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A Mixed-Methods Study of Teachers' Perceptions of the Impact of the Common Core State Standards on Elementary Students' Abilities to Think Critically

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Approval Page

This dissertation was submitted by Chris Blanton 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

A Mixed-Methods Study of Teachers' Perceptions of the Impact of the Common Core State Standards on Elementary Students' Abilities to Think Critically. Blanton, Chris, 2014: Dissertation, Gardner-Webb University, Critical Thinking/Common Core State Standards/ Elementary

This dissertation employed a mixed-methods design to ascertain the perceptions of elementary school teachers in relation to the impact the Common Core State Standards had on their students' abilities to think critically. The participants were teachers from three schools within the same district in western North Carolina. Quantitative data were collected via a 5-point Likert scale survey distributed via Survey Monkey. Qualitative data were collected via open-ended questions and focus group interviews. The data were collected to answer the research question, "What is the impact of the Common Core State Standards on the critical thinking abilities of students?" The researcher designed the survey around the characteristics of a critical thinker developed by Dr. Robert Ennis. Focus group questions were developed following an analysis of survey and open-ended responses. Data analysis entailed applying the chi square goodness of fit test, determining cumulative percentages and mean responses, as well as coding for themes based on a researcher-created strength code. The researcher found participants in this study believed the Common Core State Standards had a positive impact on their students' abilities to think critically. Recommendations for future research include conducting a study after the standards have been in place for a longer period of time. Additionally, research involving teachers at the secondary level and from varying districts and states would add to the body of knowledge related to the Common Core State Standards and critical thinking.

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Chapter 1: Introduction

Experts agree that in order to be prepared for life in the 21st century, critical thinking skills such as the ability to ask clarifying questions (Ennis, 2010) and use knowledge to solve new types of problems (Zohar & Dori, 2003) are essential for success (Bellanca, Fogarty, & Pete, 2012). Most agree that teaching critical thinking should be a vital part of the curriculum students receive as they prepare for higher education or the workplace (Case, 2005).

> For those who hope to advance their education beyond high school and into college or to compete for a significant job in the new global economy, the ability to think critically is a well-recognized imperative and an essential part of this century's first set of Common Core State Standards. (Bellanca et al., 2012, p. 13)

The basic skills of reading, writing, and arithmetic are no longer sufficient in a world where easily replicated jobs are being outsourced and automated (American Management Association, 2010). The skills necessary for success in higher education and the workforce look very different than they have in the past (Wagner, 2008). The corporate community and academic community are beginning to come to a consensus about what students need to receive in school in order to achieve success in postsecondary education as well as in their chosen career (Bassett, 2005). We are now living in an era that, among many things, is characterized by instant access to large amounts of information. It is essential that we understand how to access this information and make a determination as to its usefulness and reliability. In today's information age, the ability to think critically about and process new information is a skill that must be mastered in order to cope with a rapidly changing world (Suh, 2010; Zohar & Dori, 2003). A widely shared belief among researchers and educators is that an individual's

specific knowledge will be less important for tomorrow's workers than his/her ability to learn and make sense of new information (Fischer, Bol, & Pribesh, 2011). To achieve success in the 21st century, critical thinking is a fundamental cognitive resource. It may well be the decisive element for accomplishing the many tasks and situations we encounter on a daily basis (Almeida & Franco, 2011). One of the goals of education is to provide students with the skills and abilities needed to succeed. The recent adoption of the Common Core State Standards by many states represents an effort to teach critical thinking and the skills associated with critical thinking including analyzing, reasoning, judging, evaluating, and problem solving. These verbs are either explicitly or implicitly stated in the standards (Lai, 2011).

The National Governors Association Center for Best Practices and Council of Chief State School Officers (2010) stated the following in reference to the new standards:

> The standards were drafted by experts and teachers from across the country and are designed to ensure students are prepared for today's entry-level careers, freshman level college courses, and workforce training programs. The Common Core focuses on developing the critical-thinking, problem-solving, and analytical skills students will need to be successful. (http://www.corestandards.org/what-parents-should-know/)

Killion, Harrison, Bryan, and Clifton (2012) concurred that the Common Core State Standards are an attempt to ensure students graduate from high school armed with the thinking skills necessary for future success.

Teaching critical thinking skills in schools is not only a way to help students achieve success in schools, but it is also important if students are going to be able to navigate in an increasingly complex world (Buffington, 2007). As the civilization we

live in evolves, the members of society need more than basic knowledge; they also need to develop basic thinking skills (Goodlad, 2004). If the goal of our current education system is to produce educated citizens, then the teaching of critical thinking is a necessity because the ability to think critically is a hallmark of an educated person (Brookhart, 2010). There are different ideas surrounding what critical thinking entails. Mendelman (2007) defined critical thinking as "disciplined intellectual criticism that combines research, knowledge of historical context, and balanced judgment" (p. 300). Another description concluded that "critical thinking is skeptical without being cynical. It is open-minded without being wishy-washy. It is analytical without being nitpicky. Critical thinking can be decisive without being stubborn, evaluative without being judgmental, and forceful without being opinionated" (Facione, 2011, p. 23).

The state superintendent for North Carolina posted a blog that outlined her view of where she believed public schools are headed in the 21st century. She emphasized the importance of public schools evolving into places where students use technology and develop the ability to think critically (J. St. Claire Atkinson, 2012).

In 2010, the American Management Association (AMA), in conjunction with the Partnership for 21st Century Skills (P21), an organization that focuses on preparing students for success in the 21st century, surveyed 2,115 managers and executives. The survey focused on the four Cs that have been identified as fundamental to workforce preparedness and success in business. The first of the Cs was critical thinking and problem solving which was conceptualized as "the ability to make decisions, solve problems, and take action as appropriate" (American Management Association, 2010, p. 2). Over 75% of the executives surveyed believed the four Cs which included critical thinking, communication skills, collaboration, and creativity will become more important

to their respective organizations in the next 3-5 years. Almost half, 48.1%, of the executives rated their employees as average to below average in their critical thinking abilities (American Management Association, 2010). When asked to rate the K-12 education system on its ability to prepare students in the four Cs, only 10.9% of the executives surveyed felt the K-12 system was capable of doing an above average job (American Management Association, 2010). The survey revealed that executives believed the 21st century requires more skilled workers, and the 4 Cs, including critical thinking, will be more important in the fast paced global economy we live in (American Management Association, 2010). North Carolina, along with 18 other states, adopted the P21 Framework for 21st Century Learning, which includes critical thinking and problem solving as one of the student outcomes necessary for success in the 21st century (P21, 2011). According to the P21 framework, core knowledge is not sufficient in the 21st century. In addition to core knowledge, students will have to possess essential skills including the ability to think critically and solve problems if they are going to be successful in today's world (P21, 2011).

Goodlad (2004) developed a set of goals he believed should be the focus of American education. The first two goals fall under the category of academic goals. Goal one was mastery of basic skills and fundamental processes. Goodlad broke this goal down into five descriptors. Included in these descriptors were the basics of reading, writing, and arithmetic. In addition to the basics, Goodlad also included, as the fifth descriptor, the ability to utilize available sources of information. Goodlad's second goal was intellectual development. The descriptors for goal two revolved around the importance of problem-solving abilities and critical-thinking skills. The second descriptor, under goal two, stated that citizens need to develop the ability to use and

evaluate knowledge, i.e., critical and independent thinking in order to make judgments in various life roles including the roles of citizen and worker. The last descriptor under goal two acknowledged that we live in a changing society and placed emphasis on the importance of understanding that our world is not static (Goodlad). Along with these goals and descriptors, Goodlad stated,

> As civilization has become increasingly complex, people have had to rely more heavily on their rational abilities. Also, today's society needs the full intellectual development of each member. This process includes not only the acquisition of a fund of basic knowledge but also the development of basic thinking skills. (p. 52)

Statement of the Problem

The pervasive concern in education is that we are not adapting to the changing world we live in and our students are leaving schools unprepared for what lies in front of them (Spellings, 2006; Wagner, 2008). Even though experts realize critical thinking is an important skill, instruction at most schools does not encourage or foster students' abilities in this area. The typical school focuses more on covering content at the expense of developing critical thinking skills (Lai, 2011). Case (2005) referred to the amount of critical thinking instruction in school as disheartening, claiming that the amount of critical thinking instruction students receive in schools is far less than they should receive. Bassett (2005) stated that we must be willing to take calculated risks and design curricula that not only transmit information but also encourage critical thinking among students. Students should be taught to think during their formative years. One of the primary outcomes of quality public education should be fostering the thinking ability of students. One of the issues currently facing American public education is the notion that we are not fostering critical thinking abilities in students. This leads to the feeling that

schools are not producing students who will be globally competitive in this changing world. In order to ensure students are prepared, schools must teach critical thinking (Wagner, 2008). Lett (1990), a college professor, stated,

> I am especially concerned with the ineffectiveness of public education, which generally fails to teach students the essential skills of critical thinking. Students in my classes simply do not know how to draw reasonable conclusions from the evidence. At most, they've been taught in high school what to think; few of them know how to think. (p. 1)

Research supports the feeling that many students are leaving K-12 public schools unprepared and offers several reasons why this may be the case. Wood, one of the coauthors of *Many Children Left Behind,* believed that high stakes testing was to blame (Meier, Kohn, Darling-Hammond, Theodore, & Wood, 2004). He claimed the No Child Left Behind Act of 2001, which required the annual testing of students beginning in third grade, was forcing teachers to teach to the test. The practice of teaching to the test narrowed the curriculum to *drill and kill* and provided no evidence that testing produced better citizens, employees, or college students (Meier et al., 2004). Libresco (2006) believed high stakes testing measured only what was easy to measure, which in her opinion was also what mattered the least. Libresco, like Wood, felt high stakes testing produced teaching to the test. As opposed to spending time preparing students to take a test, she felt teachers should be using that time on activities that encouraged critical thinking (Libresco).

Wagner (2008) outlined what he called *survival skills* he believed schools should teach in order to prepare students for what he called the *new world of work*. After reading about the rapidly changing world of work and conducting interviews with

employers, Wagner became concerned that our schools were not preparing students with the skills necessary for success after graduation. Wagner felt one of the essential survival skills is critical thinking and problem solving. According to many of the people Wagner interviewed, the abilities to think critically and solve problems were vital for success in the workplace. They also noted that many applicants and college students did not have these abilities because they were not being taught these skills while in school. After visiting schools across the country, Wagner concluded that due to the No Child Left Behind law teachers were focusing on teaching the basics of reading and math because this is what students were to be tested on. The focus on teaching what will be tested was preventing teachers from developing Wagner's survival skills that included critical thinking and problem solving, largely because the tests did not/could not measure if students can think critically (Wagner). Gallagher, an author and teacher, came to the same dim conclusion regarding student readiness to enter the workforce upon completion of their formal education. Gallagher interviewed a prominent businessman and asked what type of person his multi-million dollar company looked to hire. The response he received was "we try to hire the smartest people on earth" (K. Gallagher, personal communication, July 16, 2012). Gallagher asked the follow up question, "How is that going for you" (K. Gallagher, personal communication, July 16, 2012). The reply was that it was not going very well. The business leader went on to tell Gallagher that finding smart people was not the problem, finding smart people who could think was where the company was having difficulty (K. Gallagher, personal communication, July 16, 2012).

Teacher preparation programs and the lack of quality professional development were two additional reasons Wagner (2008) felt students were not being taught to think critically in public schools in the United States. Wagner believed teacher training

programs should include internships and residencies that resembled what was required of a medical student. In addition to this, he felt teachers should be provided with support in the form of expert coaching and guidance that would equip teachers with the knowledge and ability to teach students to become thinkers (Wagner).

A final trend in education that seemed to inhibit the development of critical and higher-order thinking skills in students was the educators' unwillingness to change (Frykholm, 2004). Frykholm (2004) felt that it was difficult for educators to get out of their comfort zone and do something even mildly different. Frykholm examined this very idea and concluded that as teachers began to use a program that allowed students to become more autonomous and encouraged them to think about and explore different possible solutions, the level of discomfort among teachers increased. The discomfort increased because teachers felt students were doing activities in their classrooms that looked quite different from what one would expect to see in some of the more typical math classrooms in the 80s and 90s (Frykholm).

While the reasons are numerous and varied, it is clear that experts, business leaders, and educators agree we are failing to teach students to think critically. While many believe we are failing to teach critical thinking, most agree that critical thinking, which involves using knowledge to make decisions and being reflective (Stapleton, 2011), is a skill necessary for success in the 21st century. We are no longer living in a time where possessing knowledge is sufficient. For this reason, educators must evolve into more than distributors of knowledge. Schools must provide instruction that enables students to develop their thinking skills and creates students who desire to use critical thinking abilities if they are to be successful.

The Research Problem

Many students are graduating from high school without the ability to think critically. In order for students to obtain success in higher education and their careers, critical thinking is a necessary skill. It is imperative that schools make a conscious effort to ensure students are able to think critically upon graduation (Blosveren & Achieve, 2012; Kendall, 2011). The introduction of the Common Core State Standards is an attempt to ensure high school graduates possess the ability to think critically and are better prepared for either higher education or work. Robbins (2013) claimed the new standards are a radical redirection of American education that requires schools to focus less on knowledge and more on critical thinking. The ultimate outcome is supposed to be students who are able to transition to college or work and compete in the global economy. With instruction focused on teaching students how to think as opposed to what to think, students will not leave K-12 public education institutions unprepared for either college or a career. Students should possess the knowledge, skills, and ability to think critically upon graduation from high school (Wagner, 2008).

The focus of education in the early part of the 20th century was on making sure students acquired basic skills in reading, writing, and math calculations. Most teachers used textbooks as their primary resource, and the main focus in many classrooms was ensuring that students memorized facts (Zohar & Dori, 2003). The tests students took required them to regurgitate these facts. This type of learning required little thinking on the part of students in terms of applying what they learned. The role of teachers was viewed by many as the transmitter of these facts to their students (Zohar & Dori, 2003).

Our world has changed a great deal over the last 100 years, but many experts believe our educational practices have remained largely unchanged (Friedman, 2007).

While most still acknowledge there is a need to memorize certain factual information, the ability to acquire new knowledge and use that knowledge as a means for solving new types of problems has quickly become more important. The idea that schools can teach students the basic skills now and leave the teaching of thinking and reasoning for a later time is no longer acceptable. Thinking and reasoning must be integrated into the teaching and learning process for all students (Zohar & Dori, 2003). Learning cannot take place without thinking. For this reason, thinking skills must be intertwined with all content areas if learning with understanding is going to occur (Zohar & Dori, 2003).

In an effort to strengthen the curriculum and address areas of curricular concern, including critical thinking, North Carolina along with 47 other states adopted the Common Core State Standards in K-12 mathematics and English language arts (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010). The standards detail the content knowledge students are expected to master in each grade level and also incorporate skills such as critical thinking (Bellanca et al., 2012). Many skills are reflected in the standards as they were designed to incorporate those skills that are now being required by employers, postsecondary systems, and the democratic society in which we live (Blosveren & Achieve, 2012).

This dissertation studies teacher perceptions of the impact the Common Core State Standards has on students' abilities to think critically. The Common Core State Standards were not fully implemented in North Carolina until the 2012-2013 school year. Because the standards were not fully in place until the 2012-2013 school year, there is little research available on the impact the new standards will have on students' abilities to think critically. While there is little research surrounding the Common Core State Standards, there is a wealth of information regarding critical thinking, which is defined

by Ennis (1985) as "reflective and reasonable thinking that is focused on deciding what to believe or do" (p. 45). The critical thinking research about the need to teach critical thinking in schools is available, but there is a deficiency in the amount of research regarding critical thinking by elementary school students. The number of schools and students impacted by the adoption of the standards, along with the deficiency in available research surrounding the standards and critical thinking in elementary schools led the researcher to this topic. The researcher believes an examination of the standards and their impact on critical thinking is necessary as we progress in our understanding of teaching and learning as it is related to the new curriculum that has been adopted by the majority of states.

The Common Core Standards require that educators move away from the *drill and kill* method of preparing students (Meier et al., 2004) and move more toward teaching critical thinking and problem solving. This will be a dramatic shift from what is currently taking place in many schools across the country (Wagner, 2008). It is not that knowledge and memorization are not important, but they are not sufficient. The ability to use what has been learned previously to learn new things and solve problems is what is important (Raths, 2002). Teachers and students, however, would not be the only groups impacted. Critical thinking is essential for democracy to thrive. Critical thinking on the part of citizens in democratic societies is essential for competitive free-market economic enterprise (Facione, 2011). Because it is so important, all citizens should be educated so they can learn to think critically. The benefits of teaching students to think critically reach far beyond the school walls. If one can reform education so that students leave with the ability to think critically, society as a whole should benefit from these efforts. The Common Core State Standards represent a shift in education that some experts

believe is the reform necessary to ensure students graduate from high school with the knowledge and skills they will need to be successful in life. Critical thinking is one of the skills reflected throughout the mathematics standards and the English language arts standards (Blosveren & Achieve, 2012).

After a review of the literature, the researcher has designed much of this study around the work of Dr. Robert Ennis. While there are many definitions and conceptualizations of critical thinking, the researcher has chosen to use the work of Dr. Ennis for the purposes of developing an operational definition of critical thinking. Dr. Ennis is a leading expert in the field of critical thinking. Through a review of literature, the researcher identified Dr. Ennis as one of the foremost authorities on critical thinking. His work is referenced in many of the articles, studies, and books the researcher reviewed during the search for material relevant to this study. Dr. Ennis's work with critical thinking dates back to 1951, when he began his teaching career. Dr. Ennis continues to contribute to the body of knowledge focused on critical thinking in his current role as a Professor of Philosophy of Education at the University of Illinois. Dr. Ennis has authored several books and more than 50 scholarly articles. In addition to publishing books and articles, Dr. Ennis has developed and published several assessments that are designed to test critical thinking ability (Ennis, 2011). Facione (1990) included Dr. Ennis in a Delphi project that asked a select group of experts to collaborate around the topic of critical thinking. The project was aimed at achieving a consensus of expert opinions related to critical thinking and the conception of the skills and dispositions involved in critical thinking. This further exhibits the expertise of Dr. Ennis and provides greater justification for using the work of Dr. Ennis when defining and conceptualizing critical thinking. The researcher outlines Dr. Ennis's super-streamlined conception and how it is

being used in this study in subsequent chapters.

Many American educators are familiar with Bloom's Taxonomy and the more recent version, Bloom's Revised Taxonomy (Krathwohl, 2002). The taxonomies are classifications of learning objectives designed to promote higher order and critical thinking skills. The taxonomies require students to deal with increasingly larger amounts of information and increasingly complex relationships between the new information as they move up the hierarchies (Brookhart, 2010). There are similarities between critical thinking and many of the nouns in Bloom's Taxonomy and the verbs in the revised Bloom's Taxonomy. The overlap is most apparent in levels three through six in both versions of the Taxonomy (Table 1 and Table 2); however, the nouns in levels one through three of the original Bloom's Taxonomy and the verbs associated with Bloom's Revised Taxonomy have connections to Ennis's (2010) conception of critical thinking. "Knowledge," the lowest level of Bloom's Taxonomy (Nentl & Zietlow, 2008), and "remembering," the lowest level of Bloom's Revised Taxonomy (Ari, 2011), are closely related to being "well-informed" that Ennis (2010) believed to be a desire of the critical thinker. Understanding, comprehension, and application, which are associated with levels two and three of the original and revised Taxonomies, also have connections with critical thinking abilities and dispositions (Ennis, 2012). Analysis, evaluation, synthesis and the ability to create are the descriptors for the top three levels of Bloom's Taxonomy and Bloom's Revised Taxonomy. Activities falling in these three categories ask students to do far more than simply remember or understand (Raths, 2002). Analysis involves breaking material down and determining how the parts relate to the whole (Mayer, 2002). The act of evaluating requires a judgment to be made (Nentl & Zietlow, 2008). In order to make a judgment, the cognitive processes of checking and critiquing must be

employed (Raths, 2002). The act of creating requires that elements be put together to form a functional whole. A creator must generate, hypothesize, plan, design, produce, and construct (Raths, 2002). While all levels of Bloom's Taxonomy and Bloom's Revised Taxonomy have important educational implications, the higher levels of the taxonomies are most closely associated with critical thinking as they deal with the transfer and creation of knowledge, while the lowest level of Bloom's Taxonomy and Bloom's Revised Taxonomy focus on knowledge retention (Mayer, 2002). Nentl and Zietlow (2008) discussed the idea of breaking through what they called a learning barrier. The barrier they were referring to was the barrier between the foundational stages of learning found at the lowest three levels of Bloom's Taxonomy and advanced critical thinking which takes place when students analyze, synthesize, and evaluate information. Booker (2007) cautioned against an overreliance on Bloom's Taxonomy in American education due to what he believed was a tendency to devalue the lowest level which requires students to acquire basic knowledge. Booker felt students were being asked to think critically and function in the highest levels of the taxonomy while factual information was being regarded as unimportant. Ennis (1985) believed that higher-order thinking is a concept too vague to guide curriculum and instruction. Ennis did, however, believe the taxonomy developed by Bloom had value in the sense that it served as a reminder to schools that there are far more imperative goals in education that go beyond the basic memorization of factual knowledge. Ennis summarized the relationship between higher order thinking and critical thinking by saying, "deciding what to believe or do is a higher-order thinking enterprise and most practical higher-order thinking activity is focused on deciding what to believe or do" (p. 47).

Table 1

Bloom's Taxonomy of Educational Objectives for Knowledge-Based Goals

Level	Description of Level
1.0 Knowledge	Recall, or recognition of terms, ideas, procedures, theories, etc.
2.0 Comprehension	Translate, interpret, extrapolate, but not see full implications or transfer to other situations.
3.0 Application	Apply abstractions, general principles, or methods to specific concrete situations.
4.0 Analysis	Separation of a complex idea into its constituent parts and an understanding of organization and relationship between the parts. Includes realizing the distinction between hypothesis and fact as well as between relevant and extraneous variables.
5.0 Synthesis	Creative mental construction of ideas and concepts from multiple sources to form complex ideas into a new, integrated, and meaningful pattern subject to given constraints.
6.0 Evaluation	To make a judgment of ideas or methods using external evidence or self-selected criteria substantiated by observations or informed rationalizations.

Table 2

Bloom's Revised Taxonomy (Krathwohl, 2002)

Level	Descriptors
1.0 Remember–Retrieving relevant knowledge from long-term memory.	1.1 Recognizing 1.2 Recalling
2.0 Understand–Determining the meaning of instructional messages, including oral, written, and graphic communication.	2.1 Interpreting 2.2 Exemplifying 2.3 Classifying 2.4 Summarizing 2.5 Inferring 2.6 Comparing 2.7 Explaining
3.0 Apply–Carrying out or using a procedure in a given situation.	3.1 Executing 3.2 Implementing
4.0 Analyze–Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose.	4.1 Differentiating 4.2 Organizing 4.3 Attributing
5.0 Evaluate–Making Judgments based on criteria and standards.	5.1 Checking 5.2 Critiquing
6.0 Create–Putting elements together to form a novel, coherent whole or make an original product.	6.1 Generating 6.2 Planning 6.3 Producing

Definition of Terms

Critical thinking. "Reflective and reasonable thinking that is focused on deciding what to believe or do" (Ennis, 1985, p. 45).

Common Core State Standards. "A set of standards for what K-12 students should know and be able to do in the content areas of English language arts and math" (Anderson, Harrison, & Lewis, 2012, p. 2).

Educational standards. "Help teachers ensure their students have the skills and knowledge they need to be successful by providing clear goals for student learning" (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010, What are educational standards?).

Research Question

What is the impact of the Common Core State Standards on the critical thinking abilities of students?

Summary

Chapter 1 provides an overview of the problem the researcher focuses on in this dissertation. The problem centers on critical thinking and public schools. Through a preliminary review of the related literature, the researcher outlined the opinions of experts in the fields of education and critical thinking. The research suggests that experts believe many students are graduating from high school unprepared to enter the workforce or higher education due in large part to an inability to think critically. Chapter 1 also provides a brief look at the recently adopted Common Core State Standards. The standards are designed to outline what students should know and be able to do. The standards require students to be able to engage in critical thinking activities in both math and English language arts. Chapter 2 of this dissertation consists of an in-depth review of the related literature. The primary focus of Chapter 2 is to review ways in which educators have addressed the need to incorporate critical thinking into classrooms prior to the introduction of the Common Core State Standards. Subsequent chapters outline the methodology, analyze the data, and draw conclusions from the data.

Chapter 2: Literature Review

Overview

This research study was conducted in an effort to assess the impact the Common Core State Standards could have on the critical thinking abilities of students. The participants in this study were teachers at Connor Elementary School**.** The kindergarten, first, and second grade teachers at Connor Elementary School began teaching the math standards during the 2011-2012 school year. The teachers in Grades 3-5 began teaching the math standards at Connor Elementary during the 2012-2013 school year. All grade levels began teaching the English language arts Common Core Standards in the fall of 2012. Connor Elementary is a title I school located in the foothills of Western North Carolina. The school operates on a traditional calendar and serves students in prekindergarten through fifth grade.

The information gathered for this study attempted to determine teacher perceptions of the impact the Common Core State Standards have on the critical thinking ability of students attending Connor Elementary School. Information was gathered through surveys and interviews. Conclusions were based on the information gathered and attempted to determine what impact, if any, the Common Core Standards have on the critical thinking abilities of students.

Based on the review of current literature, it appears that many experts believe that it is imperative for K-12 public schools to move past the practice of simply presenting facts to students and attempting to have those students memorize and regurgitate them (Mandernach, 2006). Instead, educators should shift toward having children develop the ability to transfer the knowledge and skills they acquire as students to their everyday lives (Burke, Williams, & Skinner, 2007). Wagner (2008) ascertained one of the most

important skills students need upon graduating high school is the ability to think critically, defined by Ennis (1985) as "reflective and reasonable thinking that is focused on deciding what to believe or do" (p. 45).

Carr (1990) believed that students have a deficit in critical thinking skills at all levels of education and there is an urgent need to teach these skills in every grade. Traditional classrooms and schedules in schools present barriers to the development of critical thinking. Some of the challenges teachers face are a limited amount of contact time with their students, a lack of material resources, inadequate teacher preparation programs, a diverse student population, pressure associated with state testing, and a grandiose amount of material to cover (Mandernach, 2006). As a result, students are not being taught to think critically and graduates are leaving high school unprepared to face the challenges of life in the 21st century, due in large part to deficits in their critical thinking ability.

Even more alarming, students are in competition with people from all over the world. More often, geographic location is no longer a barrier to one's career options in today's society (Friedman, 2007). The current and future job markets will require graduates to be proficient in skills, such as prediction and interpretation (Balin, Case, Coombs, & Daniels, 1999), as well as possess attributes that include leadership, teamwork, problem solving, time management, critical thinking, and global awareness (Bassett, 2005). Information and knowledge in the 21st century continue to increase exponentially when compared to previous centuries. Remembering and repeating information used to be sufficient but this is no longer the case. In today's world, success depends on students' abilities to think critically: Their capacity to learn and to use knowledge to solve new types of problems (Zohar & Dori, 2003).

The Common Core State Standards attempt to address the lack of critical thinking abilities in students by incorporating critical thinking into the content students are learning in English language arts and mathematics in kindergarten through 12th grades. Teachers, researchers, and leading experts across the country collaborated to design the Common Core State Standards for mathematics and English language arts so everyone within the states that adopt the standards will have a clear focus as to what students are expected to know and be able to do (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010).

The standards have critical thinking and many of the other skills experts have identified as necessary for success imbedded within them (Manthey, 2012). Critical thinking behaviors including analysis, problem solving, and evaluation are incorporated into both sets of standards. Many of the standards explicitly mention skills and abilities associated with critical thinking while others are implicit within the language of the standards (Bellanca et al., 2012; Bouchard, 2011). According to Bellanca et al. (2012), the skills and their synonyms listed in Table 3 are implied in the standards. All of these words relate to thinking according to the authors and can be found in many of the definitions and conceptions of critical thinking.

In addition to implied critical thinking vocabulary, the standards also explicitly state skills associated with critical thinking. Table 3 identifies the words found within the K-5 Common Core Standards along with the number of times they appear. Table 4 represents only those words associated with critical thinking in Grades K-5 as identified by Bellanca et al. (2012).

Table 3

Implicit Skills and Synonyms Found in the Common Core State Standards

Skill	Synonym	Synonym
Generate	Produce	Create
Associate	Relationships	Sequence
Hypothesize	Predict	Ask/Answer
Reason	Justify	Demonstrate
Connect	Relationships	Relate
Synthesize	Create	Produce
Generalize	Comprehend	Describe

Table 4

Explicit Critical Thinking Skills in the Common Core State Standards

Word	Frequency	Subject
Analyze	2	ELA
Analyze	4	Math
Evaluate	1	Math
Solve	1	ELA
Solve	36	Math

This study focused on the Common Core Standards in the primary grades, but the researcher believes it is important to note the frequency of words the authors associate with critical thinking located in the Grades 6-12 standards. There is a dramatic increase of vocabulary related to critical thinking at the higher grade levels. The researcher feels this may be due to the cognitive ability levels of students in elementary school and their perceived ability or inability to handle higher level critical thinking activities. Within the

review of related literature, the researcher examined studies at the primary and secondary levels of education. Larmer (2012) alluded to the developmental levels of students and contends their level of readiness to master more complex critical thinking skills differs at various stages of development. Research indicates that critical thinking ability increases with age; however, there appears to be no set age when critical thinking instruction should begin. Very young children are capable of critical thought and early elementary curriculums should include instruction in critical thinking (Lai, 2011). While an individual's capacity to think critically will likely increase as they develop and mature, the integration of critical thinking skills at all levels within the standards supports the belief of many experts that the act of thinking is a way to learn content and critical thinking cannot be divorced from content (Carr, 1990).

While there appears to be a consensus among many experts that critical thinking skills are important, there is a lack of clarity on exactly how to best teach students to become critical thinkers. This review of literature identifies attempts at all levels of education to incorporate critical thinking into schools and outline studies and their findings. This review also draws on the expertise of Dr. Robert Ennis and details his conception of exactly what critical thinking is and looks like. The researcher believes this to be important as much of Dr. Ennis's work is being used to collect data for this study.

While conducting the review of related literature, the researcher discovered there are difficulties in defining and assessing critical thinking skills as well as the type of instruction that is most likely to produce critical thinkers (Malamitsa, Kokkotas, & Kasoutas, 2008; Marin & Halpern, 2011; Stapelton, 2011). According to Marin and Halpern (2011), instruction that compels critical thought can be approached in one of two

ways. Instruction should have critical thinking imbedded into the content or subject matter being taught or it can be taught explicitly with lessons specifically designed to teach students how to think critically. Maclure and Davies (1991) also felt there were two primary approaches that could be used to teach critical thinking. The first is what Maclure and Davies referred to as the general approach. This was where students were taught thinking skills apart from specific subject matter. The second was the integrated approach where thinking skills were embedded in the subject matter being taught in schools. Assaf (2009) believed that integrating the teaching of critical thinking skills into the curriculum was the most effective approach. Two of the reasons he felt infusion was the better of the two options was because time and money were limited resources and integrating the teaching of thinking skills eliminated the need to find extra time and money for students to take another course. Also, students would understand the content better when thinking skills were infused into the material being covered. Some believe critical thinking should only be taught in the context of a particular discipline, while others believe it is important to teach critical thinking in autonomous courses (Lipman, 2003). The danger in teaching critical thinking in isolation is that it could be viewed as irrelevant, whereas incorporating critical thinking instruction into courses runs the risk of being superficial (Lipman, 2003). Research supports the use of both methods and when used together they could be especially powerful (Lai, 2011; Lipman, 2003; Marin & Halpern, 2011).

McCollister and Sayler (2010) believed that integrating critical thinking into the content areas is vital for academic growth. They noted four ways teachers can effectively integrate critical thinking into daily instruction. Lessons should include problem solving, questioning that requires critical analysis, the evaluation of sources, and the opportunity

for students to make decisions. After a review of research in the field of education and instruction as it related to critical thinking, Astleitner (2002) concluded that in order for a program to effectively promote critical thinking, it should include the following features:

> 1) It should consider a disposition or an attitude against critical thinking; 2) it should regard critical thinking as a general skill that must be deepened within different subject matter or contexts; 3) it should offer segmented and instructionally fully developed training in specific skills; 4) it should focus on all (or many) relevant sub-skills of critical thinking and integrate them; 5) it should include parts for stimulating the transfer of knowledge; 6) it should support meta-cognitive skills for assisting self regulation activities: 7) it should not include formal, mathematical algorithms, but everyday language problems; 8) it should train students for several weeks or months; and 9) it should consider the organizational context of classroom instruction. (p. 55)

Related Studies

Frykholm (2004) conducted a research study that focused on curriculum reform in mathematics. He conducted his research in seven different schools within five different districts. The districts were in Colorado, Minnesota, and Wisconsin. There were many differences among the schools used in Frykholm's study including location, student population, and ethnic and socioeconomic composition. The common thread among all schools was that they were all in the early stages of implementing a program designed to reform the way math was taught in each school. The new curriculum was *Mathematics in Context* (MiC). Data collected included interactions with 25 teachers who volunteered to participate in the study. Of these 25 teachers, eight were used in detailed case studies and four of the case studies were presented in the findings. The focus of Frykholm's research

centered on the level of discomfort teachers experienced while implementing the MiC curriculum. According to Frykholm, the new math reform program emphasized problem solving and critical thinking as opposed to a more traditional stand-and-deliver approach to teaching math. The MiC curriculum was designed to ensure that students developed a deeper understanding of mathematical concepts. The goals of the MiC curriculum appear to be closely aligned with the goals of the Common Core Mathematics Standards. The Common Core Mathematics Standards were designed to help students gain a conceptual understanding of math as opposed to simply an understanding of the procedures or steps one must take to solve math problems (Kendall, 2011). During the first 2 years of this 3-year study, Frykholm made four multi-day visits to each site. The teachers involved in the eight case studies received more frequent visits. The methods for data collection were classroom observations, postlesson conferences, audiotaped lesson presentations, teachers' reflections as they critically listened to audiotapes of their teaching, interviews with teachers, various artifacts, and informal sources of information. The data were collected and coded for common themes.

One of the key findings from Frykholm's (2004) research was the feeling among teachers that the MiC curriculum did not teach students the basics they would need to be successful on standardized tests. He called this external pressure and further categorized the feeling as pressure from parents, administrators, and state-level exams. This feeling fell under what Frykholm labeled as *emotional discomfort*. According to Frykholm, there is a growing body of research that suggested students participating in reform-based programs did not suffer on standardized achievement tests. While research suggested this, teachers interviewed for the purposes of this study were concerned that teaching students to think critically and solve problems would have an adverse effect on their

ability to perform on state mandated tests. Throughout this study, Frykholm clearly stated that math reform was needed. He acknowledged that curriculums like MiC were available to help students develop a deeper understanding of mathematical concepts and foster critical thinking skills. The challenge, according to Frykholm, was the pedagogical issues that accompanied the type of teaching that fostered critical thinking in students. It was contrary to how teachers had been instructing students and therefore was often met with resistance on varying levels. Frykholm concluded by discussing the importance of teachers overcoming their own levels of discomfort and reservations so students could benefit from teaching that allowed them to explore and understand at a deeper level.

Marin and Halpern (2011) conducted a study in 2010 that examined how to best instruct students to assist them with the development of skills necessary for critical thinking. Their study considered two approaches that imbedded instruction with critical thinking skills that were then woven into the content matter, or explicit instruction, with lessons that taught students the skills specific to critical thinking. The authors acknowledged that best practice was to use implicit and explicit methods, but the goal of their research was to determine which standalone method would produce the most significant results. Marin and Halpern felt the need to conduct research on the subject due to the fact that students were leaving K-12 public schools unprepared for work or college. Reviews conducted by the American Diploma Project (ADP) found that in all states, few students acquired the knowledge or abilities necessary for college or workplace success (Marin & Halpern). In this report, the lack of critical thinking ability is noted as one of the main deficits.

In their effort to determine the most effective method for developing critical thinking skills, Marin and Halpern (2011) conducted two studies with high school

students using complementary research designs. The first study was comprised of three groups: two learning groups and a wait-listed group. One of the learning groups participated in a web-based critical thinking workshop that provided explicit instruction in specific critical thinking skills. The second learning group received critical thinking skills that were imbedded in an introduction to psychology workshop. The wait list group did not receive instruction that was designed to enhance their critical thinking skills or abilities. Researchers administered the Halpern Critical Thinking Assessment to obtain a baseline score of critical thinking ability for the students participating in the study. The students receiving the imbedded and explicit instruction also took the Halpern Critical Thinking Assessment as a posttest after completing the instruction for this research. The participants for this study were selected from a low-income school in Southern California with an enrollment of 3,500 students. Participants in the study received incentives for their participation that included vouchers that could be spent at a nearby mall, tickets to the prom, and coupons to a coffee house. All students who wanted to participate were included provided they had not been suspended during the previous year, did not have excessive absences, and spoke English fluently. The study participants were 65% female and 35% male. Hispanics accounted for 69% of those involved, 16% were African-American, and 15% were White. Participants were randomly assigned to one of the three above-mentioned groups.

The results of this study revealed that students in both learning groups showed significant gains in critical thinking. Although both groups showed increases in their critical thinking abilities, the group receiving explicit instruction showed much greater gains than the embedded instruction group. This supports the idea that implicit and explicit instruction together will produce significant results with regard to students'

abilities to think critically. It also suggests that of the two, explicit instruction will produce the greatest result in the critical thinking abilities of students. The following year, Marin and Halpern (2011) conducted a second study at a different California high school. In this study, 108 students were assigned to one of two groups. Students were placed in a group that received either explicit or implicit instruction of critical thinking skills. The test data and student demographics of this school were comparable to the school used in the first study. For the purposes of this study, instruction took place during the regular school day in junior and senior level classes. In this study, 72% of the participants were female and 28% were male. Five classes were selected to participate in this study. Two classes were randomly chosen to receive implicit instruction, two were randomly chosen to receive explicit instruction, and the remaining class functioned as the control group receiving no treatment. As with the first study, participants took the Halpern Critical Thinking Assessments as a pretest and posttest. Unlike the first study, those students receiving imbedded critical thinking instruction did not show a statistically significant gain in critical thinking ability. However, those students in the classes that received explicit instruction during the 6-week program showed significant gains on the posttest.

The results of these two studies suggest that explicitly teaching students the processes and skills associated with critical thinking can equip students with the tools that will make success after graduation more likely. As previously noted, the approach most likely to yield the greatest gains is teaching critical thinking through both explicit and implicit means. However, in these two studies, explicit instruction clearly produced students with a greater ability to think critically as measured by the Halpern Critical Thinking Assessment.

Abrami et al. (2008) conducted a study that supported the notion that critical thinking skills and dispositions are most likely to improve if the instructional approach is both explicit and implicit. The meta-analysis was based on 117 studies involving 20,698 participants. Abrami et al. defined critical thinking as the ability to engage in purposeful, self-regulatory judgment. The authors contend that critical thinking should be one of the most pressing goals of education and state; critical thinking is an essential skill in the knowledge age. The findings revealed that instruction has a positive effect on critical thinking in most cases. The meta-analysis revealed several important findings. First, when critical thinking requirements are an important part of course designs and they are clearly defined, there is a positive effect on students' abilities to think critically. The most effective approach was to develop students' abilities to think critically through explicit instruction and later apply the skill of critical thinking to course-related content and material. Finally, the least effective means according to their research was to immerse students in content or subject matter that required them to think critically without first explicitly teaching them the critical thinking skills that would be needed. In order to teach students the skills needed for critical thought and help them develop the disposition for critical thinking, educators should take an explicit and implicit approach to see the most significant gains (Abrami et al.; Marin & Halpern, 2011).

Kazemi and Stipek (2008) conducted a research study that analyzed ways teachers could help their students gain a conceptual understanding of mathematical concepts. The authors' characterization of conceptual thinking closely aligns with the definition and conception of critical thinking. Kazemi and Stipek stated, "for over a decade the mathematics education community has encouraged teachers to shift their classroom practices away from an exclusive focus on computational accuracy and toward a focus on

deeper understandings of mathematical ideas, relations, and concepts" (p. 123).

The above conclusion also aligns with the primary goals of the Common Core State Standards for mathematics that emphasized conceptual understanding of mathematical concepts (Kendall, 2011). According to Kazemi and Stipek (2008), this type of instruction was difficult for teachers because they were not necessarily taught to think in this way as students, and their teacher preparation programs were not centered on teaching students to think about math from a conceptual, problem-solving perspective that involved critical thought. For the purposes of their study, Kazemi and Stipek characterized conceptual thinking as (a) an explanation that consists of a mathematical argument, not just a procedural description; (b) mathematical thinking involved understanding relations among multiple strategies; (c) errors provided opportunities to reconceptualize a problem, explore contradictions in solutions, and pursue alternative strategies; and (d) encouraging collaborative work that involved individual accountability and consensus building through mathematical argumentation. The primary goal of this study was to describe how teachers could promote student participation in a classroom community where conceptual understanding and critical thinking were not only valued but were also developed in students.

The study took place in four fourth- and fifth-grade classrooms where the teachers were teaching the same lesson: adding fractions. Kazemi and Stipek (2008) noted that the lessons observed were similar in several ways. The students in these classrooms were describing and sharing strategies, working collaboratively, and seemed to accept errors as a normal part of learning. Along with the similarities, there were also differences noted by the researchers in the quality of student engagement with mathematics. The classes used in the study were from schools in a large, ethnically diverse, urban area in

California. All of the schools involved served predominantly low-income children. All four teachers involved had experience implementing reform-oriented curricula. Two of the teachers taught at the same school and both had master's degrees with a combined 22 years of teaching experience. The other two teachers taught at two different schools. One had 2 years of experience and a bachelor's degree, while the other had 17 years of experience and a master's degree.

The lessons used were videotaped and coded. The lessons were coded on nine motivation dimensions by two raters. After the coding took place, the lessons were collapsed into composite variables. Two composite variables, also basic premises of common core math instruction, were used to select the four teachers for this study. The first variable was labeled "press for learning." This measured the degree that students were encouraged to work through difficult problems and find multiple solutions. The second variable placed emphasis on asking students to explain their strategies and the development of better understanding. Both strategies are key components in Common Core mathematics instruction.

The quantitative findings for this study illustrated a significant positive correlation between the observed lessons and growth in students' conceptual understanding of fractions ($r = .51$, $p < .05$) (Kazemi & Stipek, 2008). Each of the four teachers taught the same lesson that focused on adding fractions. The lessons were adapted from a unit designed to be consistent with California's mathematics framework. The study involved qualitative analysis of videotaped instruction. There were two cameras in each classroom. One of the cameras stayed focused on the teacher and the other on small groups of students working collaboratively. Transcripts from the teacher- and student-focused cameras were created and each transcript was analyzed. The transcripts revealed

what happened in each classroom during both whole group and small group instruction when students described strategies, compared strategies, and made mistakes. A review of the transcripts also showed differences in the quality of student interaction as related to the mathematical concepts being taught. In two of the classes, students were engaged in a deeper level of critical thought and discussion. The two classes that engaged students in higher level mathematical thought were characterized by an atmosphere that included explanations that went beyond procedural summaries. The classes included critical thinking that involved understanding multiple strategies, learning from errors, and collaborative work and individual accountability.

All four teachers observed in this study implemented qualities of inquiry-oriented instruction. Students were asked to think critically in order to solve problems in groups and share their solutions to those problems. The norms present in the two classes that encouraged deeper conceptual understanding, multiple strategies, and collaborative work were consistent with what the common core state standards emphasize.

Critical thinking has been a focus of educators in Jordan for the last few decades (Innabi & Sheikh, 2007). In 1987, a national conference was held to begin educational reform. One of the main recommendations that came as a result of this conference was the necessity to improve critical thinking in students. As a result of this, the focus of curriculum development shifted to fostering the critical thinking abilities of students. There have been several additional reform efforts after the one in 1987 and all have had some focus on critical thinking and ways this could be nurtured and improved in students.

Innabi and Sheikh (2007) conducted a study that examined teachers' perceptions of critical thinking and teaching strategies after 15 years of educational reform. The authors selected two samples of secondary math teachers. One sample was selected in

1988 and the other in 2004. Both samples were selected from the same 12 public schools. The teachers in the 1988 sample included 12 male and 12 female teachers, while the sample in 2004 was comprised of 11 females and 12 males. The schools involved were selected using the systematic random method. The experience levels of the teachers in both samples were similar. The study included both beginning teachers and veteran teachers. All of the teachers majored in math and graduated from public universities, but none took formal courses on critical thinking.

Individual interviews were conducted to collect data on teachers' perceptions of critical thinking and critical thinking teaching strategies. The average time for each interview was 30 minutes. The interviews were taped and transcribed. Similar phrases were later coded and themes were identified. The results of the study revealed that after 15 years of educational reform, teachers did not have, in general, a comprehensive view of critical thinking. They emphasized different aspects of critical thinking. The overall findings for the study suggested that the reform efforts in Jordan have not resulted in any significant change in teachers' conceptions of critical thinking.

Innabi and Sheikh (2007) determined the failure of the reform efforts to improve teachers' conceptions of critical thinking was largely due to the lack of focus on enhancing and teaching critical thinking in teacher preparation programs as well as in-service education and training. According to the authors, the education of teachers on critical thinking and the teaching strategies that should be used to encourage and develop critical thinking abilities in students was lacking, despite 15 years of reform efforts. Innabi and Sheikh noted that simply talking about the importance of developing critical thinking in students was insufficient. Steps had to be put into place that trained teachers to develop critical thinking skills and dispositions as well as to help them understand how

to best teach their students to become critical thinkers. This study points to the importance of teacher preparation programs and professional development for teachers when a new curriculum that encourages the development of critical thinking is introduced. The Common Core State Standards claim that one result of the new standards will be better teacher preparation programs along with higher quality professional development for those already in the profession (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010).

Programs and Reform Efforts

Singapore is a country that received a great deal of global attention for its educational accomplishments in recent years. Despite its successes, Prime Minister Goh, out of concern that Singapore might lose its competitive edge in the rapidly changing global economy, conceived a vision in 1997 called Thinking Schools Learning Nation (TSLN). This vision was the blueprint for Singapore schools in the 21st century. The idea behind TSLN was that creative and critical thinking skills which included the development of qualities such as curiosity, creativity, problem solving, resourcefulness, and teamwork were important attributes that a country's workforce must have in order to remain competitive in the global economy. For this reason, Singapore developed TSLN, a policy that required students to be taught critical thinking skills (Koh, 2002). One of the similarities between TSLN and the Common Core State Standards is the reduction of content that is to be taught. In order to create time for critical thinking, in Singapore (1997), required content was to be reduced by 30% in all subjects. This was thought to allow teachers more time to infuse critical thinking in the content they were teaching (Koh, 2002). Much like the reform in Singapore, the Common Core State Standards represent a reduction in the amount of content teachers are expected to cover and students

are expected to learn. The new standards have been reduced to just 85% of the total standards that states might ultimately decide to implement. One of the end results of this reduction was supposed to be a more manageable amount of content for teachers and students (Kendall, 2011).

Koh (2002) stated that in order for the vision of TSLN to be realized, there would have to be changes to both the curriculum and teaching practices. Koh believed that a critical pedagogy that involved critical reading and writing was a far more effective approach than teaching critical thinking as problem solving. By comparison, the language and literacy standards of the Common Core were broken down into four strands. The first two standards, reading and writing, supported the view of the importance of reading and writing throughout the curriculum (Kendall, 2011).

The Talents Unlimited program (Rodd, 1999) is a program that has been used by some schools and districts to address concerns centered on the critical thinking ability of students. One elementary school in England identified a weakness in their students' abilities to think critically and implemented the Talents Unlimited program in an effort to produce students who were more adept critical thinkers (Rodd, 1999). Teaching and learning in England is dictated by the National Curriculum. According to Rodd (1999), some teachers in England focus more on imparting knowledge and less on teaching students how to think due to the National Curriculum, while some teachers simply do not understand how to teach students to think critically. The Talents Unlimited program was implemented to, in part, address the deficit in critical thinking. A study was conducted after the program was implemented for 1 year. The study used critical thinking tasks to compare the performance of 48 students. Half of the students participating in the study received instruction using the Talents Unlimited program while the other half did not.

The study found students who received instruction in the Talents Unlimited program performed significantly better on the critical thinking tasks than those who did not. The findings from this study suggested that when students receive instruction centered on the development of critical thinking skills, their ability to think critically will likely improve (Rodd, 1999).

The Common Core State Standards are not considered a national curriculum; however, the majority of states have adopted the standards for mathematics and English language arts. The standards outline what students should know and be able to do in each grade. Embedded within the standards are words associated with critical thinking (Bellanca et al., 2012).

The purpose of this researcher's study was to investigate the impact of the Common Core State Standards on students' abilities to think critically. In an effort to gain insight into teacher perceptions on their students' abilities to think critically, the researcher developed a survey around Ennis's (2010) "super-streamlined conception of critical thinking." According to Ennis (1991), critical thinking is "reasonable reflective thinking that is focused on deciding what to believe or do" (p. 6). The survey links Ennis's conception to instruction in the Common Core State Standards. The following is meant to provide a framework for the characteristics of a critical thinker. The attributes are intertwined and often overlap due to their codependent relationships upon one another.

A critical thinker

1. Is open-minded and mindful of alternatives;
2. Desires to be and is well-informed;
3. Judges well the credibility of sources;

4. Identifies reasons, assumptions, and conclusions;
5. Asks appropriate clarifying questions;
6. Judges well the quality of an argument, including its reasons, assumptions, evidence, and their degree of support for the conclusion;
7. Can well develop and defend a reasonable position regarding a belief or an action, doing justice to challenges;
8. Formulates plausible hypotheses;
9. Plans and conducts experiments well;
10. Defines terms in a way appropriate for the context;
11. Draws conclusions when warranted, but with caution; and
12. Integrates all of the above aspects of critical thinking.

For the purposes of this study, the researcher developed a survey around the first 11 of the above attributes (Appendix A). The following is an expansion of these attributes using information from Ennis (2010) and other sources to paint a clear picture of what a critical thinker does and what the act of critical thinking entails. Table 5 below depicts the conception developed by Ennis and how each characteristic aligns to the Common Core State Standards. The Common Core State Standards for English language arts are categorized by College and Career Readiness (CCR) anchor standards. The CCR anchor standards for English language arts are broken down into four subcategories. The categories are reading, writing, speaking and listening, and language. There are 10 CCR anchor standards for reading (Appendix B), 10 CCR anchor standards for writing (Appendix C), six CCR anchor standards for speaking and listening (Appendix D), and six CCR anchor standards for language (Appendix E) (http://www.corestandards.org/ELA-Literacy/CCRA/L). The Common Core State

Standards for mathematics contain eight standards for mathematical practice. These standards for mathematical practice are designed to serve as a guide for educators and a description for what they should develop in their students through instruction in the standards (Appendix F) (http://www.corestandards.org/Math/Practice).

Table 5

Comparison of Ennis's Conception of Critical Thinking and the ELA Anchor Standards

Attributes of a Critical Thinker	Reading	Writing
Is open-minded and mindful of alternatives		W.5, W.6
Desires to be, and is, well-informed	R.1, R.10	W.1, W.2, W.6
Judges well the credibility of sources	R.7, R.9	W.1, W.7, W.8
Identifies reasons, assumptions, and conclusions	R.6, R.7, R.8	
Asks appropriate clarifying questions		W.7
Judges well the quality of an argument	R.7, R.8	W.8
Can well develop and defend a reasonable position	R.1	W.1, W.2, W.5, W.9
Formulates plausible hypotheses		W.7
Plans and conducts experiments well		W.7
Defines terms in a way appropriate for the context	R.4	
Draws conclusions when warranted	R.1, R.3	W.9

Table 6

Comparison of Ennis's Conception of Critical Thinking and the ELA Anchor Standards

Attributes of a Critical Thinker	Speaking/Listening	Language
Is open-minded and mindful of alternatives	SL.1, SL.6	
Desires to be, and is, well-informed	SL.2	L.1, L.2, L.3, L.4, L.5, L.6
Judges well the credibility of sources	SL.2, SL.3	
Identifies reasons, assumptions, and conclusions	SL.2, SL.3	
Asks appropriate clarifying questions	SL.1	
Judges well the quality of an argument	SL.1, SL.2, SL.3	
Can well develop and defend a reasonable position	SL.1, SL.4	
Formulates plausible hypotheses		
Plans and conducts experiments well		
Defines terms in a way appropriate for the context		L.3, L.4, L.5, L.6
Draws conclusions when warranted	SL.4	L.4

Table 7

Comparison of Ennis's Conception of Critical Thinking and the Standards for Mathematical Practice

Attributes of Critical Thinker	Standards for Mathematical Practices
Is open-minded and mindful of alternatives	MP1, MP2, MP4, MP5, MP7, MP8
Desires to be, and is, well-informed	MP1, MP2, MP3, MP4, MP5, MP6, MP7, MP8
Judges well the credibility of sources	MP3, MP6
Identifies reasons, assumptions, and conclusions	MP3, MP4, MP6
Asks appropriate clarifying questions	MP3
Judges well the quality of an argument	MP3
Can well develop and defend a reasonable position	MP3, MP4, MP6
Formulates plausible hypotheses	MP1, MP3, MP5
Plans and conducts experiments well	MP1, MP4, MP5
Defines terms in a way appropriate for the context	MP6
Draws conclusions when warranted	MP1, MP3, MP4, MP6, MP7, MP8

The link between Ennis's (2010) definition and conception of critical thinking and the language of the Common Core State Standards is clear. The standards ask teachers to present content in such a way as to develop in their students critical thinking skills which include analysis, evaluation, and the ability to solve problems. These standards clearly indicate that memorization of facts is no longer acceptable or sufficient (Bellanca et al.,

2012). In order for students to exhibit mastery of the new standards, they will have to demonstrate the ability to think critically because critical thinking is a skill that is strongly reflected in the Common Core State Standards (Blosveren & Achieve, 2012). The following section is an elaboration of Ennis's framework which serves as the foundation for the survey and was used as the quantitative component for data collection. There is significant overlap in the components of Ennis's conception. Some portions of the conception are intertwined to the point of making it difficult to differentiate between them.

Being open-minded is a key characteristic of a critical thinker (Ennis, 2010). John Dewey and Bertrand Russell considered having an open mind crucial enough to deem it one of the fundamental aims of education (Dewey, 2008; Hare, 2004). Open-minded is defined as "Having or showing a mind receptive to new ideas or arguments" (http//dictionary.reference.com/browse/open-minded). Hare (1983) defined an open-minded person as someone who forms their own opinion but is willing to alter that opinion when information becomes available that warrants a different view. The principle of being open-minded is not new. Discussion and thought about what it means to be open-minded can be traced back as far as the Greek philosopher Socrates who identified open-mindedness as an intellectual virtue (Hare, 2011). Other philosophers noted the danger of not keeping an open mind. Locke discussed the need to look into the notions of others before judging them while Hume believed that people were closed-minded in an effort to avoid the feelings of discomfort and avoid being confused (Hare, 2011). One of the goals of education should be to encourage students to keep an open mind (Hare, 2003). While Hare believed developing open-mindedness in students should be an aim of educators, he was not convinced this is taking place in many classrooms

across the country. Hare (2011) stated,

> Many teachers fail to model open-mindedness for their students: they resist alternative suggestions, refuse to admit their mistakes, and fail to indicate that present views may change; they encourage or tolerate an uncritical acceptance of ideas; and they are sometimes overly concerned to transmit their own convictions. (p. 9)

Hare also felt that schools should serve as places that encourage students to develop and value their own opinions. Too often, thinking critically is presented in ways that decrease the likelihood students will value their own opinions and creates an attitude of skepticism about inquiry (Hare, 2011). Riggs (2010), who is a professor at the University of Oklahoma, believed having an open mind is necessary not only for individual cognitive excellence but also for civic excellence. For this reason, Riggs (2010) emphasized the importance of public schools educating students in a way that encourages and produces tolerant, open-minded thinkers.

According to Ennis (2010), a critical thinker is someone who desires to be, and is, well-informed. Well-informed is defined in the Merriam-Webster dictionary as "having extensive knowledge especially of current topics and events." A second definition is "thoroughly knowledgeable in a particular subject" (www.merriam-webster.com/dictionary/well-informed). One of the primary aims of education is to ensure that students are well-informed. This holds true for kindergarten students to medical students and everyone in between. The Common Core State Standards aim to produce students who are college and career ready which will require them to be knowledgeable and well-informed. Gallagher (2004), an author, high school English teacher, and college professor, discussed the role being well-informed plays in a students'

abilities to think and read critically. Gallagher believed possessing background knowledge is crucial for student success. He assigns students an article of the week and has them read it, write about it, and discuss it (Gallagher). A survey conducted by Krutii and Fursov (2007) found many high school students have a desire to be well-informed. Krutii and Fursov surveyed 590 students in the tenth and eleventh grades in an attempt to understand motives for enrolling in an institution of higher education. Respondents to the survey rated "raising their level of knowledge, expanding their intellectual horizon, and being well educated" as the second most important cumulative goal for attaining a higher education.

According to Ennis (2010), a critical thinker has the ability to judge the credibility of sources. Credibility is defined as the quality of being believable or worthy of trust (http://dictionary.reference.com/browse/credibility). Life in the 21st century offers the ability to uncover information on virtually any topic imaginable. While this instant access to a plethora of information has countless benefits, it also requires that we proceed with caution and learn how to evaluate the source of our information (Brookhart, 2010). Wisdom and judgment are especially important when considering the reliability of any information in our current society, but it is especially important when determining the credibility of electronic information (Brookhart, 2010). In references to the internet, Glister (1997) believed that we must navigate the internet as what he called *dynamic thinkers*. We do not have the luxury of taking information that is presented to us without a careful examination of the source (Glister) or confirmation through the use of multiple sources. In classrooms that develop students' critical thinking skills, the evaluation of sources is a necessary component (McCollister & Sayler, 2010). Students need the opportunity to conduct research and find information that either supports or refutes their

claims and beliefs. Before accepting the information, students should check the source in an effort to determine credibility (McCollister & Sayler, 2010) or use multiple sources.

A critical thinker is able to identify reasons, assumptions, and conclusions (Ennis, 2010). Reason is defined as the thing that makes some fact intelligible (http://www.merriam-webster.com/dictionary/reason). Assumption is defined as something taken for granted, a supposition (http://dictionary.reference.com/browse/assumption). Conclusion is defined as the last part of something, its end or result (http://www.vocabulary.com/dictionary/conclusion). An important aspect of critical thinking is the ability to recognize the inferences one makes and understand the assumptions upon which the inferences are based (Elder & Paul, 2002). The ability to identify assumptions or see where another person is coming from is not only a skill associated with critical thinking, it is an important life skill (Brookhart, 2010). An assumption is part of our belief system and something most people take for granted. We assume our beliefs to be true and we use our beliefs to interpret the world around us (Elder & Paul, 2002). A critical thinker possesses the ability to understand when they are making an assumption and reflect on that assumption to assess the accuracy of their conclusion (Elder & Paul, 2002). Critical thought involves the evaluation of arguments. In order to effectively evaluate an argument, it is necessary to examine the quality of the inferences as they relate to the reasons and conclusions (Finn, 2011). A prerequisite to this evaluation is the ability to recognize reasons and conclusions.

A critical thinker possesses the ability to ask appropriate clarifying questions (Ennis, 2010). An inquisitive nature and the ability to ask questions that will lead to the right answer are qualities of critical thinkers. They are also the qualities employers are

looking for in the 21st century (Wagner, 2008). Critical thinking requires students to look beyond their own experiences and questions serve to facilitate the critical thinking process by exposing the experiences of others and the wisdom of the world (Christenbury & Kelly, 1983). Critical thinking and Socratic questioning are interconnected according to Paul and Elder (2007). To formulate and ask clarifying questions, one must understand thinking. For this reason, critical thinking and questioning are paramount when it comes to educating students (Paul & Elder). It is important for adults to model appropriate questioning strategies when interacting with students. We should ask students questions that will move students beyond the knowledge and comprehension level of Bloom's Taxonomy (Krathwohl, 2002) and force them to think critically by having them apply, synthesize, and evaluate (Boswell, 2006). Asking higher level questions will not only challenge students and force them to think critically, it will also model the types of questions they should ask. Snyder and Snyder (2008) concurred that modeling critical thinking and questioning is vital to the development of critical thinking in students. They suggested that teachers ask questions that require students to "evaluate the clarity and accuracy of their thinking as well as the depth and breadth of their think" (Snyder & Snyder, p. 95). High cognitive level questions force students to examine things at a deeper level and have the ability to raise the intellectual level of thinking in classrooms (McCollister & Sayler, 2010).

Critical thinking involves judging the quality of arguments, including their reasons, assumptions, evidence, and their degree of support for the conclusion (Ennis 2010). "Arguments are the single most important ingredient in critical thinking" (Moore & Parker, 2009, p. 10). Like Ennis (2010), Moore and Parker (2009) believed that thinking critically is marked by the ability to evaluate arguments. Evaluating arguments

involves two parts, logic and truth. Critical thinking involves determining if an argument supports its conclusion and deciding if the premises are actually true (Moore & Parker). The act of thinking critically when responding to someone else's reasoning involves several steps, according to Fisher (2010). Before responding, one must first clearly understand what the other person is arguing for as well as their conclusion. An understanding of their reasoning and assumptions is also vital in the thought process when evaluating arguments or claims. Being a critical thinker requires a balance between being open-minded and skeptical. Critical thinkers are accepting of new ideas but skeptical of claims that do not have convincing evidence to back them up (Their, 2008).

A critical thinker can develop and defend a reasonable position regarding a belief or an action, doing justice to challenges (Ennis, 2010). Llewellyn (2013) ascertained that scientific argumentation, which he claimed was a critical thinking skill found within the Common Core State Standards, requires students to develop claims, provide evidence to support their claims along with an explanation of the claims, and be able to rebut any counter claims. Llewellyn believed that as states move forward in their professional development for teachers, it is imperative that teachers understand how to most effectively teach students to take a position and defend that position as challenges arise. This skill is linked to critical thinking as it requires individuals to make a claim and be able to defend the claim if it is questioned.

A critical thinker is able to formulate plausible hypotheses (Ennis, 2010). Plausible is defined as seemingly or apparently valid, likely, or acceptable; credible (http://www.thefreedictionary.com/plausible). Hypothesis is defined as a proposition set forth as an explanation for the occurrence of some specified group of phenomena, either asserted merely as a provisional conjecture to guide investigation or accepted as highly

probable in the light of established facts (http://dictionary.reference.com/browse/hypothesis).

A critical thinker is able to plan and conduct experiments well (Ennis, 2010). Most schools promote critical thinking and experimentation within their science curriculums (McDonald, 2012). According to McDonald (2012), the Common Core State Standards for English language arts and the goals for many science programs are asking students to perform some of the same critical thinking tasks and can be integrated to complement one another.

A critical thinker should be able to define terms in ways that are appropriate for the context (Ennis, 2010). Thompson (2001) echoed this idea. Thompson believed that a necessary component of critical thinking was the ability to use high-level words appropriately. According to Thompson, critical thinkers should be able to go beyond superficial word use when reading and understand the deeper meaning of vocabulary within the context. Thompson's beliefs align closely with the K-12 English language arts Common Core State Standards. The ultimate goal for the new curriculum is to ensure that upon graduation from high school students are college and career ready. In order to accomplish this goal the authors of the Common Core State Standards integrated literacy throughout all content areas. It was felt that students should be reading *complex texts* and reading these texts at a deeper level. One of the key components of a complex text is that the vocabulary is dependent upon the context and is at a high level in order to challenge students (Hill, 2011).

A critical thinker is someone who draws conclusions when warranted but does so cautiously (Ennis, 2010). Critical thinkers are able to draw conclusions when they have enough relevant information. Morgan and Rasinski (2012) pointed to the requirement of

primary source documents as an important component of the Common Core State Standards as they relate to critical thought and drawing conclusions. There is an emphasis on the use of primary source documents, but Morgan and Rasinski cautioned against the reliance on a single primary source to draw conclusions due to the fact that one perspective may not be sufficient when drawing conclusions. The authors stated, "As critical thinkers, they must learn that it can be problematic to rely on a single source for information" (Morgan & Rasinski, p. 587).

According to Ennis (2010), a critical thinker is someone who integrates all 11 abilities in the streamlined conception he identified as characteristics of one who is able to think critically. It does little good for a person to possess critical thinking abilities if they do not integrate them into their daily lives and thought processes (Ennis, 1991). A critical thinker does not employ the abilities independent of each other. In fact, according to Ennis (1991), just the opposite is true. The ideal critical thinker uses the abilities and dispositions interdependently as part of their thought process when deciding what to believe or do (Ennis, 1991).

The Common Core State Standards seek to address the issue of preparing students for success in higher education and their careers (www.corestandards.org). Schmoker (2011) cited a study conducted by ACT that determined there is a high correlation between what students need to learn in order to be prepared to enter the work force or attend college. As a result of this study, Schmoker concluded that high school students should have received instruction from a common curriculum that addressed what was important for all students regardless of their post high school plans. The majority of students in the United States are leaving school unprepared for work or postsecondary education (Wagner, 2008). The primary reasons our public education system is failing

students are we are teaching an outdated curriculum and using instructional methods that are highly ineffective (Wagner, 2008). The curriculum and pedagogical deficiencies coupled with a minuscule focus on teaching students to think critically and solve problems has resulted in an urgent need for educational reform (Frykholm, 2004). Forty-five states, four territories, the Department of Defense Education Activity, and the District of Columbia have adopted the Common Core State Standards in an effort to address the needs of students in the 21st century (National Governors Association Center for Best Practices and Council of Chief State School, 2010).

The Common Core State Standards Initiative says, "the standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers" (www.corestandards.org). Wagner (2008) believed there were seven survival skills people needed to succeed in the 21st century. The first of the seven skills is critical thinking and problem solving. Wagner felt that this first survival skill was essential for success in the workplace and/or postsecondary education. This belief was mirrored by the developers of the Common Core State Standards as evidenced by the integration of critical thinking skills throughout the standards for both mathematics and English language arts.

The review of literature conducted by the researcher identifies different approaches taken to provide instruction related to critical thinking. The research reviewed contains studies conducted in settings ranging from kindergarten through 12th grades. There is limited research available related to critical thinking in the instruction for elementary school students at this time. Possible reasons for the lack of research may be the stage of cognitive development associated with elementary school students or the lack of resources available to teach students the skills necessary for critical thought

(Larmer, 2012). Until recently, many experts believed those students in the early primary grades were less capable of critical thought. Recent research suggests that young children are capable of critical thought when they have relevant background, content knowledge, and the guidance of the adults in their lives to help them. Research also suggests critical thinking instruction should be built into all levels of the K-12 curriculum (Lai, 2011). In addition to these widely held beliefs, another possible explanation for the lack of related literature for elementary school students may be the difficulty associated with assessing critical thinking in young students. While there are numerous critical thinking assessments available including the California Critical Thinking Skills Test, the Cornell Critical Thinking Tests, the Ennis-Weir Critical Thinking Essay Test, and the Watson-Glaser Critical Thinking Appraisal, most focus on assessing the abilities of older students and adults (Lai, 2011).

"Many critical thinking researchers maintain that critical thinking skills and abilities can be taught" (Lai, 2011, p. 29). While there is some disagreement among experts as to the best methods for teaching critical thinking, the review of research suggests both implicit and explicit instruction in critical thinking should produce students who are more capable of critical thought at all levels of K-12 education. The Common Core Standards require instruction aimed at improving the critical thinking of students. The standards have critical thinking embedded in them at all levels. Some of the standards imply critical thinking and some explicitly mention abilities experts associate with critical thinking.

In the following chapter, the researcher outlines the methods that were employed to answer the research question. In an effort to answer the question, the researcher conducted a study and collected data from participant teachers at Connor Elementary

School. The question the researcher attempted to answer was "What is the perceived impact of the Common Core State Standards on elementary students' abilities to think critically?"

Data were collected through surveys and interviews at Connor Elementary School. A detailed description of this study's methodology is presented in the following chapter and includes data collection procedures and a description of the data analysis.

Chapter 3: Methodology

Introduction

This chapter provides a detailed description of the design the researcher employed for this study. The description includes specifics regarding the research question, data collection procedures, and details for how the data were analyzed. This chapter also provides detailed information about the settings, including the participating schools' demographic information. This information was collected in order to give the reader a better understanding of the perspective of the participating schools and teachers within those schools. Pseudonyms have been used for the schools and participants involved in an effort ensure anonymity of all those who participated in this research.

The purpose of this study was to consider teacher perceptions of the impact the Common Core State Standards had on elementary school students' abilities to think critically. A review of the literature has shown that experts agree our current education system is failing to teach students critical thinking skills (Spellings, 2006). Historically, when a societal issue has presented itself, one response has been for our education system to adopt a new curriculum. As early as 1749, Benjamin Franklin proposed curriculum changes to meet the changing needs of society (Marsh & Willis, 2007). In 1893, The Committee of Ten introduced changes aimed at transforming high school curricula by placing increased emphasis on modern subjects (Marsh & Willis, 2007). The 20th century embraced a number of curriculum-related changes as well. The perceived need for reform hit its peak in 1983, when the National Commission on Excellence in Education (NCEE) released *A Nation at Risk: The Imperative for Educational Reform* (Marsh & Willis, 2007). Throughout history, curriculum changes have been numerous and varied. The most recent of these changes occurred in 2010, when the Council of

Chief State School Officers (CCSSO) and the National Governors Association Center for Best Practices (NGA) led the initiative known as the Common Core State Standards. The Common Core State Standards were developed for kindergarten through twelfth grade in the areas of English language arts and mathematics. This chapter outlines in detail the research methodology that was used in this study.

The study was a mixed-methods study containing both quantitative and qualitative data collection. The complexity of the Common Core State Standards along with teacher perceptions of their students' abilities to think critically led the researcher to choose a mixed-methods approach. Creswell (2009) identified the mixed-method approach as appropriate when conducting research of a complex nature where the researcher believes both quantitative and qualitative measures will provide a more accurate and complete picture. Using both quantitative and qualitative methods enabled the researcher to examine teacher perspectives and obtain a more complete view in an effort to answer the research question (Gall, Gall, & Borg, 2007). The researcher collected data from three schools, and all participants were teachers from these schools.

The researcher has been an employee of one of the schools where the research was conducted. The researcher spent 4 years as an assistant principal at the school, but at the time the research was conducted, the researcher was removed from the setting for 2 years. The researcher used a proxy to conduct the focus group interviews in an effort to remove the potential bias. The quantitative data were collected via a Likert scale survey, which the researcher used to develop focus group questions for the qualitative component. The purpose of the study was to determine teacher perceptions of the impact the Common Core State Standards had on students' abilities to think critically after almost 2 full years of implementation. At the time the surveys were distributed, the

Common Core State Standards had been taught for 1 full year and the majority of a second year in both English language arts and mathematics in third through fifth grades at the schools used for this research. Those participants teaching kindergarten, first, or second grade had an additional year of teaching the common core mathematics standards if they were employed in the county where the research was conducted during the 2011-2012 school year.

The researcher framed this study around one primary question which was designed to inform the data collection process. The primary research question was "What is the impact of the Common Core State Standards on elementary school students' abilities to think critically?"

Ennis (1991) defined critical thinking as reasonable, reflective thinking "focused on deciding what to believe or do" (p. 6). Ennis elaborated on this definition by including dispositions and abilities that were outlined in previous chapters. Through the use of both quantitative and qualitative measures, the researcher determined the perceptions of teachers in three elementary schools, all located in the same district in western North Carolina. The researcher also determined what impact, if any, teachers believed the Common Core State Standards had on their students' abilities to think critically.

Description of the Setting

The research was conducted in a district in the foothills of rural, western North Carolina. The three schools used in this study serve students in prekindergarten through fifth grades. The schools operate on a traditional calendar by which students attend school for 180 days per year beginning in late August and ending in early June. The three schools used for this study were Connor Elementary, Avery Elementary, and

Constitution Elementary. Based on information obtained from the school report cards, Connor Elementary School had an enrollment of 573 students during the 2011-2012 and 2012-2013 school years. The reported enrollment at Avery Elementary during the 2011-2012 school year was 658 students, and the 2012-2013 school year saw a slight decrease with an enrollment of 640 students. Constitution Elementary is the smallest of the three schools with an enrollment of 444 students in 2011-2012 and 411 students during the 2012-2013 school year. Tables 8 and 9 indicate the average class sizes for these schools and the state.

Table 8

Average Class Sizes 2011-2012

Grade	Connor	Avery	Constitution	State
Kindergarten	19	17	16	19
Grade 1	18	22	22	20
Grade 2	21	21	16	19
Grade 3	19	18	22	20
Grade 4	20	19	21	21
Grade 5	24	22	19	21

Table 9

Average Class Sizes 2012-2013

Grade	Connor	Avery	Constitution	State
Kindergarten	19	19	18	20
Grade 1	19	18	20	20
Grade 2	19	19	15	20
Grade 3	17	19	16	19
Grade 4	21	21	16	21
Grade 5	20	23	20	21

These class sizes are comparable in all three schools to those across the state, with the largest variations being five students at Constitution Elementary School in Grades 2 and 4 during the 2012-2013 school year. Each school in this study added an additional classroom teacher during the 2012-2013 school year. Connor Elementary School employed 39 classroom teachers during the 2011-2012 school year and 40 teachers during the 2012-2013 school year. Avery Elementary School employed 41 teachers during the 2011-2012 school year and 42 during the 2012-2013 school year. Constitution Elementary School had a staff consisting of 31 classroom teachers during the 2011-2012 school year and 32 teachers during the 2012-2013 school year. During both school years, 98% of the teachers at Connor Elementary were fully licensed, and 100% of the teachers were highly qualified. All teachers at Avery Elementary were fully licensed and highly qualified in the 2011-2012 and 2012-2013 school years. During the 2011-2012 school year, all teachers at Constitution Elementary were fully licensed and highly qualified. The percentage of fully licensed teachers dropped to 97% during the 2012-2013 school year at Constitution Elementary, while the percent of teachers considered highly qualified remained 100. In order for a teacher to be considered *fully licensed*, they have to meet all of the requirements set forth by the North Carolina Department of Public Instruction for all areas on their current license. According to the NC School Report Card, highly qualified teachers are generally defined as teachers who are fully licensed (also called certified) by the state, who also hold at least a bachelor's degree from a 4-year institution, and who demonstrate competence in the subject area(s) they teach.

The standards only apply to core subject area teachers. For this reason, a school could have 100% of their teachers *highly qualified* and have less than 100% of their teachers fully licensed. The researcher believed gathering data for this study in schools

where all teachers are highly qualified was important to this research. While the majority of assessments involved in deeming teachers highly qualified are content-related, the highly qualified status requires more than just content knowledge. According to the U.S. Department of Education (2009), a teacher must possess content knowledge along with other classroom performance indicators, including the ability to engage students in the subject matter. The researcher believes the highly qualified status of all teachers employed at Connor Elementary School, Avery Elementary School, and Constitution Elementary School during the time of this research lends to the credibility of the results because according to the certification procedures set forth, these teachers have been deemed competent and are believed to have an understanding of the subject matter and standards they are teaching (U.S. Department of Education).

Participants

The participants in this study were the teachers of Connor Elementary School, Avery Elementary School, and Constitution Elementary School. All three schools followed the timeline set forth by the North Carolina Department of Public Instruction (NCDPI) for implementation of the English Language Arts Common Core State Standards. The NCDPI required the English Language Arts and the Mathematics Common Core Standards to be taught and assessed beginning in the 2012-2013 school year. All elementary schools within the district where this research was conducted began teaching the Mathematics Common Core State Standards in kindergarten through second grades during the 2011-2012 school year. This was important to this research because teachers' perceptions in those grades may have been different in the area of math due to the fact that they had been providing instruction using the Common Core State Standards for 2 full years as opposed to teachers in Grades 3-5 who began teaching the standards

during the 2012-2013 school year. The researcher collected data related to grade levels taught for those participants who responded to surveys and grade level taught and year of experience for the focus groups participants. This information is provided in table format in Chapter 4.

The Researcher's Role

During the period of the research, the researcher was employed as a high school principal in the district where the research was conducted. Up to the point the research was conducted, the researcher spent his entire professional career working for this district as a teacher, assistant principal, and principal. The researcher was never a teacher or principal in the schools where the research was conducted but did serve as an assistant principal at Connor Elementary School for 4 years. The researcher held two different positions in the district after being employed at Connor Elementary School. The researcher left Connor Elementary School to become an assistant principal at a middle school and after 1 year accepted a position as a high school principal in the district. The researcher developed professional relationships with the teachers of Connor Elementary School during his time there as an assistant principal. The researcher understands the importance of protecting the validity of the study; therefore, previous knowledge of the participants with regard to instructional delivery and curriculum-related matters was not included in this study. The researcher conducted analyses, reported results, and drew conclusions from the data collected during the research and disregarded any previous experiences with the participants while the researcher was an administrator at Connor Elementary School. The researcher also asked for participants to volunteer to be a part of focus groups from each grade level, kindergarten through fifth grades, in order to remove bias through participant selection.

Description of the Instrument

Surveys are a useful method when conducting research where the researcher is attempting to gauge the opinions or beliefs of a selected group of respondents or, in certain cases, the collective whole (Creswell, 2008). The decision to adopt the Common Core State Standards was made by most states in 2010. For this reason, there is little research currently available surrounding the standards. The researcher attempted to locate a survey that would help answer the research question for this study. The researcher was unable to locate an existing survey that would allow data to be collected and provide the necessary information needed for this study. For this reason, the researcher developed a cross-sectional survey to ascertain teachers' perceptions of their students' abilities to think critically after receiving instruction focused on the Common Core State Standards. One advantage of administering a cross-sectional survey was that it allowed the researcher to examine current perceptions of teachers in all three schools used for this research. The intent of the survey was to provide a numeric description of the teachers' perceptions in regard to the Common Core State Standards and their students' abilities to think critically (Creswell, 2009) as defined by Ennis (2010). In an effort to gain insight into teacher perceptions of their students' abilities to think critically, the researcher developed a survey around Ennis's "super-streamlined conception of critical thinking." According to Ennis (1991), critical thinking is "reasonable reflective thinking that is focused on deciding what to believe or do" (p. 6). The following conception is meant to provide a framework for what a person who thinks critically is and does. The attributes are intertwined and often overlap due to their codependent relationships upon one another.

A critical thinker

1. Is open-minded and mindful of alternatives;
2. Desires to be and is well-informed;
3. Judges well the credibility of sources;
4. Identifies reasons, assumptions, and conclusions;
5. Asks appropriate clarifying questions;
6. Judges well the quality of an argument, including its reasons, assumptions, evidence, and their degree of support for the conclusion;
7. Can well develop and defend a reasonable position regarding a belief or an action, doing justice to challenges;
8. Formulates plausible hypotheses;
9. Plans and conducts experiments well;
10. Defines terms in a way appropriate for the context;
11. Draws conclusions when warranted, but with caution; and
12. Integrates all of the above aspects of critical thinking.

The survey used was a 5-point Likert scale survey (Appendix A) which contained three questions under each attribute that were aimed at determining teachers' perceptions of the impact instruction in the Common Core State Standards had on their students' abilities to think critically. The Likert agreement scale consisted of the following possible responses by the participants:

- 1=Strongly Disagree
- 2=Disagree
- 3=Neither Agree nor Disagree

- 4=Agree
- 5=Strongly Agree

The researcher developed the survey (Appendix A) and contacted Dr. Ennis in an effort to have the survey validated. The researcher believed Dr. Ennis to be the most qualified to validate the survey due to the fact that the survey was developed around Dr. Ennis's "super-streamlined conception of critical thinking." Dr. Ennis responded to the researcher's request via email and provided feedback on the survey in the form of suggestions. The researcher agreed with the suggestions made by Dr. Ennis and revised the survey. Upon making the suggested revisions, the survey was sent to Dr. Ennis for further examination. The researcher communicated with Dr. Ennis via email multiple times regarding revisions and updates to the survey in July 2012. Dr. Ennis received the final revisions and updates on July 16, 2012.

The researcher made three adjustments to the survey after the final approval was received from Dr. Ennis. The researcher added a section to the beginning of the survey that asked the participants for demographic information. The demographic information requested by the researcher included the following:

- Grade level taught during the 2011-2012 school year
- Grade level taught during the 2012-2013 school year
- Grade Level taught during the 2013-2014 school year

The second change that was made was a reorganization of the survey questions. When the researcher presented the survey to Dr. Ennis, each question was under the appropriate heading from Dr. Ennis's super-streamlined conception. Prior to the survey being distributed, the researcher reorganized the questions in a random order and

removed the headings from Dr. Ennis's conceptions. This change was one that Dr. Ennis was aware would take place after validation occurred. The final change was the addition of two open-ended questions added to the end of the survey. This change was a result of discussions with the researcher's committee members. The researcher and the committee believed providing the respondents with the opportunity to answer open-ended questions would be important to this research and assist in the formulation of focus group questions.

The survey was distributed via Survey Monkey to all teachers at Connor Elementary, Avery Elementary, and Constitution Elementary schools in April 2014. Web-based and email surveys provide many advantages over other types of surveys including higher response rates in many cases and ease of use. In addition to these benefits, web-based surveys require less time, effort, and money than other types of surveys (Ary, Jacobs, Razavieh, & Sorensen, 2006). Survey Monkey (www.surveymonkey.com) is an online survey tool that allowed the researcher to gather and analyze data electronically. The researcher selected Survey Monkey as the means of distributing the survey because the online response method should be relatively simple for the participants. The researcher hoped the ease of use and simplicity would increase the response rate and provide useful data to analyze.

Prior to distributing the survey, the researcher performed a pilot test of the questions with elementary school teachers and an administrator who were not participants in this study. This pilot test consisted of the surveys being distributed to teachers who currently teach Grades K-5 or are former teachers in these grade spans and one current elementary administrator. The pilot took place prior to distribution of the survey to the three schools participating in this research; thus, they were not actual participants in the

study from a data collection standpoint. Those selected for the pilot survey were employees within the same district; therefore, they received the same training those teachers at Connor Elementary, Avery Elementary, and Constitution Elementary Schools received. Additionally, they had been teaching the Common Core State Standards for the same amount of time as those teachers involved in the study, assuming they were teaching in the district during the 2011-2012 school year and had not moved or taken time off for any reason. Their feedback was used for the sole purpose of making changes to the survey in an effort to ensure questions were understandable and would measure what the researcher was attempting to measure (Creswell, 2008). The researcher distributed copies of the survey via email to the pilot test group. This allowed the pilot group to print the survey and write on the hard copy or provide feedback in the form of a return email. The pilot group suggested minor revisions that included word choice and sentence structure. Revisions were made, and the survey was sent to participants in April 2014.

Creswell (2008) suggested that studying a problem of interest to the participants is one method for obtaining a high response rate for surveys being used. All teachers in the schools involved in this study were teaching the Common Core State Standards. The researcher was hopeful this, coupled with the freshness of the standards, would generate a high level of interest resulting in a high response rate. Creswell also identified the use of a brief instrument as another method for obtaining a higher response rate. The researcher developed this instrument in an effort to measure the participants' perceptions as they related to the critical thinking abilities of their students. The survey was developed around the conception of what Ennis (2010) claimed a critical thinker is and should be able to do. The researcher was mindful of the need for brevity in this survey while

understanding that it is necessary to incorporate all aspects of critical thinking as defined by Ennis. The researcher developed a survey that he believed was as brief as it could be and still provide the necessary information for sufficient data collection that would allow the researcher to answer the question posed by this study. At the conclusion of 3 full weeks, there were 25 respondents to the survey. The researcher sorted through the responses and eliminated those from teachers who were not kindergarten through fifth-grade teachers. The researcher was able to determine that some of the respondents were special area teachers due to the fact that they reported teaching students in multiple grade levels.

Upon completion of the survey, a detailed analysis of the data was conducted and a chi square was also performed using the results. This allowed the researcher to determine a mean score for each theme in the survey and to determine goodness of fit regarding the responses to the survey. A mean score of less than three was viewed by the researcher as a negative response, and a score of greater than three was viewed as a positive response. A mean score of three was considered a neutral response by the researcher. The researcher was able to identify teacher perceptions regarding the impact of the Common Core State Standards on critical thinking abilities based on their responses to the surveys.

The qualitative components of data collection were in the form of responses to open-ended questions attached to the survey and focus groups following analysis of the survey results. According to Creswell (2008), asking participants open-ended questions allows respondents to voice their unconstrained opinions. The researcher believed this was an important piece of qualitative data which assisted in the development of focus group questions. One of the advantages of using focus groups for qualitative data

collection cited by Kitzinger (1995) is the idea that focus groups provide the opportunity for participants to interact with each other and elaborate on something another member of the group says or disagree with a particular point of view. When using a focus group as a means to collect qualitative data, it is best to use participants who reflect the total study population (Kitzinger). The researcher used teachers from multiple grade levels in an effort to obtain a well-rounded perspective reflective of the kindergarten through fifth-grade teacher population within the district. Teachers from all three schools were invited to participate in the focus groups. The researcher set up three focus groups comprised of teachers in kindergarten through fifth grades. The initial questions for the focus groups were derived from an analysis of the open-ended responses and survey results. Upon receiving the survey data, the researcher regrouped the questions into the original categories from the super-streamlined conception developed by Ennis (2010). The researcher then analyzed the responses to see which categories comprised of the three questions received the highest and lowest mean scores, and focus group questions were developed based on this analysis of the survey data. The first focus group session was held at Connor Elementary School, and there were 6 teacher participants representing kindergarten, second, third, fourth, and fifth grades. There were two representatives from second grade and one from all other grade levels with the exception of first grade, which did not have a teacher present. The second focus group was conducted at Constitution Elementary School, and there were five participants present. There were two kindergarten teachers, two fourth-grade teachers, and one fifth-grade teacher who participated in this focus group. The third and final focus group was comprised of six teachers from Avery Elementary School where each grade level, kindergarten through fifth grade, was represented.

Data Collection

The initial step was obtaining permission to conduct the study. Permission was obtained as a result of a written request submitted by the researcher to the superintendent of the district. This request was submitted and permission was granted in July 2012. Upon receiving permission from the district superintendent, the researcher contacted the principals of all three elementary schools in an effort to obtain permission at both the district and building levels. Because permission was granted well over a year in advance of data being collected, the researcher contacted both the superintendent and principals again in July 2013 and April 2014 prior to the surveys being distributed. Upon approval of the proposal, the steps for data collection were as follows:

1. The researcher distributed the survey via Survey Monkey in April of 2014.
2. The researcher collected surveys for a 3-week period.
3. Survey data were analyzed.
4. When the analysis was completed, the researcher developed focus group questions based on the analysis and themes that resulted from the survey data and open-ended questions.
5. Focus group participants were determined and times were set for those agreeing to participate.
6. Focus groups were transcribed, and the data were analyzed.

Summary

The researcher designed a survey based on Ennis's (2010) "super-streamlined conception of critical thinking." The survey was designed to collect data that would help determine elementary school teachers' perceptions of the impact the Common Core State Standards had on their students' abilities to think critically. The instrument was validated

by Dr. Ennis and by a pilot test after a series of revisions. The completed survey was distributed to those teachers who instructed students using the Common Core State Standards during the 2012-2013 and/or 2013-2014 school years. The survey results were used to help answer the research question and develop focus group questions. Participants volunteered to take part in focus groups conducted by the proxy. The focus groups included teachers for each grade level, kindergarten through fifth. Upon completion of the interviews, the researcher analyzed the data.

Chapter 4 of this mixed-methods study presents both the quantitative and qualitative data collected by the researcher. The researcher provides detailed results of the surveys through a statistical analysis and themes that emerged from the focus groups after they were coded and analyzed. The perception data collected and reported in Chapter 4 enabled the researcher to draw conclusions which are detailed in Chapter 5. These results provide insight into the perceived impact the Common Core State Standards had on elementary students' abilities to think critically.

Chapter 4: Findings

Introduction

The purpose of this study was to determine teacher perceptions of the impact the Common Core State Standards had on students' abilities to think critically by answering this research question, "What is the impact of the Common Core State Standards on the critical thinking abilities of students?" The participants were teachers from three elementary schools within the same district in western North Carolina. The researcher chose to conduct a mixed-methods study with surveys, open-ended questions, and focus groups as the primary means of data collection. The survey questions (Appendix A) were derived from the work of Dr. Robert Ennis who is an expert in the field of critical thinking. The researcher-developed survey, open-ended, and focus group questions (Appendices A and G) aimed at determining the participating teachers' perspectives regarding the impact the Common Core State Standards had on their students' abilities to think critically as related to the super-streamlined conception developed by Ennis (2010).

Dr. Ennis's super-streamlined conception is comprised of 12 attributes of a critical thinker. The researcher developed three survey questions related to each of the first 11 attributes and put them in random order prior to distributing the survey. Upon receiving the survey responses, the researcher reorganized the responses to each question into their original categories and analyzed the results so a mean score could be obtained for each of the 11 categories.

The mean score for each category was derived from the survey responses that were assigned a numeric rating using the following Likert agreement scale:

- 1=Strongly Disagree

- 2=Disagree
- 3=Neither Agree or Disagree
- 4=Agree
- 5=Strongly Agree

In addition to being a quantitative piece of data in this mixed-methods study, the mean scores were also used to develop several of the focus group questions which centered on the lowest scoring category and the two highest scoring categories identified by the data analysis. The survey also included two open-ended questions that the researcher analyzed and used as a means for creating follow up questions during the focus groups as well.

The researcher used a proxy to conduct the focus group interviews. The proxy selected was a doctor in the field of education with extensive knowledge of the researcher's study. The focus group sessions were recorded and later transcribed and coded for themes by the researcher in an effort to answer the research question. Analysis of the transcribed focus groups provided a more detailed picture of the teachers' perceptions. A detailed summary of the data is included in this chapter.

Analysis of Data

The survey (Appendix A) was developed and distributed via Survey Monkey to all certified classroom teachers at the three participating elementary schools. There were three questions developed around each of the first 11 characteristics of a critical thinker as developed by Ennis (2010) and included in his super-streamlined conception. The questions were placed in random order prior to the distribution of the survey. Included in the survey were three initial questions asking participants which grade level (if any) they

taught each of the last 2 years and which grade level they were teaching at the time they responded to the survey. The two open-ended questions on the survey allowed participants to discuss how they believed their instructional practices have changed after the implementation of the Common Core State Standards and the difference between the former North Carolina Standard Course of Study and the Common Core State Standards.

The survey was available for 3 weeks. At the end of the third week, the researcher reorganized the survey responses to incorporate all three questions in the survey as they related to each of the 11 characteristics. The researcher took the mean scores for each individual question within the survey and combined them to determine a mean score for each of the 11 characteristics.

Tables 10, 11, and 12 summarize the information gleaned from the survey responses. The tables below identify the percentage, the number of participants, and the corresponding grade level over the last 3 years.

Table 10

Grade Level Taught During the 2011-2012 School Year

Grade Level	Percentage of Participants	Number of Participants
Kindergarten	11.76	2
Grade 1	11.76	2
Grade 2	17.65	3
Grade 3	17.65	3
Grade 4	11.76	2
Grade 5	23.53	4
None of the above	5.89	1

Table 11

Grade Level Taught During the 2012-2013 School Year

Grade Level	Percentage of Participants	Number of Participants
Kindergarten	23.53	4
Grade 1	11.76	2
Grade 2	11.76	2
Grade 3	11.76	2
Grade 4	17.65	3
Grade 5	23.53	4

Table 12

Grade Level Taught during the 2013-2014 School Year

Grade Level	Percentage of Participants	Number of Participants
Kindergarten	23.53	4
Grade 1	11.76	2
Grade 2	11.76	2
Grade 3	11.76	2
Grade 4	11.76	2
Grade 5	29.41	5

The information contained in the above tables allowed the researcher to develop an understanding of which grade level the survey participants taught. This was important data for the researcher to collect because it allowed the results to be placed in context both for individual questions and groups of questions as data were analyzed based on the 11 characteristics of a critical thinker as defined by Ennis (2010). This information was also used as the researcher reviewed the open-ended and focus group responses to determine if participants in one grade level or a combination of grade levels responded in

consensus to a perceived difference, or lack thereof, in the critical thinking abilities of their students as a result of the Common Core State Standards.

The figure below provides the responses as they relate to Ennis's (2010) characteristics of a critical thinker and the mean score for the combined questions related to each of the 11 characteristics. The researcher interpreted a mean score less than three as a negative response and greater than three as a positive response. A mean score equal to three was interpreted as a neutral response by the researcher. The only characteristic of a critical thinker the participants rated negatively was "the ability of students to judge the credibility of sources," which received a mean score of 2.86. The two highest rated characteristics were "the desire to be well-informed" with a mean score of 3.96 and "the willingness to keep an open mind" with a mean score of 3.94.

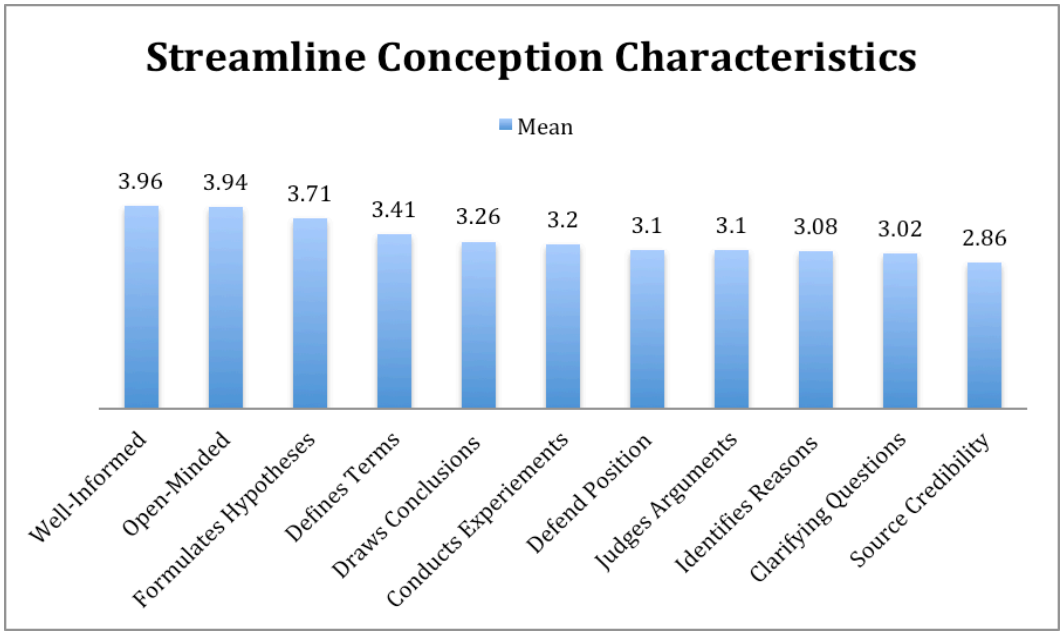

Figure. Streamline Conception Characteristics.

The researcher compared the responses for the lowest rated characteristic of a

critical thinker and the two highest rated characteristics of a critical thinker to investigate how the individual grade levels responded to each question related to the overall characteristics of a critical thinker.

Within the survey, questions 4, 17, and 30 addressed the participants' perceptions of students' abilities to judge the credibility of sources. Question 4, "students seek out multiple sources of information," received the highest mean rating at 3.12. Question 30, "students recognize the key components of credible sources," received an average rating of 3.06, and question 17, "students are able to judge the credibility of various sources of information," received and average rating of 2.41. The cumulative percentage of negative, neutral, and positive responses for the three questions associated with "students' abilities to judge the credibility of sources" was 38% negative with three participant responses of strongly disagree and 16 responses of disagree. The cumulative percent of neutral responses was 32% with 16 participants responding neither agree nor disagree and the cumulative percent of positive responses was 30% with 15 participants selecting agree and zero participants selecting strongly agree.

Tables 13, 14, and 15 show the responses to the three questions by each participant organized by the grade level they taught during the 2013-2014 school year. The three questions are related to "students' abilities to judge well the credibility of sources," which was the lowest rated characteristic with a mean score of 2.86 according to the teachers surveyed. The researcher examined the data to determine which grade levels had the lowest and highest percentage of negative responses and determined that the fourth-grade participants did not have a negative rating for any of the three questions, and the kindergarten participants had the second lowest cumulative percentage of negative ratings at 16.6%. The third-grade participants provide the highest number of

negative responses to the three questions addressing "students ability to judge the credibility of sources," with 66.6% of their responses being negative.

Table 13

Question 4–Students Seek Out Multiple Sources of Information

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	0.00% 0	0.00% 0	100.00% 4	0.00% 0	4
First	0.00% 0	50.00% 1	50.00% 1	0.00% 0	0.00% 0	2
Second	0.00% 0	50.00% 1	50.00% 1	0.00% 0	0.00% 0	2
Third	50.00% 1	0.00% 0	0.00% 0	50.00% 1	0.00% 0	2
Fourth	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Fifth	20.00% 1	20.00% 1	20.00% 1	40.00% 2	0.00% 0	5

Table 14

Question 30–Students Recognize Key Components of a Credible Source

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	0.00% 0	50.00% 2	50.00% 2	0.00% 0	4
First	0.00% 0	0.00% 0	100.00% 1	0.00% 0	0.00% 0	1
Second	0.00% 0	50.00% 1	50.00% 1	0.00% 0	0.00% 0	2
Third	0.00% 0	50.00% 1	0.00% 0	50.00% 1	0.00% 0	2
Fourth	0.00% 0	0.00% 0	50.00% 1	50.00% 1	0.00% 0	2
Fifth	0.00% 0	40.00% 2	40.00% 2	20.00% 1	0.00% 0	5

Table 15

Question 17–Students are able to Judge the Credibility of Various Sources of Information

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	50.00% 2	50.00% 2	0.00% 0	0.00% 0	4
First	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2
Second	0.00% 0	50.00% 1	50.00% 1	0.00% 0	0.00% 0	2
Third	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2
Fourth	0.00% 0	0.00% 0	50.00% 1	50.00% 1	0.00% 0	2
Fifth	20.00% 1	40.00% 2	40.00% 2	0.00% 0	0.00% 0	5

Within the survey, questions 6, 11, and 13 addressed the participants' perceptions of "students' willingness to be open-minded and mindful of alternatives." Questions 11 and 13, "students are open-minded to the ideas of others" and "students understand there are multiple ways to solve problems," received the highest mean rating of 4.06 within this characteristic. Question 6, "students are able to use multiple strategies to arrive at correct answers," received an average rating of 3.71. The cumulative percentage of negative responses for the three questions associated with "students' willingness to be open-minded and mindful of alternatives" was 9.9% with zero participant responses of strongly disagree and five responses of disagree. The aggregate percent of neutral responses was 5.8% with three participants selecting neither agree nor disagree. The aggregate percent of positive responses was 84.3% with 33 participants selecting agree and 10 respondents selecting strongly agree.

Tables 16, 17, and 18 include the responses to the three questions organized by the grade-level participants taught during the 2013-2014 school year. The three questions relate to teachers' views on their students' willingness to be open-minded and mindful of alternatives, which was the second highest rated characteristic with a mean score of 3.94, according to the teachers surveyed. The researcher examined the data to determine which grade levels had the highest and lowest percentage of positive responses. The researcher discovered that 100% of participants teaching kindergarten, second, and third grades responded positively to all three questions related to "students' willingness to be open-minded and mindful of alternatives." The lowest percentage of positive responses came from first and fourth grades with 66% of participant responses being positive.

Table 16

Question 11 –Students are Open-Minded to the Ideas of Others

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	0.00% 0	0.00% 0	75.00% 3	25.00% 1	4
First	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Second	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Third	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Fourth	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
Fifth	0.00% 0	20.00% 1	0.00% 0	80.00% 4	0.00% 0	5

Table 17

Question 13–Students Understand There are Multiple Ways to Solve Problems

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	0.00% 0	0.00% 0	100.00% 4	0.00% 0	4
First	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
Second	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Third	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Fourth	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Fifth	0.00% 0	20.00% 1	0.00% 0	40.00% 2	40.00% 2	5

Table 18

Question 6–Students are able to use Multiple Strategies to Arrive at Correct Answers

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	0.00% 0	0.00% 0	100.00% 4	0.00% 0	4
First	0.00% 0	50.00% 1	0.00% 0	50.00% 1	0.00% 0	2
Second	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Third	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Fourth	0.00% 0	0.00% 0	50.00% 1	0.00% 0	50.00% 1	2
Fifth	0.00% 0	40.00% 2	0.00% 0	40.00% 2	20.00% 1	5

Within the survey, questions 22, 25, and 32 addressed the participants' perceptions of "students' desire to be well-informed." Question 32, "students are eager to learn new information," received the highest mean rating at 4.41. Question 22, "students are excited when presented with new information," received an average rating of 4.35, and question 25, "students make an effort to be well-informed," received an average rating of 3.12. The cumulative percentage of negative responses for the three questions associated with "students' desire to be well-informed" was 7.8% negative with zero participant responses of strongly disagree and four responses of disagree. The cumulative percent of neutral responses was 15.7% with eight participants selecting

neither agree nor disagree. The cumulative percent of positive responses was 76.5% with 25 participants selecting agree and 14 participants selecting strongly agree.

Tables 19, 20, and 21 delineate the responses to the three questions organized by the grade level taught during the 2013-2014 school year. The three questions relate to "students' desire to be well-informed" which was the highest rated characteristic with a mean score of 3.96 according to the teachers surveyed. The researcher examined the data to determine which grade levels had the highest and lowest percentages of positive responses related to "students' desire to be well-informed." The analysis revealed that participants teaching third grade responded positively to all three questions related to "students' desire to be well-informed." The lowest percentage of positive responses came from first grade with 50% of participant responses being positive.

Table 19

Question 32–Students are Eager to Learn New Information

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 4	4
First	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Second	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Third	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 2	2
Fourth	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Fifth	0.00% 0	0.00% 0	0.00% 0	100.00% 5	0.00% 0	5

Table 20

Question 22–Students are Excited when Presented with New Information

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	0.00% 0	0.00% 0	50.00% 2	50.00% 2	4
First	0.00% 0	0.00% 0	50.00% 1	50.00% 1	0.00% 0	2
Second	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Third	0.00% 0	0.00% 0	0.00% 0	0.00% 0	100.00% 2	2
Fourth	0.00% 0	0.00% 0	0.00% 0	50.00% 1	50.00% 1	2
Fifth	0.00% 0	0.00% 0	0.00% 0	60.00% 3	40.00% 2	5

Table 21

Question 25–Students Make an Effort to be Well-Informed

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total
Kindergarten	0.00% 0	0.00% 0	25.00% 1	75.00% 3	0.00% 0	4
First	0.00% 0	100.00% 2	0.00% 0	0.00% 0	0.00% 0	2
Second	0.00% 0	50.00% 1	50.00% 1	0.00% 0	0.00% 0	2
Third	0.00% 0	0.00% 0	0.00% 0	100.00% 2	0.00% 0	2
Fourth	0.00% 0	0.00% 0	50.00% 1	50.00% 1	0.00% 0	2
Fifth	0.00% 0	20.00% 1	80.00% 4	0.00% 0	0.00% 0	5

The researcher chose to examine the two characteristics of a critical thinker with the highest overall mean scores and the six survey questions associated with these two characteristics. The mean scores of both characteristics indicated that the participants felt strongly that each of them have been impacted the most by the implementation of the Common Core State Standards. The researcher also decided it was important to analyze this data related to the grade level taught by each participant to see if there were differences among grade levels in their responses. In addition to analyzing the data related to "students' desire to be well-informed" and their "willingness to be open-minded to the ideas of others," the researcher decided to delve into individual grade-level perceptions of "students' abilities to judge well the credibility of sources," as this was the characteristic receiving the lowest overall mean rating.

Table 22 represents the combined responses for survey questions 4, 6, 11, 13, 17, 22, 25, 30, and 32. These nine questions address the three characteristics identified as outliers by the researcher. The researcher deemed it important to know if any of the grade levels had a significantly more negative or more positive perception of the impact the Common Core had on their students' abilities to think critically. This was accomplished by examining responses to the nine survey questions associated with the two highest characteristics and the lowest characteristic. Table 23 indicates the percentage of responses from each grade level that are negative and those that are positive.

Table 22

Combined Survey Responses for Two Highest and Lowest Rated Characteristics

Grade Level	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Kindergarten		2	5	22	7
First		6	4	5	2
Second		4	4	10	
Third	1	3		9	5
Fourth			5	8	5
Fifth	2	10	9	21	8
Total	3	25	27	75	27

Table 23

Percentage of Positive and Negative Responses by Grade Level for the Two Highest and Lowest Rated Characteristic

Grade Level	% Negative	% Positive
Kindergarten	5.5	80.5
First	35.3	41.2
Second	22.2	55.5
Third	22.2	77.7
Fourth	0	72.2
Fifth	24	58

The researcher conducted a chi-square goodness-of-fit test on each of the survey questions to determine which of the survey questions contained responses that were statistically significant. Table 24 provides the p values derived from the chi-square test for each question grouped by the characteristic each question addresses. When a chi-square test is conducted and the expected N value is less than 5, the results should be

viewed with caution. Table 25 indicates which survey questions were significant with a p value that is less than or equal to .05. The table also provides the chi-square value represented as $X^2(2)$, the degrees of freedom for each significant question, and the expected N value with asterisk for those with an expected value below 5. Two of Ennis's (2010) characteristics of a critical thinker had p values less than .05 on all three questions: open-minded and formulates hypothesis. These results indicate there was a significant difference between the expected N values and the observed N values. The researcher anticipated an equal distribution of participant responses; however, the results for these two characteristics suggest a consensus of positive responses related to students' abilities to formulate a hypothesis and their willingness to be open-minded. Based on the p values, it is probable that these results would be duplicated in a subsequent survey of similar participants.

Table 24

Chi-Square p Value Aligned by Characteristic and Item Number

Characteristic	Item	p	Item	p	Item	p
Source Credibility	4	.065	17	.012	30	.646
Clarifying Questions	5	.005	16	.325	19	.422
Open-Minded	6	.002	11	.001	13	.001
Formulates Hypothesis	7	.000	14	.002	27	.005
Draws Conclusions	8	.000	12	.065	21	.028
Conducts Experiments	9	.182	20	.000	34	.230
Defines Terms	10	.002	29	.013	31	.230
Judges Arguments	15	.193	23	.005	28	.943
Defends Position	18	.220	33	.646	35	.662
Well-informed	22	.047	25	.662	32	.467
Identifies Reasons	24	.943	26	.023	36	.220

Table 25

Questions with a Significant Difference

Question Number	p value	$X^2(2)$	df	Expected N
5	.005	15.059[b]	4	3.4*
6	.002	14.765[a]	3	4.3*
7	.000	23.059[c]	2	5.7
8	.000	13.235[d]	1	8.6
10	.002	14.765[a]	3	4.3*
11	.001	15.706[a]	3	4.3*
13	.001	15.706[a]	3	4.3*
14	.002	14.765[a]	3	4.3*
17	.012	11.000[a]	3	4.3*
20	.000	19.471[a]	3	4.3*
21	.028	9.118[a]	3	4.3*
22	.047	6.118[c]	2	5.7
23	.005	10.706[c]	2	5.7
26	.023	7.529[c]	2	5.7
27	.005	10.706[c]	2	5.7
29	.013	12.706[b]	4	3.4*

Qualitative Data Collection

In addition to collecting and analyzing quantitative data, qualitative data were also collected. The researcher included two open-ended questions at the end of the survey (Appendix A), which provided participants with the opportunity to express their unconstrained opinions (Creswell, 2008). The primary purpose for the open-ended questions was to determine if participant responses to the questions had common themes that could be used to generate follow-up questions for the focus groups. The survey data, open-ended responses, and focus group data were analyzed in hopes of generating a well-defined representation of the participants' beliefs regarding the impact the Common State Standards had on their students' abilities to think critically.

The open-ended questions posed to participants were designed to elicit responses that focused on teacher behaviors and on the new curriculum. The researcher deemed it necessary to incorporate a question directed at the teachers' instructional practices because theoretically to teach the Common Core State Standards, instructional methods should be somewhat different from those used to teach previous standards (Kendall, 2011). Question 37 in the survey was the first open-ended response question: "How have your instructional practices changed (if at all) as a result of implementing the Common Core State Standards?" Based on the district's 2014 teacher working conditions survey, 99.1% of teachers indicated that the curriculum being taught in their school was aligned with the Common Core State Standards. In this study, 88% of participants responded that their instructional practices have changed as a result of the Common Core State Standards. Two participants indicated their practices have not changed as a result of the new curriculum. Table 26 includes a sampling of responses for this question on the survey. While Table 26 does not include all participant responses and, in some cases, the samples are excerpts from the complete response, these examples provide a representation of the responses related to how they have adapted their teaching as a result of the Common Core State Standards.

Table 26

"How have your instructional practices changed (if at all) as a result of implementing the Common Core State Standards?"

Responses to Question 37	Sample of Responses
Instructional practices have changed.	"More hands-on methods and project-based learning activities. Less multiple choice tests."
	"Students are doing more of the work. They are creating more questions rather than just answering the questions I have formulated."
	"Students must explain and justify, instead of follow procedures and algorithms . . . . There is deeper understanding of concepts, and focus on different approaches to solving problems."
	"My teaching implements the why and how rather than just doing part of a lesson . . . lessons are more student-centered rather than teacher-centered. The goal of every lesson is students think rather than pour information into their heads."
	"More cooperative learning groups."
	"They have changed drastically. Everything went from whole group to small group discussion."
	"Smaller groups. Getting kids to talk to each other instead of me talking all of the time." "More talking among students."
Instructional practices have not changed.	"I teach CCSS but I still use tried and true strategies and ideas."
	"My instructional practices have not changed much at all. My classroom has always been one where I want my students to prove their ideas and answers and be able to communicate the reasoning behind their thoughts."

The second open-ended question on the survey was "In your experience, what is

the difference between the Common Core State Standards and the former North Carolina Standard Course of Study?" Table 27 includes a sampling of the responses. This table provides an overview of how the participants responded to the second open-ended question in reference to their views on the difference in the Common Core State Standards and the former North Carolina Course of Study. Responses to both questions allowed the researcher to hear the voice of participants, which is a fundamental component of conducting qualitative research (Creswell, 1998).

Table 27

"In your experience, what is the difference between the Common Core State Standards and the former North Carolina Standard Course of Study?"

Open-Ended Question 38 Sampling of Responses
"Common Core has students explain their reasoning and identify ways to get to an answer."
"The Common Core Standards are deeper not wider and there is more of an effort to build on prior knowledge."
"Common core is much more open discussion in class, with student dialogue and various ways to get the right answer. Math is a huge change because the students are not using any algorithms."
"Digging deeper into the processes."
"I think Common core requires students to think more and show a variety of methods in solving problems."
"The main difference is the wording. We get so used to the standards changing every so often this is simply one more time we have to learn the new language of what we are to teach."
"The Common Core focuses more on the child experimenting and finding out the reasons why something works or how it works. The SCOS was more the teacher doing and the kids watching and learning."
"The level of thinking is more rigorous with the Common Core Standards."
"Not quite as cut and dried as before. In some instances, I feel the CC standards are vague and difficult for teachers to teach."
"Students are asked to solve problems and explain how instead of us giving them answers and showing them one way to solve it."
"Children learn more by using manipulatives and experimenting."
"I like Common core better. My kids seem to be getting it better this year through small groups. They are talking more and seem more engaged."
"Multiple ways to solve problems instead of learning the process"
"I fear that as we see students thinking more about what they are working on, we will also see them arriving at incorrect answers because they are lacking these basic skills that they did not master due to an emphasis on the process of solving problems and a lack of practice on the basic facts needed before problems can be solved."
"CCSS focuses more application of knowledge."

In order to obtain a more accurate well-rounded view of the participants'

perceptions of the Common Core State Standards on their students' abilities to think critically, the researcher developed questions and used a proxy to conduct focus groups. After contacting the principals at each of the three schools to determine an acceptable date and time for the focus groups, the researcher composed emails to the principals to be forwarded to all classroom teachers at each school requesting their participation. Knowing a successful focus group relies heavily on the moderator's skills (Glesne, 2011), the researcher selected a proxy who is a doctor in the field of education who recently completed a mixed-methods study and was familiar with this particular study. Each focus group provided rich discussion and varied in length. The Connor Elementary School focus group lasted 80 minutes and 23 seconds, the Avery Elementary focus group lasted 26 minutes and 43 seconds, and the Constitution Elementary focus group lasted 38 minutes and 27 seconds. The focus group questions (Appendix G) were developed with the goal of "getting words to fly" (Glesne, 2011, p. 131). The survey data and open-ended responses were analyzed and served as a starting point for focus group questions. Table 28 provides an overview of the participants from each school, including grade level taught during the 2013-2014 school year and the years of teaching experience for each focus group participant.

Table 28

Focus Group Participants

School	Grade-Level Taught	Years of Experience
Avery Elementary	3	18
Avery Elementary	2	9
Avery Elementary	5	24
Avery Elementary	Kindergarten	14
Avery Elementary	4	8
Avery Elementary	1	20
Connor Elementary	3	4
Connor Elementary	2	26
Connor Elementary	5	14
Connor Elementary	4	9
Connor Elementary	Kindergarten	4
Connor Elementary	2	22
Constitution Elementary	4	12
Constitution Elementary	5	18
Constitution Elementary	Kindergarten	22
Constitution Elementary	Kindergarten	31
Constitution Elementary	4	4

Each focus group was recorded by the proxy and later transcribed by the researcher. Upon completion of the transcription, the researcher analyzed the data and identified themes. The following themes were present in at least one of the three focus sessions:

- It is too early to tell what type of impact the Common Core State Standards will have on students' abilities to think critically.
- The Common Core State Standards may not be developmentally appropriate.
- Teachers are uncomfortable with the curriculum and the changes it requires them to make.

- Concerns about the assessments.
- Implementation was done poorly.
- Students are collaborating more.
- Instructional strategies have changed.

Strength codes were applied to each theme based upon how many focus groups in which it was present. If it was only mentioned in one focus group, it was given a weak strength code. If it was mentioned in two of the three focus groups, it was assigned a moderate strength code; and if it was present in all three, it was coded as a strong theme. Table 29 summarizes the strength codes associated with each theme.

Table 29

Focus Group Strength Codes

Theme	Strength Code
Too early to tell	Strong
Not developmentally appropriate	Strong
Teacher discomfort	Moderate
Assessments do not match standards	Strong
Implementation was poor	Weak
Increased collaboration	Strong
Change in instructional strategies	Strong

Several of the themes that emerged are not directly related to Ennis's (2010) definition and conception of critical thinking, but the researcher thought the discussion and results were important to include due to the timing of the study along with the number of times the themes were mentioned during the focus groups. The role of assessment was mentioned numerous times in all three focus groups, and while concerns related to the current assessments may not be tied to the researcher's operational

definition of critical thinking, each focus group spent a substantial amount of time talking about the fact that the assessments do not match the standards and the perceived expectations related to pedagogy. One of the focus group participants stated, "The Common Core is not aligned with the assessments we have right now." Another focus group participant said, "I don't think we assess in the same way we teach." These feelings were present in all three focus groups, which led the researcher to include this qualitative data in the study. This theme will be addressed in more depth in Chapter 5.

A second theme that cannot be directly linked to the operational definition and was only present in the Connor Elementary focus group is the idea that the Common Core State Standards were poorly implemented. The researcher considered this information as notable due to the number of the times this theme was present in the Connor Elementary focus group. One participant from Connor Elementary stated,

> Common Core has been done poorly and I am afraid it's all gonna go away before we see any real benefits . . . I don't think we are going to get past the growing pains to see the big picture and see the positive that can come of it because it has been poorly implemented.

The Connor Elementary School focus group also spent a considerable amount of time discussing the implementation as it relates to the decision to begin teaching the standards in all grade levels at one time. The general feeling was that a more effective approach would have been to gradually implement the standards beginning with the lower grade levels as opposed to implementing them all at once. One participant stated, "If they had just started with kindergarten, the next year done first, the next year done second grade, those kids would not have felt quite so much like the rug was pulled out from under them." Another teacher expressed a similar feeling, saying, "If they'd had it in

kindergarten, first, second, and third grades, when you got them in fourth, they would already be used to this." Although this is a weak theme, the researcher interpreted it as relevant due to its relationship to other identified themes. This weak theme is further support for "teacher discomfort" (moderate theme) and the feeling that it may be "too early to tell" (strong theme). An interpretation of these themes will be discussed in greater detail in Chapter 5.

Participants from each focus group discussed concerns that it may be too early to tell what impact the Common Core State Standards will have on students' abilities to think critically, which is an identified limitation of the study. A participant from Connor Elementary stated, "We are probably not going to see the benefits in the upper grades for several more years." A participant from Avery Elementary stated, "I don't think we have been doing it long enough to see that big of a difference yet." This theme was present in all three focus groups, which is why it was coded as a strong theme; however, discussion was more prevalent around this theme in the Connor Elementary focus group.

Three themes emerged that were coded as separate themes but are related in many ways. These themes include "teacher discomfort" (moderate), "change in instructional strategies" (strong), and "increased collaboration" (strong). The researcher viewed these themes as related because discussion in the focus groups where these themes were present was intertwined. Two teachers from Constitution Elementary summed up their feelings by saying, "That's not how we taught ten years ago or even five years ago." In response to this statement, another teacher said, "That's been hard for us old people to let them talk more." This feeling was echoed by another participant saying,

> I think Common Core is changing our teaching style. We don't stand up in front of the class and lecture for 40 minutes then switch subjects and start all over again

> for 40 minutes. You know, we don't do that anymore with Common Core but I don't think kids are used to that yet.

The feeling that the Common Core State Standards have changed teachers' instructional strategies and allowed for more discussion and student collaboration was present throughout all three focus groups. Participants from two of the three groups indicated this made them uncomfortable.

The final theme that emerged is the idea that the Common Core State Standards and the amount of critical thinking included in the standards may not be developmentally appropriate for students in some cases. This idea was seen in the responses from participants in all three focus groups. Statements related to this theme include "You know elementary is a little bit young to demand a lot of critical thinking skills." Another participant stated, "There are some developmental issues. I mean, I just don't know that they are really ready to do what they are asking them to do and the sequence of it."

Summary

The researcher collected and analyzed quantitative and qualitative data for this study which has been summarized in this chapter. Participants included teachers from three schools who contributed to this study via survey responses, responses to open-ended questions, and focus group participation. Analysis of the data led the researcher to draw conclusions that will be discussed in Chapter 5. The data collection and analysis allowed the researcher to draw conclusions related to the research question. Collecting multiple types of data allowed for a well-rounded view of the participants' perceptions about the impact the Common Core State Standards had on their students' abilities to think critically. Discussion related to these conclusions as well as limitations and recommendations for future studies is included in the Chapter 5.

Chapter 5: Conclusions and Recommendations

Introduction

This study was designed to examine teachers' perceptions of the impact the Common Core State Standards had on their students' abilities to think critically. Ennis's (2010) conception of critical thinking was used as the foundation for this study. The researcher deemed this an important issue because the ability to think critically is vital to success in the 21st century (Bellanca et al., 2012; Brookhart, 2010). Critical thinking is woven into the Common Core State Standards that were adopted by 45 states as of December 2013 (www.corestandards.org). The adoption of the standards by the majority of states makes this study pertinent to most educators, parents, and students in the United States.

The researcher began this study by conducting a review of the related literature, which points to a lack of critical thinking ability in many students (Lett, 1990). This lack of critical thinking ability appears to be in large part due to a lack of focus on teaching critical thinking in our schools (Wagner, 2008). One of the intended outcomes of students receiving instruction in the Common Core State Standards is an increase in critical thinking abilities (Kettler, 2014). These evidences led the researcher to design a study to answer the research question "What is the impact of the Common Core State Standards on the critical thinking abilities of students?" The researcher designed a mixed-methods study in which both quantitative and qualitative data were collected. Quantitative data were collected via a 5-point Likert scale survey which was distributed via Survey Monkey. Qualitative data included open-ended questions attached to the end of the survey along with focus groups at each of the three participating schools. Collecting multiple data sources allowed the researcher to obtain an accurate picture of

the participants' perceptions of how the Common Core State Standards have impacted their students' abilities to think critically, if at all. This chapter focuses on conclusions drawn by the researcher following an analysis of data along with suggestions for future research.

Conclusions

The researcher chose to use the work of Dr. Robert Ennis when selecting a definition and conception of critical thinking. Ennis (2010) developed a "super-streamlined conception of critical thinking" which included characteristics of a critical thinker. These characteristics were discussed in detail in previous chapters. A survey was designed around these characteristics and sent to participants via Survey Monkey. The survey results were analyzed quantitatively and qualitatively and led the researcher to identify specific critical thinking characteristics the participants felt were most and least impacted by implementation of the Common Core State Standards. The two characteristics participants felt were most impacted were "the desire to be well-informed" and "the willingness to keep an open mind." The characteristic participants felt was least impacted was "the ability to judge the credibility of sources."

The characteristic "students have a desire to be well-informed" received a combined mean score of 3.96, which was the highest rated characteristic. The researcher attributed this to the change in instructional practices indicated by participants in the open-ended questionnaire and focus groups. Participant responses to the question "How have your instructional practices changed (if at all) as a result of implementing the Common Core State Standards?" suggested that the majority of participants believed their practices have changed to include more active participation among students. Participants noted that they are using more hands-on methods, cooperative learning

groups, and project-based learning activities as opposed to the more traditional methods they were using prior to the implementation of the Common Core State Standards. Participants also indicated the Common Core State Standards have decreased the amount of multiple choice tests they are giving students and the amount of time spent lecturing and delivering instruction to the whole class. The sense that instructional practices have changed is further supported by the data collected in the focus groups. One of the themes present in all three focus groups was a change in the way instruction is being delivered.

Based on the data collected, it is apparent that the Common Core State Standards have had an impact on day-to-day instruction in most participants' classrooms. These pedagogical shifts are vital if teachers are going to implement the Common Core State Standards with fidelity. The necessary changes result in engaging lessons which increase the desire to learn and foster a love of learning (Council of Chief State School, 2013). The characteristic "students have a desire to be well-informed" is present in the quantitative and qualitative data collected for this study. This conclusion is supported by the literature. Koh (2002) examined TSLN, which was the blueprint for Singapore schools to produce students with the ability to think critically in the 21st century. Koh indicated that in order for the goals of TSLN to be realized, a change in instructional practices was necessary. Kazemi and Stipek's (2008) findings further support this conclusion. They determined that pedagogical shifts led to an increase in the critical thinking abilities of students. Data collected for this study indicate that the Common Core State Standards changed participants' instructional practices. Research indicates these changes in instructional practices would lead to a student's desire to learn, thus increasing their desire to be well-informed.

The willingness to keep an "open-mind" is another characteristic of a critical

thinker which, based on these participants' responses, has been positively impacted by the implementation of the Common Core State Standards. The survey responses resulted in a combined mean score of 3.94 making this characteristic of a critical thinker the second highest rated by teachers participating in the study. The open-ended questions and focus groups pointed to an increase in collaboration. The responses to the question "In your experience, what is the difference between the Common Core State Standards and the former North Carolina Standard Course of Study?" included the idea that students are working together and are expected to demonstrate multiple ways to solve problems. This shift requires students to be open-minded not only to the ideas of their peers but also to the notion that there are multiple ways to arrive at a correct answer. This is further supported by focus group discussions, which indicated an increase in collaboration and openness to the ideas of others in all three focus groups. This strong theme was found to be related to teacher discomfort, which emerged in two of the three focus groups leading the researcher to code it as a moderate theme. Participants indicated that the Common Core State Standards led to an increase in student collaboration and, in some cases, teachers denoted this made them uncomfortable because they were not used to allowing the discussion in their classes that is now present. These results are similar to those found by Frykholm (2004) when he examined the MiC program which emphasized critical thinking and deemphasized lecture in classrooms. Participants in his study suggested that they were uncomfortable with this type of instruction that led to an increase in the critical thinking abilities of their students. Data collected in this study and related research in the literature further support the conclusion that increased collaboration is a means to improve critical thinking. This increased collaboration is present in many classrooms as a result of the Common Core State Standards. Data

suggest that the willingness to be open-minded is related to an increase in collaboration among students and the focus on finding multiple ways to solve problems. Data also suggest that in some cases participants are uncomfortable with increased amounts of collaboration and discussion.

The two characteristics with the lowest combined mean scores were students' inclination to ask clarifying questions at 3.02 and their ability to judge the credibility of sources at 2.86. A close examination of the standards reveals that judging the credibility of sources does not present itself in the standards until Grade 6. Writing standard 6.8 requires students to "assess the credibility of a source" (http://www.corestandards.org/ELA-Literacy/CCRA/L). Considering that this study was conducted with teachers in kindergarten through fifth grades, the researcher concluded that the absence of this requirement prior to the sixth grade was likely the reason that this characteristic was rated the lowest by participants. The second lowest rated characteristic was student willingness to ask clarifying questions. Focus group participants discussed their feelings as to why this characteristic was rated low by survey respondents. The overall consensus that emerged from focus group discussions was that teachers have traditionally been the ones to ask the questions. Discussion also pointed to the moderate theme of "teacher discomfort," indicating that teachers as well as students in many cases are uncomfortable with a reversal of this role.

The survey results were anonymous; however, the researcher collected and analyzed data related to the two highest and the lowest rated characteristics as they pertained to grade level taught. The results indicated that participants teaching kindergarten responded most positively with 80.5% of responses being positive. The grade level responding most negatively was first grade with 35.3% of responses being

negative, and fifth grade had the second highest percentage of negative responses at 24%. While the researcher cannot draw conclusions regarding the rationale behind the grade-level responses, it is interesting to note that a strong theme emerging from the focus groups was that it may be too early to tell at this point in the implementation of Common Core what type of impact the standards will have on the critical thinking abilities of students. Participants in each focus group conveyed the idea that when students reach the upper elementary grades after receiving instruction in the Common Core State Standards for multiple years, educators will have a better indication of the impact the standards have on critical thinking. It is plausible that kindergarten respondents seemed to believe the standards have more of an impact on critical thinking than those in subsequent grades because kindergarten students have not received instruction with any other set of standards as the guide for what they should know and be able to do. One must also acknowledge while kindergarten teachers responded most positively, first-grade teachers responded most negatively. At the time the study was conducted, those students in first grade would have only received instruction in the Common Core State Standards as well.

Assessment is not a component of Ennis's (2010) conception of critical thinking, but it is at the forefront of many educators' minds. Discussion around assessment and its relationship to the Common Core State Standards was present in all three focus groups. The prevalence of discussion in the focus groups along with the timing of the study compelled the researcher to include discussion in this chapter. The feeling among most focus group participants was that current assessments do not match the standards being taught and the pedagogical shifts outlined previously. This feeling is supported by research which indicated current assessments, which are largely fill-in the bubble format, do not measure the level of thinking required by the Common Core State Standards

(Rothman, 2012). It is impossible to overstate the impact assessments have on instruction. Standardized tests tend to measure what is easy to measure, and the ability to think critically is difficult to assess with a multiple-choice test (Rothman, 2012). This concern mirrors those of teachers in Frykholm's (2004) study. He found that teachers reported being fearful their students were not being prepared for standardized tests as a result of the new curriculum (MiC) that was designed to give students a deeper understanding of mathematics. Some of the outcomes of this curriculum were similar to those anticipated outcomes of the Common Core State Standards, and the assessment-related concerns are similar to the participants' concerns in this study. This is important to note due to the timing of the focus group interviews which occurred during testing at all of the participating schools.

Limitations

The researcher identified the following possible limitations associated with this study. The research conducted was a study in which data were collected from participants at three schools all within one district. For this reason, results may not be generalized to another district or school. There are many factors to be considered regarding the generalizability of results in educational research. It is important to consider the size of the schools, locations, demographics, and experience of the staff when attempting to compare the results of this study (Ary et al., 2006). In addition to these possible limitations, the researcher acknowledged that the Common Core State Standards for English-Language Arts had only been taught for 1 full year when data were collected. The Common Core State Standards for mathematics had been taught for 2 years in kindergarten, first, and second grades and 1 full year in third, fourth, and fifth grades. Due to the recent adoption and inherent learning curve associated with the

standards, teacher perceptions may be different after the standards have been in place for a greater amount of time. A recent study conducted by the Center on Education Policy (Kober & Rentmer, 2011) found many state-level leaders believe it will take several years before the complex changes associated with the Common Core State Standards are in place. In addition to this belief, they also acknowledged the goals of the standards are far from being realized at this point. Even with a curriculum change, experts warn that improvements to critical thinking are slow (Lai, 2011). For these reasons, the researcher recognizes the possibility for changes in teachers' perceptions after implementation of the standards has been in place for a longer period of time.

The researcher also identified his role as a former administrator as a possible limitation. While the researcher believed the relationships he developed with participants while he was an employee at Connor Elementary would increase participation, a possible limitation is that some participants may have answered survey and focus group questions differently than they would have if the researcher were not a former administrator. A proxy was used for focus groups in an effort to minimize this limitation.

Another conceivable limitation of this research was the timing of the data collection. The survey was distributed just prior to end-of-grade testing in the three participating schools. The focus groups were conducted after school during the weeks of end-of-grade testing and retesting. This is a possible limitation due to the increased stress teachers were under at this time of the year, which was directly associated with high stakes testing. The researcher acknowledges that the time of year this research was conducted could potentially cause teachers to respond to certain questions in ways they may not normally respond due to the increased stress they are under in late April and May.

Recommendations

Based on the conclusions and current limitations of this study, the researcher recommends additional investigation on this topic. The researcher suggests further study of the impact of the Common Core State Standards on the critical thinking abilities of elementary school students when the standards have been in place so all students received instruction in the standards beginning in kindergarten. Research conducted once initial implementation is completed may provide the educational community with additional insights into this topic. In addition, it is important to investigate the impact of the Common Core State Standards on the critical thinking ability of secondary students, especially considering that the secondary Common Core State Standards are more heavily saturated with critical thinking expectations. As previously noted, the ability to judge the credibility of a source, a characteristic of a critical thinker identified by Ennis (2010), is not included in the Common Core State Standards until students reach the secondary level. This characteristic is not explicitly stated until the sixth-grade writing standards (W6.8). A study including students in sixth through twelfth grades may identify the impact, if any, on this particular characteristic. The mean score for source credibility based on survey results in this study was 2.86 in an elementary school setting.

Another perspective that was not examined in this study is student and parent perceptions of the impact the Common Core State Standards have had on their abilities to think critically. This study focused on teacher perspectives, but student and parent voices would provide a different lens through which to analyze this topic.

Finally, the researcher suggests that further research should be conducted with participants in multiple districts and states and with varying levels of implementation. Further insight could be gained by comparing and contrasting participant responses

from states that adopted the Common Core State Standards with participants from states that elected not to adopt the standards.

Summary

The Common Core State Standards clearly delineate what students should know and be able to do at each grade level (www.corestandards.org). Critical thinking is seen throughout the English language arts and mathematics standards both explicitly and implicitly. The purpose of this study was to answer the question "What is the impact of the Common Core State Standards on the critical thinking abilities of students?"

The data collected by the researcher indicate that participants in this study believe the Common Core State Standards have had a positive impact on their students' abilities to think critically. The researcher was able to reach this conclusion after analyzing the quantitative and qualitative data. While all participants did not express positive feelings regarding certain aspects of the curriculum, data suggest that it has increased students' abilities to think critically as conceptualized by Ennis (2010).

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Appendix A

Survey Questions

1. Grade Level Taught during the 2011-2012 School Year- _____
2. Grade Level Taught during the 2012-2013 School Year- _____
3. Grade Level Taught during the 2013-2014 School Year- _____

Survey Questions

According to Robert H. Ennis critical thinking is defined as reasonable reflective thinking focused on deciding what to believe or do. Ennis further describes critical thinking by breaking it down into what a critical thinker is. The following survey has been designed to assess teacher perceptions of the impact the Common Core curriculum has on student's ability to think critically.

Please respond to the following questions using the Likert scale provided below for each question.

1= Strongly Disagree

2= Disagree

3= Neither Agree or Disagree

4= Agree

5= Strongly Agree

"As a result of implementing the Common Core State Standards …"

4. Students seek out multiple sources of information.7[1]
5. Students seek to clarify misunderstandings through questions14
6. Students are able to use multiple strategies to arrive at correct answers.1
7. Students are able to predict outcomes based on the information provided. 22
8. Students draw conclusions using prior knowledge and given information.33

[1] The red numbers indicate the original order of survey questions organized by characteristic. The researcher reorganized the questions before the survey was presented to participants. Prior to data analysis, the researcher reordered the questions by original number.

9. Students can conduct experiments with little adult guidance.26
10. Students use content specific vocabulary appropriately.28
11. Students are open-minded to the ideas of others.3
12. Students know when they have enough information to draw a plausible conclusion. 31
13. Students understand there are multiple ways to solve problems. 2
14. Students generate ideas based on credible information.24
15. Students can examine all sides of an argument.18
16. Students are able to formulate questions that will provide them with necessary information. 15
17. Students are able to judge the credibility of various sources of information.8
18. Students are able to defend their position a particular issue.20
19. Students understand the art of questioning.13
20. Students are able to follow sequential procedures. 27
21. Students are able to determine relevant information and use it to draw conclusions. 32
22. Students are excited when presented with new information.6
23. Students can judge arguments based on evidence.17
24. Students can identify reasons.11
25. Students make an effort to be well-informed.5
26. Students can identify conclusions.10
27. Students are able to develop hypotheses that are reasonable.23
28. Students are able to evaluate arguments.16
29. Students are able to provide synonyms or antonyms to define vocabulary within a context.30
30. Students recognize key components of a credible source.9

31. Students are able to define content specific vocabulary in their own words.29

32. Students are eager to learn new information.4

33. Students use logic and reason when taking a stance on issue.21

34. Students understand how to plan experiments.25

35. Students can articulate their stance on an issue.19

36. Students can identify assumptions.12

Open Ended Questions

37. How have your instructional practices changes (if at all) as a result of implementing the Common Core State Standards?

38. In your experience, what is the difference between the Common Core State Standards and the former North Carolina Standard Course of Study?

Appendix B

College and Career Readiness Anchor Standards for Reading

College and Career Readiness Anchor Standards for Reading

- CCSS. ELA-Literacy.CCRA.R.1- Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions from the text.
- CCSS. ELA-Literacy.CCRA.R.2- Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
- CCSS. ELA-Literacy.CCRA.R.3- Analyze how and why individuals , events, or ideas develop and interact over the course of a text.
- CCSS. ELA-Literacy.CCRA.R.4- Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
- CCSS. ELA-Literacy.CCRA.R.5-Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
- CCSS. ELA-Literacy.CCRA.R.6- Assess how point of view or purpose shapes the content and style of a text.
- CCSS. ELA-Literacy.CCRA.R.7- Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively as well as in words.
- CCSS. ELA-Literacy.CCRA.R.8- Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

- CCSS. ELA-Literacy.CCRA.R.9- Analyze how two of more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.
- CCSS. ELA-Literacy.CCRA.R.10- Read and comprehend complex literary and informational texts independently and proficiently.

Source: http://www.corestandards.org/ELA-Literacy/CCRA/R

Appendix C

College and Career Readiness Anchor Standards for Writing

College and Career Readiness Anchor Standards for Writing

- 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.
- 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 an 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.
- 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.
- CCSS.ELA-Literacy.CCRA.W.10- Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Source: http://www.corestandards.org/ELA-Literacy/CCRA/W

Appendix D

College and Career Readiness Anchor Standards for Speaking and Listening

College and Career Readiness Anchor Standards for Speaking and Listening

- CCSS.ELA-Literacy.CCRA.SL.1- Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- CCSS.ELA-Literacy.CCRA.SL.2- Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively and orally.
- CCSS.ELA-Literacy.CCRA.SL.3- Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.
- CCSS.ELA-Literacy.CCRA.SL.4- Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-Literacy.CCRA.SL.5- Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
- CCSS.ELA-Literacy.CCRA.SL.6- Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

Source: http://www.corestandards.org/ELA-Literacy/CCRA/SL

Appendix E

College and Career Readiness Anchor Standards for Language

College and Career Readiness Anchor Standards for Language

- CCSS. ELA-Literacy.CCRA.L.1- Demonstrate command of the conventions of standard English grammar and usage when writing and speaking.
- CCSS. ELA-Literacy.CCRA.L.2- Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
- CCSS. ELA-Literacy.CCRA.L.3- Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading of listening.
- CCSS. ELA-Literacy.CCRA.L.4- Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
- CCSS. ELA-Literacy.CCRA.L.5- Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
- CCSS. ELA-Literacy.CCRA.L.6- Acquire and use accurately a range of general academic and domain specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

Source: http://www.corestandards.org/ELA-Literacy/CCRA/L

Appendix F

Standards for Mathematical Practices

Standards for Mathematical Practice

- CCSS.Math.Practice.MP1- Make sense of problems and persevere in solving them.
- CCSS.Math.Practice.MP2- Reason abstractly and quantitatively.
- CCSS.Math.Practice.MP3- Conduct viable arguments and critique the reasoning of others.
- CCSS.Math.Practice.MP4- Model with mathematics.
- CCSS.Math.Practice.MP5- Use appropriate tools strategically.
- CCSS.Math.Practice.MP6- Attend to precision.
- CCSS.Math.Practice.MP7- Look for and make use of structure.
- CCSS.Math.Practice.MP8- Look for and express regularity in repeated reasoning.

Source: http://www.corestandards.org/Math/Practice

Appendix G

Focus Group Questions

Focus Group Questions

- Thank you all for coming. I know this is a tough time of the year to do this and I appreciate it.
- Brief background of the study- One of the outcomes of the CCSS is supposed to be an increase in CT. Experts have said CT is important and that students are graduating without the ability to think critically. As the teachers who are actually delivering instruction using the CCSS each day, I want to know what you think.
- I have the informed consent forms for each of you to look at and sign.
- I am going to record this so I can transcribe this and evaluate it later.
- Can we go around the group and have everyone state their name, what grade level you teach, and years of experience?

1) Now that the standards have been in place for two years, do you see a change in the critical thinking abilities of your students?
2) What differences (if any) do you see in your students now as opposed to when they were being taught using the NCSCOS?
3) The survey results indicated that students have a desire to be well-informed. Can you elaborate on this with examples?
4) The survey also indicated that students seem to be open-minded which is an attribute of a critical thinker. Do you feel your students are more open-minded than previous years? Can you be specific?
5) The ability to ask and answer questions is seen throughout the standards; however, it was rated as one of the areas students have the most difficulty with in the survey. What are your thoughts about why this was rated lower than many other characteristics of a critical thinker?
6) The open-ended responses indicated a focus on problem solving in the CCSS. Can you give more specific examples of students' abilities to solve problems in your class?

7) How is the emphasis on "process" related to students' abilities to think critically?
8) Many of the open ended responses focused on math. What is different in the language arts CCSS as opposed to the former NCSCOS with regard to CT?
9) The survey responses indicated that instructional practices have changed to include more cooperative learning groups, narrow but deeper instruction, and more hands-on activities. What impact do these instructional practices have on CT abilities of students?
10) Is there anything else you would like to share related to CT and the CCSS?