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Writing Focused Professional Development for Content-Area Teachers: The Effects of
Writing Instruction on Content-Area Student Achievement

By
Amanda Edwards Whatley

A Dissertation Submitted to the
Gardner-Webb University School of Education
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Gardner-Webb University
2017

Approval Page

This dissertation was submitted by Amanda Edwards Whatley under the direction of the persons listed below. It was submitted to the Gardner-Webb University School of Education and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Gardner-Webb University.

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Abstract

Writing Focused Professional Development for Content-Area Teachers: The Effects of Writing Instruction on Content-Area Student Achievement. Whatley, Amanda Edwards, 2017: Dissertation, Gardner-Webb University, Writing/Student Achievement/Professional Development/Content-Area

The purpose of this study was to analyze the impact of writing on the content areas when coupled with ongoing professional development and support for content-area teachers. Research shows that writing is an essential skill for success in and beyond the school setting. Research further indicates that writing plays an important role in student learning through its development of cognitive processes; however, in general, writing as a mode of learning is not a focus of either pre or in-service teacher training. As such, writing beyond note-taking and fill-in-the-blank activities is not necessarily a strategy utilized in content-area teacher classrooms.

This dissertation analyzed the impact of writing professional development and implementation on content-area student achievement in both content-area knowledge and writing skill. Data were collected through a survey instrument, pre and postassessments, benchmark assessments, and teacher reflection questionnaires for qualitative and quantitative results. Teacher participants were employees at a rural public charter high school in North Carolina. Student participants were high school students enrolled in participating teacher content-area courses.

Per analysis of the data, it was determined that writing professional development and implementation impacted student achievement in both content-area knowledge and writing. In addition, the results indicated that both student and teacher attitudes toward writing as a mode of learning were positively affected.

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Chapter 1: Introduction

Introduction

Educational institutions across the United States are tasked with the demand to improve academic achievement for students (Elementary and Secondary Education Act [ESEA], 1965). Budget dollars are meticulously itemized for programs, technology, and other teaching resources designed to provide students learning opportunities (No Child Left Behind Act of 2001 [NCLB], 2002). State standards are adopted and curriculum plans drafted delineating what is to be taught and should be learned in an academic school year (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

How does intensive writing instruction in the content areas figure into this paradigm? The ability to write well is essential for academic success (Shellard & Protherone, 2004). Students, in order to exhibit evidence of understanding, must write coherently and logically and for multiple audiences and a variety of purposes (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). With the push to create College and Career Ready students (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010), writing instruction as a curriculum focus in all content areas is more important than ever. Even before the Common Core State Standards initiative, the National Council of Teachers of Mathematics (NCTM, 2000) mandated writing as a “tool of mathematical thinking and problem solving” (Daniels, Zemelman, & Steinke, 2007, p. 8).

The 2011 National Assessment of Educational Progress (NAEP) assessment of student writing in Grades 8 and 12 indicated that 24% of students at both the eighth- and

twelfth-grade levels received a writing performance score of proficient (National Center for Education Statistics, 2012). According to the reports, students who score at the proficient level “have clearly demonstrated the ability to accomplish the communicative purpose of their writing” (National Center for Education Statistics, 2012, p. 1). The report indicates that 54% of students in Grade 8 and 52% of those in Grade 12 scored at the basic level (National Center for Education Statistics, 2012). The basic level scores indicated “partial mastery of the prerequisite knowledge and skills that are fundamental for proficient work at each grade” (National Center for Education Statistics, 2012, p. 2). That leaves 21% of students scoring below basic, and only around 3% scoring advanced (National Center for Education Statistics, 2012). Essentially, the report indicates that students are graduating from high school and entering the workforce or college with only basic writing skills, and further research indicates the U.S. government spends close to a quarter of a billion dollars to remediate the writing skills of their employees yearly (Daniels et al., 2007). Clear, strong writing “paves the way to fulfilling employment” (Daniels et al., 2007, p. 5).

Statement of Problem

Educators have been asked to create monthly writing exercises for students to complete, teachers to score, and administrators to file away, often without providing students writing instruction, feedback, or opportunity to revise (McLeod, 1987). Such practice may be explained by a study conducted by Gillespie, Graham, Kiuahara, and Hebert (2013) which reported that “on average, teachers reported taking just 1 course” in the area of writing (p. 1065). There is a large body of research on various aspects of writing-to-learn including Emig’s (1977) connection between writing and learning, where she discussed the similarities between learning and the writing process to content-specific

research connecting writing tasks. Additionally, the body of writing-to-learn research includes learning processes for a particular content area such as Caukin's (2010) study on science writing heuristic. Herrington (1981) referenced Emig's writing/learning connections in her explanation of a 2-year project to train faculty at the university level "to use writing as an integral component of the courses" (p. 380). McLeod (1987) defined Writing Across the Curriculum (WAC) as reforms that affect a University system. McLeod and Maimon (2000) called WAC, or what high school teachers would term content areas, "one of the most important educational reform movements of the twentieth century [that] will extend the influence of active learning into the future" (p. 582).

What is problematic is that writing to learn and WAC are concepts of which many educators are familiar but not proficient (Gillespie et al., 2013). Writing-to-learn has often been a method of intervention for academic achievement. In fact, a meta-analysis by Bangert-Drowns, Hurley, and Wilkinson (2004) investigated variations in research findings "about the efficacy of writing-to-learn programs" (p. 34). The review of 46 different studies found that "75% of the outcomes favored writing to learn over conventional academic measures" (Bangert-Drowns et al., 2004, p. 49), indicating that writing as a learning intervention is more successful than conventional academic interventions. Much of the research reviewed by Bangert-Drowns et al. was focused on specific writing tasks and/or implementation of writing into the content-area classroom to improve student academic success and growth, not writing instruction in the content areas specifically. Although research suggests that writing enhances learning, content-area teachers infrequently utilize writing in their content-area classrooms (Armbruster, McCarthey, & Cummins, 2005).

Even though research suggests that writing plays a significant role in the production and presentation of knowledge, writing in the content areas is not utilized for these purposes on a regular basis (Armbruster et al., 2005). In fact, Fisher, Frey, and ElWardi (2005) asserted that many secondary students go “days without being asked to write” (p. 146). When students are asked to write in the content-area classroom, it is more often “knowledge telling” activities: completing worksheets, recording what they know, or answering chapter questions (Armbruster et al., 2005). Marzano, Pickering, and Pollock (2001) identified summarizing and note-taking, both writing tasks, as high yield instructional strategies, but there is a need to move beyond notes and summaries.

Researchers suggest that writing is vital to creating and maintaining student engagement in curricular content (Daniels et al., 2007). Writing extends student thinking and helps to further engage students “by investing them in their own ideas” (Shellard & Protheroe, 2004, p. 34). Beyond the school setting, writing is “a necessity, a prerequisite to living a literate life” (Gallagher, 2011, p. 5); however, research suggests that 70% of America’s students are leaving high school without the skills necessary to participate in the global economy (Gallagher, 2011; Graham & Perin, 2007). The scope of employers requiring writing proficiency for new hires is vast and includes government, clerical, industrial, and manufacturing settings (Graham & Perin, 2007).

What remains to be explored is how intensive and purposeful writing instruction in the content areas, supported by ongoing teacher professional development, will affect student learning and academic growth at the high school level. The level of learning shifts dramatically when students enter high school predominately due to the level of content complexity students encounter (Shellard & Protheroe, 2004). Students move from narrative and expository forms of writing to analytical modes of writing once they

reach the secondary grades (Shellard & Protheroe, 2004); however, content-area teachers often indicate they receive little training in the teaching or utilization of writing in their content-area classroom (Gillespie et al., 2013).

Purpose of Study

The purpose of this study was to determine how purposeful writing instruction in the content areas, supported by ongoing teacher professional development, would affect student learning and academic growth at the high school level. Research suggests that writing, theoretically, works to facilitate learning in multiple ways (Gillespie et al., 2013). Meta-analyses have been utilized to provide discourse about the effects of writing on the learning process (Bangert-Drowns et al., 2004; Graham & Hebert, 2011; Hebert, Gillespie, & Graham, 2013). These studies address what Klein and Boscolo (2016) identified as moderator variables. The moderator variables include “instruction in writing versus writing without instruction, the education level of students, the frequency and duration of writing activities, the type of discipline in which students write, and methodological feature such as the type of dependent measure” (Klein & Boscolo, 2016, p. 316). Strategy instruction’s affect on learning has also been investigated, and studies suggest writing significantly effects learning; however, “large-scale research regarding teachers’ approaches to writing instruction suggests” a variation in practice across the content areas (Jeffery & Wilcox, 2013, p. 1098; Klein & Boscolo, 2016). Gillespie et al.’s (2013) survey findings suggest that teachers do not typically incorporate strategy instruction for writing to learn purposes. In fact, research indicates that content-area teachers receive minimal instruction related to the teaching of writing in their discipline (Pytash, 2012). In spite of limited writing preparation, 45 states have adopted Common Core State Standards that include standards for writing in history, science, and technical

subjects (National Governors Association & Council of Chief State School Officers, 2010). This study provided content-area teachers with professional development specifically designed to instruct and support teachers in implementing discipline-specific writing instruction into their classrooms. This study was an attempt to add to the current body of knowledge devoted to writing-to-learn and writing-across-the-curriculum with a focus on writing specific professional development coupled with ongoing support for teachers and the effect on student achievement.

Key Terms and Definitions

Academic achievement. Refers to a “student’s subject-matter knowledge, understanding, and skills at one point in time while *student learning* is the growth in subject-matter knowledge, understanding, and skills over time” (Student Learning, Student Achievement Task Force, 2011, p. 28).

Content area. For the purpose of this study, content area refers to high school, non-English courses housed in the science, math, and history departments. These courses are state graduation requirements for all students.

WAC. Within the context of this study, WAC is “teaching writing as practiced in all disciplines by teaching it through school subjects” (Moffett, 1981, p. 13).

Writing-to-learn. Within the context of this study, writing-to-learn falls under the umbrella of WAC and refers to the synthesizing of information through various, informal writing activities and assessments.

Common Core State Standards. A set of academic standards in mathematics and English language arts (ELA)/literacy.

Research Questions

1. What resources do content-area teachers need to implement writing in their

content-area classrooms?

2. What effect does writing instruction in the content areas have on student content-area knowledge?
3. What effect does writing instruction in the content areas have on student writing skills?
4. How does in-service teacher training affect writing pedagogical practices in the content-area classroom?

Theoretical Framework

Learning theories can generally be divided into three major schools of thought: philosophy-based, psychology-based, and progressive learning theory (Darling-Hammond, Austin, Orcutt, & Rosso, 2001).

One of the first philosophers to suggest that education be child-specific was Jean-Jacques Rousseau (1712-1778). He believed that children should be allowed to develop naturally. This child-centered ideology can be found later in the philosophies of Dewey, Montessori, and Piaget, among others (Darling-Hammond et al., 2001). From Kant (1724-1804), educational theorists learn “a priori” knowledge, knowledge that is present before experience. Kant elucidates the need for an organizing structure for information received by the senses, and is “the first to recognize the cognitive processes of the mind” (Darling-Hammond et al., 2001, p. 5).

Psychology-based learning theory can be traced back to the 19th century and the explosion of scientific study. During this time period, psychologists began studying “how” people learn through objective testing (Darling-Hammond et al., 2001). Edward Thorndike (1874-1949), the first modern educational psychologist, believed learning “was incremental and that people learned through a trial-and-error approach” (Darling-

Hammond et al., 2001, p. 5). He described learning as mental connections formed through response to stimuli, suggesting the need for active learning in environments structured to produce the required stimulus (Darling-Hammond et al., 2001). “Jean Piaget (1896-1980) was the first to state that learning is a developmental cognitive process, that students create knowledge rather than receive knowledge from the teacher” (Darling-Hammond et al., 2001, p. 6). Through his observations, Piaget (1968) developed four stages of growth: sensorimotor (birth to about 2 years), preoperational (roughly ages 2-7), concrete operations (encompassing about ages 7-14) and formal operations (beginning around ages 11-15 and extending into adulthood. Piaget’s (1968) theory of development was extended through the work of the Russian scientist, Vygotsky (1896-1934). Vygotsky established the Zone of Proximal Development (ZPD), which suggested that students learn best when given teacher support for subjects that are just beyond their range of experience (Darling-Hammond et al., 2001). This idea led directly to the use of “scaffolding” to assist student learning. Consistent with Vygotsky’s ZPD, writing promotes explicitness, it is integrative, it supports reflection, it fosters personal involvement with information, and it aids learners in thinking about what ideas mean (Gillespie et al., 2013).

The theoretical framework for this study is guided by a cognitive constructivist theory of learning. Cognitive approaches as defined by Piaget (1968) and Perry (1999) focus on mental processes, with knowledge seen as something that is actively constructed by learners based on their own cognitive processes. Cognitivists assert that a learner’s own knowledge and experiences influence learning through unobservable mental processes (Paciotti, 2013). Cognitivists combine the approaches of educational theories that focus on mental processes, with knowledge seen as something that is actively

constructed by learners based on their own cognitive processes (Paciotti, 2013). Properly structured writing activities can foster students in creating their own meaning from information, a foundational element of constructivist ideologies (Rosenblatt, 2013).

Constructivism is the philosophy, or belief, that learners create their own knowledge based on interactions with their environment (Narayan, Rodriguez, Araujo, Shaqlaih, & Moss, 2013). Constructivists maintain that learning is an active process; and when prior knowledge is integrated with new ideas, the learner constructs knowledge (Narayan et al., 2013). Constructivists combine educational theories that focus on the learner as the creator of their own knowledge based on interactions with their environment (Narayan et al., 2013). Writing relies on both common knowledge and process (Fitzgerald & Shanahan, 2000, as cited in Graham & Hebert, 2011).

Setting

The study was conducted at a public charter high school in central North Carolina. The school, a STEM-focused, project-based learning site was in its fourth year of operation. The study site serves students Grades 9-12 from five surrounding school systems. The study site serves approximately 448 students: 84% White, 7% Hispanic, 5% Black or African-American, 1% Native American, and less 1% Asian. The total population is 59% female and 41% male (Education First, 2015). The study site's charter has a student population cap of 500 students, and students are selected through a lottery process when there are fewer open spots available than total number of enrollees.

Writing diagnostics given to students in Grades 9-12 by the site's English department revealed that 60% of students, overall, scored at developing on the assessment. Benchmark data indicated very little change in student writing abilities overall, with 60% of the English 10 (sophomore) students scoring at developing on their

second writing benchmark of the school year. Student scores are consistent with NAEP 2011 writing results (National Center for Education Statistics, 2012). As a project-based learning school, the site requires writing intensive curricular units. This study provided important data regarding methodologies for implementing writing into core content-area classes, a task typically exclusive to the English teachers.

Conclusion

The ability to write well is essential for academic success and employment beyond the school setting (Daniels et al., 2007; Shellard & Protherone, 2004), yet an overwhelming majority of high school students in the United States continues to write below the proficiency level, leaving them unable to successfully compete in a global economy (Gallagher, 2011; Graham & Perin, 2007; National Center for Education Statistics, 2012). Because research suggests that writing works to facilitate learning in multiple ways, educator focus on writing in the classroom is essential (Gillespie et al., 2013); however, content-area teachers receive little preservice training on writing strategies or processes (Pytash, 2012). This study provided content-area teachers with professional development specifically designed to instruct and support them in implementing discipline-specific writing instruction into their classrooms. This study sought to determine how purposeful writing instruction in the content areas, supported by ongoing teacher professional development, affected student learning and academic growth at the high school level.

Chapter 2: Literature Review

Introduction

This study investigated writing instruction in the content areas and its effect on student achievement. By examining how writing affects student achievement, the researcher sought to establish methodologies that support teachers in their efforts to help students achieve academically. This literature review explores the historical rise of secondary schools in America and programs and initiatives surrounding student achievement. Research regarding writing instruction and its connection to student learning is explored and analyzed. This literature review also reviews the research on teacher preparation programs and professional development and its effect on student achievement.

Purpose

The purpose of this study was to determine how purposeful writing instruction in the content areas, supported by ongoing teacher professional development, affected student learning and academic growth at the high school level. The 2011 NAEP assessment of student writing indicated that 52% of students in Grade 12 scored at the basic level and another 21% scored below the basic level (National Center for Education Statistics, 2012). At the basic level, students exhibit only “partial mastery” of knowledge and skills needed to perform at grade level (National Center for Education Statistics, 2012, p. 2). Without the skills needed to perform at grade level, students will leave high school and enter a global economy in which they are ill prepared to compete (Daniels et al., 2007; Gallagher, 2011; Graham & Perin, 2007).

History of Secondary Schools in America

Rise of the high school. Formal education in 18th century America, beyond

grammar school, was primarily reserved for the wealthy or the clergy, through private or religious academies and schools (Clark, 2007). The Boston Latin Grammar School was the first American high school. It was founded in 1635; and its primary purpose was to prepare men for the church, government service, or a college education at Harvard (United States Department of Education, Office of Vocational and Adult Education, 2003). It was not until 1821 that the first public high school opened in the United States. The English Classical School in Boston was the first tax-supported school, but an admission test was required prior to entry (Clark, 2007; United States Department of Education, Office of Vocational and Adult Education, 2003). Although an admission test was required for entry, the school's opening did mark a change in American education (Clark, 2007); however, by 1870 the number of public high schools in the United States was still relatively small with only 500 schools hosting 50,000 students (United States Department of Education, Office of Vocational and Adult Education, 2003).

Public high schools were founded across various regions of the country, the Northeast, South, and Midwest, until the middle of the 19th century (Iorio & Yeager, 2011). It is important to note that "public" during this time of educational change meant supported by tax dollars. From 1910-1940, the number of students enrolled in either public or private high schools rose from 18-71% (Goldin, Katz, Costa, & Lamoreaux, 2008). It was during this period of growth that school enrollment was made available to females and working-class males (United States Department of Education, Office of Vocational and Adult Education, 2003). The curriculum of these early secondary schools looked similar to what we call the "core curriculum" in today's high schools: history, geography, mathematics, English, and science (United States Department of Education, Office of Vocational and Adult Education, 2003); however, many females trained to

become teachers, and working class students learned a trade (United States Department of Education, Office of Vocational and Adult Education, 2003).

Many states required each district to provide public high school and delineated the standards for school organization and student performance required for graduation (Goldin et al., 2008). The pioneers of public education, Horace Mann for instance, pushed the public school agenda touting it as the “foundation of democracy and as the fairest way to distribute power in the country” (Clark, 2007, p. 1). Mann, among other school reformers, thought it necessary to attract middle-class students to public over private schools (Clark, 2007); however, there was opposition to the expansion of public schools. Critics during the 19th century expressed the belief that education was a financial responsibility of the family, not the taxpayer; and many opponents thought public education inferior to that offered in the private academies (Clark, 2007). The opposition did not prevail.

Curriculum. The community-based expansion of public high schools created a curriculum disparity (Clark, 2007). Schools established courses of study to meet the community and individual needs, but this approach left many students unprepared for further study (Iorio & Yeager, 2011). The National Education Association (NEA), formerly known as the National Teacher’s Association, responded to the community-driven curriculum. The NEA issued a report in 1893 that dealt with the problem of students being unprepared for college study (Marsh & Willis, 2007). The report titled Report of the Committee of Ten on Secondary Schools outlined four parallel programs for all high schools to teach: classical, Latin scientific, modern languages, and Greek (Marsh & Willis, 2007). There was not a distinction between college-bound and non-college-bound subject matter; and overall, the report “helped move high school curricula

... toward modern subjects, including sciences” (Marsh & Willis, 2007, p. 39).

John Dewey (1859-1952) ushered in the progressive era in education. In 1918, the Commission on the Reorganization of Secondary Education, a group appointed by the NEA, issued *The Cardinal Principles of Secondary Education* (United States Department of Education, Office of Vocational and Adult Education, 2003). The report contained a statement of principles proposed to expand the secondary school curriculum for American students, incorporating life experiences alongside academic subjects (Marsh & Willis, 2007). The commission concluded that the seven main objectives of secondary education should be health, command of fundamental processes, worthy home membership, vocation, citizenship, worthy use of leisure, and ethical character (Marsh & Willis, 2007; United States Department of Education, Office of Vocational and Adult Education, 2003). Marsh and Willis (2007) noted that the Cardinal Principles shifted the focus of curriculum “away from subject matter and toward the individual student” (p. 44). Additionally in 1918, Franklin Bobbitt published *The Curriculum*. Bobbitt’s book “was probably the first book to self-consciously focus on curriculum matters exclusively” (Marsh & Willis, 2007, p. 45).

After World War II, American public high schools saw a reduced focus on the progressive ideals of education centered on the individual and a shift more toward the traditional society-centered curriculum (Marsh & Willis, 2007). The launch of Sputnik in 1957 by the Soviet Union only served to solidify this shift; and reformers demanded more mathematics, science, and foreign language courses (Clark, 2007; U.S. Congress, Office of Technology Assessment, 1992). The 1950s and 1960s saw more rigorous courses and tests for students in advanced curricular tracks. Advanced Placement (AP) tests, Nation Merit Scholarship Exams, and International Baccalaureate (IB) tests and programs were

also introduced during this period (U.S. Congress, Office of Technology Assessment, 1992). Many considered a single curriculum for all schools the most desirable option; however, the federal government could not issue a national curriculum (Clark, 2007). Instead, federal funding was offered for curriculum packages through the National Defense Education Act of 1958 (Clark, 2007; Iorio & Yeager, 2011; Marsh & Willis, 2007). The funding was authorized “for a wide variety of education purposes, including support for mathematics, science and foreign language, expansion of testing, and enhancement of state education agencies” (Clark, 2007, p. 5).

Equity. Significant efforts were made to ensure access to public education for all students, especially during the 1950s through the 1970s (United States Department of Education, Office of Vocational and Adult Education, 2003). The Supreme Court’s ruling in *Brown v. the Board of Education of Topeka* (1954) ending legal segregation and the Education of all Handicapped Children Act of 1975 were both significant in providing all children with access to education (United States Department of Education, Office of Vocational and Adult Education, 2003). This time period also saw an exodus of middle-class families from urban centers of town to the suburbs, reducing the public education tax base in those urban areas which resulted in low-income minority high schools (United States Department of Education, Office of Vocational and Adult Education, 2003). In 1965, ESEA was born. ESEA was a piece of President Lyndon B. Johnson’s War on Poverty, and it provided supplemental federal funding for education of low-income children (Clark, 2007). In 1968, ESEA incorporated the Bilingual Education Act (1968), intended to provide funding to assist limited English proficient (LEP) students. The social movements that championed education as a basic civil right led to the social and academic freedom movements of the 1970s; the desire of education leaders

to bring back progressive education was evident (Horwitz, 1979). Alternative models of schools were prolific during the late 1960s and early 1970s; however, these open school practices received much skepticism and resistance from parents and educators alike (Cuban, 2004). By the mid-1970s, social, cultural, and political changes prompted demands for a return to traditional school practice (Cuban, 2004).

School reform. The 1980s saw a renewed focus on rigorous education. In 1981, Terrel H. Bell formed the National Commission on Excellence in Education (NCEE), and in 1983 the commission released *A Nation at Risk: The Imperative for Educational Reform* (Clark, 2007; Marsh & Willis, 2007; United States Department of Education, Office of Vocational and Adult Education, 2003). The report decried public high schools as severely inadequate at preparing our students to compete globally and a risk to national security (Gardner, 1983). The report encouraged reform of high school education through a curriculum called The New Basics. The New Basics required 4 years of English, 3 years of mathematics, 3 years of science, 3 years of social studies, and 1 and a half years of computer science; additionally, college-bound students were recommended to complete 2 years of a foreign language (Clark, 2007; Marsh & Willis, 2007; Gardner, 1983).

By 1986, 45 states and the District of Columbia had raised high-school graduation requirements, 42 had increased math requirements, and 34 had boosted science requirements. These changes reduced the choices that students could make in their course selections and thus marked a dramatic shift away from the policies of the previous half-century. (Marsh & Willis, 2007, p. 20)

These changes in curriculum; however, did not result in a quick change in student achievement in core liberal arts courses (Marsh & Willis, 2007). In response to the slow

pace of school reform efforts, the National Governors Association released a report in 1986 titled *Time for Results* examining the role of the governor in school reform. The report suggested accountability of school reform through gubernatorial oversight (Clark, 2007). In a second Result report released by the National Governors Association in 1987, the National Governors Association pushed for “assessment systems that would allow states to track the progress of students over a period of years” (Clark, 2007, p. 8). The goal with the assessment tracking system was to identify and develop strategies for addressing weaknesses evident in those results (Clark, 2007).

In 1989, the Education Summit in Charlottesville, Virginia convened by George H. W. Bush included governors and policy experts. The parties present discussed education reform goals and the role of states and the federal government in the process (Clark, 2007). The summit resulted in governors’ adoption of six national guidelines to steer educational improvements focused on student preparedness for schooling; student performance on international exams; dropout rate reduction and at-risk student improvement; adult literacy; workforce training; qualified teachers and modern technology in the classroom; and a safe, drug-free environment (Clark, 2007).

Between 1990 and 2010, educational reforms experienced many shifts based on recommendation from both *A Nation at Risk* and the National Goals (Iorio & Yeager, 2011). One of the most significant reform efforts occurred through NCLB passed by the U. S. Congress in December 2001 and subsequently signed into law by President George W. Bush in January 2002 (NCLB, 2002). NCLB, a revision of ESEA, required states to develop standards for mathematics and ELA and test student achievement in those areas in both Grades 3 and 8 to establish student adequate yearly progress (AYP) toward meeting set standards. Science was added as a tested subject later, and testing expanded

to include almost all grade levels. Federal funds were lost by states that did not comply with NCLB statutes (Marsh & Willis, 2007). Furthermore, schools that did not reach AYP for 5 consecutive years were forced to restructure or close. NCLB established the requirement that teachers must be “highly qualified” in the subject area they teach (Iorio & Yeager, 2011).

Although NCLB pushed for standards alignment, those standards were determined at the state level, not nationally (Mathis, 2010). “Initially, the wide diversity of state standards under NCLB was viewed as a virtue” (Mathis, 2010, p. 4); however, state test scores indicating proficiency did not appear to be policy or to correlate with scores reported by NAEP, an accountability tool developed in 2002 as “an external audit of state tests mandated for AYP” (Iorio & Yeager, 2011, p. 26) by the National Center for Education Statistics, a U.S. Department of Education division (Mathis, 2010). In response to NAEP trends, representatives from 41 states met in Chicago in 2009. These state representatives met with the Council of Chief State School Officers and the National Governors Association and determined a need for common educational standards. The National Governors Association and Council of Chief State School Officers commissioned Achieve, a corporation founded by the National Governors Association, to draft these new common standards for mathematics and reading (Mathis, 2010). A draft of the content-based standards was released to the public on March 10, 2010. The standards stated aim was to promote higher order thinking over rote memorization through fewer, clearer standards (Mathis, 2010). From these standards, the Common Core State Standards Initiative was born.

All of the states, except for Alaska and Texas, joined the Common Core State Standards Initiative by signing a memorandum of agreement. By July 2011, all of

the participating states, except for Montana, Nebraska and Virginia, had adopted the Common Core State Standards formally or provisionally. (Watt, 2011, p. 5)

Accountability

Student achievement. Student achievement is an inflammatory topic and has been the focus of politicians, education researchers, administrators, educators, and parents as evidenced by the 2000 Presidential campaign (New York Times Archives, 2000). During the debate between then Gov. George W. Bush of Texas and Vice President Al Gore, both candidates named accountability as a focus for education, only differing in their views on mandatory testing and voluntary national testing in addition to state mandatory tests (New York Times Archive, 2000). Both candidates indicated a need for teacher recruitment and training, although their approaches were very different, with Gov. Bush promoting school choice and alternate routes for teachers like Teach for America, while Vice President Gore championed smaller class sizes and testing for new teachers (New York Times Archive, 2000).

There is a plethora of learning theories and models, methodological approaches, curriculum designs, and classroom strategies and practices all aimed to aid student achievement (Coe, Aloisi, Higgins, & Major, 2014). Coe et al. (2014) reviewed research related to effective teaching practices, student and teacher measurements, and classroom management resulting in a list of effective and ineffective practices used to “set the scene” for a 2014 international summit in Washington, D.C. focused on effective professional learning for teachers (p. 8). It is important to note, however, that teacher access to professional development opportunities varies tremendously by state (Darling-Hammond, 2000). Darling-Hammond’s (2000) findings suggest, “policy investments in the quality of teachers may be related to improvements in student performance”

(p. 1), and student achievement is most strongly correlated with teacher preparation and certification.

Academic achievement refers to a “student’s subject-matter knowledge, understanding, and skills at one point in time while *student learning* is the growth in subject-matter knowledge, understanding, and skills over time” (Student Learning, Student Achievement Task Force, 2011, p. 28). In order for students to successfully navigate their way through high school to a diploma, they must first show basic achievement, a passing grade, in each required curriculum area (North Carolina Department of Public Instruction [NCDPI], 2013). At the secondary level, the educational goal for students is ultimately high school graduation and successful entrance into the workforce or a collegiate program of study (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010). In 2013, approximately 65% of young adults working full time had higher levels of educational attainment, a high school diploma or equivalent, and beyond; suggesting a relationship between education level and employment (United States Department of Education, National Center for Education Statistics, 2015).

Achievement tests. Testing in America began early in the history of the secondary school (United States Congress, Office of Technology Assessment, 1992). “The period from 1840 to 1875 established several main currents in the history of American educational testing” (United States Congress, Office of Technology Assessment, 1992, p. 104). In the mid-19th century, education leaders sought for grading of students, and testing earned a role in the classification process (United States Congress, Office of Technology Assessment, 1992). The first reported use of a written test came while Horace Mann was the Secretary of the State Board of Education, and it

was given in Massachusetts. The state moved from oral exams to standardized written tests to streamline student classification (United States Congress, Office of Technology Assessment, 1992). Test results suggested a gap in student knowledge, and Mann's model led to the adoption of written exams across the United States (Gallagher, 2003). "The first published national subject examinations that established norms for grade-level performance appeared in the 1890s"; and by the early 20th century, commercially marketed achievement tests were developed (Glaser & Silver, 1994, p. 12). Historically, educational testing can be categorized into three basic functions: assist students and teachers with classroom learning, systemically monitor educational outcomes, and aid in the classification of students (United States Congress, Office of Technology Assessment, 1992).

The largest expansion of the school testing movement has been attributed to Army testing during World War I. The Alpha and Beta scales were developed for and used by the U.S. Army to determine "which recruits were capable for service and to assign them jobs" (United States Congress, Office of Technology Assessment, 1992, p. 119). Modern educational measurement was landmarked by the publication of the Stanford Achievement Test in 1923 (Gallagher, 2003; Glaser & Silver, 1994). The Iowa Test of Basic Skills and the Iowa Test of Educational Development, the first set of statewide achievement tests, were developed in 1929 (Gallagher, 2003). The Iowa test was adopted by other states and utilized for over 50 years (Gallagher, 2003). Additionally, during the 1930s and 1940s, the work conducted by Ralph Tyler (1934) on behavioral objectives influenced test creation and production (Clarke, Madaus, Horn, & Ramos, 2000). Tyler argued that a student's ability to correctly answer test items was not necessarily an indication that the test was valid, and insisted that educational objectives must contain

both behavioral and content components (Clarke et al., 2000). In an effort to expand individual access to education, the General Educational Development (GED) was created “to address problems of returning service personnel who had been inducted before graduating from high school” (United States Congress, Office of Technology Assessment, 1992, p. 128) and was patterned much like the Iowa Test of Basic Skill. A noteworthy expansion of testing during the 1950s was the automatic scoring machine developed by the Iowa Testing Program, providing volume test processing which opened the door for national testing programs (United States Congress, Office of Technology Assessment, 1992).

Beyond automaticity, social and political factors influenced the expansion of standardized testing (Clarke et al., 2000). The launch of *Sputnik* led to federal and state legislation promoting reform in science and mathematics (Clark, 2007; United States Congress, Office of Technology Assessment, 1992). These reform efforts promoted and often mandated standardized testing (Clarke et al., 2000). The Coleman et al. (1966) report, in part, related the achievement of students to school characteristics. A noteworthy summary provided by the report indicated “the achievement of minority pupils depends more on the schools they attend than does the achievement of majority pupils” (Coleman et al., 1966, p. 22). Because the ESEA was intended to expand equity in education, the report initiated a shift to a focus on results or school accountability using student performance on available multiple-choice tests as output measures (Clarke et al., 2000).

By 1970, technological advances in test production and scoring resulted in exponential increases in large-scale assessment conducted at the state, national, and international levels (Clarke et al., 2000). The release of *A Nation at Risk* perpetuated a

push for content standards, and standards-aligned assessments in the 1980s created a need for adaptations in testing format (Clarke et al., 2000; United States Department of Education, 2008). In the 1980s and 1990s, state and local content standards were developed along with standards-based assessments, and federal legislation made those standards and assessments a requirement for states receiving federal aid (United States Department of Education, 2008). Tests were expanded to additional grades, and accountability requirements attached to those assessments with the passing of NCLB (2002). “Today, all 50 states have reading and math content standards and tests at a minimum in grades 3-8 and once in high school” (United States Department of Education, 2008, p. 5). The results of these tests are publicly accessible to provide information for all stakeholders, including parents (United States Department of Education, 2008).

Teacher Preparation

Prior to the establishment of normal schools, the pathways to teaching were not particularly uniform. Teachers were not required to have any special training or pedagogical preparation. They merely needed some familiarity with the subject they would teach (Labaree, 2008). Some districts required new teachers to pass a test of their general knowledge; more often, they needed to persuade local school boards of their moral character (Ravitch, 2003).

The mid-19th century saw the establishment of normal schools, facilities created for the preparation of teachers. The program design of normal schools was dependent on the region of the country. For instance, Massachusetts supported “normal schools” for teacher training, offering short courses in educational methods; but these were primarily for elementary teachers, while western states “offered longer courses, both academic and

professional” (Ravitch, 2003, para. 7). State level normal schools became the most prominent and influential in teacher preparation. The first state model opened in Lexington, Massachusetts in 1839, with the sole purpose of educating future teachers (Labaree, 2008). There were 37 normal schools in the United States by 1867. In 1887, the New York School for the Training of Teachers was established and eventually became Teacher’s College at Columbia University (Iorio & Yeager, 2011).

In 1834, Pennsylvania was the first state to require teachers to pass a reading, writing, and mathematics test; and by 1867, most states had locally required certification tests for teachers (Ravitch, 2003). In North Carolina, teacher preparation was judged to have the greatest impact on public school effectiveness. In the late 1860s, North Carolina saw the establishment of normal school institutions for teacher training. By 1897, a State Board of Examiners (SBE) was created as an agency of the State Board of Education. The Board was authorized to “define and grant first grade life certificates, to furnish annual examinations to supervisors and to recommend a course of reading and professional study for teachers” (NCDPI, 1993, p. 11). In 1919, the SBE became the responsible agent for the certification of all teachers.

In 1930, the American Council on Education established a National Teachers’ Exam that tested subject matter mastery. These tests fell by the wayside during WWII because of a national teacher shortage (Ravitch, 2003); however, in the 1950s and 1960s, teacher education saw a change in its professionalization. More stringent requirements for licensure were developed, resulting in a need for advanced degrees and professional development (Iorio & Yeager, 2011). Individuals preparing to teach at the high school level “were given specific instruction in their fields of study as well as in educational pedagogy” (Iorio & Yeager, 2011, p. 17). In 1954, the American Association of Teacher

Education (AACTE), the National Association of State Directors of Teacher Education and Certification (NASDTEC), the NEA, the Council of Chief State School Officers, and the National School Boards Association (NSBA) founded the National Council for Accreditation of Teacher Education (NCATE). NCATE consisted of 19 members with college faculty, classroom teachers, and one representative from NASDTEC, Council of Chief State School Officers, and the NSBA (Angus, 2001). “The promise of NCATE was to lift the standards of teacher education programs” (Angus, 2001, p. 33). The goal of the creation of the NCATE was to create a program approval process existing at the national level and controlled by educationists and remove this process from state departments (Angus, 2001).

During this post WWII era, the NEA established the National Commission on Teacher Education and Professional Standards and the subsequent Project on New Horizons in Teacher Education and Professional Standards in 1959 (Edelfelt & Raths, 1998). The Project’s report defined the state as the responsible party for teacher certification and education program approval and called for an inclusive definition of professional teacher competence (Edelfelt & Raths, 1998). The report recommended the following standards for teacher education:

1. Teacher education should be “staffed by fully prepared educators who perform with excellence.”
2. Teacher education should be characterized by “broad liberal education.”
3. Teacher education should include “an internship, in addition to student teacher and other laboratory experiences, as an integral part of the program.”
4. Teacher education should be characterized by “appropriate use of both qualitative and quantitative evaluation of student progress.” (Edelfelt &

Raths, 1998, pp. 7-8)

The report also encouraged NCATE to adopt standards that

- Are based on continuing study, research, and experimentation,
- Are stated in terms that facilitate understanding of them and appraisal of programs in relation to them,
- May be viewed as stimulating improvement as well as regulating practice, and
- Not only provide for but actually require institutional experimentation with varied approaches to the preparation of professional personnel. (Edelfelt & Raths, 1998, p. 8)

By the 1970s, competency-based teacher education reached a pinnacle (Edelfelt & Raths, 1998). In 1972, the Committee on National Program Priorities in Teacher Education published *The Power of Competency-Based Teacher Education*; however, competency-based teacher education was not defined by the book (Edelfelt & Raths, 1998).

However, state licensure has rarely required completion of an accredited teacher education program (Murray, 2005). In fact, by 2005 less than half of the nation's schools of education were accredited by a U.S. Department of Education recognized accrediting body (Murray, 2005).

Under NCLB (2002), all teachers were required to be "highly qualified" by the 2005-2006 school-year end (United States Department of Education, Office of the Secretary, Office of Public Affairs, 2004). For a teacher to be considered "highly qualified," he or she must hold a bachelor's degree, hold a certification or licensure to teach in the state of his or her employment, and have proven knowledge of the subjects

he or she teaches (NCLB, 2002). The legacy of teacher requirements described by NCLB (2002) remains intact for teachers hired prior to December 10, 2015 under Every Student Succeeds Act of 2015 (ESSA, 2015); however, the term highly qualified has been replaced with effective for those hired after the aforementioned date.

There remains a variety of pathways offered for teacher preparation including traditional baccalaureate degree programs, alternative certification programs, partnership programs between community colleges and universities, Teach for America or other recruitment programs, and state governed certification alternative programs through professional development (Iorio & Yeager, 2011).

Writing and Learning

Research suggests that writing, theoretically, works to facilitate learning in multiple ways (Gillespie et al., 2013). Consistent with Vygotsky's (1896-1934) ZPD, writing promotes explicitness, it is integrative, it supports reflection, it fosters personal involvement with information, and it aids learners in thinking about what ideas mean (Gillespie et al., 2013). Both language arts and content-area experts contend that writing helps students comprehend, construct new understandings, and think critically (Gillespie et al., 2013). Kant (1724-1804) elucidated the need for an organizing structure for information received by the senses and was "the first to recognize the cognitive processes of the mind" (Darling-Hammond et al., 2001, p. 5). The role of writing and its connection to Kant's theory of cognitive processes is evident in Applebee and Langer's (1987) explanation of the role of writing and learning:

The role of writing in thinking can be conceptualized as resulting from some combination of (1) the permanence of the written word, allowing the writer to rethink and revise over an extended period; (2) the explicitness required in

writing, if meaning is to remain constant beyond the context in which it was originally written; (3) the resources provided by the conventional forms of discourse for organizing and thinking through new relationships among ideas; and (4) the active nature of writing, providing a medium for exploring implications entailed within otherwise unexamined assumptions. (p. 5)

Applebee and Langer (1987) asserted that inquiry-based learning and process-oriented writing approaches share goals (Applebee & Langer, 1987). Thorndike (1874-1949) described learning as mental connections formed through response stimulus, suggesting the need for active learning environments structured to produce stimulus (Darling-Hammond et al., 2001). Appropriately structured writing tasks can stimulate student interest and assess or review information they already know (Applebee & Langer, 1987).

In their study, Applebee and Langer (1987) discovered that teacher use of quick writing activities, free writes or quick writes, were successful for participant teachers in motivating student interest in a topic or subject and focusing student attentions on their own prior knowledge (Applebee & Langer, 1987); however, the researchers found that a prescriptive formula for the types of writing that “work” is not tangible. “At the level of the broader functions that writing can serve; however, the answer is easier” (Applebee & Langer, 1987, p. 71). Writing to review, reformulate, and extend ideas; writing to prepare or motivate students; and writing to evaluate all found successful outlets in the classrooms of teachers studied by Applebee and Langer (1987), although the activities took many forms.

Students “learn through language, subject matter and language are inextricably bound” (Richardson, Morgan, & Fleener, 2012, p. 6). “Jean Piaget (1896-1980) was the first to state that learning is a developmental cognitive process, that students create

knowledge rather than receive knowledge from the teacher” (Darling-Hammond et al., 2001, p. 6). Rosenblatt’s (2013) Transactional Theory asserted, “the teaching of reading and writing at any level should become, first of all-, the creation of environments and activities in which students are motivated and encouraged to draw on their own resources to make ‘live’ meanings” (p. 15). In other words, properly structured writing activities can foster students in creating their own meaning from information, a foundational element of constructivist ideologies. “According to the shared knowledge view of reading-writing connections . . . both rely on common knowledge and process” (Fitzgerald & Shanahan, 2000, as cited in Graham & Hebert, 2011, p. 712). This shared knowledge construct suggests that improving writing processes should improve reading skills, in turn fostering improvement in student achievement overall. Graham and Hebert’s (2011) meta-analysis found that “writing about material read enhances reading comprehension” (p. 726).

Teaching writing. The majority of writing research focuses on college-level writing; however, less is known about writing expectations in secondary school subjects, especially content areas other than ELA (Jeffery & Wilcox, 2013). Adolescent perceptions of writing in the disciplines has received much research focus; however, “large-scale research regarding teachers’ approaches to writing instruction suggests” a variation in practice across the content areas (Jeffery & Wilcox, 2013, p. 1098). This variation of practice could be due, in large part, to the discrepancies in teacher preparation in the teaching of writing. A study by Gillespie et al. (2013) surveyed high school teachers across the U.S. A random sample of 800 teachers was obtained, and 200 teachers were selected for the study. The teachers taught ninth to twelfth grade and were selected from four subjects: language arts, math, science, and social studies (Gillespie et

al., 2013). The study reported that 47% of teachers surveyed indicated they received minimal training during college on how to use writing to support learning, while 23% reported no formal training. “Only 29% of teachers reported taking courses in college where they were taught to use writing to support students’ learning” (Gillespie et al., 2013, p. 1051). Additionally, 45% of teachers reported they received minimal in-service training, while 11% reported no formal in-service training; however, 92% of teachers surveyed reported they made personal efforts to learn how to use writing (Gillespie et al., 2013).

The limited amount of pre or in-service writing preparation could limit the amount of time content-area teachers spend on writing assignments in the classroom. According to teacher self-reported writing practices, Applebee and Langer (2011) found that students were assigned extended writing tasks most often in ELA classes, with history and science following (Jeffery & Wilcox, 2013). Although these findings are not surprising, given the nature of the ELA curriculum, writing skills and abilities are not automatically transferred from one disciplinary setting to another (Jeffery & Wilcox, 2013). In fact, numerous studies regarding writing proficiency conclude that student ability in one domain is not a guarantee of transferred ability into other domains. Students who have mastered writing in the ELA classroom may not have sufficient experience with the appropriate disciplinary discourse to write proficiently in the science classroom (Jeffery & Wilcox, 2013).

Research shows that “students need more support in understanding how writing functions as an instrument for knowledge construction” across content areas or disciplines (Jeffery & Wilcox, 2013, p. 1099); however, Gillespie et al. (2013) found that teachers reported using note-taking while listening approximately once to several times

per week, making note-taking the most commonly used writing activity. While more intensive and engaging writing activities that required critical thinking, such as synthesis writing and writing to solve a problem, were used less often, once a month, per teacher reports (Gillespie et al., 2013).

Student writing concerns. Literacy experts assert that all middle and high school students should be provided quality writing instruction (Pytash, 2012); however, “previous studies have shown that after grade 3, most teachers spend little time teaching any writing skills or strategies” (Gillespie et al., 2013, p. 1069). Applebee and Langer (2011) reported that 260 middle and high school teachers studied, regardless of subject area, dedicated only 7.7% of class time to writing; and writing tasks did not typically involve student composition. The lack of time spent on writing could be due, in part, to literacy training for preservice secondary teachers that tends to focus on reading instruction and is commonly condensed into a single course (Pytash, 2012). Applebee and Langer (2011) reported that students are writing more in the middle and high schools than they did in the 1970s and 1980s; however, the writing that students do is short. Overall, students are not being asked by teachers to use writing as a pathway for thinking through problems (Applebee & Langer, 2011). The use of short writing tasks by teachers could be due to their limited exposure to the teaching of writing, instead preservice courses focused on strategy instruction and not discipline-specific writing practices that incorporate the language and production unique to the content area (Pytash, 2012).

Meeting competency demands of a content area requires the instruction of discipline-specific writing (Lance & Lance, 2006); however, the difficulty with implementing writing instruction can be summed up in one word: time (Gallagher, 2011). Lance and Lance (2006) suggested that teachers need to change the way they view

writing in order to incorporate it more effectively into the classroom, suggesting minimally graded writing exercises to help students write to learn (Lance & Lance, 2006).

Writing in the Content Areas

WAC refers to the ideology that writing is integral to student learning and should not be reserved for the English classroom only (Fischer, 2006). WAC established its roots in the university setting as early as 1969 when Barbara Walboord led a WAC faculty seminar and has existed as a research and program presence since (Britton, Burgess, Martin, McLeod, & Rosen, 1975; Bullock, 1975; Fulwiler & Young, 1982; Maimon, 1982; McLeod, 1987; McLeod & Maimon, 2000). The WAC movement, centralized in the university setting, embodied a “systematic encouragement, institutional support, and educational knowledge to increase the amount and quality of writing” across disciplines with a major assumption that writing should help students learn and think critically, essentially establishing writing as a mode of learning (Bazerman et al., 2005, p. 9; Fischer, 2006). Moffett (1981) defined WAC as essentially teaching writing through school subjects.

WAC approaches outside of the university setting have been less widespread. The administrative arrangements of K-12 systems typically have not allowed for schoolwide initiatives, leaving WAC utilized in individual classrooms as a tool to improve instruction (Bazerman et al., 2005). Additionally, Fischer (2006) cited research from Applebee and Langer (1987) and Rivard (1994) as suggesting that teacher practice of focusing on content coverage over deep conceptual understanding limits the successful infusion of WAC into the classroom (Fischer, 2006). Yore and Hand (2003) asserted that explicit instruction and relevant writing tasks (narrative, descriptive, expository, and

argumentative) must be provided to create effective writing-to-learn science programs. The same conclusions were drawn in additional science writing research. Fischer's (2006) review of the research found writing forms contributed to student recall, content knowledge, student engagement, and critical thinking and evaluation (Fischer, 2006). Applebee, Auten, and Lehr (1981) asserted that student writing in their content areas results in real knowledge of the material (Fischer, 2006). NCTM (2000) articulated that high school students "should be able to generate explanations, formulate questions, and write arguments that teachers, coworkers, or mathematicians would consider to be logically correct and coherent" (p. 348). Bazerman et al. (2005) cited Prain and Hand's (1999) findings indicating that writing provided students occasions to "reorder, synthesize, elaborate, and reprocess concepts and ideas" (p. 42).

When using writing as a mode of learning across the content areas, teachers need to be aware of the types of writing utilized and the outcomes of each of those types.

Applebee and Langer (1987) supported this need, asserting that

1. The more content is manipulated, the more likely it is to be remembered and understood.
2. The effects of writing tasks are greatest for the particular information focused upon during writing.
3. Writing tasks differ in the breadth of information drawn upon and in the depth of processing that information that they invoke.
4. If content is familiar and relationships are well understood, writing may have no major effect at all. (pp. 135-136)

The National Commission on Writing in America's Schools and Colleges issued a report in 2003 titled *The Neglected "R": The Need for a Writing Revolution*. The report

recommended doubling the amount of time students spend writing, assigning WAC, and requiring all teachers to pass a course in writing theory and practice as a condition for licensure (Fischer, 2006).

Despite the research and recommendations, writing in the content areas has not become the norm in most high school settings.

Applebee et al. (1987) found that most of the writing students were asked to do fell into the category of “mechanical uses of writing.” Even though 40 percent of the observed lesson time involved writing, 24 percent was spent on writing without composing, such as short answer and fill-in-the-blank tasks, 17 percent on note-taking, and only 3 percent on writing of paragraph length or longer (p. 93). (Fischer, 2006, p. 17)

Gillespie et al. (2013) found

only about one half of the time or slightly more did teachers discuss with students why a writing to learn activity was effective, modeled how to use it, had students practice applying it on their own and with others, provided extra instruction to some students, helped students identify other situations where it was applicable and reminded them to use it, and assessed its impact. (p. 1069).

Jeffery and Wilcox (2013) indicated, “students may not be developing the kinds of understandings regarding how knowledge is discursively constructed within and across disciplines that might support their development in advanced disciplinary writing” (p. 1011). Jeffery and Wilcox (2013) further suggested that content-area teachers’ lack of sufficient training in literacy instruction could limit their use of writing as a mode of learning in classroom instruction and recommended that support via professional development is necessary.

Professional Development

Professional development in education not only offers skills development and on-the-job training opportunities for teachers, but it can also serve as an avenue for license renewal in many states. Research, although limited, suggests that teacher professional development “is related to student achievement gains” (Darling-Hammond, Wei, Andree, Richarson, & Orphanos, 2009, p. 5).

Teacher professional development should occur over an extended amount of time (Darling-Hammond et al., 2009); however, Gulamhussein (2013) cited Yoon et al. (2007) indicating that the most prevalent model for professional development delivery is the one-time workshop format. The report elucidates that the one-time workshop format does little to change teacher practice or affect student achievement (Gulamhussein, 2013). Often, educators leave one-time workshops with strategies and new skills but then fail to effectively implement what they have learned into the classroom settings. Research (Darling-Hammond et al., 2009; Gulamhussein, 2013) indicates that professional development should be ongoing over a significant time period, allowing teachers the opportunity to learn and implement strategies, and support must be available for teachers to address specific classroom needs during the implementation process. Harwell (2003) emphasized the importance of the process of professional development, identifying Process as one of the characteristics of effective teacher professional development. Harwell further stated that “professional development programs should focus on how people learn . . . and they should give teachers time to reflect and interact within learning communities” (p. 9).

Teacher professional development should also be an active process. A 2009 report from the National Staff Development Council (NSDC) indicated that only 59% of

teachers “found content-related learning opportunities useful . . . the ratings were not significantly varied across states and schools” (Darling-Hammond et al., 2009, p. 21). Gulamhussein (2013) indicated that content presented to teachers through professional development should be grounded in a teacher’s specific discipline and should not be passive; teachers need to actively participate in the learning process through various approaches. Harwell’s (2003) paper conveyed the same message: When participants interact, the learning is transferred to the classroom. Darling-Hammond et al. (2009) further indicated that 57% of content-area professional development participants received less than 2 days of in-depth learning in their content areas.

The report argued, “the intensity and duration of professional development offered to US teachers is not at the level that research suggests is necessary to have noticeable impacts” (Darling-Hammond et al., 2009, p. 20). Teachers need an average of 20 instances of practices with a skill to develop mastery (Gulamhussein, 2013). Research highlights the ineffectiveness of the one-time workshop format commonly utilized for professional development (Darling-Hammond et al., 2009). Instead, teachers need support during the implementation period of any new strategy (Gulamhussein, 2013). The over-used episodic workshop format disconnects teachers from practical application without providing opportunity to reflect on results of implementation (Darling-Hammond et al., 2009). Research has revealed that short-term professional development that does not allow time for implementation, reflection, and support does not increase student learning (Gulamhussein, 2013). Often, short-term professional development does not change teacher practice (Gulamhussein, 2013). “Nine existing experimental research studies of in-service programs found that programs of greater intensity and duration were positively associated with student learning” (Darling-Hammond et al., 2009, p. 9).

Further research suggests that teachers change their practice “only after they see success with students” (Gulamhussein, 2013, p. 12).

The way in which teachers view professional development affects how they implement new learning. A study by Darling-Hammond et al. (2009) as cited in the 2013 Center for Public Education report revealed “that while 90 percent of teachers reported participating in professional development, most of those teachers also reported that it was totally useless” (Gulamhussein, 2013, p. 9). Joyce and Calhoun (2010) asserted that teacher perceptions affect their learning capacity. Professional development must be seen as useful by teachers in order for it to be effective. Professional development should focus on “concrete, everyday challenges” faced by teachers specific to their academic content area (Darling-Hammond et al., 2009, p. 10). Teachers often participate in generic, staff-wide professional development sessions; but useful, discipline-specific concepts are more effective foci for training (Gulamhussein, 2013). Teachers themselves report that their professional development priority is deeper learning in their content (Gulamhussein, 2013).

Conclusion

The necessity to write well extends beyond the classroom (Daniels et al., 2007; Shellard & Protherone, 2004); however, high schools across the country continue to graduate students who possess minimal writing skills and are poorly prepared for either college or the workforce (Gallagher, 2011; Graham & Perin, 2007; National Center for Education Statistics, 2012). Although research suggests that writing works to facilitate learning in multiple ways, making educator focus on writing in the classroom essential (Gillespie et al., 2013), studies indicate, “most teachers spend little time teaching any writing skills or strategies” (Applebee & Langer, 2011; Kiuahara et al., 2009, as cited by

Gillespie et al., 2013, p. 1069). The purpose of this study was to provide content-area teachers with professional development specifically designed to instruct and support them in implementing discipline-specific writing instruction into their classrooms. This study sought to analyze data to connect writing instruction in the content areas, supported by ongoing teacher professional development, to student learning and academic growth at the high school level.

Chapter 3: Methodology

Introduction

Research implies that writing facilitates learning in multiple ways (Gillespie et al., 2013); however, the limited amount of pre or in-service writing preparation could limit the amount of time content-area teachers spend on writing assignments in the classroom. According to teacher self-reported writing practices, Applebee and Langer (2011), found that students were assigned extended writing tasks most often in ELA classes, with history and science following (Jeffery & Wilcox, 2013). The purpose of this study was to determine how purposeful writing instruction in the content areas, supported by ongoing teacher professional development, affected student learning and academic growth at the high school level.

Study Design

The first phase of the study used survey instruments to assess teacher perceptions of and needs for content-area writing instruction, strategies, and classroom implementation. Qualitative data collection informed the second phase of the study – the design of content-area writing focused professional development for participating teachers.

The second phase of the study utilized concurrent data collection. A preassessment was used to gain baseline data of student content-area knowledge and writing-skill level. During this phase of the study, teachers implemented content-area writing instruction into their classroom. Benchmark assessments were utilized to collect content knowledge and writing-skill data at various points throughout the study. Observational protocols were utilized to collect qualitative data focused on teacher implementation behaviors in the classroom. A final postassessment was used to collect

student content knowledge and writing-skill data at the end of the third phase of the study.

The final phase of the study analyzed qualitative data to determine any significant changes, and observational data were analyzed to attempt further explanations or relationships between professional development, classroom implementation, and student achievement data. The multiphase design was chosen to thoroughly explore the effects of a content-area writing program implementation and provide a comprehensive look at writing and achievement.

A mixed-methods design was chosen to allow for qualitative survey data using analysis of closed and open-ended items designed to gauge teacher and student perception, comfort level, and experience with writing in the content areas. Quantitative data were collected using pre and postassessment as well as benchmark assessment student data for each content area to measure effect in student content knowledge. This mixed-methods study explores writing instruction and processes as a methodological approach for meaning making and learning in the content-area secondary classroom. A multiphase mixed-methods design was used for this study. The multiphase mixed-methods design used multiple phases of data collection to inform the overall program objective.

Participants

The study was conducted at a public charter high school in North Carolina. Permission to complete this study at the selected test site was received from the site's Chief Educational Officer (Appendix A). The school, a STEM-focused, project-based learning site was in its fourth year of operation and served students in Grades 9-12 from five surrounding school systems. The researcher asked teachers from the study site to

volunteer to participate in the study. Of the volunteers, one participant from each of the core content areas (history, science, and math as well as Exceptional Children's curriculum support) was chosen. Volunteers from the English content area were excluded because writing is implicit in the English curriculum and was not a content area of focus for this study. The volunteers were required to sign confirmation of informed consent (Appendix B). Each content-area teacher taught 16-25 students per course section, totaling 164 students.

Parents of the students in participating teacher courses were asked to complete permission affidavits to allow the researcher to collect their child's data for the study (Appendix C). The grade level and ages of the students varied depending on the content-area course the participating teacher was assigned to teach for the school year. For example, biology courses are typically reserved for high school juniors, whereas civics courses are reserved for high school freshmen; however, an anatomy course could possibly have a heterogeneous group of students. The sample population was based on the number of students in each teacher volunteer's content-area courses, with participation based on received parent permission.

Instruments

Teacher survey. The researcher utilized a pre and postsurvey instrument to establish participant teacher perceptions, experience, and training with writing in the content areas. Fitzpatrick, Sanders, and Worthen (2011) noted that surveys can be used in evaluation and study for a wide variety of purposes. The researcher followed procedures outlined by Creswell (2014) regarding the survey method. Sample survey items provided by Smith (2014) were populated to determine teacher perception, experience, and comfort with writing in the content areas (Appendix D). Permission to

use the survey items was received via email from Dr. Smith (Appendix E). Each survey item was asked in three different ways, with one open-ended format for each item included to assess teacher needs for development of a writing professional development module. Survey items to determine teacher experience asked teachers to identify the grade levels they teach, their number of years teaching, their current level of education, and National Board certification status. Teachers were asked to indicate their comfort with and perception of their efficacy teaching writing, writing frequency in their classrooms, their confidence level teaching writing, their confidence level teaching writing to students of varying abilities, their confidence connecting the teaching of writing to their curriculum standards, and their confidence assessing student writing. Survey items also asked teachers to identify their professional training and the school-level support they received in the teaching of writing. The researcher adhered to procedures that helped establish purpose and rationale for the study. Survey items related to the study variables and research so that the data collection connected to these variables and/or questions (Creswell, 2014). Table 1 delineates the research questions and survey instrument alignment. The survey was designed to specifically address Research Questions 1, teacher needs, and 4, classroom pedagogy, as shown in Table 1.

Table 1

Research Questions & Teacher Survey Alignment

Research Questions	Connections	Survey Question Numbers
(Needs)		
Q1: What resources do content-area teachers need to implement writing in the content-area classrooms?		Question 6 Questions 8 – 12 Question 14 Question 19
(Pedagogy)		
Q4: How does in-service teacher training affect writing pedagogical practices in the content-area classroom?		Question 7 Question 13 Question 15 Question 16 Questions 17 – 18

The researcher piloted the survey items with a group of university teacher education students in order to establish reliability and validity. The pilot group of 18 education students was instructed to include comments on the survey to note questions that needed additional verbiage or reformatting for understanding or clarification. The finalized survey was given to participating teachers at the study site in July 2016 and again at the end of the study period in November 2016.

Preassessment, benchmarks, and postassessment. Participating teachers used school-mandated preassessments during the course of the study. Science department teachers used released State Standardized End-of-Course (EOC) and North Carolina Final Exams (NCFE) test items to create their diagnostic tests. The North Carolina EOC test items protocol for validity and reliability is outlined in *The North Carolina Science Tests: Technical Report* (NCDPI, 2009). The NCFE test items protocol for validity and reliability is outlined in the *North Carolina Testing Program Multiple-Choice Test Development Process* (NCDPI, 2003). As experts in their field, the teachers discussed

and chose the questions they deemed necessary for diagnostic purposes in their PLC. Math department teachers followed the same protocol for preassessment development. The test items were populated from released EOC test items and NCFE items. The North Carolina EOC test items protocol for validity and reliability is outlined in *The North Carolina Mathematics Tests Edition 3: Technical Report* (Bazemore, Kramer, Gallagher, Englehart, & Brown, 2008). History department teachers followed the same protocol for preassessment development. The tests items were populated using released EOC and NCFE items. The North Carolina EOC test items protocol for validity and reliability is outlined in archived documents on the NCDPI website (NCDPI, 2007). The researcher used these teacher-developed preassessments. Preassessments were beneficial to this study, as they provided a baseline for measuring student content knowledge.

Participating teachers used school-mandated benchmark assessments during the course of the study. Science department teachers used released versions of the EOC or NCFE to develop benchmark assessments. These released exams were obtained from the NCDPI website and, as mandatory standardized tests, given to all students. Currently, there are 2012 and 2015 released versions. The teachers used the questions that were relevant to the topics they were covering to construct their benchmarks during PLC meetings. The benchmark questions were entered into Socrative.com for data analysis and collection. The math and history departments followed the same protocol for benchmark development, using released EOC and/or North Carolina FINAL exam test bank items. The researcher used data from these teacher-developed benchmark assessments.

A postassessment developed by teachers was given to students, and the data were

collected in the final month of the study. The postassessment was developed using the same protocol as the preassessment. The same content assessed during the preassessment was assessed with the postassessment. The researcher used data for analysis from these teacher-developed postassessments. These postassessments are considered reliable and valid because they are developed using released state standardized tests.

Along with content knowledge in math, history, and science, writing was assessed and analyzed throughout the course of the study. Written response items were included at each stage of assessment throughout the course of the study. The “Rubric for Content Areas” created by NCDPI was used to assess College and Career Ready writing standards (Appendix F). College and Career Ready anchor writing standards are divided into four strands, as provided in Table 2.

Table 2

College and Career Ready Writing Standards (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

<u>Text Types and Purposes</u>	
CCSS.ELA-LITERACY. CCRA.W.1:	Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
CCSS.ELA-LITERACY. CCRA.W.2:	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
CCSS.ELA-LITERACY. CCRA.W.3:	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences
<u>Production and Distribution of Writing</u>	
CCSS.ELA-LITERACY. CCRA.W.4:	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CCSS.ELA-LITERACY. CCRA.W.5:	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
CCSS.ELA-LITERACY. CCRA.W.6:	Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.
<u>Research to Build and Present Knowledge</u>	
CCSS.ELA-LITERACY. CCRA.W.7:	Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
CCSS.ELA-LITERACY. CCRA.W.8:	Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
CCSS.ELA-LITERACY. CCRA.W.9:	Draw evidence from literary or informational texts to support analysis, reflection, and research.

The researcher worked with each content-area group of teachers to determine

anchor texts for each written response item including writing strategy lesson planning and identifying anchor student responses. Independent scorers scored the items using rubrics, and the data were analyzed at each assessment phase. Each student response was scored twice. A Cohen's Kappa was used to measure interrater reliability.

Observation protocol. The researcher used the Classroom Observation Protocol (Singer & Scollay, 2006) to collect both qualitative and quantitative data on implementation of writing in the participant classrooms (Appendix G). The researcher received permission to use the observation protocol via email from Dr. Singer (Appendix H). The observation protocol is divided into four sections: physical setting/classroom context, lesson flow and summary, strategies, and other observations.

The first section of the observation instrument collected qualitative data. It asked the observer to describe the physical setting of the participating teacher's classroom. The protocol asked the observer to consider and describe four elements of the classroom setting and context: where the students and teachers are working; what is displayed on the walls, particularly focus on writing and student work; what is *not* displayed on the walls; what details concerning literacy stand out; and how students are interacting. This section also provided an area for the observer to sketch the classroom layout if desired and helpful.

Section two of the instrument focused on the lesson flow and summary. The protocol instructions asked the observer to record the major events of the lesson, citing evidence, examples, and direct quotations when possible. The observer documented the lesson from beginning to end, noting the time of transitions, what they observe during lesson delivery, any comments the observer may have regarding the lesson flow, and the materials utilized by both the teacher and students during the lesson.

The third section of the instrument focused on observation of strategies. The instrument directed the observer to mark “yes” if evidence was observed of the following: kinds of writing, strategies, the writing process, support of students for writing development, response to student writing, and sharing of student writing.

The fourth section of the instrument allowed for the observer to document any additional observations and comments they found important to deepen the researcher’s understanding of the observation.

Teacher reflection. Participant teachers completed a short, written reflection at the beginning of each professional development session. The reflection instrument contained three open-ended questions to which each participant was asked to respond. Question 1 asked, “What strategies did you utilize in your classroom since the last meeting? What was the student response/results of the strategy implementation?” Question 2 asked, “What problems or issues did you encounter during implementation since the last meeting?” Question 3 asked, “What areas of writing implementation/strategy utilize need clarification or additional support?” (Appendix I). In order to establish validity and reliability, a group including three English teachers and a Chief Education Officer, an expert in the field, piloted the reflection instrumented. The pilot group was asked to read the reflection instrument questions and document changes that should be made to ensure question clarity and understanding.

Procedures

The study began with a professional development phase which included survey data collection and analysis to identify professional development needs. Then the study moved to a concurrent implementation and data collection phase and ended with the data analysis phase of the study.

Professional development. Research-based best practices for implementing writing into the classroom include organizing for writing, arranging for meaningful-to-students opportunities to write, using reading materials to model writing, arranging for constructive response to student writing, providing opportunities for student collaboration, and conducting mini-lessons on writing (Whitaker, 2016).

Module design. A professional development module was designed based on research-based best practices in writing (Whitaker, 2016) and the needs identified by the teacher participant survey items. The researcher utilized survey data obtained to structure professional development sessions. The survey questions identified two areas the researcher addressed with professional development: teacher needs and classroom pedagogy. To identify the teacher needs, the researcher used data from the following survey questions.

Q8: I feel confident teaching writing in my class.

Q9: I feel confident teaching the average writer in my class.

Q10: I feel confident teaching the advanced writer in my class.

Q11: I feel confident teaching the struggling writer in my class.

Q13: I feel confident creating grading rubrics for writing assignments.

Q19. List any training you have received regarding writing instruction (in-service professional development or preservice instruction).

To identify the classroom pedagogy, the researcher used data from the following survey questions.

Q7: My students write regularly in my class.

Q12: I feel confident creating writing assignments based on curriculum standards.

Q14: I use writing assignments to assess student mastery of content standards.

Q15: I use grading rubrics to assess writing assignments.

Q16: I reflect on my daily instructional practices and student performance.

Q17: For students who have difficulty writing, I accommodate for their ability by _____.

Q18: For students who are advanced writers, I accommodate for their ability by _____.

The first week of the professional development module was created to address both best practices and the survey questions (Appendix J). The module lessons were adjusted in length or depth as needed. The purpose of the module was to provide teachers with in-service training on writing tasks and strategies, implementation, and assessment.

Teachers learned what research-based writing activities are best suited to their content area, how to design writing tasks that address curriculum standards and goals, and how to create rubrics for writing assessment.

Teacher participants were asked to implement strategies and methodologies learned through the professional development series during the data collection period. Participating teachers were also asked to participate in ongoing professional development throughout the course of the study. Participant teachers were asked to implement two writing strategies or activities into their content-area classroom each week. The ongoing professional development required participating teachers to attend weekly 30-minute meetings over the 4-month data collection period. For a schedule of series meetings, see Appendix J. The researcher facilitated each professional development session. At the beginning of the weekly professional development meeting, the researcher asked the participants to complete a reflection survey for the previous week's writing implementation. The researcher facilitated additional strategy instruction, addressed

questions related to implementation, and/or provided materials and resources.

Per district guidelines, participating teachers received one literacy CEU for their participation in the professional development.

Classroom observations. The Classroom Observation Protocol (Singer & Scollay, 2006) was used during classroom observations of participating teachers to identify the teaching of writing, types of writing evident, and implementation of writing strategies (Appendix G). The observation data were used to identify frequency, type, and fidelity. The researcher observed each participant teacher two times each study month throughout the course of the study for a total of eight observation sessions per participant. The observations were scheduled and announced with the participant teacher. Prior to the observation, the participant teacher was provided a copy of the observation instrument. The researcher instructed the participant teacher to complete a self-evaluation of the lesson to be observed using the observation instrument. The researcher instructed the participant teacher to complete the self-evaluation prior to the scheduled observation date. The researcher collected the participant's self-evaluation prior to the scheduled observation.

On the scheduled observation date, the researcher reported to the participant teacher's classroom at the beginning of the class. The observation period was a minimum of 45 minutes in length, approximately one-half of the total 85-minute class time. The researcher did not participate in the class at any point. During the observation time, the researcher used the Classroom Observation Protocol (Singer & Scollay, 2006) instrument to document the observation date, time/length, content area/course name, and school. In section I, the researcher described the classroom setting through written descriptions and sketches that were attached to the observation form. In section II, the

researcher used the same instrument to document the lesson flow, noting transition times, content instruction, and lesson format. Direct quotes were noted where appropriate. In section III, the researcher marked “yes” beside observed writing strategies utilized during the class by the participant teacher. The researcher also made qualitative notes beside each observed strategy. If a strategy was not observed, the researcher left the column next to the listed strategy blank. The researcher wrote qualitative notes or additional information important to the observation in section IV of the instrument.

Teacher reflections. The teacher participant reflection instrument was given to each participant at the beginning of each professional development session. Participants were asked to provide their names on the questionnaires to allow for differentiated professional development that met each participant’s needs. The researcher asked teacher participants to complete the questionnaires prior to beginning the professional development learning session. The researcher instructed the participants to place the completed reflections in an envelope marked “Reflection” and a number that corresponds with the professional development session: 2nd, 3rd, 4th, and 5th. A participant reflection was not given during the first professional development session because the questions were not applicable. The reflections remained categorized by the reflection number that corresponded to the professional development session in which they were collected.

Data Collection

Data were collected over a period of 4 months, starting at the beginning of the school year. The researcher collected and analyzed test data from a preassessment, two benchmark assessments, and a postassessment for each content-area course of the participating teachers during the course of the study. Preassessment test data were

collected the second week of August 2016. Two benchmark assessments were given during the course of the study. The first benchmark assessment data were collected the second week of September 2016. The second benchmark assessment data were collected the second week of October 2016. The postassessment data were collected the second week of November 2016. Each participant teacher was identified by content name and course only, to ensure confidentiality, i.e., science/chemistry, history/civics, math/math I. Student names were removed from all assessment data and coded using student identification numbers, content name, and course. The researcher created a teacher and student participant master list and stored it in a password-protected document.

Survey data collection. The teacher participant survey collected descriptive as well as perceptual data. Paper surveys were given to participating teachers. Participant names were not collected in order to keep the surveys anonymous. Each participant's survey answers were entered into a Google form. The Google form included an exact copy of each question and its respective answer choices in the same multiple choice or open-ended format as the paper survey. The answers were populated into a spreadsheet titled Participant Survey Responses.

Content data collection. Content-area assessment data were collected, compiled, and sorted by student number, teacher number, content area, course, grade level, and score and entered into spreadsheets titled preassessment, benchmark 1, benchmark 2, and postassessment. To maintain confidentiality, a letter identified participant teachers. Student names were removed from assessment data, and students were assigned a number for confidentiality.

Writing data collection. On demand writing prompts from released national tests were given using a counter-balance design, two prompts from the ACT released test

and two content specific prompts. The participating teachers were divided into two groups for the purpose of creating the writing prompt assessment schedule, as shown in Table 3.

Table 3

Writing Assessment Schedule

Administration Time	Group 1 (One half of students enrolled in participating teacher courses)	Group 2 (One half of students enrolled in participating teacher courses)
August	Prompt A	Prompt D
September	Prompt B	Prompt C
October	Prompt C	Prompt B
November	Prompt D	Prompt A

To align to standards set by the study site state, the researcher contacted NCDPI for a state standardized writing rubric; however, an email reply from Julie Joslin, Section Chief for ELA, stated that LEAs create their own writing rubrics. In light of this discovery, all writing prompts were scored using the North Carolina Content-Area rubric (Appendix F). The North Carolina Content-Area rubric was created for the online writing instruction program through ACRE: Accountability and Curriculum Reform Effort initiative that began in 2008 (NCDPI) as part of the CCSS rollout effort. The rubric provided general, qualitative descriptions of writing criteria for content specific writing assignments with the qualitative scales: developing, proficient, accomplished, and distinguished. For the purposes of this study, the rubric scales were assigned a numerical value where developing = 1, proficient = 2, accomplished = 3, and distinguished = 4.

Student writing samples were numerically coded using the participant master list to remove all identifying information. Independent scorers were used to assess student samples. To calculate reliability, student samples were scored twice.

Classroom observational data collection. Classroom observation data were collected using the observation protocol checklist (Singer & Scollay, 2006; Appendix G). Observation data were transferred to a spreadsheet in order to tally the instances of observed writing occurrences. Participant teachers were observed following the observation schedule shown in Table 4.

Table 4

Observation Schedule

Participant Observed	August	September	October	November
Teacher 1	Week 1	Week 2	Week 3	Week 4
Teacher 2	Week 2	Week 3	Week 4	Week 1
Teacher 3	Week 3	Week 4	Week 1	Week 2
Teacher 4	Week 4	Week 1	Week 2	Week 3

Data Analysis

Research Question 1. What do content-area teachers need to implement writing in their content-area classroom? Each question of the professional development survey was designed to inform the creation of a professional development series that met the needs of participant teachers. Data analysis from survey questions informed professional development prioritization to answer Research Questions 2 and 3. The researcher utilized survey data obtained to structure professional development sessions. The survey questions identified two areas the researcher addressed with professional development: teacher needs and classroom pedagogy. To identify the teacher needs, the researcher used data from the following survey questions.

Q8: I feel confident teaching writing in my class.

Q9: I feel confident teaching the average writer in my class.

Q10: I feel confident teaching the advanced writer in my class.

Q11: I feel confident teaching the struggling writer in my class.

Q13: I feel confident creating grading rubrics for writing assignments.

Q19. List any training you have received regarding writing instruction (in-service professional development or preservice instruction).

To identify the classroom pedagogy, the researcher used data from the following survey questions:

Q7: My students write regularly in my class.

Q12: I feel confident creating writing assignments based on curriculum standards.

Q14: I use writing assignments to assess student mastery of content standards.

Q15: I use grading rubrics to assess writing assignments.

Q16: I reflect on my daily instructional practices and student performance.

Q17: For students who have difficulty writing, I accommodate for their ability by

_____.

Q18: For students who are advanced writers, I accommodate for their ability by

_____.

Participant survey data were summarized according to the information each question asked.

Research Question 2. What effect does writing instruction in the content areas have on student content-area knowledge? Content knowledge data were assessed with a preassessment, two benchmark assessments, and a postassessment. Descriptive statistics were analyzed, and the continuous data and variable points in the study allowed the researcher to complete a One-way Repeated Measures ANOVA statistical analysis to determine any changes in student content knowledge and at what points the change was most significant. Data collected were analyzed across content area and course to determine if there were significant differences among these subgroups.

Data were also analyzed across student grade-level subgroups and represented in both charts and tables.

Research Question 3. What effect does writing instruction in the content areas have on student writing skills? Writing skills data were assessed with a preassessment, two benchmark assessments, and a postassessment. Qualitative rubrics with a quantified scale score provided continuous data and variable points for analysis. Descriptive statistics were analyzed, and the continuous data and variable points in the study allowed the researcher to complete a One-way Repeated Measures ANOVA statistical analysis to determine any changes in student writing skills and at what points the changes were most significant. Data collected were analyzed across content area and course to determine if there were significant differences among these subgroups. Data were also analyzed across student grade-level subgroups where relevant and represented in both charts and tables.

Research Question 4. How does in-service teacher training affect writing pedagogical practices in the content-area classroom? Observation, teacher reflection, and teacher survey data provided opportunity to discuss possible outcomes and offered teachers the opportunity to give feedback regarding implementation.

Observation data were analyzed to determine the frequency and type of writing implemented in the participant teacher classrooms. The findings were categorized by writing type, and frequency of use was summarized. Percentages were used to identify writing types utilized by participant teachers.

Participant teacher reflection data were analyzed for common themes and coded according to those themes. Findings were summarized and data were represented in a chart. These data established patterns that emerged throughout this study.

Participant teacher postsurvey questions identified two areas the researcher addressed with professional development: teacher needs and classroom pedagogy. To determine the effectiveness of the professional development series on meeting the teacher needs, the researcher used data from the following survey questions.

Q8: I feel confident teaching writing in my class.

Q9: I feel confident teaching the average writer in my class.

Q10: I feel confident teaching the advanced writer in my class.

Q11: I feel confident teaching the struggling writer in my class.

Q13: I feel confident creating grading rubrics for writing assignments.

Q19. List any training you have received regarding writing instruction (in-service professional development or preservice instruction).

To determine the effectiveness of the professional development series on changing classroom pedagogy, the researcher used data from the following survey questions.

Q7: My students write regularly in my class.

Q12: I feel confident creating writing assignments based on curriculum standards.

Q14: I use writing assignments to assess student mastery of content standards.

Q15: I use grading rubrics to assess writing assignments.

Q16: I reflect on my daily instructional practices and student performance.

Q17: For students who have difficulty writing, I accommodate for their ability by _____.

Q18: For students who are advanced writers, I accommodate for their ability by _____.

Participant survey data were summarized according to the information each question asked.

Limitations

Limitations to this study must be considered. The population studied was located in a rural town in central North Carolina. The results only apply to the participating student and teacher population and cannot necessarily be generalized to represent other areas in North Carolina. The study did not include national or global populations; therefore, the results cannot be considered universal.

A second limitation to the study was the researcher's employment at the study site. Participating teachers were colleagues, which could have influenced their willingness to utilize knowledge and strategies gained from the professional development and the fidelity and frequency with which they applied knowledge to classroom practice. Due to this limitation, methodology effect cannot be generalized to all content-area classrooms.

A third limitation to the study was the study site's project-based learning focus. Project-based learning lends itself to more frequent use of writing in the classroom; therefore, participant teachers may have been more apt to incorporate writing to meet the project-based learning requirement of the study site. Because of this limitation, results cannot be generalized to all public high schools.

Writing is a curriculum standard and embedded in four of the five North Carolina Common Core State Standards for ELA. In an effort to control for bias, the researcher's content area, English, was not included in the study. Creswell (2014) asserted that qualitative research should "contain comments by the researcher about how their interpretation of the findings is shaped by their background" (p. 202). As a participant observer, the researcher acknowledges the possibility that interpretation of findings could have been influenced by their content background and personal experience with the

planned methodology, writing.

Conclusions

Research suggests that writing, theoretically, works to facilitate learning in multiple ways (Gillespie et al., 2013). Meeting competency demands of a content area requires the instruction of discipline specific writing (Lance & Lance, 2006); however, the limited amount of pre or in-service writing preparation could limit the amount of time content-area teachers spend on writing assignments in the classroom. Therefore, the methodology of this study sought to analyze the effects of writing instruction in the content areas, supported by ongoing teacher professional development, on student learning and academic growth at the high school level.

Chapter 4: Results

Introduction

Literacy experts assert that students at both middle and high school levels should be provided high-quality writing instruction (Pytash, 2012). Research suggests that writing plays a significant role in the production and presentation of student knowledge (Armbruster et al., 2005); however, research by Applebee and Langer (2011) indicated students are not being asked by teachers to use writing as a pathway to think through problems. The purpose of this study was to analyze the effects of purposeful writing instruction in the content areas, supported by ongoing teacher professional development, on student learning and academic growth at the high school level.

Findings

Teacher surveys. Four teachers volunteered to participate in this study and completed the High School Content Area Writing Professional Development Series 2016 Survey. Survey responses regarding teaching experience indicated that one participant had 6-10 years teaching experience, two had 5-10 years, and one had 1-4 years. All four participants held a bachelor's degree and North Carolina teaching certification in their content area: history, math, and biology. One participant was National Board Certified.

Research Question 1. What resources do content-area teachers need to implement writing in their content-area classrooms? To address this question, data were compiled and analyzed from survey questions identifying two areas the researcher addressed with professional development: teacher needs and classroom pedagogy. Table 5 provides a summary of participant teacher responses to teacher needs-focused questions.

Table 5

Teacher Needs Diagnostic Survey Summary Data

Survey Question #	Participant Response		
	No	Yes	No Response
Q6: Content-area literacy is encouraged at my school	2	1	1
Q8: I feel confident teaching writing in my class.	4	0	0
Q9: I feel confident teaching the average writer in my class.	3	1	0
Q10: I feel confident teaching the advanced writer in my class.	3	1	0
Q11: I feel confident teaching the struggling writer in my class.	3	1	0
Q13: I feel confident creating grading rubrics for writing assignments.	4	0	0

When asked if content-area literacy was encouraged at their school, one of four participant teachers answered, “yes”; while two of four answered “no.” One of four participants did not respond to the question. Survey question 8 asked participants if they felt confident teaching writing in their classroom; all four answered “no.” One of four participant teachers answered, “yes” to questions 9, 10, and 11, which focused on confidence teaching average, advanced, and struggling writers. Survey question 13 asked participants if they felt confident creating grading rubrics for writing assignments, to which all four participants answered “no.”

Survey question 19 asked participant teachers to list any training received regarding writing instruction (in-service professional development or preservice instruction). One of four participants indicated literacy strategy training at a previous institution, while the other participants did not indicate any writing instruction training.

At the end of the study implementation period, the participant teachers were asked

to complete the High School Content Area Writing Professional Development Series 2016 Survey postsurvey. The postsurvey contained the same questions answered by participants prior to implementation. Table 6 provides a summary of participant teacher responses to teacher needs-focused questions.

Table 6

Teacher Needs Postsurvey Summary Data

Survey Question #	Participant Response	
	No	Yes
Q6: Content-area literacy is encouraged at my school	0	4
Q8: I feel confident teaching writing in my class.	0	4
Q9: I feel confident teaching the average writer in my class.	1	3
Q10: I feel confident teaching the advanced writer in my class.	1	3
Q11: I feel confident teaching the struggling writer in my class.	0	4
Q13: I feel confident creating grading rubrics for writing assignments.	2	2

At the conclusion of the study, all four participants answered “yes” when asked if content-area literacy was encouraged at their school. All four participants answered “yes” when asked if they felt confident teaching writing in their classrooms. One of four participants indicated they felt confident teaching the average or advanced writer, and all four participants indicated they felt confident teaching the struggling writer. At the study’s end, two of four participants did not feel confident creating grading rubrics for writing assignments.

Research Question 2. What effect does writing instruction in the content areas have on student content-area knowledge? To address this question, the

following data were compiled and analyzed.

Table 7 provides a summary of proficiency scores of students enrolled in participant courses as determined by the content-area pre and postassessments.

Table 7

Student Proficient Count

	Proficient		Not Proficient		Total Count
	Count	N %	Count	N%	
Preassessment	7	6.5%	101	93.5%	108
Postassessment	38	33.6%	75	66.4%	113

Proficiency is defined on a 100-point scale; scores between 70 and 100 are defined as proficient, and scores between 0 and 69 are defined as not proficient. Of the 108 students preassessed, 6.5% scored proficient, while 93.5% scored not proficient. Of the 113 students scored for the postassessment, 33.6% scored proficient and 66.4% scored not proficient. There were five more students assessed during the postassessment interval than the preassessment interval due to changes in student schedules. Table 8 shows ANOVA results.

Table 8

ANOVA Proficiency Scores by Assessment

Assessment		Sum of Squares	df	Mean Square	F	Sig.
Preassessment	Between Groups	.567	2	.284	4.980	.009
	Within Groups	5.979	105	.057		
	Total	6.546	107			
Postassessment	Between Groups	11.256	2	5.628	44.331	.000
	Within Groups	13.965	110	.127		
	Total	25.221	112			

An analysis of variance showed that that there was a significant difference

between preassessment and postassessment proficiency scores, $F(2, 105) = 4.980, p = .009$, and the between groups postassessment proficiency score was significant, $F(2, 110) = 44.331, p = .000$.

A Post Hoc Bonferroni multiple comparison test was conducted to compare the means and identify where the differences were between the content-area groups. Table 9 provides the results for the preassessment proficiency scores.

Table 9

Post Hoc Bonferroni Preassessment Proficient Score by Content Area

(I) Course Content Area	(J) Course Content Area	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Science	History	.00000	.06175	1.000	-.1502	.1502
	Math	-.14583*	.05446	.026	-.2783	-.0133
History	Science	.00000	.06175	1.000	-.1502	.1502
	Math	-.14583*	.05675	.035	-.2839	-.0078
Math	Science	.14583*	.05446	.026	.0133	.2783
	History	.14583*	.05675	.035	.0078	.2839

*The mean difference is significant at the 0.05 level.

The results of the Post Hoc Bonferroni test indicate a significant difference at the $\alpha = .05$ level between science and math proficiency scores, a significant difference between history and math proficiency scores, and a significant difference between math and science proficiency scores. The results indicate no statistical significance between science and history proficiency scores on the preassessment.

Table 10 provides the results of the Post Hoc Bonferroni multiple comparisons test for the postassessment proficiency scores.

Table 10

Post Hoc Bonferroni Postassessment Proficient Score by Content Area

(I) Course Content Area	(J) Course Content Area	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Science	History	.74444*	.08458	.000	.5388	.9501
	Math	.60952*	.08155	.000	.4113	.8078
History	Science	-.74444*	.08458	.000	-.9501	-.5388
	Math	-.13492	.08093	.295	-.3317	.0618
Math	Science	-.60952*	.08155	.000	-.8078	-.4113
	History	.13492	.08093	.295	-.0618	.3317

*The mean difference is significant at the 0.05 level.

The results of the Post Hoc Bonferroni test indicate a significant difference at the $\alpha = .05$ level between science and math proficiency scores, a significant difference between history and science proficiency scores, and a significant difference between math and science proficiency scores but no statistically significant difference between math and history proficiency scores for the postassessment.

A One-way ANOVA was conducted to compare effect of writing professional development on the content scores at the pre and postassessments intervals. Table 11 provides a summary of results comparing pre and postassessment data.

Table 11

Content-Area Assessment

		Sum of Squares	df	Mean Square	F	Sig.
Preassessment Score	Between Groups	418.383	2	209.191	.771	.465
	Within Groups	30911.156	114	271.150		
	Total	31329.539	116			
Postassessment Score	Between Groups	16828.312	2	8414.156	31.129	.000
	Within Groups	29733.119	110	270.301		
	Total	46561.431	112			

The ANOVA results showed that the effect of writing on content preassessment was not significant, $F(2, 114) = .771, p = .465$, whereas ANOVA results indicate that the effect of writing on content postassessment was significant, $F(2, 110) = 31.129, p = .000$.

A one-way ANOVA was conducted to compare effect of writing professional development on the content scores at the benchmark assessment intervals. Table 12 provides a summary of results comparing benchmark assessment interval scores.

Table 12

Content-Area Benchmark Assessment

		Sum of Squares	df	Mean Square	F	Sig.
Benchmark 1 Score	Between Groups	8277.975	2	4138.987	15.188	.000
	Within Groups	31339.718	115	272.519		
	Total	39617.693	117			
Benchmark 2 Score	Between Groups	2860.704	2	1430.352	4.062	.020
	Within Groups	41196.596	117	352.108		
	Total	44057.300	119			

The ANOVA results showed that the effect of writing on content benchmark 1 was significant, $F(2, 115) = 15.188, p = .000$, and the effect of writing on content benchmark 2 was significant, $F(2, 117) = 4.062, p = .020$.

A Post Hoc Bonferroni multiple comparison test was conducted to compare the means and identify where the differences were between the assessment groups, as shown in Table 13.

Table 13

Post Hoc Bonferroni by Assessment Interval

(I) Assessment	(J) Assessment	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
Preassessment	Benchmark1	-37.214*	2.190	.000	-43.131	-31.297
	Benchmark2	-34.914*	2.204	.000	-40.869	-28.960
	Postassessment	-17.116*	1.886	.000	-22.213	-12.020
Benchmark1	Preassessment	37.214*	2.190	.000	31.297	43.131
	Benchmark2	2.300	2.319	1.000	-3.967	8.567
	Postassessment	20.098*	2.951	.000	12.123	28.073
Benchmark2	Preassessment	34.914*	2.204	.000	28.960	40.869
	Benchmark1	-2.300	2.319	1.000	-8.567	3.967
	Postassessment	17.798*	2.071	.000	12.202	23.393
Postassessment	Preassessment	17.116*	1.886	.000	12.020	22.213
	Benchmark1	-20.098*	2.951	.000	-28.073	-12.123
	Benchmark2	-17.798*	2.071	.000	-23.393	-12.202

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

The results of the Post Hoc Bonferroni test indicate a significant difference at the $\alpha = .05$ level at the preassessment to benchmark 1 assessment interval and at the benchmark 2 to postassessment interval. Results show there is not a significant difference at the $\alpha = .05$ level at the benchmark 1 and benchmark 2 assessment interval.

Additional tests were conducted to determine means and identify differences among gender groups. Table 14 provides a summary of mean assessment scores by gender.

Table 14

Assessment Mean Scores by Gender

	Gender	Mean	Std. Deviation	N
Preassessment Score	Female	44.6800	18.48863	45
	Male	40.1175	13.47685	40
	Total	42.5329	16.38986	85
Benchmark 1 Score	Female	79.7889	18.42193	45
	Male	79.7000	19.26762	40
	Total	79.7471	18.71170	85
Benchmark 2 Score	Female	75.9111	19.73785	45
	Male	79.1750	14.25390	40
	Total	77.4471	17.35176	85
Postassessment Score	Female	61.8756	19.22817	45
	Male	57.1450	19.89111	40
	Total	59.6494	19.57047	85

The results indicate the mean preassessment score for female students was 44.68% and mean score for male students was 40.11%. The mean benchmark 1 score for female students was 79.78% and 79.70% for male students. The mean benchmark 2 score was 75.91% for female students and 79.17% for male students. The mean postassessment score for female students was 61.87% and 57.14% for male students.

An ANOVA was conducted to determine difference in assessment means by gender, as shown in Table 15.

Table 15

ANOVA Assessment Scores by Gender

Source	Dependent Variable	Type IV Sum of Squares	df	Mean Square	F	Sig.
Student Gender	Preassessment Score	440.818	1	440.818	1.654	.202
	Benchmark 1 Score	.167	1	.167	.000	.983
	Benchmark 2 Score	225.592	1	225.592	.747	.390
	Postassessment Score	473.890	1	473.890	1.241	.269
Error	Preassessment Score	22123.890	83	266.553		
	Benchmark 1 Score	29410.564	83	354.344		
	Benchmark 2 Score	25065.419	83	301.993		
	Postassessment Score	31698.382	83	381.908		
Total	Preassessment Score	176334.050	85			
	Benchmark 1 Score	569976.170	85			
	Benchmark 2 Score	535125.000	85			
	Postassessment Score	334606.720	85			

Results show there is not a significant difference at the $\alpha = .05$ level between male and female mean assessment scores for all assessment intervals.

A Post Hoc Bonferroni multiple comparison test was conducted to identify where proficiency score differences were between male and female groups, as shown in Table 16.

Table 16

Post Hoc Bonferroni Proficiency by Gender

Dependent Variable	(I) Gender	(J) Gender	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
						Lower Bound	Upper Bound
Preassessment	Female	Male	.108	.059	.071	-.010	.226
Benchmark1	Female	Male	-.017	.096	.863	-.208	.175
Benchmark2	Female	Male	-.114	.092	.221	-.298	.070
Postassess	Female	Male	.075	.106	.479	-.135	.285

Based on estimated marginal means.

a. Adjustment for multiple comparisons: Bonferroni.

The results of the Post Hoc Bonferroni test indicate there is not a significant difference at the $\alpha = .05$ level between male and female group proficiency scores at all assessment intervals.

Research Question 3. What effect does writing instruction in the content areas have on student writing skills? To address this question, the following data were compiled and analyzed.

Writing prompts were assessed by independent raters and given a score of 1 = developing, 2 = proficient, 3 = accomplished, and 4 = distinguished. Given the nature of subjectivity in the assessment of writing, a Cohen's κ was run to determine if there was agreement between two raters on student preassessment writing samples, as shown in Table 17.

Table 17

Kappa Analysis of Preassessment Rater Agreement

	Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Measure of Agreement Kappa	.634	.087	7.104	.000
N of Valid Cases	51			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Using the Landis and Koch (1977) classification for assessing the strength of agreement, there was substantial agreement between the two independent raters of student preassessment writing responses, $\kappa = 0.634$ (95% CI, 0.51 to 0.816), $p < .000$.

The writing data were analyzed to determine differences in mean preassessment scores between content areas: science, history, and math. Table 18 provides the mean scores for the three content groups.

Table 18

Writing Preassessment Score Means by Content Area

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Science	13	2.462	.6602	.1831	2.063	2.861	1.0	3.0
History	37	1.730	.8383	.1378	1.450	2.009	1.0	4.0
Math	23	2.652	.8317	.1734	2.293	3.012	1.0	4.0
Total	73	2.151	.9079	.1063	1.939	2.363	1.0	4.0

The mean prewriting score for students in the science content area was 2.46, as compared to a mean score of 2.65 for the math content-area group, where a score of 2 equals writing proficiency. The mean score for students in the history content area was 1.73, where a score of 1 equals developing. Writing preassessment mean scores are shown in Figure 1.

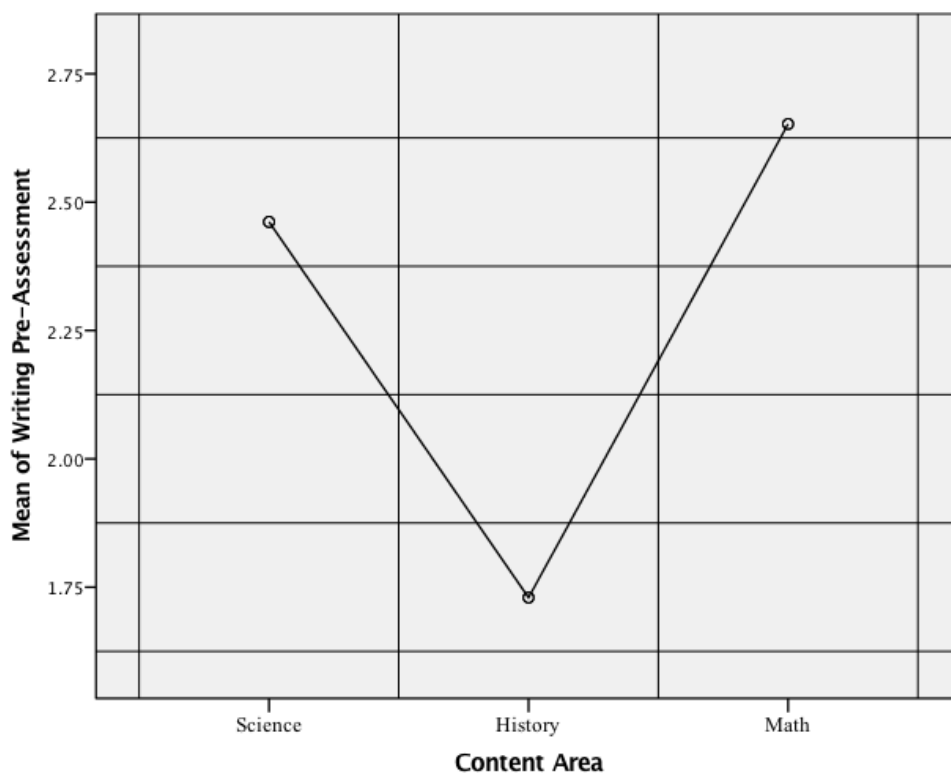


Figure 1. Mean of Writing Preassessment.

Table 19 provides the results of an analysis of variance conducted to determine the level of significance of prewriting assessment means between content-area groups.

Table 19

ANOVA for Writing Preassessment Scores by Content Area

		Sum of Squares	df	Mean Square	F	Sig.
Writing Preassessment	Between Groups	13.597	2	6.799	10.403	.000
	Within Groups	45.745	70	.654		
	Total	59.342	72			

The ANOVA results showed that the difference between group mean preassessment scores was significant, $F(2, 70) = 10.403, p = .000$.

A Post Hoc Bonferroni multiple comparison test was conducted to compare the

means and identify where the differences were between the content-area groups. Table 20 provides the results for the writing preassessment mean scores by content area.

Table 20

Post Hoc Bonferroni Writing Preassessment by Content Area

(I) Course Name	(J) Course Name	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Science	History	.7318*	.2606	.019	.092	1.371
	Math	-.1906	.2805	1.000	-.879	.497
History	Science	-.7318*	.2606	.019	-1.371	-.092
	Math	-.9224*	.2147	.000	-1.449	-.396
Math	Science	.1906	.2805	1.000	-.497	.879
	History	.9224*	.2147	.000	.396	1.449

*The mean difference is significant at the 0.05 level.

The results of the Post Hoc Bonferroni test indicate a significant difference at the $\alpha = .05$ level between science and history, a significant difference between history and math writing preassessment mean scores. The results indicate there is no statistical significance between math and science writing mean scores on the preassessment.

A Cohen's κ was conducted to determine if there was agreement between two raters on student benchmark 1 writing samples, as shown in Table 21.

Table 21

Kappa Analysis of Benchmark 1 Rater Agreement

	Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Measure of Agreement Kappa	.516	.098	5.496	.000
N of Valid Cases	56			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Using the Landis and Koch (1977) classification for assessing the strength of

agreement, there was moderate agreement between the two independent raters of student preassessment writing responses, $\kappa = 0.516$ (95% CI, 0.324 to 0.708), $p < .000$.

The writing data were analyzed to determine differences in mean benchmark 1 scores between content areas: science, history, and math. Table 22 provides the mean scores for the three content groups.

Table 22

Writing Benchmark 1 Score Means by Content Area

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Science	11	2.364	.5045	.1521	2.025	2.703	2.0	3.0
History	35	2.257	.7005	.1184	2.016	2.498	1.0	4.0
Math	22	2.045	.6530	.1392	1.756	2.335	1.0	3.0
Total	68	2.206	.6592	.0799	2.046	2.365	1.0	4.0

The mean benchmark 1 writing score for students in the science content area was 2.36, as compared to a mean score of 2.25 for the history content-area group and a mean score of 2.04 for the math content-area group, where a score of 2 equals writing proficiency. The ANOVA results for benchmark 1 are shown in Table 23.

Table 23

ANOVA for Writing Benchmark 1 Scores by Content Area

		Sum of Squares	df	Mean Square	F	Sig.
Writing Benchmark1	Between Groups	.932	2	.466	1.075	.347
	Within Groups	28.186	65	.434		
	Total	29.118	67			

The ANOVA results showed that the difference between group mean benchmark 1 scores was not significant, $F(2, 65) = 1.075$, $p = .347$.

A Cohen's κ was conducted to determine if there was agreement between two

raters on student benchmark 2 writing samples, as shown in Table 24.

Table 24

Kappa Analysis of Benchmark 2 Rater Agreement

	Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Measure of Agreement Kappa	.620	.109	5.467	.000
N of Valid Cases	39			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Using the same classification as previous analysis, the results indicate there was substantial agreement between the two independent raters of student benchmark 2 writing responses, $\kappa = 0.620$ (95% CI, 0.407 to 0.833), $p < .000$.

The writing data were analyzed to determine differences in mean benchmark 2 scores between content areas: science, history, and math. Table 25 provides the mean scores for the three content groups.

Table 25

Writing Benchmark 2 Score Means by Content Area

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Science	12	2.167	.5774	.1667	1.800	2.533	1.0	3.0
History	22	2.545	.5958	.1270	2.281	2.810	2.0	4.0
Math	19	2.000	.5774	.1325	1.722	2.278	1.0	3.0
Total	53	2.264	.6248	.0858	2.092	2.436	1.0	4.0

The mean benchmark 2 writing score for students in the science content area was 2.167, as compared to a mean score of 2.545 for the history content-area group and a mean score of 2.00 for the math content-area group, where a score of 2 equals writing proficiency. The ANOVA results for benchmark 2 are shown in Table 26.

Table 26

ANOVA for Writing Benchmark 2 Scores by Content Area

		Sum of Squares	df	Mean Square	F	Sig.
Writing Benchmark 2	Between Groups	3.181	2	1.590	4.644	.014
	Within Groups	17.121	50	.342		
	Total	20.302	52			

The ANOVA results showed that the difference between group mean benchmark 2 scores was significant, $F(2, 50) = 4.644, p = .014$.

A Post Hoc Bonferroni multiple comparison test was conducted to compare the means and identify where the differences were between the content-area groups. Table 27 provides the results for the writing benchmark 2 mean scores by content area.

Table 27

Post Hoc Bonferroni Writing Benchmark 2 by Content Area

(I) Course Name	(J) Course Name	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Science	History	-.3788	.2100	.232	-.899	.141
	Math	.1667	.2158	1.000	-.368	.701
History	Science	.3788	.2100	.232	-.141	.899
	Math	.5455*	.1833	.013	.091	.999
Math	Science	-.1667	.2158	1.000	-.701	.368
	History	-.5455*	.1833	.013	-.999	-.091

*The mean difference is significant at the 0.05 level.

The results of the Post Hoc Bonferroni test show a significant difference at the $\alpha = .05$ level between history and math writing benchmark 2 mean scores. The results indicate there is no statistical significance between math and science or history and science content group writing mean scores for the benchmark 2 assessment.

A final Cohen's κ was conducted to determine if there was agreement between

two raters on student postassessment writing samples, as shown in Table 28.

Table 28

Kappa Analysis of Postassessment Rater Agreement

	Value	Asymptotic Standard Error ^a	Approximate T ^b	Approximate Significance
Measure of Agreement Kappa	.676	.095	6.985	.000
N of Valid Cases	39			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Using the same model as previous analysis, the results show there was substantial agreement between the two independent raters of student postassessment writing responses, $\kappa = 0.676$ (95% CI, 0.490 to 0.862), $p < .000$.

The writing data were analyzed to determine differences in mean postassessment scores between content areas: science, history, and math. Table 29 provides the mean scores for the three content groups.

Table 29

Writing Postassessment Score Means by Content Area

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Science	3	3.000	.0000	.0000	3.000	3.000	3.0	3.0
History	24	3.000	.8847	.1806	2.626	3.374	1.0	4.0
Math	16	1.875	.7188	.1797	1.492	2.258	1.0	3.0
Total	43	2.581	.9570	.1459	2.287	2.876	1.0	4.0

The mean postassessment writing score for students in the science and history content areas was 3.0, as compared to a mean score of 1.875 for the math content-area group, where a score of 2 equals writing proficiency. The ANOVA results for postassessment scores are shown in Table 30.

Table 30

ANOVA for Writing Postassessment Scores by Content Area

		Sum of Squares	df	Mean Square	F	Sig.
Writing	Between Groups	12.715	2	6.358	9.876	.000
Postassessment	Within Groups	25.750	40	.644		
	Total	38.465	42			

The ANOVA results show a statistical significance between group writing postassessment mean scores, $F(2, 40) = 9.876, p = .000$.

A Post Hoc Bonferroni multiple comparison test was conducted to compare the means and identify where the differences were between the content-area groups. Table 31 provides the results for the writing postassessment mean scores by content area.

Table 31

Post Hoc Bonferroni Writing Postassessment by Content Area

(I) Course Name	(J) Course Name	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Science	History	.0000	.4913	1.000	-1.228	1.228
	Math	1.1250	.5048	.095	-.136	2.386
History	Science	.0000	.4913	1.000	-1.228	1.228
	Math	1.1250*	.2590	.000	.478	1.772
Math	Science	-1.1250	.5048	.095	-2.386	.136
	History	-1.1250*	.2590	.000	-1.772	-.478

*The mean difference is significant at the 0.05 level.

The results of the Post Hoc Bonferroni test show a significant difference at the $\alpha = .05$ level between history and math writing postassessment mean scores. The results indicate there is no statistical significance between math and science or history and science content group writing mean scores for the postassessment.

Research Question 4. How does in-service teacher training affect writing pedagogical practices in the content-area classroom? To address this question, data were compiled and analyzed from survey questions identifying two areas the researcher addressed with professional development: teacher needs and classroom pedagogy.

Table 32 provides a summary of participant teacher responses to classroom pedagogy focused questions.

Table 32

Teacher Diagnostic Survey Summary Data

Survey Question #	Classroom Pedagogy	
	Participant Response	
	No	Yes
Q7: My students write regularly in my class.	4	0
Q12: I feel confident creating writing assignments based on curriculum standards.	2	2
Q14: I use writing assignments to assess student mastery of content standards.	2	2
Q15: I use grading rubrics to assess writing assignments.	2	2
Q16: I reflect on my daily instructional practices and student performance.	0	4
Q13: I feel confident creating grading rubrics for writing assignments.	4	0

When asked if students write regularly in their classrooms, all four participant teachers answered “no.” Two of four participants indicated they felt confident creating assignments based on curriculum standards and use writing to assess student mastery of content standards. Although two participants indicated they use grading rubrics to assess writing assignments, all four participants indicated they did not feel confident creating grading rubrics for writing assignments. All four participants were asked if they reflect

on their daily instructional practices and student performance, and all answered, “yes.”

Survey question 17 asked participant teachers to list all accommodations they currently provide for students who have difficult writing. Participant teachers listed scaffolding, shorten assignments, more structured writing assignments, altered prompts, and sentence and paragraph frames as current practice. Survey question 18 asked participants to name accommodations made for advanced writers. One of four participant teachers indicated they do not teach advanced writers, and another of the four participants answered, “I accommodate for their ability by giving them a choice to complete a more in depth topic that calls for more attention to detail. Use a more difficult prompt, require a lengthier response (even though I don’t like this option), and grade more strategically.” Two of the four participants did not respond to survey question 18.

At the end of the study implementation period, the participant teachers were asked to complete the High School Content Area Writing Professional Development Series 2016 Survey postsurvey. The postsurvey contained the same questions answered by participants prior to implementation. Table 33 provides a summary of participant teacher responses to teacher needs-focused questions.

Table 33

Teacher Postsurvey Summary Data

Survey Question #	Classroom Pedagogy	
	No	Yes
Q7: My students write regularly in my class.	0	4
Q12: I feel confident creating writing assignments based on curriculum standards.	1	3
Q14: I use writing assignments to assess student mastery of content standards.	0	4
Q15: I use grading rubrics to assess writing assignments.	2	2
Q16: I reflect on my daily instructional practices and student performance.	0	4
Q13: I feel confident creating grading rubrics for writing assignments.	2	2

After the study implementation period, all four participants indicated that students write regularly in their classrooms. Three of the four participants indicated they felt confident creating writing assignments based on curriculum standards, while all four participants denoted they use writing assignments to assess student mastery of content standards. Two of four participants signified they use grading rubrics to assess writing assignments and felt confident creating grading rubrics for writing assignments.

Survey question 17 asked participant teachers to list all accommodations they currently provide for students who have difficult writing. One of four participant teachers responded, “adjusting length, giving guiding questions, and using paragraph frames”; another participant responded, “allowing them to create bullet list instead of paragraphs. Using shorthand to get their ideas across.” Another responded,

giving options when assigning prompts. I usually have 3 options when giving a writing assignment. This allows the students to have a choice when choosing what they write about. I also model writing for them at the beginning of the semester so students know what is expected.

The final participant responded, “modeling, providing structure through graphic organizers, using low stakes writing, having volunteers share with the class.”

Survey question 18 asked participants to name accommodations made for advanced writer. One of four participant teachers indicated they do not teach advanced writers, while another participant answered, “allowing them to explore the content from their own perspective.” The third participant responded,

designing a detailed rubric for each assignment that allows them to see specifically what is expected of them. Being an advanced writer looks a little different in science. Students must be able to convey their information in an extremely concise manner. I am able to work with advanced writers so that they are able to report information in a more concise manner.

The final participant responded, “asking them to dissect advanced concepts through writing.”

Teacher reflections. Participant teacher reflection data were analyzed for common themes and coded according to those themes. Findings were summarized and data were represented in a chart. These data established patterns that emerged throughout this study.

To begin analysis of the reflection data, participant teacher response questionnaires were transcribed into a single document. The researcher entered the participant responses into the document in chronological order, with the first reflection a

response of each participant at the beginning of the document and subsequent reflections in the order they were received. The chronological transcription was essential to identifying possible trend progressions in the data. The reflection responses were hand coded by the researcher. Five major categories emerged after the qualitative analysis of the teacher reflection responses. The categories were coded as follows: strategy use, student response to strategy, student attitude, teacher attitude, and teacher observations. Table 34 provides a summary of the category results and their associated concepts after the open coding analysis of 16 reflection responses provided by the participants.

Table 34

Major Categories Pedagogical Practices

Major categories	Associated concepts
Strategy Use	Strategy implemented, times implemented, additional strategy needs
Student Response to Strategy	Student effort, student awareness of strategy effectiveness, student desire to use strategy, content breakthrough
Teacher Observations	Student writing, student content knowledge, student confidence, student efficacy, teacher implementation, teacher practice
Teacher Attitude	Writing in their content class, teaching writing, student learning
Student Attitude	Writing assignments, writing production, sharing writing

Strategy use. In the first series of participant reflections, the teacher responses, Teacher A, a science teacher, utilized Essential Question response writing with their students four times during the week. Direction writing was an additional strategy employed by Teacher A.

I also had them write directions for making a PB & J sandwich. I encouraged students to use as much detail as possible. Once we completed the activity, I

constructed a PB & J using the detail that one group gave.

Teacher B, a history teacher, implemented journal writing in the form of free writes, brain dumps, and historical frames. The participant indicated five free writes, five brain dumps, and one historical frame were utilized. Teacher C, a math teacher, did not list any specific strategies implemented during the first week; instead, responded, “I’m not sure that I have used a specific strategy but I have been more intentional about students writing to explain their process.” Teacher D, an Exceptional Children teacher, listed daily journals, public writings, and “circle” writes as strategies employed during the first week of implementation. The first series of reflections suggest participant teachers acquired numerous writing strategies from the professional development provided.

In the second series of reflections, Teacher A discussed the strategy used to address student confidence: “I explained that I am not grading grammar simply content. I encourage them to use punctuation to help me understand what I am reading but I also let them know that I am not going to deduct for grammar.” Teacher A also indicated that the professional development resource website developed by the researcher was easy to follow and comprehend. Teacher B listed journals, historical frames, fish bones, and board meetings as the writing strategies used during week two of implementation. Teacher B noted that these strategies were used in class daily. Teacher C’s weekly reflection provided a list of strategies and how they were used in class during week two. Quick writes were used to have students process what was done in class or to explain in their own words. The Frayer Model was “used two to three times in Pre-Cal, used in reverse to introduce concept.” The Storyboard strategy was used two to three times in all classes. Teacher D explained that “students had to write directions for a hands-on activity (including pictures) and write a descriptive observation/analysis of activity.”

Teacher D also indicated that brain dumps were used during week two, as well as “reflection writing on personal experience w/gossip/rumor.”

Week three reflections did not provide new strategy implementation. The participant teachers listed strategies used in previous weeks. What is important to note is the participant’s request for new strategies, evidence of their eagerness to try new types of writing in their classrooms. Teacher B specifically noted the need for additional help with rubrics and notebooks during their week three reflection.

In the final reflection, Teacher A explained that all strategies implemented required modeling, but students adapted quickly to each strategy implementation. Teacher A further explained that by the end of the semester, the pair and share writing strategy was used frequently because students were more confident in public sharing of what they had written. Teacher B’s final reflection indicated the most effective writing strategy used was the removal of grades for grammar or structure, explaining, “I wanted to see what they were thinking without worrying about if they were following all the rules.” Teacher C’s final reflection provided great detail about strategy use throughout the study period:

One of my favorite strategies . . . is the storyboard. The next time I did it, I had them do a “live” version where they each took a step and completed that step in the problem. The last time I used it with them, I had them write their own steps after I did an example.

Teacher C explained their use of the quick write strategy also:

After their writing time, I would give them time to share with a buddy, the table, or the class. It was a great launching point at the beginning of class, but also served to clarify misconceptions when used to summarize processes. Quick

writes were a great tool for my Honors Calculus class where we have to process high level and often abstract math concepts. They would read the theorems and then I would have them break down what the theorems meant in their own words. They were also easy to implement into the interactive notebooks that I used this semester.

The teacher reflections suggest that participant teachers fully participated in implementing writing strategies into their content areas for the entire study period. The detail provided by each reflection provides evidence of teacher buy-in to the process of adding writing as part of their content instruction. The reflection data indicates that each week, teacher participants repeated strategy use while experimenting with new strategies. The most notable writing strategy was the teachers' decision to create a "low-stakes" writing environment by grading only content and not grammar.

Student response to strategy. In the first series of reflections, participant teachers briefly described student overall responses to strategies implemented. Teacher A utilized direction writing as a strategy during the first week of implementation. Students were instructed to write directions for making a peanut butter and jelly sandwich. As a follow-up to the writing assignment, Teacher A attempted to make a peanut butter and jelly sandwich using the directions written by a group of students, noting, "Students quickly realized how detailed the writing need to be." Teacher A also noted student responses to implementing the essential question writing strategy: "Students started realizing the EQ summarized the activity that is being covered by the activity. It is a great start to studying for a quiz or test." Teacher B only noted that student effort was lacking when discussing their first strategy implementation; however, Teacher B added, "My failure to scaffold" as explanation for student writing output.

Teacher C did not comment on student response to strategy implementation during week one. Teacher D provided student responses to each strategy utilized during the first week of implementation. When using the daily journal writing strategy, Teacher D noted, “some students enjoy writing their thoughts and others don’t even want to do it.” It was also noted “students did it and most put forth good effort” when using the public writing strategy, and “students enjoyed” using the circle writes strategy.

Week two reflections also provided some insight into student response to strategy. Teacher A noted, “they are thinking more like scientists.” Teacher B did not reflect on student response to strategies on the reflection questionnaire. The researcher met with Teacher B to ask about student response to strategies. Teacher B responded, “The students really got into the Board Meeting strategy. Now every day, we begin class with that. The concept map stays on the whiteboard for student reference and they are engaged in updating the board each day.” Teacher C wrote of the storyboard writing strategy: “Standard class love and used it very often.” Teacher D reflected that engagement was better since the group’s last professional development support meeting but added, “it could always be better.”

Teacher A noted in their final reflection that students “actually started enjoying this [writing] aspect of the class.” Teacher B noted that the fishbone activity was the “breakthrough” moment in their classes. Teacher C explained that the storyboard activity received the most positive student feedback and added, “they explicitly told me that they like it and wanted me to use it again.”

Student response to strategy implementation followed a specific trend from negative to positive throughout the study period. Teacher reflections indicate student reluctance to use writing in their content areas at the beginning of the study; however, by

the end of the implementation period, teachers elucidated that students were more engaged and willing to use the writing strategies.

Teacher observations. Teacher observations during implementation were also noted in the reflection documents. During week one of implementation, Teacher A observed, “The PB&J activity was a huge success. Students truly grasped the concept of detail in their writing. I have still provided detail feedback for the experimental design encouraging even more detail.” Teacher B only indicated, “students worked hard” during week one. While Teacher C wrote, “I have been more intentional about students writing.” Teacher D did not provide any observations in their week one reflection.

Teacher A did not provide written observations in reflection two. Teacher B noted of the strategies used during week two, “they worked.” Teachers C and D did not provide any additional observation notes during week two, focusing only on student response to strategies implemented.

In the final reflection, Teacher A observed, “By the end of the semester, they were much better writers.” Teacher B explained, “I saw continued improvement in not only the student’s writing but also their learning.” Teacher B also reflected that students wrote best when they knew they were writing for an audience of peers and they would receive feedback on what was written. Teacher D noted the amount of writing per prompt increased and “creativity blossomed.”

Teacher observation reflections indicated a positive trend in student engagement and learning.

Teacher attitude. The attitude of teacher participants toward writing and writing instruction was an unexpected category; however, participant attitudes were expressed in the reflection documents during the first week of implementation and continued

throughout the study.

Teacher A said of the study implementation, “As I began implementing writing in my weekly lessons, I realized I was going to be learning and growing as an educator through this process.” Teacher A also described implementing writing into the classroom as “an uphill battle.” Teacher B did not reveal their attitude toward writing or writing instruction in the first reflection; however, Teacher C explained, “I love the informal writing concept” when discussing strategy implementation. Teacher D stated, “I feel much more confident about writing instruction now. I was doing better than I thought.”

Teacher attitude is not addressed again until teacher final reflections. Teacher A reflected, “I am certain writing strategies are one of the main reasons my students will experience growth this semester.” Teacher B stated, “I feel students learned through this method of pedagogy and retained more of the content.” Teacher C noted, “I have enjoyed being a part of this study because it has given me a new perspective on literacy in the content area.” Teacher C added that writing in their content area “has become not just something I have to do, but a form of processing and assessing my students understanding . . . I look forward to continuing to implement it in my classes as we move forward into the second semester.”

Student attitude. Student attitudes about writing were described in the participant reflections beginning in week one of the study implementation period.

Teacher A described their students’ attitudes towards writing as follows:

The one area I see most is the lack of confidence that students demonstrate toward writing. They think they can’t write. The lack of confidence was obvious in my standard class. I even have a few students in my honors class that lack the confidence needed to write.

Teacher B did not mention student attitude in their first reflection; however, Teacher C noted that some students complained that they had to write their processes in a math class. Teacher D explained that student buy-in was difficult, adding, “Really, it is just one or two that just don’t want to do anything. It seems I focus more on trying to win over those 2 than the success of the other 9.”

Teacher B noted student apathy in their week two reflection, adding “students have prior experiences with writing that are negative.” No other teacher participant noted student attitude during the week two reflections. Week three reflections did not note student attitude about writing.

Final teacher reflections included reflections on student attitudes toward writing. Teacher A wrote, “I am also fortunate to have instilled a love of writing in a few students.” Teacher B’s final reflection tracked student attitudes from the beginning of the study to its end.

What I learned was that students have deep rooted frustrated with writing that informs their particular paradigm. It was almost like a student either felt strong about their writings skills and excelled or felt weak in their writing skills and needed more aid regardless if their self-esteem was rooted in truth.

Teacher B explained that once grammar was not a focus of the writing, “their writing improved” and their willingness to write increased. Teacher C explained that students began requesting specific writing strategies that they enjoyed. Teacher D’s final reflection also included student attitude towards writing:

The students in our class have typically been reluctant writers and not grading their writing has helped them more than anything. Our students showed increased confidence in their writing. Once students realized their writing wouldn’t be

graded their confidence soared and the content of their writing included higher-level thinking. When writing was graded and constructive feedback given, students were more open to and more positive about making needed changes because they were more confident.

Teacher observations. Observation data were analyzed to determine the frequency and type of writing implemented in participant teacher classrooms. The findings were categorized by writing type, and frequency of use was summarized. Percentages were used to identify writing types utilized by participant teachers.

The observation protocol provided a list of 56 writing strategies that could be utilized by the participant teacher. The participating teachers utilized 32 of the 56 different strategies during observations; however, some strategies were implemented more than others. A total of 16 observations were completed during the study period, four observations for each participating teacher. Two strategies were observed more often than any other strategy: learning logs/classroom notes and graphic organizers. Learning logs/classroom notes were utilized most often, identified in 75% of the observations; and graphic organizers were identified in 63% of the classroom observations. Additional strategies commonly observed in all participant classrooms are summarized in Figure 2.

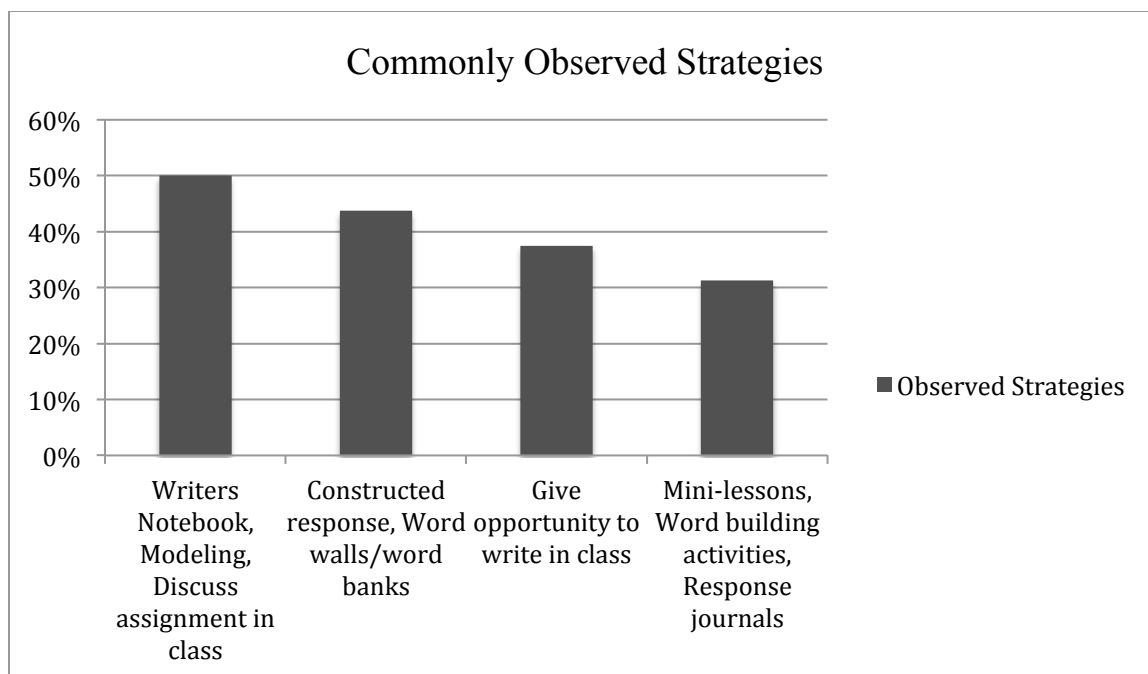


Figure 2. Commonly Observed Strategies.

Participant teachers implemented writer notebooks, modeling, and in-class discussion of assignments during 50% of the observations. Constructed response and word wall/word banks were utilized during 44% of the classroom observations. Teachers provided students the opportunity to write in class in 38% of the observations. In 31% of the observations, participant teachers implemented writing mini-lessons, word building activities, and response journals in their lessons.

Chapter 5: Conclusions

Introduction

Research indicates that of the students planning to enter college, one-third do not meet readiness benchmarks, an indication that they will have difficulty learning effectively in the college setting (Graham & Perin, 2007). Beyond college readiness, writing proficiency has become critical in the workplace for both private and public sectors (Graham & Perin, 2007). The purpose of this study was to examine the effects of writing instruction in the content areas, supported by ongoing teacher professional development, on student learning and academic growth at the high school level. The implication of findings will be organized by research question.

Implication of Findings

Research Question 1. What resources do content-area teachers need to implement writing in their content-area classrooms? Researchers assert that teachers are more likely to implement new practice into their classroom when it has been previously modeled for them (Darling-Hammond et al., 2009). This study sought to determine what resources were needed by content-area teachers in order to implement writing into their content-area classrooms, and a professional development series was developed to prepare participants to teach and implement writing in content-area courses as part of their normal instructional practice. Content-area teachers receive minimal, if any, formal training on how to teach writing during their college preparation (Gillespie et al., 2013). This study is consistent with research findings that indicate 47% of teachers surveyed received minimal training during college on how to use writing to support learning (Gillespie et al., 2013). None of the participants of this study denoted any preservice writing training. Additionally, 45% of teachers reported they received

minimal in-service training, while 11% reported no formal in-service training (Gillespie et al., 2013). Results from the current study support this research with only one of four participants signifying in-service literacy strategy training.

The Commission on Behavioral and Social Sciences lists teacher practice, interaction with other teachers, teacher education programs, and experiences outside of the profession as sources for teacher learning (Fischer, 2006). The learning sources identified provide a clear indication that teachers are individuals with individual learning needs (Fischer, 2006). As shown in Table 5, all four participant teachers indicated they did not feel confident teaching writing in their content-area classrooms. Only one of the four participant teachers indicated confidence teaching writers that range in ability from struggling to advanced. The other three participants responded that they did not feel confident teaching writing regardless of ability level. These findings are consistent with research indicating that teachers face their greatest challenge in classroom implementation of new knew knowledge and skills (Gulamhussein, 2013). The lack of confidence signified by the participant responses informed the professional development delivery prior to implementation. Historically, preservice teachers are provided generic writing instruction preparation through courses that focus on writing and literacy strategies (Pytash, 2012). Unfortunately, these courses do not focus on discipline-specific discourse, a necessary component in teaching writing in a content area (Pytash, 2012). As such, what participant teachers in this study needed most were tools and strategies coupled with support that could be easily transferred to their specific content-area classroom.

Episodic professional development workshops disconnect teachers from practice without allowing for reflective practice in the classroom (Darling-Hammond et al., 2009).

When professional development includes applications of knowledge to teacher planning and instruction, it is more likely to influence teaching practices (Darling-Hammond et al., 2009). The current study supports previous research. At the conclusion of this study, all four participants indicated they felt confident teaching writing in their classrooms. Additionally, three of the four participants indicated they felt confident teaching the average or advanced writer, and all participants signified they felt confident teaching the struggling writer. The ongoing professional development provided support and resources needed for the participants to gain confidence during the implementation process; however, two of the four participants did not feel confident creating grading rubrics for writing assignments, suggesting the need for additional support in this area of writing instruction.

Research Question 2. What effect does writing instruction in the content areas have on student content-area knowledge? This study sought to determine the effect of writing instruction on student content-area knowledge. Fischer's (2006) review of research found that writing forms contributed to student recall and content knowledge (Fischer, 2006). Through writing, students can take ownership of their learning through planning and monitoring of cognitive processes (Bangert-Drown et al., 2004). Additionally, Applebee and Langer (1987) asserted from their findings that repeated manipulation of subject content through writing increases student recall and knowledge. The results of the current study support these research findings.

When comparing student pre and postassessment proficiency scores, 6.5% of students scored at the proficient level on the preassessment as compared to 33.6% scoring at proficient on the postassessment, for a 27.1% increase in students scoring <80 on a 100-point scale, as shown in Table 5. Table 7 shows results of an ANOVA that

determined a significant difference between preassessment and postassessment proficiency scores between the three content-area groups, at the $\alpha = .05$ level. A Post Hoc Bonferroni was used to determine the significance between groups. Table 9 shows that the number of students proficient on the science postassessment was significantly different than those proficient on the math and history postassessments; however, there was no statistical difference in proficiency scores when comparing the history to the math students.

These results suggest that students benefited from the implementation of writing in the content-area classroom; however, the results also suggest that students in the history content area did not benefit from writing exposure as much as those in the science and math content areas. Applebee and Langer (1987) explained that for writing to impact learning, explicitness is necessary for “meaning to remain constant beyond the context” of the writing (p. 5). Scientific and mathematical writing are inherently concrete and explicit, whereas historical writing, in the context of the classroom, tends to be more conceptual. The explicit nature of writing in science and math content courses might account for the difference in student postassessment proficiency scores.

“Developing students who are skilled and confident writers will also require better-prepared teachers” (Graham, Harris, & Hebert, 2011, p. 33). Assessment intervals were analyzed to determine the effect of writing professional development on the content scores at pre and postassessment intervals. Table 10 shows results of an ANOVA indicating the effect of writing professional development on pre and postassessment proficiency scores. Preassessment scores indicate no statistical significance, whereas postassessment scores indicate a significant difference. These data support the effect of writing professional development on content-area knowledge. To determine effect at

assessment intervals, an ANOVA was conducted. Table 12 shows the effect of writing professional development was significant at both benchmark 1 and benchmark 2 assessment intervals; however, the effect is more significant for the time interval between preassessment and benchmark 1 than between benchmark 1 and benchmark 2. This variance in difference could be due to content covered between testing periods, with more content addressed between preassessment and benchmark 1 than between benchmark 1 and benchmark 2. Table 13 shows the Post Hoc Bonferonni comparison between assessment groups. Results indicate a significant difference at the $\alpha = .05$ level at the preassessment to benchmark 1 interval and at the benchmark 2 to postassessment interval; however, there is not a significant difference at the benchmark 1 to benchmark 2 interval. These results suggest that the writing professional development had more impact on participant classrooms at the beginning and end of the study period than the middle. Research indicates that writing tasks that require students to reflect on their learning and confusions were most effective, and longer writing tasks were less effective (Bangert-Drowns et al., 2004). The results of this study could imply that the participant teachers used more effective writing strategies at the beginning and end of the study period, possibly returning to tasks that were initially successful. The results might also suggest student participation levels changed from the beginning to the end of the study.

As related to gender, Table 15 shows the ANOVA results for assessment scores by gender. The results indicate there was no significant difference at the $\alpha = .05$ level between male and female mean assessment scores for all assessment intervals. Therefore, differences among content-area proficiency scores cannot be attributed to gender. These findings are not consistent with gender-focused results from the 2011 NAEP writing assessments, where higher percentages of female students scored at the

proficient and advanced levels than their male peers (National Center for Education Statistics, 2012).

Research Question 3. What effect does writing instruction in the content area have on student writing skills? A 2006 Gateway Writing Project report indicated “students of program-group teachers made significantly higher gains than those in the comparison group” (Singer & Scollay, 2006, p. 11). This study sought to determine if writing instruction in the content area, supported by ongoing professional development for participant teachers, would affect student written expression. Research indicates a grade-level variance that suggests, “students in high school (particularly higher-achievers) showed some evidence of having developed finer-grain understandings of differences among disciplinary genres” (Jeffery & Wilcox, 2013, p. 1112). Table 19 shows the results of an ANOVA indicating a significant difference between content areas on writing preassessment scores. The preassessment scores provide a baseline for student writing ability prior to writing strategy implementation. For students to indicate proficiency on the writing assessments, a score of 2.0 was needed. The mean preassessment score for science students was 2.462, and the mean score for math students was 2.65; while the mean score for history students was 1.73. These results suggest a more advanced understanding of written expression among the students in the math and science content areas than those in the history content areas. One explanation for the writing skill variance among content-area student groups could be grade-level difference. All students in the history group were sophomores (Grade 10), while the students in the science and math content areas were either juniors (Grade 11) or seniors (Grade 12). The difference in grade level could account for the difference in the proficiency averages of content areas. The eleventh- and twelfth-grade students in both the science and math

content areas have been exposed to writing longer than the tenth-grade students, suggesting a need for more exposure to writing for students in the lower grade-level; however, research findings suggest “students’ stances, including how they feel about writing and how they perceive their knowledge of writing” can influence their writing performance (Jefferey & Wilcox, 2014, p. 1096).

Research regarding writing proficiency indicates that student ability in one domain does not necessarily transfer to other domains; writing ability does not automatically transfer from one content area to another (Jeffery & Wilcox, 2013). Additionally, research shows that “students need more support in understanding how writing functions as an instrument for knowledge construction” (Jeffery & Wilcox, 2013, p. 1099). The results of the current study support the previous research. The mean benchmark 1 writing score for students in the science content area was 2.36, as compared to a mean score of 2.25 for the history content-area group and a mean score of 2.04 for the math content-area group, where a score of 2 equals writing proficiency. The results show an average score of proficient for students across all content areas by the benchmark 1 assessment interval. The increase to a proficient mean score in the history content area suggests writing skill improvement among those students that received content-specific writing instruction.

Table 29 shows the mean postassessment writing score for students in the science and history content areas was 3.0, as compared to a mean score of 1.875 for the math content-area group, where a score of 2 equals writing proficiency; however, it is important to note that only three student postassessments were collected in the science content area, whereas 24 postassessments were collected in the history content area. Although the proficiency average increased for students in the history content area, the

proficiency average decreased for students in the math content area on the writing postassessment. Research indicates that student writing in their content areas results in real knowledge of the material (Applebee et al., 1981); however, the results of the current study cannot assert that student writing in their content areas resulted in improvement in student writing production.

Research Question 4. How does in-service teacher training affect writing pedagogical practices in the content-area classroom? This study sought to determine content-area teacher practice as it related to writing instruction as well as to provide in-service training to support implementation of writing into participant teacher classrooms.

Survey implications. Research has shown that teachers spend little time on writing skills or strategies after the third grade (Applebee & Langer, 2011). The current study reinforces these findings. The results of the Teacher Diagnostic Survey in Table 6 show that students did not write regularly in participant teacher classrooms prior to implementation. Only two of the four participant teachers indicated they used writing assignments to assess student mastery of content standards. These findings are consistent with Applebee and Langer's (2011) findings that only 7.7% of class time is dedicated to writing and writing tasks. The postsurvey given at the end of the study implementation period reveals a change in teacher participant practice. Table 6 shows that all four participants signified that students write regularly in their class. Three of the four participants revealed that they felt confident creating writing assignments based on curriculum standards. All four participants indicated they now use writing assignments to assess student mastery of content standards. The change in teacher usage and confidence implies that the professional development series fulfilled participant needs in order to change pedagogical practice.

Teacher reflection implications. Research suggests that teacher professional development can be connected to student achievement gains (Darling-Hammond et al., 2009); however, in order for professional development to affect actual classroom practice, professional development should occur over an extended amount of time, with ongoing support during the implementation period, rather than the typical one-time workshop (Darling-Hammond et al, 2009; Gulamhussein, 2013). The professional development series provided weekly meetings for participant teachers to reflect on implementation and learn strategies for classroom use. The reflection data collected during this study provided five major categories of pedagogical practice: strategy use, student response to strategy, teacher observations, teacher attitude, and student attitude, summarized in Table 4. Results of the first teacher reflection indicate participant teachers acquired numerous writing strategies from the professional development provided and implemented those strategies into their respective classrooms. Research indicates that educators fail to effectively implement new strategies and skill learned during one-time workshops (Gulamhussein, 2013); however, the continuous format of this study's professional development provided its participants a format for reflection and questioning along with support. Week two reflections of this study's professional development provide further support for previous research on the effect of ongoing professional development and its transference to the classroom (Harwell, 2003). Participant teachers provided reflections indicating new strategy implementation along with the continuation of strategies that worked in the week's prior implementation. Teacher A reflected on the content-specific resource website, created by the researcher, as "easy to follow and comprehend." Results from week three reflections imply participant teachers' eagerness to continue learning, with participants requesting new strategies to try in their classrooms,

with specific needs identified. Requests from participants further maintain research indicating support must be available for teachers to address specific classroom needs (Darling-Hammond et al., 2009; Gulamhussein, 2013).

Student response to strategy implications. Applebee and Langer's (2011) research asserts that students are not being asked by teachers to use writing as a pathway for learning. Instead, teachers predominantly use writing without composing via activities such as fill-in-the-blank, note-taking, and short answer (Fischer, 2006). Further research found that teachers explain to their students why writing to learn is effective only half the time or modeled how to use it (Gillespie et al., 2013). The professional development prepared for this study intentionally provided participant teachers writing strategies designed to incorporate composition.

In week one of implementation, Teacher A utilized direction writing as a strategy in which students were instructed to write directions to make a peanut butter and jelly sandwich. As a follow-up to the writing assignment, Teacher A attempted to make a peanut butter and jelly sandwich using the directions written by a group of students. Teacher A documented, "Students quickly realized how detailed the writing need to be." The direction writing activity provided an opportunity for Teacher A to model why and how writing to learn is effective by providing students an occasion to "reprocess concepts and ideas" (Bazerman et al., 2005, p. 42). Teacher D's indication that most students enjoyed journal writing activities supports previous research asserting students express more favorable feelings toward writing they feel allows for more subjectivity (Jeffery & Wilcox, 2013). Teacher B's students were described as lacking effort attributed to the teacher's failure to scaffold. Teacher B's self-assessment is supported by writing strategy research that indicates strategy instruction, with teacher support and scaffolding, is

effective for struggling writers (Graham & Perin, 2007).

Teacher reflections from week two of implementation suggest a change in student behavior towards writing instruction. Teacher A noted of the students, “they are thinking more like scientists.” Teacher B explained, students “really got into the Board Meeting strategy.” Teacher C wrote of the storyboard strategy, “standard class love and use it very often.” Teacher D explained, “engagement is better.”

“Writing research suggests students’ stances are not fixed but rather are highly susceptible to change over time and across settings as students socially construct variable subjectivities as writers” (Jeffery & Wilcox, 2013, p. 1096). The student response to strategy implementation followed a specific trend from negative to positive throughout the study period suggesting a possible change in student stance towards the writing activities implemented. Teacher reflections indicate student reluctance to use writing in their content areas at the beginning of the study; however, by the end of the implementation period, teachers elucidated that students were more engaged and willing to use the writing strategies.

Teacher observations implications. Gillespie et al. (2013) found that English teachers were more likely than math or science teachers to assign writing activities that ask students to create or make meaning and more likely than social studies teachers to have students support their learning through analysis writing. Throughout the course of this study, the participating teachers utilized 32 different strategies during observations, with some strategies implemented more than others. Consistent with research, learning logs/classroom notes were utilized most often, identified in 75% of the observations; and graphic organizers were identified in 63% of the classroom observations. Writing research indicates

language arts teachers were more likely than math and science teachers to have their students write a journal entry, write a metaphor, free-write to generate ideas, write a literary analysis, write to persuade or defend a point of view, write a biography, and write a 5-paragraph essay to support learning. (Gillespie et al., 2013, p. 1052)

The exclusion of English content-area teachers could explain the participants' tendency toward these specific writing strategies. Learning logs/classroom notes and graphic organizers connect easily to the step-by-step instructions and lab reports more common in science content courses; transfer easily to timelines, summary writing, and document-based questions found in the social studies content courses; and easily transition to problem/solution writing and note-taking required in the math content-area courses (Gillespie et al., 2013).

During the implementation period, participants commonly utilized additional strategies. Participant teachers implemented writer notebooks, modeling, and in-class discussion of assignments during 50% of the observations as well as constructed response during 44% of the observations, a move beyond "the mechanical uses of writing" (Gillespie et al., 2013) described by Applebee and Langer (1987); however, these findings are consistent with those of Gillespie et al. (2013) acknowledging that teachers discussed why writing was used, modeled the types of writing assigned, and assessed its impact half the time. Although teacher observation data indicates a positive trend from typical strategy use such as note-taking and graphic organizers, it also suggests that more intentional explanation of why writing is used as well as modeling and assessing impact is needed.

Teacher attitude implications. Teacher attitude toward writing and writing

instruction was an unexpected category for analysis that emerged during this study. Although the researcher did not initially plan to analyze participant feelings about writing, the expressions of attitude in teacher reflection documents warranted consideration. Research indicates, “most teachers reported they received minimal (47%) or no formal preparation (23%) during college” (Gillespie et al., 2013, p. 1051) and “minimal (45%) or no formal in-service preparation (11%) on how to use writing to support learning” (Gillespie et al., 2013, p. 1051). Teacher attitude toward writing and writing instruction could be due, in part, to the limited amount of writing-specific training received both formally and informally (Pytash, 2012). Participant reflections support this research. Teacher A reflected, “I realized I was going to be learning and growing as an educator through this process”; while Teacher D commented, “I feel much more confident about writing instruction now. I was doing better than I thought.” Teacher C noted, “I have enjoyed being a part of this study because it has given me a new perspective on literacy in the content area.”

Teacher attitude towards writing evolved throughout the course of the study. Teacher participants became more confident in their implementation of writing into their content areas.

Student attitude implications. Student attitudes toward writing assignments could potentially affect written production (Jeffery & Wilcox, 2013). Although student affect was not an intended area of analysis for this study, teacher reflection data analysis revealed student attitude as a focus of teacher concern. Early in the implementation, Teacher A commented, “The one area I see most is the lack of confidence that students demonstrate toward writing. They think they can’t write.” Teacher C noted that students complained that they had to write in math class; Teacher B described student attitude as

apathetic; and Teacher D expressed that “buy-in” was difficult. Research suggests incorporating minimally graded writing exercises in the content areas to help students write to learn (Lance & Lance, 2006). Additionally, teachers should focus more on writing and less on grammar (Fischer, 2006). Participant focus on low-stakes writing strategies was an intentional strategy employed over the 4-week implementation period based on these findings. Both Teachers B and D specifically noted improved student writing engagement and production once they eliminated grading of student writing. Student attitude towards writing experienced a positive shift throughout the course of the study. This change in student willingness to write was a direct result of the removal of grammar grading. The teacher reflections indicated that once students were not afraid of how their writing would be graded, they became more willing writers and ultimately more confident writers.

Limitations

There were several limitations to this study. First, the population studied was from a rural town in a central region of a southern state; therefore, no comparisons of a similar population were made within the same state or other states. Additionally, the sample groups were located within the same Test High School; and as such, the results were limited to students enrolled in the site’s content-area courses. Results were not compared across other high schools regionally or nationally. These results cannot be generalized or considered universal.

A second limitation to the study is the researcher’s employment at the Test High School. Participating teachers were colleagues; therefore, their willingness to utilize knowledge and strategies gained from the professional development and the fidelity and frequency with which they applied knowledge to their classroom practices could have

been influenced by their relationship with the researcher. Methodology effect cannot be generalized to all content-area teachers or their classrooms.

A third limitation to the study is the Test High School's project-based learning focus. Project-based learning inherently incorporates more frequent use of writing in the classroom setting; thus, participant teachers may have been more eager to incorporate writing to meet project-based learning expectations outlined by the Test High School. Because of this limitation, results could not be generalized to all public high schools.

A final limitation to the study is the researcher's own interpretation of findings. Writing is a curriculum standard and embedded in four of the five North Carolina Common Core State Standards for ELA. In an effort to control for bias, the researcher's content area, English, was not included in the study. Creswell (2014) asserted that qualitative research should "contain comments by the researcher about how their interpretation of the findings is shaped by their background" (p. 202). As a participant observer, the researcher acknowledges the possibility that interpretation of findings may have been influenced by their content background and personal experience with the planned methodology, writing.

Recommendations

Taking all results of this study into account, it can be implied that writing instruction in the content areas, coupled with ongoing professional development, significantly impacted student learning. Although, student-learning gains could not be attributed specifically to writing or instructional practice improvement, the importance of incorporating strategies connected to cognitive processes of students is apparent. Change in teacher and student attitudes toward writing suggests a more complete understanding of its purpose and practical utilization within the instructional framework. Training

preservice teachers to incorporate writing as a mode of learning into their classrooms is necessary for the continued development of students. Additionally, school districts should incorporate writing to learn professional development for content-area teachers in order to maximize writing instruction and use at the secondary level.

A second recommendation is to investigate differences among student-learning gains in classrooms where writing instruction is not intentional. Understanding how groups of students learn through writing might be more evident if compared to groups of student learning without specific strategy implementation and instruction. Additional studies with a true control group for comparison could provide a clearer picture of writing to learn effectiveness.

Summary

Writing is a necessity for individuals wishing to compete and thrive in a global economy (Daniels et al., 2007; Shellard & Protherone, 2004). Beyond this necessity, writing also works to facilitate learning by promoting explicitness, integration, reflection, comprehension, and critical thinking (Applebee & Langer, 1987; Gillespie et al., 2013; Graham & Hebert, 2011; Richardson et al., 2012). In determining the relationship of writing in the content areas to student achievement, this study suggests that including writing strategies in the content-area classroom positively affects student achievement. Further, the ongoing professional development provided to teachers during the implementation process positively impacted instructional practice.

When analyzing student writing gains, the results of this study suggest that student writing can improve when writing instruction and strategies are utilized in the content-area classroom. Student and teacher attitudes toward writing as a mode of learning experienced a positive shift through the course of this study; however, high

schools across the United States continue to graduate students with minimal writing skills (Gallagher, 2011; Graham & Perin, 2007; National Center for Education Statistics, 2012). In order for students to become more proficient and confident writers, writing cannot remain a focus of the ELA classroom alone.

When assessing what teachers needed to incorporate writing into their instructional practice, this study found that strategies, tools, and training were required for teachers to feel confident using writing as a mode of learning. The one-time workshop model for professional development will not equip teachers to utilize writing effectively in their classrooms. As research indicates, teachers need ongoing professional development and support to implement any new skill or strategy effectively (Gillespie et al., 2013). Beyond in-service training, courses designed to effectively train the preservice teacher to use writing as a mode of learning are needed. Limiting the scope of writing to one content-specific course during undergraduate training does not provide the necessary training needed to fully understand the scope of writing as a pedagogical practice (Pytash, 2012).

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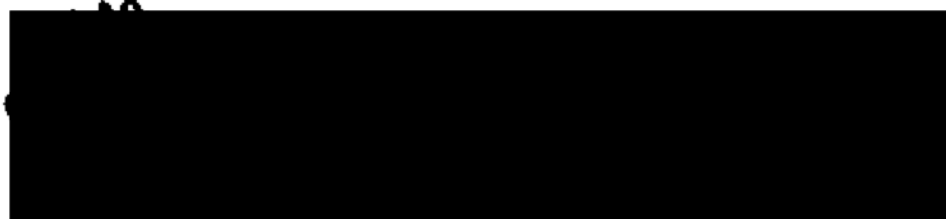
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Appendix A

Permission to Conduct Study at Test Site

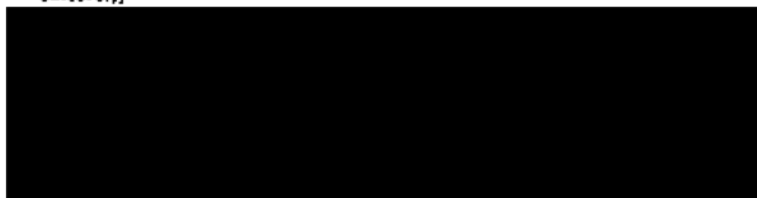


June 15th, 2016

To whom it may concern:

Please consider this letter as an indication of my full support and permission for Amanda Edwards-Whatley to conduct research and collect data at ~~the following school~~. Mrs. Edwards-Whatley may conduct research and collect necessary data for her study entitled "Writing Focused Professional Development for Content-area Teachers: The Effects of Writing Instruction on Content-Area Student Achievement." Please contact me if you have further questions or need additional information at (336) ~~626-6629, ext. 100~~.

Sincerely,



Appendix B

Teacher Informed Consent Form

INFORMED CONSENT

Study Title: The Effects of Intensive Writing Instruction in the Content Area Classroom on Student Achievement

Principal Investigator: Amanda Edwards-Whatley

Faculty Adviser: [REDACTED]

Sponsor: [REDACTED]

Dear Teacher:

My name is Amanda Edwards-Whatley, and I am a doctoral student in the Curriculum and Instruction program at Gardner-Webb University. You have volunteered to participate in my study. This consent form will give you the information you will need to understand why this study is being done and what your participation in the study means. It will also describe what you will need to do to participate as well as any known risks, inconveniences, or discomforts that you may have while participating. I encourage you to ask questions at any time. You will be given a copy of this form to keep.

PURPOSE AND BACKGROUND

As part of my dissertation, I would like to provide you, the content area teacher, with professional development on writing strategies and best practices to implement in your classroom. I will obtain benchmark data and copies of student writing to better evaluate the effectiveness of the writing instruction implementation in your classroom. I will also collect teacher survey data, classroom observation data, and conduct teacher interviews to evaluate the effectiveness of the professional development series.

PROCEDURES

This study will include participation in a professional development series, an analysis of teacher survey data, analysis your students' testing data and writing samples, classroom observation data, and interview data. This study will require you to implement writing strategies and procedures in your classroom.

It is estimated that the research study will take approximately four months to complete.

EXTENT OF CONFIDENTIALITY

Reasonable efforts will be made to keep the personal information in your research record private and confidential. Any identifiable information obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by law. Your name will not be used in any written reports or publications, which result from this research. Data will be kept for three years (per federal regulations) after the study is complete and then destroyed.

RISKS

There are no known risks involved with your participation in this study.

PAYMENT

There will be no payment to you as a result of your participation in this study.

QUESTIONS

If you have any questions or concerns about participation in this study, you should first talk with the investigator Amanda Edwards-Whatley or her advisor, [REDACTED], at [REDACTED].

If you have questions about your rights as a research participant, you may contact the Gardner-Webb Institutional Review Board (IRB), which is concerned with the protection of volunteers in research projects. You may reach the board office between 8:00 AM and 5:00 PM, Monday through Friday, by calling or by writing: Institutional Review Board, Office of Research Compliance,

DOCUMENTATION OF CONSENT

I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement and possible risks have been explained to my satisfaction. I understand I can withdraw at any time.

Printed Name of Teacher Participant

Signature of Teacher Participant

Date

Signature of Person Obtaining Consent

Date

Appendix C

Parent/Student Informed Consent Form

INFORMED CONSENT

Study Title: The Effects of Intensive Writing Instruction in the Content Area Classroom on Student Achievement

Principal Investigator: Amanda Edwards-Whatley

Faculty Adviser: [REDACTED]

Sponsor: [REDACTED]

Dear Parent/Guardian:

My name is Amanda Edwards-Whatley, and I am a doctoral student in the Curriculum and Instruction program at Gardner-Webb University. I am asking for your permission to include your child in my research. This consent form will give you the information you will need to understand why this study is being done and why your child is being invited to participate. It will also describe what your child will need to do to participate as well as any known risks, inconveniences, or discomforts that your child may have while participating. I encourage you to ask questions at any time. If you decide to allow your child to participate, you will be asked to sign this form and it will be a record of your agreement to participate. You will be given a copy of this form to keep.

➤ PURPOSE AND BACKGROUND

As part of my dissertation, I would like to provide content area teachers with writing strategies and best practices to implement in your child's classroom and obtain benchmark data and copies of their writing to better evaluate the effectiveness of the writing instruction in their classroom.

➤ PROCEDURES

This study will include an analysis of your child's testing data and writing samples. This study will not require your child to do anything above and beyond what they would be doing in class anyway. If you choose not to allow your child to participate, s/he will remain in their classroom, but copies of their testing data and course work will not be analyzed.

It is estimated that the research study will take approximately four months to complete. At no time will your child be separated from peers or the teachers.

➤ EXTENT OF CONFIDENTIALITY

Reasonable efforts will be made to keep the personal information in your research record private and confidential. Any identifiable information obtained in connection with this study will remain confidential and will be disclosed only with your permission or as required by law.

Your name will not be used in any written reports or publications, which result from this research. Data will be kept for three years (per federal regulations) after the study is complete and then destroyed.

➤ **PAYMENT**

There will be no payment to you or your child as a result of your child taking part in this study.

➤ **QUESTIONS**

If you have any questions or concerns about participation in this study, you should first talk with the investigator Amanda Edwards-Whatley or her advisor, [REDACTED], at [REDACTED].

If you have questions about your rights as a research participant, you may contact the Gardner-Webb Institutional Review Board (IRB), which is concerned with the protection of volunteers in research projects. You may reach the board office between 8:00 AM and 5:00 PM, Monday through Friday, by calling or by writing: Institutional Review Board, Office of Research Compliance,

DOCUMENTATION OF CONSENT

I have read this form and decided that my child will participate in the project described above. Its general purposes, the particulars of involvement and possible risks have been explained to my satisfaction. I will discuss this research study with my child and explain the procedures that will take place. I understand I can withdraw my child at any time.

Printed Name of Child

Printed Name of Parent/Guardian

Signature of Parent/Guardian

Date

Signature of Person Obtaining Consent

Date

Appendix D

High School Content Area Writing Professional Development Series 2016 Survey

**High School Content Area Writing Professional Development Series 2016
Survey**

1. What grades levels do you teach? (Choose all that apply)
 - a. 9
 - b. 10
 - c. 11
 - d. 12

2. How long have you been teaching?
 - a. 1-4 years
 - b. 5-10 years
 - c. 11-15 years
 - d. 16-20 years
 - e. 21-25 years
 - f. 26-30 years

3. What is your level of education?
 - a. Bachelors Degree
 - b. Masters Degree
 - c. Doctoral Degree

4. Are you NC Certified in your content area?
 - a. Yes
 - b. No

5. Are you National Board Certified?
 - a. Yes
 - b. No
 - c. Awaiting Scores

6. Content Area Literacy instruction is encouraged at my school.
 - a. Yes
 - b. No

7. My students write regularly in my class.
 - a. Yes
 - b. No

8. I feel confident teaching writing in my class.
 - a. Yes
 - b. No

9. I feel confident teaching the average writer in my class.
- Yes
 - No
10. I feel confident teaching the advanced writer in my class.
- Yes
 - No
11. I feel confident teaching the struggling writer in my class.
- Yes
 - No
12. I feel confident creating writing assignments based on curriculum standards.
- Yes
 - No
13. I use writing assignments to assess student mastery of content standards.
- Yes
 - No
14. I feel confident creating grading rubrics for writing assignments.
- Yes
 - No
15. I use grading rubrics to assess writing assignments.
- Yes
 - No
16. I reflect on my daily instructional practices and student performance.
- Yes
 - No
17. For students who have difficulty writing, I accommodate for their ability by _____.
18. For students who are advanced writers, I accommodate for their ability by _____.
19. List any training you have received regarding writing instruction (in-service professional development or preservice instruction).
_____.

Appendix E

Email Permission to Use Survey

From: [REDACTED] >
Sent: Wednesday, August 5, 2015 9:56 AM
To: [REDACTED]
Subject: Re: Info From Last Week

I have created a survey using some of the questions from your example you sent me. How do I cite your survey when writing it up? Can you take a look and the questions I have so far, and let me know if I should develop anything further?

Kindly,
 [REDACTED]

NOTICE: This e-mail correspondence is subject to Public Records Law and may be disclosed to third parties. —

NOTICE: This e-mail correspondence is subject to Public Records Law and may be disclosed to third parties. —



High School Content Area Writing Professional Development

Series 2016.docx

19K

[REDACTED] Fri, Aug 7, 2015 at 7:47 PM
To: [REDACTED]

Thanks so much! The adjustments make perfect sense :) Also - how do I cite your survey?

[Quoted text hidden]

[Quoted text hidden]

NOTICE: This e-mail correspondence is subject to Public Records Law and may be disclosed to third parties. —<High School Content Area Writing Professional Development Series 2016.docx>

[REDACTED] Fri, Aug 21, 2015 at 12:59 PM
To: [REDACTED]

Cite my survey as follows:

Smith, N.L. (2014). *Middle Grades Literacy in Language Arts Professional Development Series*. Greensboro, NC: NC A&T State University.

[REDACTED]
Assistant Professor and Coordinator,
MAED Reading Education
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Appendix F

Rubric for Content Area Writing

Rubric for Content Areas

This rubric applies to the content-specific writing assignments in content areas such as mathematics, sciences, social sciences, humanities, arts, technology, etc., and should be used in conjunction with the Writing Features rubric.

Content Area Rubric

2011-2012 Online Writing Instruction

Performance Levels	Descriptions
Distinguished	The student response meets the following criteria: <i>demonstrates all aspects of the writing assignment</i> <i>follows all directions, steps, and/or procedures</i> <i>cites and explains appropriate content-specific examples accurately employs sound reasoning, arguments, and/or support</i> <i>demonstrates the use of evaluating, analyzing, and applying skills</i>
Accomplished	The student response meets the following criteria: <i>demonstrates most aspects of the writing assignment</i> <i>follows most directions, steps, and/or procedures</i> <i>cites and explains appropriate content-specific examples, however, some inaccurate information is included</i> <i>employs inferential reasoning, arguments, and/or support</i> <i>demonstrates the use of analyzing and applying skills</i>
Proficient	The student response meets the following criteria: <i>demonstrates some aspects of the writing assignment</i> <i>follows some directions, steps, and/or procedures</i> <i>may attempt to cite and explain some content-specific examples, and/or inaccurate information is included</i> <i>employs concrete reasoning, arguments, and/or support</i> <i>demonstrates the use of analyzing skills in a literal manner</i>
Developing	The student response meets the following criteria: <i>does not demonstrate any aspect of the writing assignment</i> <i>follows few directions, steps, and/or procedures or none at all</i> <i>cites inaccurate or inappropriate examples</i> <i>employs little or no evidence of reasoning, argument, and/or support</i> <i>demonstrates little or no evidence of any apparent reasoning skills</i>
Note	Those performance levels for content-specific assignments for Second Language courses should note that student responses may be composed in the foreign language that is being taught and scored accordingly.

Appendix G

Classroom Observation Protocol

Classroom Observation Protocol

Context: This instrument is designed to be used on a continuum with other measures of classroom practice. Prior to this observation, teachers have completed a self-report survey of their classroom practices. This observation and the brief interview attached are intended to provide further evidence to support the survey data. The observation cycle is best followed by an in-depth interview.

Some questions for this survey were developed by the Mississippi Writing Thinking Institute and are copyrighted by Mississippi State University.

<i>Observation Date</i>	
<i>Observer's Name</i>	
<i>Content Area/Course Name</i>	
<i>School</i>	
<i>Observation Length/Time</i>	

I. Physical Setting/Classroom Context

Consider the room arrangement. Where were the students and teacher working on this particular day? Describe what was on the walls/board in regards to writing and the display of student work. Also consider what was *not* there. What are the details that stand out to you concerning the literacy elements of the classroom—particularly the teaching of writing? How were students interacting? Who was talking? Who was listening? What was the teacher doing? If helpful, sketch the layout of the classroom designating desk/work and writing spaces/supports (e.g. computers) and attach to observation form.

II. Lesson Flow and Summary

Please record the major events of the lesson. Cite evidence, examples, and direct quotations if possible.

Time (Min.)	Observations	Comments	Materials

III. Strategies

Listed below are strategies/concepts participants rated on a self-assessment survey. Either in the lesson you observed or in other assignments/student writing the instructor may share with you, please mark “yes” if you saw evidence of the following:

What kinds of writing did you see used? (Leave blank if not observed.)

	Yes	Notes/Evidence
Quickwrites/free writes		
Constructed response		
Point of view writing		
Dialogues/plays		
Poetry		
Personal narratives/memoirs		
Stories		
Essays of various kinds		
Book reports		
Research paper/projects		
Reading response journals		

Learning logs/classroom notes		
Personal journals		
Letters		
Editorials		
Summaries		
Interviews		

What strategies did you see? (Leave blank if not observed.)

	Yes	Notes/Evidence
Graphic organizers		
Writers notebooks		
Word walls/word banks		
Word building activities		
Sentence combining/sentence building		
Mini-lessons		
Modeling		
Running records		
Student-teacher conferences		
Scoring guides		
Portfolios		
Power writing		
Jigsaws		
Literature circles		
Other major strategies (specify)		

What aspects of the writing process did you observe? (Leave blank if not observed.)

	Yes	Notes/Evidence
Prewriting		
Drafting		
Peer responding		
Revision		
Editing		
Publishing student work		

Did you observe support as students developed a major writing assignment?

	Yes	Notes/Evidence
Discuss the assignment in class		
Allow the student to work on the		

assignment over time		
Give opportunities for writing in class		
Conference with individual students		
Provide opportunities for revision		
Use examples of finished products as models		
Discuss and analyze these models		
Give students opportunities for feedback from peers on drafts		
Provide some instruction on how to respond to drafts		
Allot time for editing and proofreading of drafts before they are submitted.		
Other (specify topic)		

Did you observe response to student writing?

	Yes	Notes/Evidence
Write comments in margins or at the end		
Offer students specific written suggestions for revisions		
Provide comments and a grade		
Write comments on post-it notes		
Put comments on a response form		
Conference with individual students		
Not applicable		
Other (Explain: _____)		

Did you observe the sharing of student writing?

	Yes	Notes/Evidence
Publishing		
Read arounds		
Bulletin board displays		
Author's chair/presentations		

Websites or online conference boards		
Other (specify)		

IV. *Other Observations*

Please record any additional notes/observations/insights you might have.

Appendix H

Email Permission to use Classroom Observation Protocol

research protocol permissions5 messages

Wed, Jan 27,
2016 at 11:51
AM

To

Dr. Singer,

Good morning! I am a doctoral student at Gardner-Webb University preparing to conduct a study focused on intensive writing instruction in the content areas and student achievement. The study will include professional development for participating teachers. I would like to use the observation and interview protocols developed for The Gateway Writing Project and need further instructions for obtaining permissions. Is this an area that you could provide further help? I look forward to hearing from you.

Kindly,

--
[Redacted]

Singer, Nancy <singerna@umsl.edu>

Wed, Jan 27, 2016 at 5:44 PM

To: [Redacted]

Hi [Redacted]

What are the specific instruments you would like to use? I'm happy to share.

Nancy Robb Singer, Ph.D.

Gateway Writing Project Director & Associate Professor

358 Marillac Hall, St. Louis MO 63121 | 314-516-5517 (office) | 314-516-5348 (fax) | singerna@umsl.edu

From: [Redacted]
[mailto:[Redacted]]

Sent: Wednesday, January 27, 2016 10:52 AM
To: Singer, Nancy
Subject: research protocol permissions

[Quoted text hidden]

Wed, Jan 27,
2016 at 9:38
PM

To: "Singer, Nancy" <singerna@umsl.edu>

Hi Dr. Singer,

I am interested in using the Classroom Observation Protocol and the semi-structured interview questions found in the 2006 project "Increasing Student Achievement in Writing Through Teacher Inquiry: An Evaluation of Professional Development Impact." One set of data that I will collect and analyze is teacher classroom implementation of writing strategies learned from professional development.

Kindly,

[Quoted text hidden]

Singer, Nancy <singerna@umsl.edu> Wed, Jan 27, 2016 at 9:39 PM
To: Amanda Edwards-Whatley [REDACTED]

I am happy for you to use it so long as you credit the source.

Best of luck with your project!

Nancy Robb Singer, Ph.D.

Gateway Writing Project Director & Associate Professor

358 Marillac Hall, St. Louis MO 63121 | 314-516-5517 (office) | 314-516-5348 (fax) | singerna@umsl.edu

Appendix I

Teacher Reflection Questionnaire

Teacher Participant Reflection Questionnaire

Question 1: What strategies did you utilize in your classroom since the last meeting? How many total times did you use the strategy/strategies? What was the student response/results of the strategy implementation?

Question 2: What problems or issues did you encounter during implementation since the last meeting?

Question 3: What areas of writing implementation/strategy use need clarification or additional support?

Appendix J

Professional Development Agenda and First Week Session Plan

 Professional Development Agenda

 Series Plan

Date	Time	Focus/Mode
August 2016	1 to 1.5 hour(s) each workday.	Face-to-face session with researcher and participants. Best practices instruction for teaching writing. Content-specific standards unpacking and writing activity development. Content-specific strategies practice.
August (weekly) 2016	.5 hour per session	Follow-up support sessions. Teacher reflection questionnaire completed. Teachers come with questions. Student work samples reviewed and discussed.
September (weekly) 2016	.5 hour per session	Additional strategy instruction. Teacher reflection questionnaire completed. Follow-up support sessions. Teachers come with questions. Student work samples reviewed and discussed.
October (weekly) 2016	.5 hour per session	Additional strategy instruction. Teacher reflection questionnaire completed. Follow-up support sessions. Teachers come with questions. Student work samples reviewed and discussed.
November (weekly) 2016	.5 hour per session	Additional strategy instruction. Teacher reflection questionnaire completed. Final meeting (last week of November) Teacher debriefing, take-away, comments, suggestions for researcher

Writing in the Content-Areas: Professional Development Series				
Week 1:				
Session Day	Session Length	Objectives	Content Taught	Reflection/Assignment
Day 1	1 hour	Introduce Writing in the Content Areas	<ul style="list-style-type: none"> List best practices Define practices Provide models for best practices 	Participants will gather two writing assignments used in past lessons for day 2 session
Day 2	1.5 hours	Teaching and Modeling Writing	<ul style="list-style-type: none"> Participants share writing assignments used Group discussion of assignments <i>EQ: How did you model this assignment for your students?</i> Training focus: How to model writing for students 	What types of writing do you use throughout the year? Bring back example activities for each type.
Day 3	1.5 hours	Writing strategies/ activities	<ul style="list-style-type: none"> Daily writing activities: provide activities and strategies for daily and weekly writing Writing to write – not grade 	Which of the strategies or activities shared could you use immediately? Bring back a lesson with two activities or strategies incorporated.
Day 4	1.5 hours	Differentiation and Scaffolding	<ul style="list-style-type: none"> Writing as differentiation Writing as scaffolding Shared activities and strategies Model use/practice 	Bring content standards and lesson plans to next meeting.
Day 5	1.5 hours	Addressing Content Standards with Writing	<ul style="list-style-type: none"> How to connect writing to content standards Provide activities / strategies Practice with participants Leave session with two activities or strategies connected to standards 	Incorporate strategies or activities created during this session into lesson plans for first week of classes.