answer this question. First, data obtained from the OWLS (Carrow-Woolfolk, 1996) were analyzed using a 3 (treatment) by 2 (time of assessment) by 2 (type of student) mixed-model analysis of variance (ANOVA). Second, data obtained from the Curriculum-Based Paragraph Writing Assessment were analyzed using a 3 (treatment) by 2 (time of assessment) by 2 (type of student) mixed-model ANOVA. A .05 confidence level was used to determine statistical significance for each ANOVA.

Research Question 2: Is online instruction using Power Point media effective for increasing the writing achievement of students with and without disabilities? Two data sets were used to answer this question. First, using data obtained from the OWLS (Carrow-Woolfolk, 1996), a paired-samples *t*-test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Second, using data obtained from the Curriculum-Based Paragraph Writing Assessment, a paired samples *t*-test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Since multiple *t*-tests were used, a Bonferroni correction of $p < 0.009$ was required to determine statistical significance.

Research Question 3: Is online instruction using streaming video effective for increasing the writing achievement of students with and without disabilities? Two data sets were used to answer this question. First, using data obtained from the OWLS (Carrow-Woolfolk, 1996), a paired-samples *t*-test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Second, using data obtained from the Curriculum-Based Paragraph Writing Assessment, a paired-samples *t*-test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Since multiple *t*-tests were used, a Bonferroni correction of $p < 0.009$ was required to determine statistical significance.

Research Question 4: Is online instruction using multimedia (Power Point and video) effective for increasing the writing achievement of students with and without disabilities? Two data sets were used to answer this question. First, using data obtained from the OWLS (Carrow-Woolfolk, 1996), a paired-samples *t*-test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Second, using data obtained from the Curriculum-Based Paragraph Writing Assessment, a paired-samples *t*-test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Since multiple *t*-tests were used, a Bonferroni correction of $p < 0.009$ was required to determine statistical significance.

Research Question 5: Does online learning strategy instruction reduce the difference in writing achievement between students with disabilities and students without disabilities? Two data sets were used to answer this question. First, data obtained from

the OWLS (Carrow-Woolfolk, 1996) were analyzed using difference scores. Second, data obtained from the Curriculum-Based Paragraph Writing Assessment were analyzed using difference scores.

CHAPTER 4

RESULTS

The purpose of this study was to investigate the effectiveness of three online models for teaching a paragraph writing strategy to students with and without disabilities. The three online treatment groups consisted of the following: (a) online instruction using Power Point media, (b) online instruction using streaming video, and (c) online instruction using multimedia (Power Point and video). All students were taught *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993). A total of five research questions were answered in this study. This chapter is organized according to these questions. After a restatement of each question, the data analysis procedures that were used to answer the question as well as the results obtained are reported. Following the results related to each research question, interscorer reliability for the two assessments used in this study are reported. Also, the results from the interobserver reliability measure are reported.

Research Questions and Related Findings

Question 1: Is online instruction using multimedia (Power Point and video) more effective for increasing the writing achievement of students with and without disabilities than Power Point media or streaming video alone?

Two data sets were used to answer this question. First, data obtained from the OWLS (Carrow-Woolfolk, 1996) was analyzed using a 3 (treatment) by 2 (time of assessment) by 2 (type of student) mixed model analysis of variance (ANOVA). Second, data obtained from the Curriculum-Based Paragraph Writing Assessment were analyzed using a 3 (treatment) by 2 (time of assessment) by 2 (type of student) mixed model ANOVA. A .05 confidence level was used to determine statistical significance for each ANOVA.

There was no interaction between the type of student and the type of treatment based student performance on the OWLS ($F_{(2,98)} = 0.16, p < 0.05$). Therefore, the effectiveness of treatment was not dependent upon disability. In other words, the relationship of the two independent variables had no effect on the OWLS writing achievement scores. Also, there was no main effect for the type of student ($F_{(1,98)} = 0.42, p < 0.05$) and there was no main effect for the type of treatment ($F_{(2,98)} = 1.34, p < 0.05$) related to student performance on the OWLS. The difference in writing achievement as measured by the OWLS was not a function of whether or not students had a disability. Also, the difference in writing achievement as measured by the OWLS was not a function of the treatment type. See Table 3 and Table 4.

There was no interaction between the type of student and the type of treatment based on student performance on the Curriculum-Based Paragraph Writing Assessment

($F_{(2,98)} = 2.33, p < 0.05$). Therefore, the effectiveness of treatment was not dependent upon disability. In other words, the relationship of the two independent variables had no effect on the Curriculum-Based Paragraph Writing Assessment scores. Also, there was no main effect for the type of student ($F_{(1,98)} = 0.18, p < 0.05$) and there was no main effect for the type of treatment ($F_{(2,98)} = 1.27, p < 0.05$) related to student performance on the Curriculum-Based Paragraph Writing Assessment.

Table 3

Summary of a 3 X 2 X 2 Analysis of Variance (OWLS)

(N = 104)					
Source of Variance	Sum of Squares	df	Mean Square	F	Level of Significance
Type of Student (main effect)	50.238	1	50.238	.422	.518
Type of Treatment (main effect)	318.264	2	159.132	1.336	.268
3-Way Interaction	38.793	2	19.397	.163	.850
Error	11670.198	98	119.084		

Table 4

OWLS Pre- and Posttest Means and Standard Deviations for Students with and without Disabilities Related to Treatment Type

(N = 104)				
<i>Student Type and Treatments</i>	Pretest M	Standard Deviation	Posttest M	Standard Deviation
Students with Disabilities (N=25)				
Power Point	90.89	11.41	95.44	11.04
Streaming Video	90.86	14.01	91.43	25.06
Multimedia	95.33	19.02	101.89	20.98
Students without Disabilities (N=79)				
Power Point	103.52	12.80	113.15	17.88
Streaming Video	107.63	13.94	108.47	15.25
Multimedia	102.15	14.96	110.33	12.64

Note. OWLS scores are Standard Scores.

The difference in writing achievement as measured by the Curriculum-Based Paragraph Writing Assessment was not a function of whether or not students had a disability. Also, the difference in writing achievement as measured by the Curriculum-Based Paragraph Writing Assessment was not a function of the treatment type. See Table 5 and Table 6.

Table 5

Summary of a 3 X 2 X 2 Analysis of Variance (Curriculum-Based Paragraph Writing Assessment)

(N = 104)					
Source of Variance	Sum of Squares	df	Mean Square	F	Level of Significance
Type of Student (main effect)	47.745	1	47.745	.0182	.671
Type of Treatment (main effect)	668.438	2	334.219	1.273	0.285
3-Way Interaction	1224.38	2	612.190	2.331	0.103
Error	25738.973	98	262.643		

Table 6

Curriculum-Based Paragraph Writing Pre- and Posttest Means and Standard Deviations for Students with and without Disabilities Related to Treatment Type

(N = 104)				
<i>Student Type and Treatments</i>	Pretest M	Standard Deviation	Posttest M	Standard Deviation
Students with Disabilities (N=25)				
Power Point	32.00	18.55	60.22	19.20
Streaming Video	27.43	14.32	48.86	25.56
Multimedia	31.11	12.77	47.33	20.57
Students without Disabilities (N=79)				
Power Point	44.79	21.31	60.24	21.39
Streaming Video	38.95	10.98	75.58	15.84
Multimedia	44.30	16.54	64.80	18.77

Note. Curriculum-Based Paragraph Writing Assessment scores are Percentage Scores.

Although there were no significant interactions or main effects related to student performance on the OWLS and the Curriculum-Based Paragraph Writing Assessment, there was a statistically significant difference between the OWLS pre- and posttest scores for all students (M Pretest = 98.40, M Posttest = 103.45) ($F_{(1,98)} = 7.97, p < .05$) and there was a statistically significant difference between the Curriculum-Based Paragraph

Writing Pre- and Posttest scores for all students (M Pretest = 36.43, M Posttest = 59.52) ($F_{(1, 98)} = 75.34, p < 0.05$).

Because interaction was not significant, separate analyses were conducted using difference scores (i.e., subtracting the pretest scores from the posttest scores for both students with and without disabilities). As expected, students without disabilities had significantly higher scores ($M = 107.54$) than students with disabilities on the OWLS ($M = 94.31$) ($F_{(1, 98)} = 18.29, p < 0.05$). Students without disabilities had significantly higher scores ($M = 54.79$) than students with disabilities on the Curriculum-Based Paragraph Writing Assessment ($M = 41.16$) ($F_{(1, 98)} = 16.12, p < 0.05$). The students without disabilities outperformed students with disabilities.

Question 2: Is online instruction using Power Point media effective for increasing the writing achievement of students with and without disabilities?

Two data sets were used to answer this question. First, using data obtained from the OWLS (Carrow-Woolfolk, 1996), a paired-samples t -test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Second, using data obtained from the Curriculum-Based Paragraph Writing Assessment, a paired-samples t -test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Since multiple t -tests were used, a Bonferroni correction of $p < 0.009$ was required to determine statistical significance.

For students with disabilities, the pretest ($M = 90.89$) and posttest ($M = 95.44$) scores from the OWLS revealed no significant differences in writing achievement when Power Point media was used, $t(8) = 1.533, p = 0.164$. For students with disabilities, the

pretest ($M = 32.00$) and posttest ($M = 60.22$) scores from the Curriculum-Based Paragraph Writing Assessment revealed significant differences in writing achievement when Power Point media was used, $t(8) = 3.839$, $p = 0.005$. See Table 7.

Table 7

Group Means (Standard Deviations) of paired-samples t-tests for pre- and post-treatment of Students with Disabilities who Received Power Point Media

(N = 9)				
	Pretest	Posttest	<i>t</i>	<i>p</i>
Oral and Written	90.89	95.44	1.533	0.164
Language Scales	(11.41)	(11.04)		
Curriculum-Based	32.00	60.22	3.839	0.005*
Paragraph Writing	(18.55)	(19.20)		
Assessment				

* $p < 0.009$

For students without disabilities, the pretest ($M = 103.52$) and posttest ($M = 113.15$) scores from the OWLS revealed significant differences in writing achievement when Power Point media was used, $t(32) = 3.206$, $p = 0.003$. For students without disabilities, the pretest ($M = 44.79$) and posttest ($M = 60.24$) scores from the Curriculum-Based Paragraph Writing Assessment revealed significant differences in writing achievement when Power Point media was used, $t(32) = 3.252$, $p = 0.003$. See Table 8.

Table 8

Group Means (Standard Deviations) of paired-samples t -tests for pre- and post-treatment of Students without Disabilities who Received Power Point Media

(N = 33)				
	Pretest	Posttest	t	p
Oral and Written	103.52	113.15	3.206	0.003*
Language Scales	(12.80)	(17.88)		
Curriculum-Based	44.79	60.24	3.252	0.003*
Paragraph Writing	(21.31)	(21.39)		
Assessment				

* $p < 0.009$

Question 3: Is online instruction using streaming video effective for increasing the writing achievement of students with and without disabilities?

Two data sets were used to answer this question. First, using data obtained from the OWLS (Carrow-Woolfolk, 1996), a paired-samples t -test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Second, using data obtained from the Curriculum-Based Paragraph Writing Assessment, a paired-samples t -test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Since multiple t -tests were used, a Bonferroni correction of $p < 0.009$ was required to determine statistical significance.

For students with disabilities, the pretest ($M = 90.86$) and posttest ($M = 91.43$) scores from the OWLS revealed no significant differences in writing achievement when streaming video was used, $t(6) = 0.093$, $p = 0.929$. For students with disabilities, the pretest ($M = 27.43$) and posttest ($M = 48.86$) scores from the Curriculum-Based Paragraph Writing Assessment revealed no significant differences in writing achievement when streaming video was used, $t(6) = 2.725$, $p = 0.034$. See Table 9.

Table 9

Group Means (Standard Deviations) of paired-samples t-tests for pre- and post-treatment of Students with Disabilities who Received Streaming Video

(N = 7)				
	Pretest	Posttest	<i>t</i>	<i>p</i>
Oral and Written	90.86	91.43	0.093	0.929
Language Scales	(14.01)	(25.06)		
Curriculum-Based	27.43	48.86	2.725	0.034
Paragraph Writing	(14.32)	(25.56)		
Assessment				

For students without disabilities, the pretest ($M = 107.63$) and posttest ($M = 108.47$) scores from the OWLS revealed no significant differences in writing achievement when streaming video was used, $t(18) = 0.249$, $p = 0.806$. For students without disabilities, the pretest ($M = 38.95$) and posttest ($M = 75.58$) scores from the

Curriculum-Based Paragraph Writing Assessment revealed significant differences in writing achievement when streaming video was used, $t(18) = 11.340, p = 0.000$. See Table 10.

Table 10

Group Means (Standard Deviations) of paired-samples t -tests for pre- and post-treatment of Students without Disabilities who Received Streaming Video

(N = 19)				
	Pretest	Posttest	t	p
Oral and Written	107.63	108.47	0.249	0.806
Language Scales	(13.94)	(15.25)		
Curriculum-Based	38.95	75.58	11.340	0.000*
Paragraph Writing	(10.98)	(15.84)		
Assessment				

* $p < 0.009$

Question 4: Is online instruction using multimedia (Power Point and video) effective for increasing the writing achievement of students with and without disabilities?

Two data sets were used to answer this question. First, using data obtained from the OWLS (Carrow-Woolfolk, 1996), a paired-samples t -test was conducted to determine whether significant differences occurred from pretest to posttest for students with and without disabilities. Second, using data obtained from the Curriculum-Based Paragraph Writing Assessment, a paired-samples t -test was conducted to determine whether

significant differences occurred from pretest to posttest for students with and without disabilities. Since multiple *t*-tests were used, a Bonferroni correction of $p < 0.009$ was required to determine statistical significance.

For students with disabilities, the pretest ($M = 95.33$) and posttest ($M = 101.89$) scores from the OWLS revealed no significant differences in writing achievement when multimedia (Power Point and video) was used, $t(8) = 0.939$, $p = 0.375$. For students with disabilities, the pretest ($M = 31.11$) and posttest ($M = 47.33$) scores from the Curriculum-Based Paragraph Writing Assessment revealed no significant differences in writing achievement when multimedia (Power Point and video) was used, $t(8) = 3.300$, $p = 0.011$. See Table 11.

Table 11

Group Means (Standard Deviations) of paired-samples t-tests for pre- and post-treatment of Students with Disabilities who Received Multimedia (Power Point and video)

	(N = 9)			
	Pretest	Posttest	<i>t</i>	<i>p</i>
Oral and Written	95.33	101.89	0.939	0.375
Language Scales	(19.02)	(20.98)		
Curriculum-Based	31.11	47.33	3.300	0.011
Paragraph Writing	(12.77)	(20.57)		
Assessment				

For students without disabilities, the pretest ($M = 102.15$) and posttest ($M = 110.33$) scores from the OWLS revealed significant differences in writing achievement when multimedia (Power Point and video) was used, $t(26) = 3.366$, $p = 0.002$. For students without disabilities, the pretest ($M = 44.30$) and posttest ($M = 64.89$) scores from the Curriculum-Based Paragraph Writing Assessment revealed significant differences in writing achievement when multimedia (Power Point and video) was used, $t(26) = 0.000$, $p = 0.000$. See Table 12.

Table 12

Group Means (Standard Deviations) of paired-samples t-tests for pre- and post-treatment of Students without Disabilities who Received Multimedia (Power Point and Video)

(N = 27)				
	Pretest	Posttest	<i>t</i>	<i>p</i>
Oral and Written	102.15	110.33	3.366	0.002*
Language Scales	(14.96)	(12.64)		
Curriculum-Based	44.30	64.89	4.335	0.000*
Paragraph Writing	(16.54)	(18.77)		
Assessment				

* $p < 0.009$

Question 5: Does online learning strategy instruction reduce the difference in writing achievement between students with disabilities and students without disabilities?

Two data sets were used to answer this question. First, data obtained from the OWLS (Carrow-Woolfolk, 1996) were analyzed using difference scores. Second, data obtained from the Curriculum-Based Paragraph Writing Assessment were analyzed using difference scores.

Online learning strategy instruction did not reduce the difference in writing achievement between students with disabilities and students without disabilities. Difference scores based on the OWLS revealed that students with disabilities made gains of 4 points; students without disabilities made gains of 7 points. Difference scores based on the Curriculum-Based Paragraph Writing Assessment revealed that students with disabilities and students without disabilities made equivalent gains of 22 points. See Table 13 and Table 14.

Table 13

Difference Scores Based on the OWLS for Students with Disabilities and Students without Disabilities

	Pretest	Posttest	Difference Scores
Students with Disabilities (N = 25)	92.48	96.64	4.16
Students without Disabilities (N = 79)	104.04	111.06	7.03

Table 14

Difference Scores Based on the Curriculum-Based Paragraph Writing Assessment for Students with Disabilities and Students without Disabilities

	Pretest	Posttest	Difference Scores
Students with Disabilities (N = 25)	30.40	52.40	22.00
Students without Disabilities (N = 79)	43.22	65.52	22.30

Interscorer Reliability

After the researcher scored the two assessments, a research assistant independently scored 20% of the assessments to determine reliability of the scoring systems. An agreement was tallied when both observers recorded the same score for a given answer. The percentage of agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Interscorer reliability for the OWLS assessment was 95% and interscorer reliability for the Curriculum-Based Paragraph Writing Assessment was 93%. See Table 15.

Table 15

Interscorer Reliability

Interscorer Reliability	
OWLS	95%
Curriculum-Based Paragraph Writing	93%
Assessment	

Fidelity of Treatment

Two research assistants independently reviewed 20% of the online instructional sessions for each of the three online treatment groups. The research assistants used the Treatment Fidelity Checklist developed for this purpose (See Appendix F). Interobserver reliability was computed for the fidelity of treatment observations using the following formula: agreements divided by agreements plus disagreements multiplied by 100. Interobserver reliability was 96% for Power Point media, 92% for streaming video, and 96% for multimedia (Power Point and video). See Table 16.

Table 16

Fidelity of Treatment

Power Point media	Streaming Video	Multimedia (Power Point and video)
96%	92%	96%

Summary of Findings

Data Analysis of the Pretest and Posttest scores from two assessments, the OWLS and the Curriculum-Based Paragraph Writing Assessment, resulted in answers to five research questions related to the effectiveness of three online models for teaching a paragraph writing strategy to students with and without disabilities. The three online instructional models were: (a) Power Point media, (b) streaming video, and (c) multimedia (Power Point and video). Based on the 3 (treatment) by 2 (time of assessment) by 2 (typed of student) mixed model ANOVA, there were no significant differences related to writing achievement. Based on *t*-test analyses, students with disabilities, who received the Power Point media treatment, demonstrated significant improvement as measured by the Curriculum-Based Paragraph Writing Assessment. Based on *t*-test analyses, students without disabilities, who received the Power Point media treatment, demonstrated significant improvement as measured by both the OWLS and the Curriculum-Based Paragraph Writing Assessment. Based on *t*-test analyses, students without disabilities, who received the streaming video treatment, demonstrated significant improvement as measured by the Curriculum-Based Paragraph Writing Assessment. Based on *t*-test analyses, students without disabilities, who received the multimedia (Power Point and video) treatment, demonstrated significant improvement as measured by the OWLS and the Curriculum-Based Paragraph Writing Assessment. The students with disabilities and the students without disabilities made equivalent writing achievement gains as measured by the Curriculum-Based Paragraph Writing Assessment.

CHAPTER 5

DISCUSSION

Over the past decade, research has been conducted related to the effectiveness of online education. Most of these studies involved comparisons of online instruction to traditional instruction, and most of the research to date has involved post-secondary environments. A majority of findings, from this body of literature, reveal that online instruction is comparable in effectiveness to traditional instruction (Diaz 2000; Wegner, Holloway, & Garton, 1999; Neuhauser, 2002; Schutte, 1998; Smith, Smith, and Boone, 2000; Tucker, 2001). The success and interest related to online instruction at the post-secondary level appears to be influencing the increased use of online learning within the K-12 sector. Unfortunately, research to validate online instructional models for school-aged students is limited. It should not be assumed that because online instruction is effective for postsecondary learners that it also will be effective for school-aged students. The K-12 sector is likely to include greater diversity among students than post-secondary environments, especially related to students with disabilities and special learning needs. Therefore, research related to online learning and students with disabilities is especially important.

Another important issue within K-12 education is the increased emphasis on raising academic standards for all students, including those with disabilities. Recent legislation such as the No Child Left Behind (NCLB) Act of 2001 (P.L. 107-110) and the

Individuals with Disabilities Education Improvement Act (IDEA) of 2004 supports the idea that all students need to demonstrate annual yearly progress in academic achievement. The use of technology has the potential to help with the increased performance demands being placed on school-aged students, but quality research is needed to determine how to best use technology to promote high levels of student achievement in complex areas of the curriculum (e.g., writing).

The purpose of this study was to explore the effectiveness of three online models for teaching a paragraph writing strategy to students with and without disabilities. The three online models were: (a) Power Point media, (b) streaming video, and (c) multimedia (Power Point and video). Five research questions were answered in this study to address this purpose. Two pre- and posttest measures were used to answer the research questions. The measures were the OWLS (Carrow-Woolfolk, 1996) and a Curriculum-Based Paragraph Writing Assessment.

This chapter includes four sections. First, findings related to each research question are discussed. Second, conclusions drawn from the research findings are shared. Third, practical implications derived from the research are noted. Finally, recommendations for future research are described.

Discussion of Findings Related to Research Questions

The five research questions used to guide the design and implementation of this study are presented in this section of the chapter. The findings for each question are reviewed and then related discussion follows.

Question 1: Is online instruction using multimedia (Power Point and video) more effective for increasing the writing achievement of students with and without disabilities than Power Point media or streaming video alone?

There was no interaction between the type of student and the type of treatment based on student performance on *The Oral and Written Language Scales* (OWLS) (Carrow-Woolfolk, 1996). Therefore, the effectiveness of treatment was not dependent upon disability. Also, there was no main effect for the type of student and there was no main effect for the type of treatment related to student performance on the OWLS. In other words, the difference in writing achievement as measured by the OWLS was not a function of whether or not students had a disability, and the difference in writing achievement as measured by the OWLS was not a function of the treatment type.

Similarly, there was no interaction between the type of student and the type of treatment based on student performance on the Curriculum-Based Paragraph Writing Assessment. Therefore, the effectiveness of treatment was not dependent upon disability. Also, there was no main effect for the type of student and there was no main effect for the type of treatment related to student performance on the Curriculum-Based Paragraph Writing Assessment. In other words, the difference in writing achievement as measured by the Curriculum-Based Paragraph Writing Assessment was not a function of whether or not students had a disability, and the difference in writing achievement as measured by the Curriculum-Based Paragraph Writing Assessment was not a function of the treatment type.

Although there were no significant interactions or main effects related to student performance on the OWLS and the Curriculum-Based Paragraph Writing Assessment,

there was a statistically significant difference between the OWLS pre- and posttest scores for all students and there was a statistically significant difference between the Curriculum-Based Paragraph Writing Pre- and Posttest scores for all students.

Based on these findings, high school students benefited from online instruction related to the Paragraph Writing Strategy. The multimedia (Power Point and video) model of online instruction, however, was no more effective than the Power Point media or streaming video instructional models. Previous studies related to teaching the *Paragraph Writing Strategy* (Moran, Schumaker, and Vetter, 1981; Schmidt, Deshler, Schumaker, and Alley, 1989) revealed positive outcomes when teaching the strategy to students with disabilities in traditional face-to-face settings. Of the three online models used in this study, it was thought that the multimedia model would most closely approximate traditional instruction because students would see the teacher via video and also see the Power Point slides. Therefore, it was hypothesized that this model might be stronger than the other two. There are several possible explanations for why the multimedia model did not turn out to be more effective than the Power Point or streaming video models.

First, it is possible that the multimedia model was somewhat distracting for students. The combination of Power Point that was synchronized with streaming video using software called Tegrity (Tegrity, Inc., 2004) might be too much stimulation for students to comprehend at one time. Researchers (Okolo, 1991; Okolo, 1992; Okolo, Hensey, & Yousefian, 1990) have noted that students, particularly students with disabilities, perform well with software that is plain or bland in its design, as long as it is instructionally sound. In fact, researchers further noted that plain software designs

resulted in higher achievement than distracting game environments (Christensen & Gerber, 1990). It appears that unnecessary stimulation in technology-based environments may distract students from the instructional process. This may be particularly problematic for students with learning disabilities who frequently have attention deficits as part of their disability (Tsal, Shalev, & Mevorach, 2005).

A second possible explanation for why the multimedia model did not emerge as the strongest model may be related to the ease of use of the three models. It is likely that the multimedia model was the most difficult for students to use and navigate through. For example, students could not move efficiently from place to place within a lesson to review key points.

A third possible explanation for why the multimedia model did not emerge as the strongest model is related to the technology itself. This model of online instruction requires solid access to technology (e.g., a well-functioning computer, a high speed Internet connection, and good audio output). If students experienced technology “glitches” and / or frustration related to slow computer processing speed, this may have interfered with the potential for increased learning.

A fourth possible explanation for why the multimedia model did not emerge as a stronger model than the other two involves student engagement. With the multimedia (Power Point and video) instructional model, less engagement in the learning process was required of students. Multimedia (Power Point and video) was instructor-paced; students were passive observers of the instructional content. Once the student started a lesson, there were few opportunities for the student to pause and think about the content. Some students would be challenged to comprehend the content at this pace. Less student-

involved learning in the multimedia model may have influenced the outcomes related to writing achievement that were found related to these three models.

As expected, students without disabilities outperformed students with disabilities on the writing measures used in this study. Students without disabilities had significantly higher writing scores than students with disabilities on the OWLS, and students without disabilities had significantly higher writing scores than students with disabilities on the Curriculum-Based Paragraph Writing Assessment.

Students without disabilities are likely to benefit from instruction regardless of the specific instructional model used. Effective and efficient learners acquire new information, retain the information, and apply the information on class assignments and tests. They seem to do this regardless of the specific instructional approach used. In some cases, these efficient learners perform well in spite of poor instruction. It is possible that this phenomenon is present in online environments as well. In previous studies, involving participants without disabilities, online instruction was equally effective (Neuhauser, 2002; Smith, Smith, & Boone, 2000; Wegner, Holloway, & Garton, 1999) or more effective (Diaz 2000; Schutte, 1998; Tucker, 2001) than traditional instruction in terms of student achievement of the content. Thus, the online models of instructional delivery (online vs. traditional) did not negatively influence student learning. The comparison of online instructional models, in the current study, resulted in findings similar to those seen in other comparison studies within the literature. Because more students without disabilities participated in this study, it is possible that this contributed to the finding that each instructional model was equally effective.

Question 2: Is online instruction using Power Point media effective for increasing the writing achievement of students with and without disabilities?

For students with disabilities, the pretest and posttest scores from the OWLS revealed no significant differences in writing achievement when Power Point media was used. For students with disabilities, the pretest and posttest scores from the Curriculum-Based Paragraph Writing Assessment revealed significant differences in writing achievement when Power Point media was used.

For students without disabilities, the pretest and posttest scores from the OWLS revealed significant differences in writing achievement when Power Point media was used. For students without disabilities, the pretest and posttest scores from the Curriculum-Based Paragraph Writing Assessment revealed significant differences in writing achievement when Power Point media was used.

Based on *t*-test analyses, online instruction using Power Point media resulted in the most positive outcomes of the three instructional models studied because both students with and without disabilities demonstrated significant improvement on at least one of the two writing measures. In general, students who participated in this study had more prior exposure to Power Point media as an online instructional model than either streaming video or multimedia (Power Point and video); this might explain these positive outcomes related to Power Point media. Also, Power Point media may have been easier for students to navigate through the instructional material than the other two online models. Also, compared to the other two models, Power Point media required less advanced computer equipment in order for students to view lessons online with ease.

Power Point media may be the best online instructional model explored when inclusive online environments are used to present the same writing instruction to all students in the class (i.e., those with disabilities and those without disabilities). First, Power Point media may be less distracting for students. The instruction is student-paced, so students can proceed through the content at the pace that matches their skills in processing information. Also, students can easily make hard copies of Power Point slides to use for notes and reference material. This is an instructional support that may benefit both students with and without disabilities. Next, slide titles, displayed on the left column in the form of a “tool bar,” may provide greater structure to the lesson content and therefore support student learning. The slide titles shown on the tool bar may help students with and without disabilities organize the main ideas within the lesson. Additionally, the slide titles may benefit students for review purposes and navigation to specific points within a lesson. These may be reasons for the positive outcomes seen for students that received Power Point media.

Question 3: Is online instruction using streaming video effective for increasing the writing achievement of students with and without disabilities?

For students with disabilities, the pretest and posttest scores from the OWLS revealed no significant differences in writing achievement when streaming video was used. For students with disabilities, the pretest and posttest scores from the Curriculum-Based Paragraph Writing Assessment revealed no significant differences in writing achievement when streaming video was used.

For students without disabilities, the pretest and posttest scores from the OWLS revealed no significant differences in writing achievement when streaming video was

used. For students without disabilities, the pretest and posttest scores from the Curriculum-Based Paragraph Writing Assessment revealed significant differences in writing achievement when streaming video was used.

Based on the *t*-test analyses, online instruction using streaming video resulted in the weakest outcomes for students with and without disabilities. One reason for these results may be that students likely had less prior exposure to watching instructional videos when compared to viewing instruction that used Power Point media. Also, with online instruction using streaming video, the visual presentation of content may not have cued students to key ideas as well as the features used in the Power Point media and multimedia presentations. The latter two models took advantage of bold print, colored print, and bulleted items to emphasize important details. Additionally, despite the benefit of audio output, students were not able to benefit from printing hard copies of instructional content.

When using streaming video, it is more difficult for students to return to specific sections of a lesson to review content needed to complete assignments. Without the tool bar or slide titles that Power Point media offered, students could not navigate to needed information easily. When students are able to retrieve review information, greater comprehension of content may be gained. In short, the ability to review information and repeat content might increase student mastery of the skill. Next, streaming video proceeds at the instructor's pace, not the student's pace unless the student would pause the video in order to think about and comprehend its content. This pacing of instruction does not provide accommodation for the slower processing speed of many students with disabilities. When the student can proceed through instruction at his or her own pace, the

processing time required to comprehend instruction can be increased as needed.

Additionally, other modes of online instruction (e.g., Power Point media) may capture more active engagement by the student when slide advancement and review of content is allowed for.

Question 4: Is online instruction using multimedia (Power Point and video) effective for increasing the writing achievement of students with and without disabilities?

For students with disabilities, the pretest and posttest scores from the OWLS revealed no significant differences in writing achievement when multimedia (Power Point and video) was used. For students with disabilities, the pretest and posttest scores from the Curriculum-Based Paragraph Writing Assessment revealed no significant differences in writing achievement when multimedia (Power Point and video) was used.

For students without disabilities, the pretest and posttest scores from the OWLS revealed significant differences in writing achievement when multimedia (Power Point and video) was used. For students without disabilities, the pretest and posttest scores from the Curriculum-Based Paragraph Writing Assessment revealed significant differences in writing achievement when multimedia (Power Point and video) was used.

Based on *t*-test analyses, online instruction using multimedia (Power Point and video) did not result in significant improvement in writing performance for students with disabilities, but students without disabilities did demonstrate significant improvement. It is interesting to note that students with disabilities who were involved in the multimedia group, had higher mean National Percentile Rank scores on the *Iowa Tests of Educational Development* (ITED) (Forsyth, Ansley, Feldt, & Alnot, 2003). Revising Written Materials subtest than students with disabilities in the other two treatment groups (see

Table 1 in Chapter 3). In spite of this unanticipated difference on a potentially related writing assessment, the students with disabilities that received online instruction using multimedia did not demonstrate significant improvement.

There are several possible explanations for these results. First, as mentioned previously, the combination of Power Point media and streaming video might be too distracting for students with disabilities, or students might not be focused on the most important component of the instruction. An overload of media may be a weakness with this model. Several researchers (Chiappe, Hasher, & Siegel, 2000; Gernsbacher, 1997; Passolunghi & Siegel, 2004). have noted that students with learning disabilities have difficulty screening out information that is irrelevant. Second, the streaming video component of the multimedia instruction may have decreased the level of student engagement. The streaming video that accompanied each lesson could have resulted in more passive behavior from the student. Students with and without disabilities should be active participants in the learning process for positive results to occur. Third, using multimedia (Power Point and video) the instructional pace of the teacher drives the lesson; student's speed of processing and comprehension may be vital for increases in achievement to occur. Next, when online instruction used multimedia, it was difficult for students to return to specific points within a lesson to find needed information. This may have negatively affected students' opportunities to master needed skills. Finally, multimedia (Power Point and video) required more advanced computer technology; there was a higher potential for students to experience technology-related problems using this online instructional model.

Question 5: Does online learning strategy instruction reduce the difference in writing achievement between students with disabilities and students without disabilities?

Online learning strategy instruction did not reduce the difference in writing achievement between students with disabilities and students without disabilities.

Difference scores based on the OWLS revealed that the students with disabilities made gains of 4 points; students without disabilities made gains of 7 points. Difference scores based on the Curriculum-Based Paragraph Writing Assessment revealed that the students with disabilities and the students without disabilities made equivalent gains of 22 points.

For students with and without disabilities, proficient writing skills are needed and performance assessments are mandated per the No Child Left Behind (NCLB) Act of 2001 (P.L. 107-110), the Individuals with Disabilities Education Improvement (IDEA) Act of 2004, as well as state and/or school district written expression tests. Online learning strategy instruction did not reduce the difference in writing achievement between students with disabilities and students without disabilities, because both types of students made improvement as evidenced by both *The Oral and Written Language Scales* (OWLS) (Carrow-Woolfolk, 1996) and the Curriculum-Based Paragraph Writing Assessment. Because both types of students improved in the area of writing, the gap in achievement between students with disabilities and students without disabilities did not get smaller. If the intervention had only been taught to students with disabilities as a compensatory strategy, their achievement would have been aligned with their peers without disabilities. In fact, students with disabilities at the posttest level outperformed students without disabilities at the pretest level on the Curriculum-Based Paragraph Writing Assessment. Additionally, a narrowing of the gap in achievement is seen when

analyzing posttest scores for students with disabilities and pretest scores for students without disabilities on the OWLS.

This is an interesting finding given the original intent of the Strategy Instruction Model (i.e., the model that includes a variety of learning strategies including *The Paragraph Writing Strategy*). One of the original premises underlying the development of the Strategy Instruction Model was that students with learning disabilities could be taught compensatory strategies that would prepare them to succeed in grade-level materials within general education classes. The original thinking was that the strategy instruction would be provided in resource or support classes and that mastery of the strategies taught would allow students with learning disabilities to compensate for their academic deficits and subsequently succeed in general education classes (Deshler et al., 1982).

The results obtained in this study reveal that if the students with disabilities had been taught *The Paragraph Writing Strategy* online, they would have performed similarly to students without disabilities who had not been taught the strategy. However, with the increased emphasis on inclusion and access to the general education curriculum per IDEA 2004, students with disabilities are increasingly taught with their general education peers. Thus, if strategy instruction is to be a part of the high school curriculum, it is likely that all students will receive this instruction, not just those with disabilities. Based on the current findings, the achievement gap between students with disabilities and those without disabilities will not decrease. Instead, the academic performance of all students is likely to increase related to the strategy taught.

Summary of Discussion Related to the Research Questions

Exploring the effects of online instructional models on the writing achievement of high school students with and without disabilities resulted in some interesting findings. First, of the three online instructional models studied, there was no significance found, based on the 3x2x2 analysis of variance, to suggest that one model was better than another. Students with disabilities and students without disabilities showed similar achievement gains across the three online instructional models.

Second, although previous research (Moran, Schumaker, & Vetter, 1981; Schmidt, Deshler, Schumaker, & Alley, 1989) indicates that instruction in the *Paragraph Writing Strategy* (Schumaker & Lyster, 1993) delivered in traditional face-to-face settings is effective for improving students' writing performance, the outcomes in this study, based on *t*-test analyses, appear to be somewhat different when the strategy is offered online, especially for students with disabilities. A potential explanation for this difference is that essential components of the instruction are lost when the strategy is taught online. For example, the model and verbal practice stages lack the periodic comprehension checks that would be commonplace in a face-to-face setting. Also, when the strategy is taught online, it is more difficult for an instructor to recognize and provide immediate, individual feedback and/or accommodations to students who are confused or who do not master a particular concept.

Third, improvement in writing was significant more often when measured by the Curriculum-Based Paragraph Writing Assessment than when measured by *The Oral and Written Language Scales* (OWLS) (Carrow-Woolfolk, 1996). The Curriculum-Based Paragraph Writing Assessment was closely linked to the strategy instruction that was

provided. Hence, students with and without disabilities were able to demonstrate significant improvement in writing more often when the Curriculum-Based Paragraph Writing Assessment was used. The OWLS pre- and posttest was given using a paper and pencil format; this task was not similar to the tasks students would typically perform in an online setting. Also, the OWLS is used to assess a broader range of writing skills than those explicitly taught using the *Paragraph Writing Strategy*. Students with disabilities struggle with generalization of skills (McLeskey, Rieth, & Polsgrove, 1980); it makes sense that students with disabilities would perform better on the Curriculum-Based Paragraph Writing Assessment. Because students without disabilities demonstrated higher writing ability before receiving the intervention, and because students without disabilities struggle less with generalization of skills, the results from the two assessments are logical. Finally, the results that were found related to the research questions in this study reveal a need for further investigation of online instructional models implemented for high school students with and without disabilities.

Conclusions

The following conclusions can be drawn based on the quantitative data analysis used in this study:

1. The three treatment models were equally effective in terms of increasing the writing achievement of high school students with and without disabilities.
2. Students with disabilities have more difficulty benefiting from the three online instructional models explored in this study than students without disabilities.

3. Students without disabilities are better able to generalize the instruction received in *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993) to comprehensive writing tasks such as those measured with *The Oral and Written Language Scales* (OWLS) (Carrow-Woolfolk, 1996).
4. When *The Paragraph Writing Strategy* is taught to students with and without disabilities, the gap in achievement between the two types of students does not decrease because both groups improve.

Practical Implications

Several important implications emerged from this study. First, when designing online instruction for students with and without disabilities, Power Point media should be incorporated into the instructional model so students can capture the content being taught without unnecessary distractions. The Power Point media instructional model provides students with a number of options to independently enhance their learning. Second, when teaching a complex learning strategy online (e.g., *The Paragraph Writing Strategy*), the instructor should consider ways to supplement the instruction to support student learning. A hybrid model is one option that may offer high school students this needed support. The hybrid model merges traditional, face-to-face teaching methods with components of online learning to create a more meaningful learning experience. Finally, because instruction in learning strategies is a complex process, the level of intensity must be high, and students with disabilities require a greater level of intensity than the online instructional models studied were able to supply.

Suggestions for Further Research

This study represents an initial contribution to literature that explores the effects of online instructional models on the achievement of high school students with and without disabilities. From the results obtained in this study, suggestions for further research include the following:

1. Further exploration of online instruction for students with disabilities is needed to determine what instructional model is best suited to their unique needs. There may be more effective models for students with disabilities than the three used in this study.
2. Further research related to online instruction of learning strategies is needed to determine if the results in this study were specific to *The Paragraph Writing Strategy* (Schumaker & Lyster, 1993). Perhaps the outcomes would be different for reading and/or mathematics strategies. The outcomes also may be different for strategies that involve fewer steps and fewer concepts to master. *The Paragraph Writing Strategy* is one of the most complex strategies in the learning strategy curriculum
3. Additional research should be conducted to explore the implementation of hybrid models as a potential way to improve the quality and effectiveness of learning strategy instruction for students with disabilities. It would be interesting to see if strategy lessons presented online using Power Point media paired with weekly face-to-face, follow-up sessions to review the content would result in better learning outcomes for students with disabilities.

4. Further research is needed to determine if students with disabilities would benefit from controlled practice and advanced practice provided online in support of intensive face-to-face or hybrid instruction in the other learning stages (e.g. describe, model, verbal practice).
5. Future research should be conducted to explore synchronous online instructional models as a potential way for students with disabilities to gain more immediate feedback, assistance, and support for their learning.
6. Further investigations should be designed to examine other types of software for online instructional delivery than the streaming video and multimedia software that were used in this study. Perhaps different products would be more effective for the integration of video into instruction.
7. Additional research should take into consideration the amount of instructional time devoted to teaching the strategy. Students may benefit from a longer or more intensive intervention period to more fully master the strategy.
8. Future research designed to compare face-to-face instruction with online instruction related to learning strategies is warranted. Although previous research indicated comparable achievement in online and traditional instructional settings among postsecondary students, this may not generalize to school-aged students who are learning complex writing strategies.
9. Future research should be designed to compare the effects of online instruction in a learning strategy with a control group that does not receive online strategy instruction. This may provide useful information related to whether or not strategy instruction in online environments is beneficial and therefore appropriate.

10. Additional research should be conducted to explore the effectiveness of other writing strategies using the same online instructional models that were used in this study. It is possible that strategies other than those that are a part of the Strategy Instruction Model (SIM) may be more conducive for students with disabilities enrolled in online schools.
11. Future studies related to the effects of teaching multiple writing strategies using the same online model should be conducted to determine if students are able to learn better after several subsequent learning experiences. Perhaps increased comfort with the model would result in increased learning.
12. Research should be conducted to explore whether or not students apply newly acquired learning strategies to other subject areas taught online.
13. Further research should be conducted assess students' satisfaction related to online instruction in learning strategies.
14. Future research should be designed to investigate what supports and instructional differentiation can be provided to students with disabilities online to reduce the gap in achievement between their performance and that of their peers without disabilities.
15. The data from this study can be analyzed further to determine if significant results are revealed for component parts of the treatment (e.g., capitalization, punctuation, sentence variety, and format). This may provide greater insight into accommodations and/or supplemental instruction that students with disabilities need when learning *The Paragraph Writing Strategy* in an online environment.

APPENDIX A

SAMPLE ITEMS FROM *THE ORAL AND WRITTEN LANGUAGE SCALES*

Sample Items From *The Oral and Written Language Scales* (Carrow-Woolfolk, 1996)

- Write one sentence using these four words: have, my, not, here. You may add other words, but your sentence must include all of these words in any order. Write the best sentence you can.
- Add to the following sentence (at the point indicated by the space) additional phrases that would make the sentence more descriptive. Try to make it as interesting and expressive as you can. The boy (space) mowed the lawn.
- Listen carefully to the paragraph I am going to read so that you can remember the important facts. When I finish, write one or more sentences that summarize the events of this paragraph. (The paragraph is read aloud here) Write what happened here.
- Your mother is still at work and you are home alone. You break one of her favorite coffee mugs. You have to leave for practice and can't tell her in person what happened. Write her a note so that she will understand.
- Combine the facts presented in these three sentences into one sentence. Do not add any new information. The boy saw the bus. The boy had on a cap. The boy started running. Remember to use all three facts, but write only one sentence.
- Write two reasons why there should not be school on Saturdays. Write your reasons in complete, expressive sentences.
- Write three or four sentences to complete the following story: The day came to a rapid close. As darkness settled in, the noises that had appeared natural by sunlight became so menacing that I found myself paralyzed with fear.
- A famous person said, "Even when the mouth lies, the way it looks still tells the truth." Write a short paragraph about this quotation. Tell what you think it means and whether you agree or disagree. You may add examples to support your position.

APPENDIX B

INSTRUCTIONAL STAGES AND LESSONS WITHIN *THE PARAGRAPH WRITING STRATEGY*

Instructional Stages and Lessons Within *The Paragraph Writing Strategy* (Schumaker &
Lyerla, 1993)

Instructional Methods	Lessons
Part I: Topic Sentences	
Describe	2
Model	1
Verbal Practice	1
Controlled Practice and Feedback	3
Practice Activities: 1A – 1D, 2A – 2D, 3A – 3D	
Part II: Detail Sentences	
Describe	3
Model	1
Verbal Practice	1
Controlled Practice and Feedback	5
Practice Activities: 1A – 1D, 2A – 2D, 3A – 3D, 4A – 4D, 5A – 5D	
Part III: Clincher Sentences	
Describe	1
Model	1
Verbal Practice	1
Controlled Practice and Feedback	3
Practice Activities: 1A – 1D, 2A – 2D, 3A – 3D	

Part IV: Whole Paragraphs	
Describe	1
Model	1
Verbal Practice	1
Advanced Practice and Feedback	9
Narrative Paragraphs	
Step-by-Step Paragraphs	
Descriptive Paragraphs	
Expository Paragraphs	
Reasons Paragraphs	
Examples Paragraphs	
Compare Paragraphs	
Contrast Paragraphs	
Compare and Contrast Paragraphs	
Lesson Total	35

APPENDIX C

STEPS OF THE PENS AND SCRIBE MNEMONIC DEVICES

Steps of the PENS and SCRIBE Mnemonic Devices

Steps for Writing Topic, Detail, and Clincher Sentences

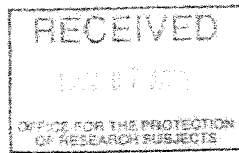
- Step 1 Pick a sentence type and formula.
- Step 2 Explore words to fit the sentence type and formula.
- Step 3 Note the words.
- Step 4 Search and check.

Steps for Writing a Paragraph

- Step 1 Set up a diagram.
 - Step 2 Create the title.
 - Step 3 Reveal the topic
 - Step 4 Iron out the details.
 - Step 5 Bind it together with a clincher.
 - Step 6 Edit your work.
-

APPENDIX D

INFORMED CONSENT AND STUDENT ASSENT TO PARTICIPATE IN RESEARCH



INFORMED CONSENT
Department of Special Education



TITLE OF STUDY: Exploring the Effects of Online Instructional Models on the Writing Achievement of High School Students With and Without Disabilities

INVESTIGATOR(S): Dr. Susan Miller and Bradley Kaffar

CONTACT PHONE NUMBER: (702) 895-1108

Purpose of the Study

Your son/daughter is invited to participate in a research study. The purpose of this study is to determine the effectiveness of several online instructional models on the writing achievement of high school students.

Participants

Your son/daughter is being asked to participate in the study because he/she is enrolled in either Life Strategies or Career Study Skills at Odyssey Charter High School and will be receiving online instruction in writing as part of his/her academic program this school year.

Procedures

If you volunteer to have your son/daughter participate in this study, you will be asked to do the following: allow us to analyze your child's pretest and posttest scores from The Paragraph Writing Strategy (Schumaker & Lyster, 1991) and scores from a standardized achievement test called Oral and Written Language Scales (OWLS).

Benefits of Participation

There *may not* be direct benefits to your son/daughter as a participant in this study. However, we hope to learn more about effectively providing online instruction to high school students.

Risks of Participation

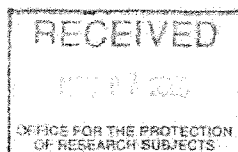
There are risks involved in all research studies. This study includes only minimal risks because the tasks are already routine. Time spent completing online tasks may cause a minimal degree of anxiety or frustration.

Cost /Compensation

There *will not* be financial cost to have your son/daughter participate in this study. The study will take approximately 10 weeks of instructional time. He/she *will not* be compensated for his/her time.

Contact Information

If you have any questions or concerns about the study, you may contact **Dr. Susan Miller** at (702) 895-1108 or **Bradley Kaffar** at (702) 257-0578 ext. 5547. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being



INFORMED CONSENT
Department of Special Education



TITLE OF STUDY: Exploring the Effects of Online Instructional Models on the Writing Achievement of High School Students With and Without Disabilities

INVESTIGATOR(S): Dr. Susan Miller and Bradley Kaffar

CONTACT PHONE NUMBER: (702) 895-1108

conducted you may contact the UNLV Office for the Protection of Research Subjects at 702-895-2794.

Voluntary Participation

Participation in this study is voluntary. You may refuse to have your son/daughter participate in this study or in any part of this study. You may withdraw your son/daughter at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Confidentiality

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link your son/daughter to this study. All records will be stored in a locked facility at UNLV for at least 3 years after completion of the study. After the storage time the information gathered will be destroyed.

Participant Consent:

I have read the above information and agree for my son/daughter to participate in this study. I am at least 18 years of age and the parent of this student. A copy of this form has been given to me.

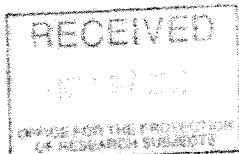
Name of Student

Signature of Parent

Date

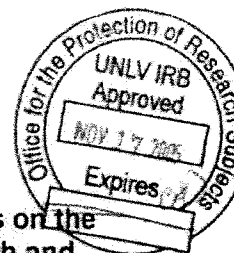
Parent Name (Please Print)

Participant Note: Please do not sign this document if the Approval Stamp is missing or is expired.



Student Form

ASSENT TO PARTICIPATE IN RESEARCH



Exploring the Effects of Online Instructional Models on the Writing Achievement of High School Students With and Without Disabilities

1. My name is Mr. Bradley Kaifar.
2. We are asking you to take part in a research study because we are trying to learn more about how to effectively provide online instruction to high school students.
3. If you agree to be in this study, you will allow me to analyze your pretest and posttest scores from *The Paragraph Writing Strategy* and scores from an achievement test called *Oral and Written Language Scales (OWLS)*.
4. Being involved in this research study allows me to access your test scores. Your responsibility for completion of online tasks should not increase your anxiety or frustration because you are already familiar with these routines.
5. By allowing me to analyze your test scores, we hope to learn more about providing online instruction to high school students. Also, it is expected that you will be better at writing as a result of this study.
6. Please talk this over with your parents before you decide whether or not to participate. We will also ask your parents to give their permission for you to take part in this study. But even if your parents say "yes", you can still decide not to do this.
7. If you don't want to be in this study, you don't have to participate. Remember, being in this study is up to you and no one will be upset if you don't want to participate or even if you change your mind later and want to stop.
8. You can ask any questions that you have about the study. If you have a question later that you didn't think of now, you can call me at (702) 257-0578 ext. 5547 or ask me next time. You may contact me at any time during school hours to ask questions.
9. Signing your name at the bottom means that you agree to be in this study. You and your parents will be given a copy of this form after you have signed it.

Print your name

Date

Sign your name

APPENDIX E

THREE ONLINE TREATMENT GROUPS AND CORRESPONDING WEBSITES

Three Online Treatment Groups and Corresponding Websites

Treatment 1: Online instruction using Power Point media

The Paragraph Writing Strategy Online

- Advance Organizer
- Writing a General Clincher Sentence
- "Step 3"
- Post Organizer

Advance Organizer

Review
You have learned the types of Clincher Sentences and the 'PENS' steps for writing Clincher Sentences.

Objectives

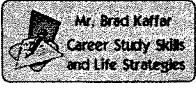
- To translate the 'PENS' steps into thoughts and actions as you write Clincher Sentences
- To see a model of what you think and do as you are writing Clincher Sentences

Required activities
Comprehension Check

Go to Quarter 1

Go to Quarter 2

702-257-0578 ext. 6547



The Paragraph Writing Strategy Online (Power Point)

Part 1: Topic Sentences		
Lesson #	Instructional Stage	Activities
Lesson 1	Describe	Comprehension Check
Lesson 2	Describe	Comprehension Check
Lesson 3	Model	Comprehension Check
Lesson 4	Verbal Practice	Topic Sentences Out
Lesson 5	Controlled Practice	Practice Activities 1A - 1D
Lesson 6	Controlled Practice	Practice Activities 2A - 2D
Lesson 7	Controlled Practice	Practice Activities 3A - 3D

Treatment 2: Online instruction using streaming video

The Paragraph Writing Strategy Online

- Advance Organizer
- Writing a General Clincher Sentence
- "Step 3"
- Post Organizer

Advance Organizer

Review
You have learned the types of Clincher Sentences and the 'PENS' steps for writing Clincher Sentences.

Objectives

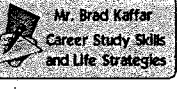
- To translate the 'PENS' steps into thoughts and actions as you write Clincher Sentences
- To see a model of what you think and do as you are writing Clincher Sentences

Required activities
Comprehension Check

Go to Quarter 1

Go to Quarter 2

702-257-0578 ext. 6547



The Paragraph Writing Strategy Online (video)

Part 1: Topic Sentences		
Lesson #	Instructional Stage	Activities
Lesson 1	Describe	Comprehension Check
Lesson 2	Describe	Comprehension Check
Lesson 3	Model	Comprehension Check
Lesson 4	Verbal Practice	Topic Sentences Out
Lesson 5	Controlled Practice	Practice Activities 1A - 1D
Lesson 6	Controlled Practice	Practice Activities 2A - 2D
Lesson 7	Controlled Practice	Practice Activities 3A - 3D

Note. Video is viewed within the black box.

Treatment 3: Online instruction using multimedia (Power Point and video)

The Paragraph Writing Strategy Online

- Advance Organizer
- Writing a General Clincher Sentence
- "Step 3"
- Post Organizer

Advance Organizer

Review
You have learned the types of Clincher Sentences and the 'PENS' steps for writing Clincher Sentences.

Objectives

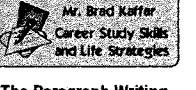
- To translate the 'PENS' steps into thoughts and actions as you write Clincher Sentences
- To see a model of what you think and do as you are writing Clincher Sentences

Required activities
Comprehension Check

Go to Quarter 1

Go to Quarter 2

702-257-0578 ext. 6547



The Paragraph Writing Strategy Online (Multimedia)

Part 1: Topic Sentences		
Lesson #	Instructional Stage	Activities
Lesson 1	Describe	Comprehension Check
Lesson 2	Describe	Comprehension Check
Lesson 3	Model	Comprehension Check
Lesson 4	Verbal Practice	Topic Sentences Out
Lesson 5	Controlled Practice	Practice Activities 1A - 1D
Lesson 6	Controlled Practice	Practice Activities 2A - 2D
Lesson 7	Controlled Practice	Practice Activities 3A - 3D

Note. Video is viewed within the black box.

APPENDIX F

FIDELITY OF TREATMENT CHECKLIST

Fidelity of Treatment Checklist

Date: _____

Lesson evaluated: _____

Instructional Procedures	Evaluation 1 = observed 0 = not observed	Comments
Advance Organizer to include: <ul style="list-style-type: none"> • Review of previously learned material • Objectives for the lesson • Rationales/purpose • Required activities for practice 		
Explicit Instruction to include: <ul style="list-style-type: none"> • Description of the skill • Model/Demonstration of the skill • Guided practice • Instruction for independent practice 		
Post Organizer to include: <ul style="list-style-type: none"> • Summary of learned material • Direction to proceed to activities for independent practice • Mastery criteria • Upcoming lesson 		

Percent of instructional procedures observed:

_____ / 12 X 100 = _____ %

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Fitzgerald, N., Kaffar, B., & Miller, S. (2006). Stepping into the future: The use of technology at an online high school. *Technology and Teacher Education Annual*.

Miller, S., Fitzgerald, N., & Kaffar, B. (2006). Integrating technology into special education methods courses: A journey worth taking. *Technology and Teacher Education Annual*.

Dissertation Title: Exploring the Effects of Online Instructional Models on the Writing Achievement of High School Students With and Without Disabilities

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