Beyond Standardization: Fostering Critical Thinking in a Fourth Grade Classroom Through Comprehensive Socratic Circles

by

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ABSTRACT

Due to government initiatives, education in the classroom has focused on high stakes test scores measuring student achievement on basic skills. The purpose of this action research study was to augment fourth grade students' knowledge of basic content by teaching greater meaning and depth of understanding—to teach critical thinking using Socratic circles. Using a constructivist approach, a comprehensive plan was designed and implemented that included an age-appropriate platform for argument and inquiry, a process that required critical thinking skills, and allowed the intellectual standards for critical thinking to be developed and measured. Ten students representing the academic levels of the whole class were selected and participated in seven Socratic circles. Over a period of 15 weeks, a mixed methods approach was employed to determine how students were able to apply the intellectual standards to reasoning during Socratic circles, how this innovation provoked participation in student-centered dialogue, and how Socratic circles improved students' evaluation of competing ideas during their reasoned discourse. Results suggested that Comprehensive Socratic Circles increased participation in reasoned discourse. Students' ability to evaluate competing ideas improved, and their application of the intellectual standards for critical thinking to their reasoning increased. Students also increased their use of student-centered dialogue across the sessions. These findings suggest that Socratic circles is a flexible and effective teaching strategy that fosters critical thinking in fourth graders.

DEDICATION

To the hard working and dedicated elementary education teachers who persevere.

To the elementary school students: think, learn, know….and love it.

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Chapter 1 Introduction

During the time renewed interest and attention became focused on critical thinking, a national movement to improve education was underway that took teaching in a different direction. The government became involved and initiated an education reform movement known as the No Child Left Behind Act of 2001 (NCLB). Unfortunately, due to a stringent focus on student achievement on high stakes tests measuring the basic skills, fluency, and facts, NCLB ignored higher-level thinking (Apple, 2006; Clark, 2013; Darling-Hammond, 2010; Nichols & Berliner, 2008). Race to the Top (RTT) is the most recent national attempt to improve the quality of education, and fortunately, is changing direction again by evoking Common Core Standards designed to promote deeper and more critical thought (The White House, 2009).

No Child Left Behind

NCLB (2001), a federal mandate aimed to improve the quality of schools by increasing their accountability, was initially hailed as an honorable and bold attempt to provide a universal education for all children, especially those in struggling public schools (Darling-Hammond, 2010; Ravitch, 2013a). High expectations and definitive goals were to produce greater achievement for all students (NCLB, 2001). Instead, along with NCLB came high-stakes testing and the initiative's unintended consequences (Apple, 2006; Clark, 2013; Darling-Hammond, 2010; Nichols & Berliner, 2008; Ravitch, 2013a).

NCLB changed teaching, learning, and testing. Unfortunately, standardized testing set into motion teaching to the test, rather than teaching for meaning or achieving deeper understanding of all subjects (McTighe, Seif, & Wiggins, 2004; Nichols &

Berliner, 2008; Paul & Elder, 2009). Many leading scholars (e.g., Apple, 2006; Clark, 2013; Darling-Hammond, 2010; Nichols & Berliner, 2008; Ravitch, 2013a) argue that high-stakes tests have a stifling impact on learning. Complex thinking skills are difficult to assess; thus, NCLB measures students' ability to choose from multiple choice answers as opposed to being measured by the depth of their thinking or their academic potential. For example, Darling-Hammond (2010) stated:

> Unfortunately, when used in high-stakes contexts, more narrow tests, limited to a multiple-choice format, have been found to exert strong pressures to reduce the curriculum to subjects and modes of performance that are tested, and to encourage less focus on complex reasoning and performance. (p. 71)

Therefore, an unintended consequence of NCLB and high-stakes testing has been that teachers have been forced to emphasize the basic skills, and problem-solving skills have received little, if any, attention (Apple, 2006; Clark, 2013; Darling-Hammond, 2010; Nichols & Berliner, 2008). Some believe that high-stakes tests are not an accurate measure of student learning or an accurate accountability measure for teaching.

According to Glass (2008):

> This accountability movement [standardized testing] has had a devastating effect on public education, it is destroying the richness of a curriculum that has taken decades to develop, it is obliterating the professional autonomy of teachers, and it is dimming the personal hopes and dreams of hundreds of thousands of children. (p. 18)

As time passed, debates over the law and its approach to learning have focused on its soundness and need for revision (Nichols & Berliner, 2008). Given this, the government took action.

Race to the Top

The federal government announced its latest initiative, Race to the Top (RTT), in July 2009. RTT offers funding in order to motivate states to agree to its dictates to

improve student learning and educator efficacy. RTT obligates states to instill a set of common academic standards that requires student assessments to include critical knowledge and deeper thinking skills as well as assessments of educator effectiveness (The White House, 2009). RTT aims to offer high-quality education in an effort to prepare all children to succeed and effectively contribute to the nation and the world as knowledgeable and innovative citizens of 21st century democracy. Arizona's application to RTT was accepted in 2010 and the state began to implement new mandated standards that same year.

In 2010, Arizona adopted the Common Core State Standards (CCSS), standards that align all states with a one size fits all curriculum to assure uniformity and the same goals for all students. States would not receive RTT funding unless they adopted the CCSS that states:

> Common Core State Standards Initiative provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. 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. (Common Core State Standards Initiative, 2010, p. 1)

Ravitch (2013b), a proponent of voluntary national standards, is opposed to the federal government imposing CCSS on the nation's schools. Ravitch (2013b) suggests CCSS have never been field-tested, and it is not known how they will affect students, teachers, or schools. Ravitch (2013b) also suggests that there are many ways to be a good teacher and teachers should not be mandated to teach only one way. Additionally, Ravitch (2013b) stated, "I have come to the conclusion that the Common Core standards effort is fundamentally flawed by the process with which they have been foisted upon the nation." (p. 1)

District Context

In response to NCLB, the elementary school district where I teach began to focus on teaching to tested subjects and implementing block schedules that have designated the times teachers are to spend teaching math and reading. The underlying assumption was that all students learn at the same pace as long as all teachers teach the same curriculum at the same time. For example, the district adopted math and reading teaching manuals and student textbooks, created curriculum pacing guides, and directed quarterly benchmark tests based on the content in the resources and the timing set in the pacing guides. In dictating how to teach the compartmentalized subjects, teachers lost their autonomy, time, and ability to integrate subjects and use problem-based approaches. In the past, teachers had time and autonomy to individualize lessons plans to meet student needs and assure all students reached their potential. In an effort to meet mandated requirements, teachers no longer had the time to foster critical thinking skills in students. Even in my school with above average students and high quality veteran teachers, it was ten years before new legislation, RTT, brought attention back to critical thinking skills.

In response to RTT, Arizona adopted new Common Core State Standards (CCSS) (Core Standards, 2010). At the end of the 2011-2012 school year, the district began preparing principals and teachers for implementation of the CCSS. The CCSS require greater depth of student learning. Rather than teaching large amounts of superficial content through rote memory for standardized tests, teachers will need to provoke students to think critically. The assessments for students are still in the process of being developed; teachers will be evaluated, in part, on students' scores.

The elementary school in this study is located in a Phoenix suburb in Maricopa County. The school serves students in grades K-5 and is a part of the district that is made up of 25 schools, 19 elementary and six middle schools. The Arizona Department of Education has designated both the district and the school as achieving the grade "A," which is the highest rating a school can get based on the Arizona Instrument to Measure Standards (AIMS) performance results. The school has 27 certified teachers and 430 students; it was opened in 1999. Ten of the original teachers still work there, and it has been six years since the attendant school has hired any new teachers. However, enrollment has decreased due to the lack of community growth, forcing teacher transfers to other schools.

As a fourth grade teacher, I worked diligently in the 2012-2013 school year to teach the newly adopted Common Core curriculum while trying to meet the mandated standardized testing requirements that were still in place. The effects brought about by the district's ongoing response to state and federal mandates, however, limited my time and autonomy. For example, instead of developing integrated units of study and motivating lesson plans based upon my students' interests and needs, I was obligated to follow the restrictive district curriculum map and schedule. Every Tuesday from 9:45 a.m. until 11:35 a.m., I taught reading. In that time, I was required to teach reading according to the content in the teachers' manual, including asking explicitly dictated questions at specific points in the story. Teaching was regulated and defined by the guidelines. Mandatory district testing was, and still is, quarterly. In the 2013-2014 school year, I no longer had to teach the scripted lessons out of the teachers' manual; however, all other restrictions were still in place.

My role as a teacher. I have taught fourth and fifth grades for twenty-three years. In 2009, I earned recognition as a National Board Certified Teacher. Given this, I believe I am a highly effective teacher and am consistently able to report that the students in my class achieve very good results on the district and state assessments. I am also a teacher-leader, with active roles in mentoring and professional development.

I believe critical thinking is important for every child. However, Socratic questioning and student responses are time consuming. Lack of both time and autonomy in the classroom prevented divergence from the dictated demands of district.

Problem

Teachers can miss many opportunities to foster critical thinking while being held accountable for and teaching to student achievement on high-stakes tests. The literature offered definitions of critical thinking, its benefits to student learning, and recommendations for fostering critical thinking in fourth graders. Socratic circles appeared as the logical innovation to provide an age-appropriate vehicle for fourth graders to practice the skills of argument and inquiry in order to foster critical thinking in my fourth grade students.

Kuhn (1999) stated that although most students in fourth grade have the epistemological understandings of absolutists, they are not developmentally ready for independent inquiry and argument. However, their level would allow them to acquire fundamental critical thinking skills that could serve as a foundation for more advanced forms of critical thinking (Kuhn, 1999).

Cycle 1

Cycle 1 of my action research was primarily an exploratory mixed methods study. A survey was administered to 30 fourth grade students. Responses indicated that students were absolutists and developmentally ready to practice thinking critically. A student focus group was also conducted. Most student responses indicated that they liked to give an answer, explain why they thought their answer was correct, and then apply it; and they liked their thinking to be challenged. Socratic circles was a strategy that would provide students with that opportunity to think critically—to analyze, investigate, infer, and construct social learning. Kuhn (2005) stated, "Reasoned discourse is a powerful way of evaluating competing ideas and constructing shared understanding" (p. 173). Socratic circles would provide an opportunity for students to apply their critical thinking skills during collaborative discussion; thus, an opportunity for the researcher to identify those skills. To prepare myself to facilitate Socratic circles, I took two professional development courses: a Socratic circles course offered by my district and a Paideia Seminar course offered by the Arizona Department of Education.

Once prepared, videotaping, coding, and transcriptions were collected, and Paul and Elder's Intellectual Standards of Critical Thinking Model was adapted as a strategy to identify and measure their critical thinking skills. The dialogue of only three Socratic circles was studied and revealed that these fourth grade students were developmentally absolutists and ready to build upon their critical thinking foundation. Additionally, the results of the survey and focus group indicated that students were motivated to participate in learning that required them to think deeper. Finally, data collected from transcribed

and coded videotapes of their Socratic circles suggested that students used critical thinking skills during their discussions.

Six months after Cycle 1, a follow-up focus group in the same setting as the Socratic circles with the same 10 student participants was conducted and videotaped to explore students' opinions of the lasting effects of last years' experience in Socratic circles. Students were unanimous in their love of Socratic circles, stated they became aware of thinking, and still found it fascinating that the text did not change, but their thinking had changed. They reported transferring their new thinking strategies to math and rechecking their answers. Analysis of all of the findings indicated that Socratic circles fostered critical thinking in the fourth grade students.

Purpose of Study and Research Questions

The purpose of the current innovation was to foster critical thinking in my fourth grade students. To accomplish this, Comprehensive Socratic Circles, a Socratic unit I designed, was implemented. It included Socratic circles as well as the explicit teaching of Paul and Elder's (2009) Intellectual Standards of Critical Thinking and their "Three Thinkers." The literature is rich with descriptions of critical thinking and provides consensus on the effectiveness of the Socratic method. Argument and inquiry was an approach that demanded the use of critical thinking and also served as the platform on which critical thinking skills could be recognized and measured. The purpose of this study was to understand the following:

1. How, and to what extent, did students apply the intellectual standards for critical thinking to reasoning during Comprehensive Socratic Circles?

2. How, and to what extent, did Socratic circles provoke and improve students' evaluation of competing ideas during reasoned discourse?
3. How, and to what extent, did Socratic circles provoke and increase participation in student-centered dialogue?

Chapter 2 Supporting Scholarship

"Critical thinking is thinking about your thinking while you're thinking in order to make your thinking better" (Paul, Binker, Jensen, & Kreklau, 2010, p. 378).

Chapter 1 included an explanation of how federal initiatives on education have impacted decisions at state, district, and school levels. The unintended consequences have been significant. Teaching and learning have been altered and the loss of teacher autonomy due to government mandates had resulted in a demand on teachers to teach for high scores on standardized tests. This resulted in teaching focused on content alone rather than augmenting the content with critical thinking. Critical thinking is crucial to effective communication, problem solving abilities, and participation in a democratic society of the 21st century (Darling-Hammond, 2010; Kuhn, 2005; Roberts & Billings, 2012; Wagner, 2012; Zhao, 2012). Teachers were missing opportunities to foster critical thinking; it was necessary to investigate a plan of action to address this problem.

Chapter 2 is a review of supporting scholarship on critical thinking, the Socratic Method, and Socratic circles. The theoretical framework for the study is also presented.

Critical Thinking

Critical thinking identified. According to Scriven and Paul (1987), the concept of critical thinking has been evolving over the past 2,500 years and the term "critical thinking" originated in the mid-late 1900s. Thus, recognition of different levels of thinking is not new. John Dewey (1933) was one of the first educators to distinguish the different levels and described searching as reflective thinking and judging as critical thought, both being higher-level thinking. Like Dewey, Paul and Elder (2009) identified both critical thought and reflective thinking. They stated that the highest order thinking

was using critical thinking tools in analyzing and assessing thinking as well as being unequivocally reflective. Paul and Elder also recognized the importance of critical thinking and stated that while everyone thinks, it is the quality of thinking that determines the quality of lives.

Critical thinking defined. As attention to critical thinking grew, definitions of critical thinking began to appear. The following are but a few examples of definitions. Huitt (1998) proposed, "Critical thinking is the disciplined mental activity of evaluating arguments or propositions and making judgments that can guide the development of beliefs and taking action" (p. 3). A panel of experts, composed of 46 men and women throughout North America representing different scholarly disciplines, participated in a research project and published a report, *The APA Delphi Report*, which included a definition of critical thinking as, "Purposeful, reflective judgment which manifests itself in reasoned consideration of evidence, context, methods, standards, and conceptualizations in deciding what to believe or what to do" (Facione, 2011). Ennis (1991) defined critical thinking as "reasonable reflective thinking focused on deciding what to believe or do" (p. 6). Paul and Elder (2009) defined critical thinking as, "Critical thinking is the art of analyzing and evaluating thinking with a view to improving it" (p. 2). Paul and Elder's definition provides a working definition that captures the needs of this work. Additionally, Paul and Elder (2009) recognized that involvement in the critical thinking process is not enough; it must also direct the foundation of our beliefs and influence our behavior (Huitt, 1998).

Critical thinking components. Critical thinking skills can be identified during problem solving, decision making, and strategizing. Kuhn and Dean (2004), Glaser

(1985), Facione (2011), and Paul and Elder (2007a) described these critical thinking components. They agreed that in addition to cognitive skills, students must develop dispositions in order to understand their thinking and value their learning.

Kuhn and Dean (2004) theorized that two major families of skills come under the critical thinking umbrella—inquiry (posing a question or claim and seeking evidence) and argument (collaborative problem-solving). Kuhn and Dean (2004) stated, "It is only their [students'] own experiences that will lead them to the conviction that inquiry and reasoned argument offer the most promising path to deciding between competing claims, resolving conflicts, solving problems, and achieving goals" (p. 273). In addition to critical thinking and knowing, Kuhn (2005) also asserted that individuals develop values, or a disposition, towards learning; they understand their intellectual skills and value the learning process. Likewise, Glaser (1985) defined critical thinking as using knowledge of and skills in the application of thinking strategies, coupled with the disposition, or attitude, toward the thoughtful reflection of most problems. In agreement with Kuhn and Glaser, Facione (2011) recognized both cognitive skills and dispositions, but offered more specific descriptors.

Facione's (2011) identification of cognitive skills included interpretation, analysis, evaluation, inference, and explanation. At the heart of these skills is purposeful reflective judgment. However, Facione explained that there is more to critical thinking than the cognitive skills. Individuals must have attitudes or dispositions that provide the incentive, prudence, and willingness to apply them. This insight is pertinent to those individuals considering fostering critical thinking since they can provide areas to target for investigation, assessment, and teaching.

Finally, the cognitive skills recognized by Paul (2007a) aligned with those presented by Facione (2011). Paul (2007a) identified intellectual standards, elements of reasoning, and dimensions of critical thought. By applying intellectual standards such as accuracy, clarity, and relevance to elements of reasoning such as goals, problems, facts, and assumptions, individuals can develop intellectual traits such as confidence in reason, fair-mindedness, and intellectual perseverance (Paul & Elder, 2007a).

Critical thinking benefits. Teachers recognize the need for fostering critical thinking skills to benefit student learning and to prepare them for the future. Students must be fully equipped as they attempt to master their lives and contribute to society. However, it is necessary to improve our teaching to invoke critical thinking in students. Paul (1996) stated, "…you cannot improve student learning for all or most students without improving teacher learning for all or most teachers" (p. 3). In other words, within classrooms, teachers need to become aware of the importance of promoting critical thinking in students, not just for excellence in test scores, but to help ensure future excellence in learning (Clark, 2013; Copeland, 2005; Darling-Hammond, 2010; Kuhn, 2005; Nichols & Berliner, 2008; Paul & Elder, 2009; Roberts & Billings, 2012; Wagner, 2012; Zhao, 2012). "Shoddy thinking is costly, both in money and in quality of life. Excellence in thought, however, must be systematically cultivated" (Paul & Elder, 2009, p. 2). Fostering critical thinking in students benefits their learning (Facione, 2011; Kuhn, 1999; Paul & Elder, 2009) by enhancing their cognitive skills, understanding, and values (Kuhn, 2005).

Both Kuhn (2007) and Geertsen (2003) recognized the continual technological advances that have contributed to the flood of information and, given this, the need to

interpret, analyze, and apply the knowledge to appropriately benefit our democratic society. Kuhn (2007) recognized that school prepares students for adult life when their intellectual activities and skills "give them a most productive path for answering questions, solving problems, resolving conflicts, and participating in a democratic society" (p. 760).

Geertsen (2003) predicted certain extraordinary change and growth in information in the 21st century that will require effective adaptation dependent upon individuals' ability to use higher level thinking skills. The unpredictable, unceasing, and accelerating onslaught of information means society will need critical thinking skills in evaluating and appraising knowledge (Geertsen, 2003).

Critical thinking action research studies. Other educators who have recognized the need to incorporate instruction directed at honing students' critical thinking skills have studied different methods of implementation. For example, Lawlor (2012) studied the impact of lesson study on teachers' abilities to teach critical thinking in 4th, 5th, and 6th grades. The teachers wanted critical thinking to be incorporated into their lessons, but had never been trained in how to implement it. Using lesson study, teachers worked in teams as they planned, taught, observed, and assessed as their process developed to insure critical thinking responses in students. Lawlor's (2012) study found that critical thinking could be integrated into lessons.

In another elementary school, Medrano (2012) studied the effects of Cognitively Guided Instruction (CGI) on students' math achievement, problem-solving abilities, and teacher questioning. During this process Medrano also studied the levels of questioning, based on Bloom's Taxonomy, which teachers used during instruction. Organized, higher

order questioning during instruction was shown to have a positive impact on problem solving and critical thinking, but the questioning did not necessarily cause students to think critically.

Connerly (2006), a fourth grade teacher, studied whether critical thinking skills could be explicitly taught to fourth grade gifted and talented students. A program developed by Elder (2002) was implemented and students participated in activities that taught the "intellectual standards of clarity, accuracy, relevance, logic, and fair-mindedness" (p. 22) using a "thinking of thinking" approach. Connerly's study found that students used critical thinking terms accurately and frequently and became more aware of their thinking. Another researcher, Kassem (2001), also developed an approach to enhance teaching for fostering critical thought.

Kassem (2001) described a study of the development of the new CRTA Model. The "CRTA" acronym was generated by its four steps designed to foster critical thinking instruction: create the right climate, reflect about thinking skills and revise instructional objectives, teach thinking skills/dispositions explicitly, and assess critical thinking for real-life use (Kassem, 2001). The design and implementation was a comprehensive process that took one year and resulted in systemic change in a small K-12 school. The findings were positive but most significant, both teacher and student attitudes toward critical thinking had changed; teachers became motivated to keep trying new critical thinking approaches and students enjoyed the demands of critical thinking instruction.

Elder and Paul (2009) believed that for students to live successfully in this world, a way was needed to foster their critical thought and to enhance their ability to take

control of their cognitive processes in order to determine what corresponds to reality and what does not. What strategy would foster critical thinking? Copeland (2005) stated:

> We must empower our students in Socratic dialogue and offer them opportunities to practice the skills and processes they will rely upon throughout the remainder of their lives. If we honestly seek to produce self-directed learners and holistic individuals, we must change our classrooms and embrace strategies such as the Socratic circle. (p. 23)

Socratic Method

Socratic strategies. Socrates (469-399 B.C.) believed that teaching by lecture was not effective in accessing students' storehouse of knowledge and opinions. The Socratic method uses a form of inquiry, a discussion between students through thoughtful questioning and answering in which students can be helped to examine their beliefs and ideas logically and improve their reasoning skills to increase critical thinking and provoke ideas (Copeland, 2005). Brogan and Brogan (1995) reported that Socrates called this provocative thinking process *dialectics*. The dialectical method of interactive learning consists of two workings: (a) Dialectical inquiry elicits individuals to open their minds and make connections to previous beliefs in their search for the whole picture, to extend thought, and (b) Dialectical inquiry that is analytical in taking things apart, as in argument. One such Socratic method is Socratic questioning.

Socratic questioning. Today Socratic questioning, the methodology Socrates developed to help students improve their skills of reasoning and logically draw out rational thinking and ideas, is a systematic process that enables teachers to access the pre-existing ideas and beliefs in students' minds and make students aware of the learning and understanding that has already transpired in order to help them connect to new ideas and thus, improve their comprehension. Copeland, (2005) stated:

> It is by following every statement with a question to further explore the depth of our thinking that we allow our ideas to grow and develop more deeply. In the classroom, this concept is incredibly important, especially in breaking the habits of students preprogrammed to think that all questions have one, and only one, correct answer. (Copeland, 2005, p. 8)

Socrates was considered the wisest because he knew that he knew nothing. However, Socrates also had the gift of the question. Brogan and Brogan (1995) stated, "Awareness of not knowing is the condition for beginning the process of inquiry" (p. 292). If individuals believe they already know something, learning will seldom occur. In a dialogical setting, thinking often goes beyond the answer because students have become interested in the question; they want to know why. "They have been captivated by the spirit of inquiry. They have become intellectuals" (Brogan and Brogan, 1995).

Elder and Paul (1998) posited that thinking is driven by questions, not answers. "Questions define tasks, express problems, and delineate issues. Answers on the other hand, often signal a full stop in thought. Only when an answer generates further questions does thought continue as inquiry" (Paul & Elder, 2007b, p. 62). Shiman and Nash (1974) believe that questioning is central to learning and described the difference between factual and conceptual questions. Factual questions elicit information that is known, verifiable, and usually easy to measure. The predominance of factual questioning conveys the assumption that a learner is to understand pre-existing knowledge and not to question it. It is preoccupied with factual recall. Students are trained to parrot, not to think for themselves. "Educators who limit their questioning to this rudimentary level are training, not educating" (Shiman & Nash, 1974, p. 252). Copeland stated, "With this goal [understanding] in sight, the idea of Socratic questioning is incredibly valuable in reviving student minds made numb to critical thought" (p. 7). Conceptual questioning is

open-ended and requires students to investigate, analyze, connect, and generalize. Socratic questioning is conceptual questioning. Conceptual questions move students from the recall of facts to critical thinking (Shiman & Nash, 1974).

The Socratic seminar. Another proponent of the dialectical method in more recent times was Mortimer Adler. In *The Paideia Proposal*, Adler suggested that all children can be educated, education is a lifelong process of learning, and there are multiple approaches to teaching (Adler, 1982). Roberts and Billings (2012) stated that a Paideia Seminar embraces the Socratic method and promotes open discussion and uses questioning aimed at understanding in order to inspire lifelong learners. Roberts and Billings (2012) define, "…the Paideia Seminar as a collaborative, intellectual dialogue facilitated with open-ended questions about a text" (p. 9). Socratic questioning typically uses more leading questions intended to elicit a pre-determined response. Both facilitate discussion with understanding as the goal of discussion (Roberts & Billings, 2012).

Also based on the Socratic method and a modification and extension of the Paideia Seminar is the Socratic seminar or Socratic circle. Copeland (2005) explained the reason for the variety of terms used to describe this strategy. Educators began incorporating Socratic inquiry into their practices in the early 20th century. In more recent years, the Socratic seminar strategy has carried a variety of names from open forums to fishbowl conversations. Some circles have only an inner circle in which students' dialogue and other circles will use extra students in a second or outer circle to observe and critique (Copeland, 2005). Regardless of the name, Socratic circles is "…the careful implementation of a method of philosophy more than 2,400 years old" (Copeland, 2005. p. 3). The Socratic circle is a systematic process used today to examine beliefs or

ideas based on the premise that all new knowledge is connected to prior knowledge, all thinking is fostered by asking questions, and that one question should prompt other questions. Students collaborate—they do not debate—to find answers and meaning—understanding. The exchange is reciprocal. Students are open to each other and in search of common understanding (Brogan & Brogan, 1995; Copeland, 2005).

The teacher's role in Socratic circles. According to Brogan and Brogan (1995), Socratic circles, the Socratic method of interactive learning, differ from typical teacher-centered practice by placing the students in control of the focus of the dialogue. In this setting, teachers only function to keep the discussion moving, regardless of its direction. Knowledge is not simply conveyed to passive learners. Students draw out their pre-existing beliefs, identify relations, support with evidence, and construct new assertions or confirm existing assertions (Brogan & Brogan, 1995; Copeland, 2005). To carry out their role, teachers must create a risk-free learning environment where students feel safe and supported (Copeland, 2005).

The teacher's role is challenging. The goal is not to teach facts or ideas but to provide a setting that fosters the ability to access practical wisdom (Pihlgren, n.d.) Although teachers must lead, their participation must be minimal. Through Socratic questions, teachers keep the circle discussion focused, commenting only out of necessity. The control of the conversation is turned over to the students. "Teachers must be flexible, adaptable, and willing to move with the student conversation" (Copeland, 2005, p. 31). The teacher's role is to select a text for the circle's focus. The teacher creates a learning environment conducive to the spirit of inquiry (Brogan & Brogan, 1995; Copeland, 2005). Copeland (2005) recommended that the teacher needs to address both the physical

and emotional aspects of the classroom environment since it impacts the students' confidence, comfort, readiness to try something new, and willingness to take risks. Exhibiting agreement, Shiman and Nash (1974) reported, "We try to create a group setting which is open, nonjudgmental, and mutually supportive at all times" (p. 253). In addition to guiding discussion unobtrusively, teachers are cautioned to know their students and their learning process.

Teachers must be aware of the impact of student thought processes during Socratic circles, know their students, and be prepared to guide them in their pursuit of understanding.

Pekarsky (2006) stated that not all self-knowledge is correct and teachers must help students examine their beliefs because students will become perplexed when they discover conflict. Teachers must guide students toward seeking the truth. It is bad teaching if a teacher overwhelms students with perplexities and no help in finding a solution. Pekarsky (2006) warned that teachers should know with whom they are dealing emotionally. Copeland (2005) also acknowledged a need for caution and stated, "Socratic circles are a powerful classroom tool when used consciously to supplement the scope and sequence of the curriculum. But, like any other strategy, they can be a detriment to student growth when used in a haphazard or inept manner (p. 31).

Benefits of Socratic circles. Copeland (2005) reported that Socratic circles foster critical reading and the love of reading, listening and speaking skills, reflection, dialogue skills, participation, conflict resolution skills, and teambuilding. In giving students control of the dialogue, Socratic circles also enhance independent and motivated learning. Furthermore, as students' dialogue skills improve within the classroom, their skills

outside the classroom will also improve. Copeland (2005) stated, "Perhaps what Socratic circles offer students and teachers more than anything is the opportunity to practice and hone their skills in critical thinking" (p. 11). Adler believed that this method was the best way to improve understanding; the dialogical approach of Socratic circles stimulates imagination and intellect through inquiry and creativity (Copeland, 2005).

Pihlgren (n.d.) professed that one of the major goals of employing Socratic dialogues is to protect and enhance democracy by preparing students to participate in problem solving decision making in collaborative dialogues: a way of sustaining a democratic society. Demonstrating agreement, Brogan and Brogan (1995) stated:

> No amount of skill and training can compensate for the lack of the kind of fundamental thinking our future is likely to require of our students. Without an ability to think and learn at this level, we are not likely to continue to flourish as a society. (p. 289)

Additionally, Roberts and Billings (2012) recognized the important role that Socratic discussions could fulfill, regarding current mandates, demanding deep rather than surface skills stated, "The seminar embodies the reading, speaking, and listening standards that are at the heart of the Common Core" (p. xii).

In summary, there is a need to address teachers' teaching to promote critical thinking in students. Content knowledge remains a priority, but it must be augmented with critical thinking in order for the learner to value knowing and knowledge. This study was grounded in Kuhn's (2005) theory that inquiry and argument offers an appropriate and beneficial vehicle for problem solving, decision making, and conflict resolution—all critical thinking skills—and all necessary for students to understand their intellectual skills and value learning. Socratic circles was chosen as that vehicle. Teaching to foster critical thinking is an important responsibility and the purpose was to discover a teaching

strategy that includes posing questions, seeking evidence, and collaborative problem-solving. The goal was to give students "the gift of the question and the spirit of inquiry—prerequisites for thinking" (Brogan and Brogan, 1995, p. 296).

Theories

Theoretical perspective. Kuhn, a professor of psychology and education, was a proponent of a developmental model of critical thinking to explain the intellectual development and epistemological understandings of elementary school children. Kuhn's (2005) position was that the role of an educator is to help students to think about their thinking in order to know what they know.

Stemming from contemporary empirical research on the processes of intellectual development in students, Kuhn (1999) provided insight into the knowledge and skills that provide a foundation for critical thinking. Meta-knowing, which is central to critical thinking, is divided into three categories. First, the meta-strategic form deals with procedural knowledge and manages one's own thinking in the selection and monitoring of strategies in order to reach goals. Second, metacognition operates on one's declarative knowledge base as its executive management to coordinate ideas and evidence in justifying information assertions (Kuhn, 1999), and involves understanding both thinking and knowing in general (Kuhn & Dean, 2004). Finally, epistemological knowing has both a philosophical and personal aspect that influences the other two workings. In other words, these three categories of cognition function as a means to manage and develop "knowing what one knows and how one knows it" (Kuhn, 1999, p. 20).

Kuhn (1999) described four levels of epistemological understanding that correlated with how individuals process new information: the realist (preschool-aged

children), absolutist (elementary-aged children), multiplist (middle and high school-aged children), and evaluativist (critical thinkers). The second level, the absolutist, is applicable to elementary school students. At this stage in development, individual understanding is evolving from just knowing that something is true to evaluating whether it might be true. Absolutists view assertions as facts that can be either right or wrong; critical thinking can be used in comparing these claims and deciding their truth or misrepresentation. At this stage in development, individuals acquire basic critical thinking skills that serve as a foundation for the growth of advanced thinking (Kuhn, 1999).

Kuhn (2005) categorized inquiry and argument as the two families of intellectual skills that serve as the base to acquiring knowledge as students identify issues, collect evidence, make judgments, solve problems, and learn. One goal is for students to become independent learners and able to find answers to their own questions and foster the development of inquiry skills. Students are asked probing questions to promote reflection. Argument can be thought of as a form of inquiry because individuals seek to justify their own claims and at the same time, to question and understand the claims of others. More progress is made in a shorter period of time compared to thinking alone, demonstrating the advantage of collaborative reasoning and problem solving (Kuhn, 2005).

Equally important as intellectual skills are intellectual values. As students recognize and practice using their intellectual skills, they recognize their value. Skills without values have little use. Together, knowledge, skills, and values are nurtured by one another and the individual is potentially equipped with the tools to become a life-long

learner and contributor to a democratic society (Kuhn, 2005). Kuhn's (2005) work established that my students were developmentally ready to build upon their critical thinking foundation. Kuhn's stance on the use of argument and inquiry as a vehicle to foster critical thinking guided selection of a useful teaching approach. Furthermore, constructivism served as the framework to understanding students' learning and demonstrated that Socratic circles would supply that format. Figure 1 is a visual illustrating constructivism as it translates into Socratic circles.

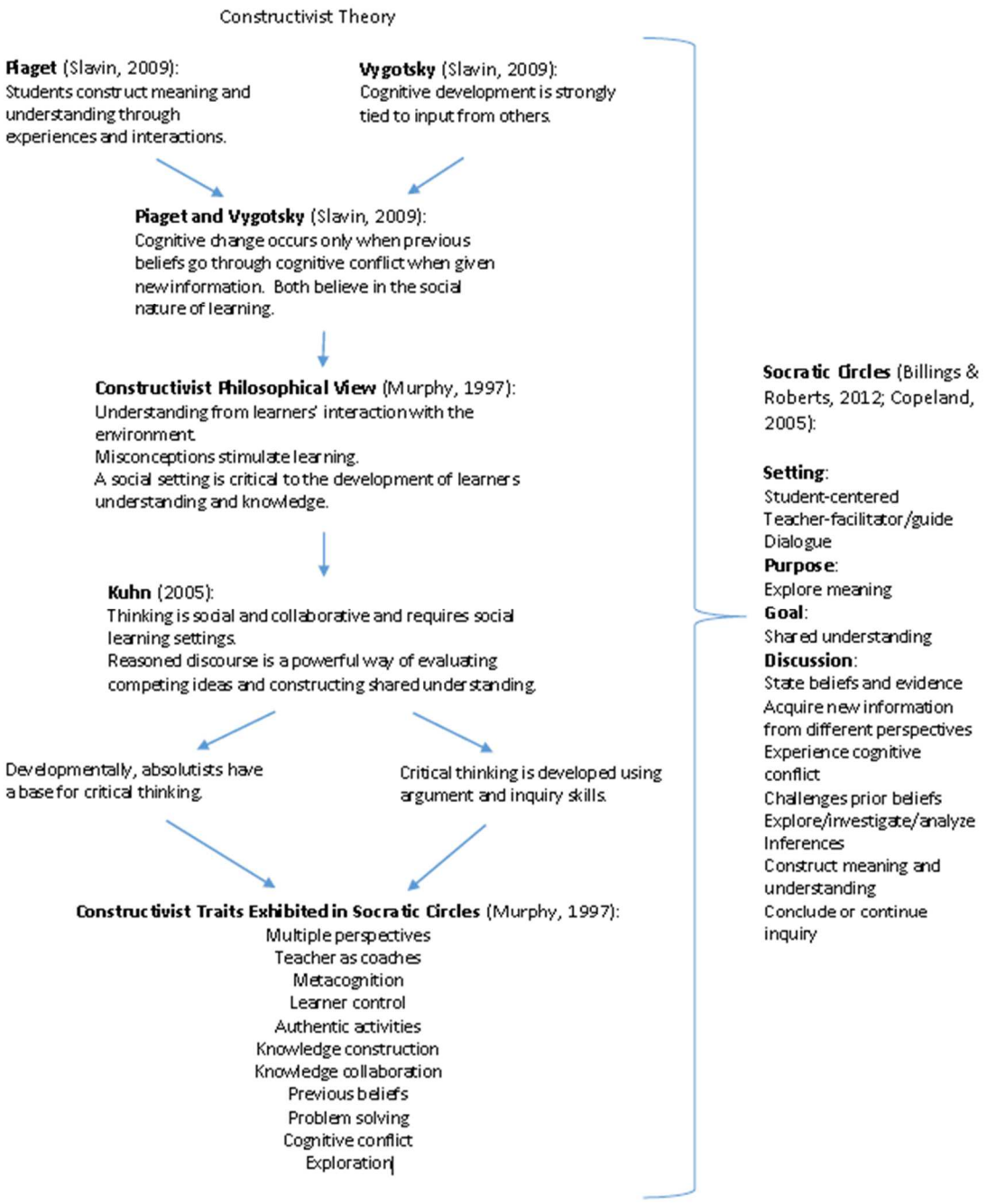

Figure 1. Constructivism translates into Socratic Circles.

Constructivism. Slavin (2009) stated, "The task of education is not to pour information into students' heads, but to engage students' minds with powerful and useful

concepts" (p. 231). Educational psychology purports that knowledge cannot be given to students. Students must solve problems, engage in active discovery or application, and ponder ideas; they must construct knowledge in their own minds—students, individually and socially, construct meaning as they learn. "Constructing meaning is learning; there is no other kind" (Hein, 1991, p. 1). Students need to discover and convert new information in order to make it their own. Theories of learning based on these ideas are called constructivist theories of learning. The teacher serves as a guide to assist students in finding their own meaning (Slavin, 2009).

Constructivism draws heavily from the works of Piaget and Vygotsky. Both theorists believed that when new information was introduced to present understanding, cognition underwent imbalance and a process of change in light of the new information. Sousa (2003) reported that scientific research confirms, "The brain goes through physical and chemical changes when it stores new information as the result of learning" (p. 22). Key elements for both Piaget and Vygotsky's theories of cognitive change emphasized the use of peers to model thinking and challenge each other's misconceptions. Additionally, they suggested using students with a broad range of intellectual abilities due to the social nature of learning, cooperative learning (Slavin, 2009). Vygotsky believed that children learn through their interactions with more capable individuals and suggested that effective problem solvers talk themselves though difficult problems. Students working together can learn from listening to others. "… he [Piaget] also believed that social interaction with peers, especially arguments and discussions, helps to clarify thinking and, eventually, to make it more logical" (Slavin, 2009, p. 32).

It can be argued that constructivism can trace its origin to Socrates and his belief that knowledge was not an object to be taught, but knowledge was within each individual and

> by helping students examine their premonitions and beliefs while at the same time accepting the limitations of human thought, Socrates believed students could improve their reasoning skills and ultimately move toward more rational thinking and ideas more easily supported with logic. (Copeland, 2005, p. 7)

Constructivism uses a student-centered approach that fosters critical thinking while engaging students in analytic discussion (Coffey, 2009). Kuhn (2005) was in agreement with these constructivist ideas. Kuhn believed that students must be given hands-on authentic activities that utilize collaboration, problem solving, and used the thinking skills of inquiry and argument to construct knowledge. For example, in describing students co-constructing knowledge during an exercise in argument, Kuhn (2005) stated, "They [students engaged in argument] will be on their way to understanding reasoned discourse as the most powerful means of evaluating competing ideas and constructing shared understanding" (p. 173).

Savery and Duffy (2001) offered three primary propositions that characterize the constructivist philosophical view:

1. Understanding is in the learners' interactions with the environment—what is learned is a function of the content, context, activity of the learner, and the goals of the learner.
2. Cognitive conflict or misconception stimulates learning.
3. The social setting is critical to the development of the learner's understanding and knowledge.

Therefore, teaching strategies should include activities that are authentic, meaningful, and allow students to process the new material, linking it to what the student already knows. "As student's learning will involve errors, tasks should offer opportunities for self-assessment, correction, peer discussion, teacher feedback and other 'reality checks'" (Petty, 2011, p. 2).

Murphy (1997) reported that constructivist epistemology is difficult to label due to different interpretations, but many educators and researchers agree about how this epistemology should affect instruction and learning. Murphy designed a list of constructivist characteristics that can provide insight into how constructivist philosophy translates into educational practice. Constructivist traits cited by Murphy (1997) that are exhibited in Socratic circles included the following: multiple perspectives, teachers as coaches, learner control, authentic activities, knowledge construction, knowledge collaboration, problem solving, and cognitive conflict.

Theory to practice. Socratic circles, a strategy based on the Socratic method, is an appropriate vehicle for fourth grade students to conduct collaborative discourse. Students are developmentally ready to build an elementary critical thinking foundation (Kuhn, 2005). Socratic circles is an activity that requires the critical thinking skills needed for argument and inquiry and provides the teacher-researcher the opportunity to recognize them (Kuhn, 2005). Socratic circles was chosen because it aligns with the Constructivist Learning Theory. The Socratic circle process begins with a teacher-selected interpretive text that students have read critically. Students come to the circle to explore the meaning expressed in the text; they state their beliefs and provide relevant supporting evidence. Others in the group offer their perspectives and evidence. This new

information creates awareness in the learners of their misconceptions and leads to a collaborative dialogue. Students must examine, analyze, clarify and consider the accuracy and logic of their own perspectives as well as the perspectives of others. Finally, students construct their new understanding and reach a conclusion of accepting their own belief, accepting the belief of another, or choosing to continue inquiry. Generally, answers lead to further inquiry.

Elder and Paul (2008) conjectured that in order to determine good thinking from bad, intellectual standards can be used to evaluate the quality of student reasoning and take their thinking to higher levels. Critical thinking can be measured by applying clearly defined standards such as clarity, accuracy, relevance, logic, precision, and breadth to the elements of reasoning such as problems, perspectives, information, and evidence; all thinking contains these elements either explicitly or implicitly (Elder & Paul, 2007).

Chapter 3 Methods

Mixed Methods

The purpose of this action research study was to investigate whether Comprehensive Socratic Circles foster critical thinking in fourth grade students. Action research allows a teacher-researcher to reflect on a specific practical problem and attempt to obtain a solution and improve practice (Herr & Anderson, 2005; Mills, 2011; Plano Clark & Creswell, 2010). Because action research uses either quantitative, qualitative, or both quantitative and qualitative data collection, this study used a triangulation mixed methods design since both approaches were necessary to interpret the findings and understand social phenomena (Creswell, 2009; Johnson & Onwuegbuzie, 2004; Mills, 2011; Plano Clark & Creswell, 2010). Quantitative and qualitative data were collected using concurrent procedures. Both approaches were given equal priority and analyzed separately to determine whether there were similar results (Creswell, 2009; Plano Clark & Creswell, 2010). "Mixed methods research offers great promise for practicing researchers who would like to see methodologists describe and develop techniques that are closer to what researchers actually use in practice" (Johnson & Onwuegbuzie, p. 15).

Setting

This study was conducted at an elementary school located in a middle-to-upper middle class suburb in the southwestern United States that served K-5 students. It was part of a district that was made up of 25 schools: 19 elementary and 6 middle schools. The state department of education had designated both this district and this elementary school as achieving the grade "A" based on AIMS performance results. The school had 27 certified teachers and 430 students.

Participants

A captive audience method of convenience sampling was used for this study (Teddlie & Yu, 2007). The participants were 10 fourth grade students ranging in age from nine to ten years old and represented the school's diverse ethnicity. Copeland (2005) emphasized the importance of teacher autonomy in selecting and facilitating each circle yet suggested eight to fifteen students as ideal to form an inner Socratic circle. Ten students were chosen to enhance dialogue yet still allow time for all students to fully contribute. This sample for this study was purposely chosen to represent the academic levels of the whole class. Students were selected using a stratified random distribution (Teddlie & Yu, 2007). Out of the three groups of low, medium, and high achievers on the Dynamic Indicators of Basic Early Literacy Skills composite scores, the selection of these ten students was based on their range of reading proficiencies. Based on the percentages of students in each group, the sample of children was randomly chosen to represent that proportion of the class. IRB approval was obtained and participation was secured by sending parent and student permission letters home (Appendix A and B). One hundred percent of parents returned signed active consents and every student provided assent to participate in the study.

Socratic circles were conducted every other week in an empty fourth grade classroom. A total of seven circles were conducted throughout the fall semester of the school year. The setting was away from other students and provided an environment without distractions. The remaining students in the class stayed in the regular classroom with the gifted resource teacher in order to participate in a Socratic circle that was not part of this study.

Comprehensive Socratic Circles

Socratic circles. Socratic circles, a student-centered teaching strategy comprised of ten students and the teacher seated in a circle to discuss and explore the meaning of an interpretive text, afforded a safe and open environment to induce dialogue. During the discussion, students acquired new information from peers that challenged their pre-existing beliefs, students stated their beliefs and provided evidence, and students analyzed, investigated, and made inferences. The dialogue was the learning experience and the goal of the discussion was shared understanding. The Socratic circle was a vehicle that provided the occasion for students to apply their critical thinking skills and allowed the opportunity to recognize and measure these skills. The teacher was to facilitate the discussion, not as an active participant, but as a guide to encourage students' participation in dialogue with each other (Copeland, 2005; Roberts & Billings, 2012).

Often, Socratic circles consist of two concentric circles of students. The inner circle discussion centers on understanding the meaning presented in the text, and the outer circle quietly observes the inner circle then provides feedback on the dialogue and group dynamics (Copeland, 2005). However, research shows problems with this configuration. Heipp and Huffman (1994) conducted a study on high school students' perceptions of Socratic circles and found that the high school students particularly liked the inner circle but found it difficult to stay engaged in the outer circle. This innovation had only an inner circle to ensure that these fourth grade students would stay engaged in the discussion process.

Intellectual standards for critical thinking. During the 15 weeks of the study, students were engaged in two additional ongoing learning strategies. The first was

teaching students critical thinking concepts. Paul and Elder's (2009) intellectual standards of critical thinking were explicitly taught during regular class time. Students had the opportunity to apply the standards to the elements of reasoning used in collaborative dialogue, such as perspectives, evidence, and inferences. Paul and Elder (2009) believed the standards must be taught explicitly and when instilled in thinking, they guide students to improved reasoning. Initially, students were taught the definitions of the intellectual standards. The definitions taught to students were the same definitions as used by the researcher and raters to identify the skills. The first intellectual standards taught were clear, accurate, and relevant. As each standard was defined and described, students identified and applied them during various sets of activities throughout the innovation. Logic, precision, and breadth were individually presented every two weeks along with their reinforcement activities. The Paul-Elder Critical Thinking Model illustrates the intellectual standards that must be applied to all thinking in order to assess its quality.

Three thinkers. Paul and Elder's (P-E) Three Thinkers (Paul & Elder, 2009), the second learning strategy, was taught explicitly and applied during class time. Naïve Nancy does not think critically and is merely a recipient of information. Selfish Sam has maladaptive critical thinking and thinks critically for selfish reasons. And Fairminded Fran has the desirable fairminded critical thinking and thinks critically and with fairmindedness regarding self and others (Paul & Elder, 2009). The names were modified to eliminate gender bias. Students were taught the definitions and descriptions of the thinking characters. Students were given a variety of activities that required them to recognize and explain these types of thinking. Students also had an opportunity to

identify with types of thinkers and thus, be helped to gain awareness of their own types of thinking. The combination of Socratic circles, the Three Thinkers, and critical thinking concepts was called Comprehensive Socratic Circles.

The study was conducted for 15 weeks between August and December 2014. The seven Socratic circles were facilitated within that time frame (see Appendix D). Students' application of clarity, accuracy, relevance, logic, precision, and breadth were the specific critical thinking skills then assessed during the Socratic circle discussion process.

Preliminary Steps

Seven interpretive texts were selected from the Great Books Foundation (Appendix C), one for each circle. To motivate and challenge students to engage in rich discussions, specific age-appropriate texts were intentionally chosen that offered readers multiple perspectives, supportive evidence, and the potential for different interpretations. Carefully selected pieces were ambiguous and allowed opportunity for students to identify with or connect to the different characters or situations. The text provided the purpose of discussion, to explore meaning. The initial stories were simple and short; stories with increased complexity were chosen as students' ability to read and discuss improved.

The norms of Socratic circles process goals were explained and the expectations were posted. Students read the text twice before Socratic circles and made notations on important concepts and questions. Students were taught to "recognize that the work of close reading consists in mindfully extracting and internalizing the important meanings implicit in a text" (Paul & Elder, 2008, p. 9).

The day of and prior to a Socratic circle, the norms/rules of the discussion were reviewed. These norms included speak one at a time, listen to others, address everyone, eliminate hand-raising, respect the opinions of others, and feel free to ask questions. Students individually re-read the text in order to refresh their memories and noted the text for any additional pertinent information. Then, the text was read to them to assure their understanding of the story and the focus question was asked for that text—an open-ended Socratic question that students answered in their pre/post reflection journals to state their claims and provide evidence. Next, Socratic circles were conducted.

Socratic Circles Dialogue

Socratic circles began when students were prompted to go around the circle one at a time and state their perspectives in answer to the focus question. This probing was intended to incite discussion of ideas and provide opportunities for students to supply supporting evidence from the text. As students freely dialogued about their claims, they would be challenged by the perspectives and evidence of other students. Students would investigate and analyze the different points of view. Socratic circles offered students an opportunity to present their pertinent ideas clearly, accurately, relevantly, logically, precisely, and with breadth. The goal for the 20 minute discussion was to provoke students to socially construct meaning and understanding and either conclude or continue inquiry. Socratic circles had the potential to be an age-appropriate argument and inquiry vehicle that would motivate discussion and provide the opportunity for students to apply their intellectual standards for critical thinking. At the same time, it provided an opportunity for the teacher to recognize and measure these skills. Appendix D outlines the 15 week innovation plan.

Comprehensive Socratic Circles 15 Week Data Collection Plan

Data included transcribed videotapes from seven 20-minute Socratic circles, pre and post reflection journals, an intellectual skills matrix, a student response table, a student-to-student interaction chart, and field notes.

Quantitative Data Collection

Measure 1: Intellectual standards for critical thinking matrix. This collection tool provided perspectives for the following research questions: (1) *How, and to what extent, did students apply the intellectual standards for critical thinking to the elements of reasoning during Comprehensive Socratic Circles?* The purpose of this tool was to identify and measure the presence of each specific intellectual standard for each student and the group as a whole. The intellectual standards for critical thinking matrix (Appendix E) provided definitions of each and all standards to be utilized by raters. Each standard was specific and either was identified as present or not present for each response from each student participant. Student responses were collected from the transcribed videotapes and student reflection journals.

The intellectual standards for critical thinking illustrated the application of the standards for critical thinking to the elements of reasoning in order to make it, or determine whether it was, critical thinking (Paul and Elder, 2007a). Therefore, to add validity, the intellectual standards defined by Elder and Paul (2008) were adapted to the intellectual standards for critical thinking matrix. Clarity was defined as a response that was understandable, the meaning could be grasped. Clarity was the gateway standard because without clarity the other standards could not be determined. Elder and Paul (2008) stated, "It is helpful to assume that we do not fully understand a thought except to

the extent that we can elaborate, illustrate, and exemplify it" (p. 7). When statements were understandable and the meaning could be grasped, they were clear. Accuracy was defined as being free from errors or distortions, true (Elder and Paul, 2008). Elder and Paul (2009) described accuracy as an important goal in critical thinking and explained that understanding was a matter of accepting mistakes in the process of developing accuracy in perspective. Relevance was defined as relating to the matter at hand. Elder and Paul (2009) stated, "Relevance, in its most widely-used form, is an essential intellectual standard focused on the extent to which something bears upon something else" (p. 64). Logic was defined as having parts that make sense together, no contradictions (Elder & Paul, 2009). "When the combination of thoughts is mutually supporting and makes sense in combination, the thinking is logical" (Elder & Paul, 2008, p. 10). Precision was defined as being exact to the necessary level of detail. Understanding could be identified to the extent that it could be specified it in detail (Elder & Paul, 2008). "Precision, as in exactness, is important when details are necessary for reasoning through a problem or issue" (Paul & Elder, 2007a, p. 55). Breadth was defined as encompassing multiple viewpoints. "…breadth of thinking requires the thinker to reason insightfully within more than one point of view or frame of reference" (Elder & Paul, 2008, p.9).

The matrix contained clear and unambiguous definitions of the critical thinking standards. The intellectual standards for critical thinking matrix demonstrated the frequency with which every intellectual skill was exhibited and applied to the reasoning identified during the discussion and student reflection journals in each of the seven sessions. Information for the matrix was collected by the teacher-researcher from

transcribed videotapes and journals from each session. The intellectual standards for critical thinking matrix may be found in Appendix E.

Measure 2: Response table. Data for the response table was collected from the transcribed videotapes and informed the following research question: (3) *How, and to what extent, did Socratic circles provoke and increase participation in student-centered dialogue?* The response table was a numerical tally of responses by students and teacher for each Socratic circle. The purpose of the response table was to indicate whether the frequency of responses by teacher and students changed over the 15-week period of seven circles. Data of students' response behavior was collected by the teacher/researcher from the transcribed videotapes and entered into the table.

Measure 3: Student-to-student interaction chart. This collection tool provided data for the following research questions: *(3) How, to what extent, did Socratic circles provoke and increase participation in student-centered dialogue?* The purpose of the student-to-student interaction chart was to identify the number of continuous student-to-student exchanges that took place in-between teacher facilitation. It was used to understand if the Socratic circle was enhancing students' ability to practice argument during interactive discourse in an effort to construct meaning. After each Socratic circle, data from the student-to-student interaction chart was collected by the teacher-researcher from the transcripts of the videotape and entered into the chart. The use of a transcript helped to assure rater accuracy by providing continuous access and unrestricted time to observe.

Qualitative Data Collection

Measure 4: Transcribed videotapes. This tool provided data for the following research questions: (2) *How, and to what extent, did Socratic circles provoke students' evaluation of competing ideas during reasoned discourse?* All seven sessions of Socratic circles were videotaped and transcribed. The purpose of the video portion was to allow the researcher to identify the participants during transcription. The teacher-researcher, then evaluated the transcribed and coded audio portion of the videotapes of each Socratic circle. The data was analyzed for the presence of the following: intellectual standards for critical thinking, students' claims and supportive evidence, and the competing claims and supportive evidence of others.

Measure 5: Student reflection journals. This data collection tool provided data for the following research questions: (2) *How, and to what extent, did Socratic circles provoke students' evaluation of competing ideas during reasoned discourse?* After reading the selected text and before and after participating in each Socratic circle, students answered a Socratic question in their student refection journals (Appendix F) that provided an opportunity for them to make a claim and provide evidence to support that claim from the text. Following Socratic circles, students reflected upon their original claim with supporting evidence, peer influence, new competing claims and evidence, and their conclusion to the original focus question. The purpose of the reflection journals was to gather evidence to see if their participation in Socratic circles caused them to compare, analyze, and evaluate competing ideas and construct shared understanding.

Measure 6: Field notes. This data collection tool was used throughout the study to provide data for the following research questions: (1) *How, and to what extent, did*

students apply the intellectual standards for critical thinking to the elements of reasoning during Comprehensive Socratic Circles? (2) *How, and to what extent, did Socratic circles provoke students' evaluation of competing ideas during reasoned discourse?* (3) *How, and to what extent, did Socratic circles provoke and increase participation in student-centered dialogue?* Any ongoing observation of behavior during and between Socratic circles that was not accessed by data collection tools was also noted. Figure 2 illustrates the research question and the corresponding data collection instruments that were used. The data were used to triangulate information during the analysis phase of the study to establish reliability to answer.

Data collection tools	Intellectual standards for critical thinking matrix	Response table	Student-to-student and student-to-teacher interaction chart	Transcribed videotapes	Student reflection journals	Field notes
Research Questions	QUAN	QUAN	QUAN	QUAL	QUAL	QUAL
1. How, and to what extent, did students apply the intellectual standards for critical thinking to the elements of reasoning during Comprehensive Socratic Circles?	X					X
2. How, and to what extent, did Socratic circles provoke and improve students' evaluation of competing ideas during reasoned discourse?				X	X	X
3. How, and to what extent, did Socratic circles provoke and increase participation in student-centered dialogue?		X	X			X

Figure 2. Data collection tools and research questions.

Data Analysis

The following are brief descriptions of how the data were analyzed from each measure including the statistics used to analyze the quantitative data and the procedures that were used to analyze the qualitative data in order to inform the research questions.

1. How, and to what extent, did students apply the intellectual standards for critical thinking to reasoning during Comprehensive Socratic Circles?

Intellectual standards for critical thinking matrix. Data from the transcripts of each videotaped Socratic circle were transferred to the intellectual standards for critical thinking matrix to quantify data from each session and indicated the number of times each standard was used. Data from the response table served to calculate the percentage of use for each intellectual standard. The analysis of combined standards and their frequency of use was necessary to demonstrate the presence of critical thinking in students. To strengthen reliability, two other unbiased raters independently coded when they believed the intellectual standards of clarity, accuracy, relevance, logic, precision, and breadth were applied. There was over 90% agreement among all three raters. Raters triple coded 20 to 30% of the transcriptions to reach reliability.

Field notes. Field notes were open coded for use in interpreting results and for informing all research questions.

2. How, and to what extent, did Socratic circles provoke and improve students' evaluation of competing ideas during reasoned discourse?

Transcribed videotapes and student reflection journals. Open coding was used to analyze the qualitative data provided by the transcribed videotapes and student reflection journals. While reading the transcribed videotapes and the reflection journals, on-going analysis allowed student perspectives to be identified, and each response was then coded. Themes, patterns, or categories were identified as responses merge into groups. This process aided in understanding students' reasoned discourse—stating claims, providing evidence to support the claims, and changing in beliefs.

3. How, and to what extent, did Socratic circles provoke and increase participation in student-centered dialogue?

Response table. The response table specified the frequency of each student response during the sessions. The transcripts provided data that was entered in the table. The responses were totaled to provide quantitative evidence of participation and any changes in the frequency and length of their responses over the course of the study. To strengthen validity of this measure, the video and the transcripts were reviewed on two independent occasions and checked for consistency.

Student-to-student and student-to-teacher interaction chart. The student-to-student and student-to-teacher interaction chart was developed using the data from transcribed videotapes. Data were converted to numbers and used to identify the number of student interactions between each teacher interjection. Descriptive statistics were used to determine a change in number and extent of responses by students and teacher. The video and transcripts were reviewed on two independent occasions and checked for consistency.

Chapter 4 Results

In the previous chapter the methodology and data collection tools were explained. This included descriptions of how the quantitative data from each collection tool were examined and the procedures used to analyze the qualitative data in order to inform the research questions. Chapter 4 will discuss the results of data collected from each tool and describe how they address each research question.

Research Question One

How and to what extent did students apply the intellectual standards for critical thinking to the elements of reasoning during Comprehensive Socratic Circles?

Intellectual Standards for Critical Thinking Matrix. Individual student participant results, as well as group results, were analyzed and demonstrated that students' use of the intellectual standards of clarity, accuracy, relevance, logic, precision, and breadth for critical thinking increased over the duration of the study. Table 1 provides definitions and examples for each standard.

Table 1

Intellectual Standards for Critical Thinking—Defined (Elder & Paul, 2008)

Standard	Definition	Example
Clarity	Understandable, the meaning could be grasped	"The older brother didn't go with the younger brother."
Accuracy	Free from errors or distortions, true	"In the story it doesn't say whether those memories are good or bad."
Relevancy	Related to the matter at hand	"I think it was the younger brother because he was the one that got to become king."
Logic	The parts made sense together, no contradictions	"The one who was king had a better chance of really living a fancy life but he also had a chance of dying in the war."
Precision	Exact to the necessary level of detail	"In the story it specifically says that he isn't poor. The older brother is neither rich nor poor."
Breadth	Encompassed multiple viewpoints	"I agree with what *Student 1* said and I changed my mind. You don't really know what kind of happiness he has and you really don't know what kind of memories he has now."

The results for each standard are visually presented and described below. The proportion of responses that met each standard was calculated for the group by dividing the number of responses for each standard by the total number of responses in each session.

Clarity. Clarity was assessed by determining whether statements were understandable and the meaning could be grasped; they were clear (Elder & Paul, 2008). Clarity was the most frequently used standard throughout all seven sessions. Responses indicated that students spoke with clarity 66.67% of the time in the first Socratic circle,

and this percentage increased with each ensuing circle. By the final circle, students spoke with clarity 89.13% of the time. There was an overall trend of a notable presence and improvement in the group's ability to respond with clarity across all sessions (see Figure 3).

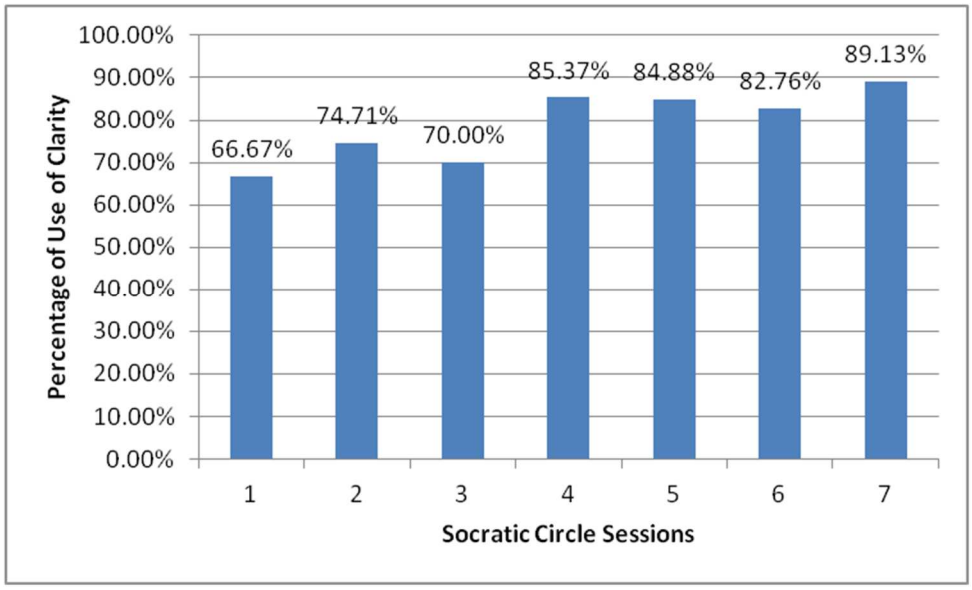

Figure 3. Group percentages of responses using the intellectual standard of clarity.

Accuracy. Accuracy was assessed by determining whether responses represented things as they really were. Statements had to be free from errors or distortions; they were true (Elder & Paul, 2008). Student responses were less accurate in the first three sessions than in the last four. In the last four sessions, participants were making accurate statements over 70% of the time. Again, as with clarity, participants showed overall improvement over the course of the seven Socratic sessions in this standard (see Figure 4).

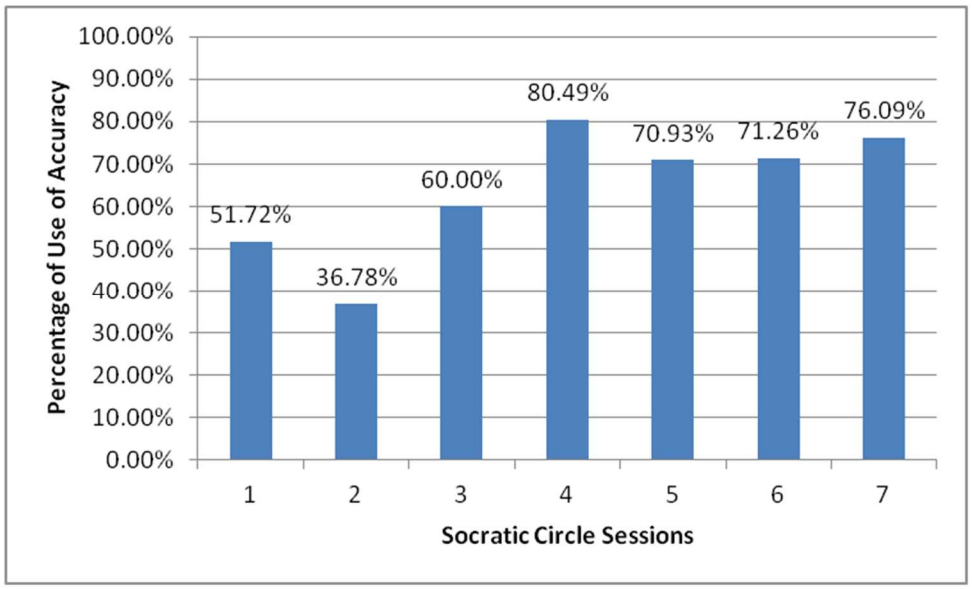

Figure 4. Group percentages of responses using the intellectual standard of accuracy.

Relevance. Relevance was assessed by determining whether responses related to the matter at hand. Thinking must have considered all issues, concepts, and information that was relevant to it. Figure 5 illustrates an increase in the percentages of students' responses that were relevant. In the first two sessions, less than 45% of students' responses were relevant, yet their relevant responses increased to over 71% by the final session.

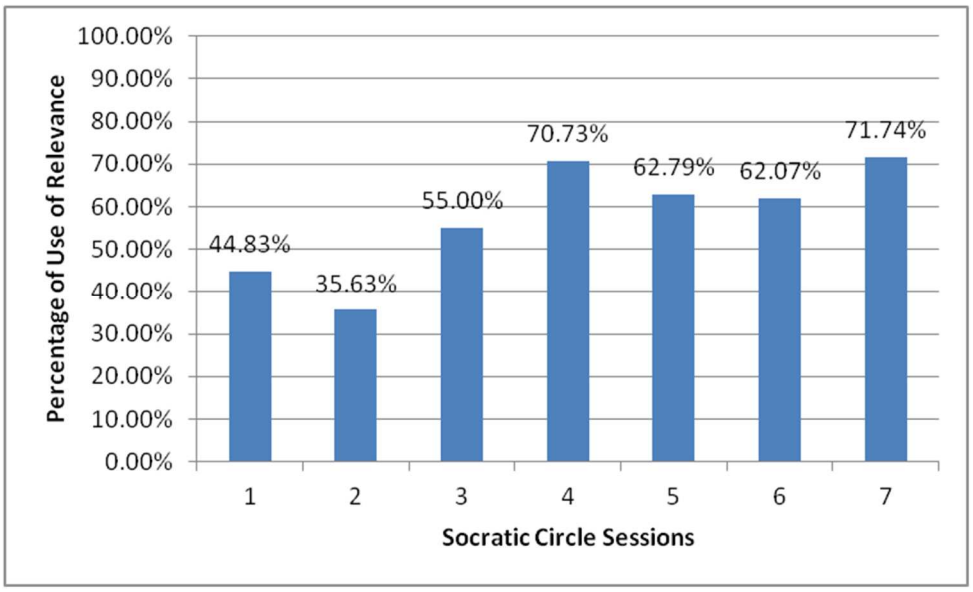

Figure 5. Group percentages of responses using the intellectual standard of relevance.

Logic. Logic was assessed by determining whether the students' statements made sense, and did not contradict. Logic included utilizing sound judgment and reasoning. Students increased their frequency of using logical responses during the seven sessions of Socratic circles (see Figure 6). Students used logic in 39.08% of their responses in the first two sessions and were above 56% starting with the third session and increasing to their highest percentage of logical responses in the seventh session at 64.13%.

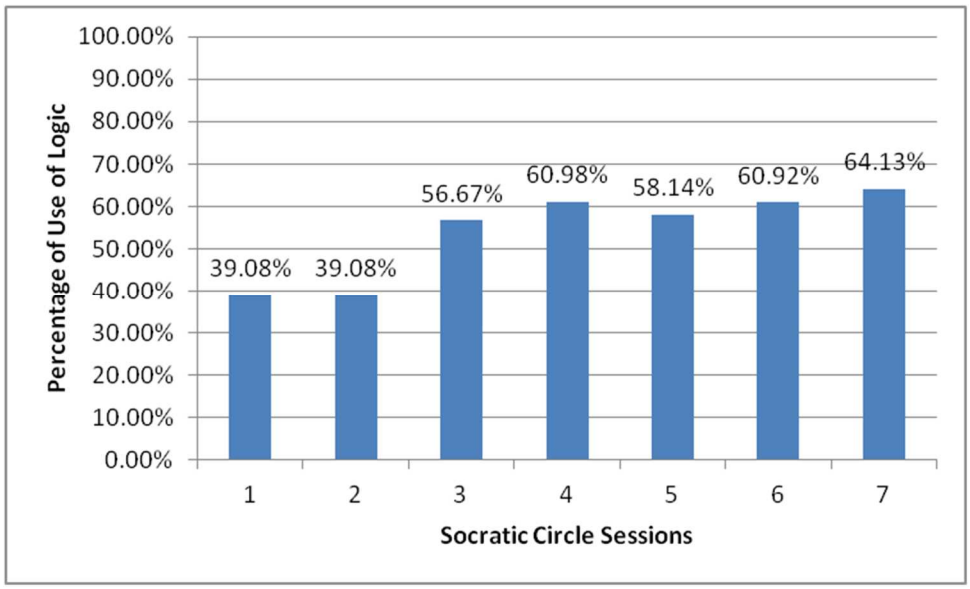

Figure 6. Group percentages of responses using the intellectual standard of logic.

Precision. Precision was assessed as being specific, definite. Overall, less than 22% of responses made by students were considered precise in any one session. However, the percentage of precise responses increased during the seven sessions (see Figure 7). Students were precise in their responses less than 1.25% of the time in the first two sessions. The third session responses using precision increased to 15%, which was largely maintained for the fourth session. While the fifth session dropped the percentage of precise responses considerably, the final two sessions showed more growth in this skill with rates close to 21% of precise responses in each of those sessions.

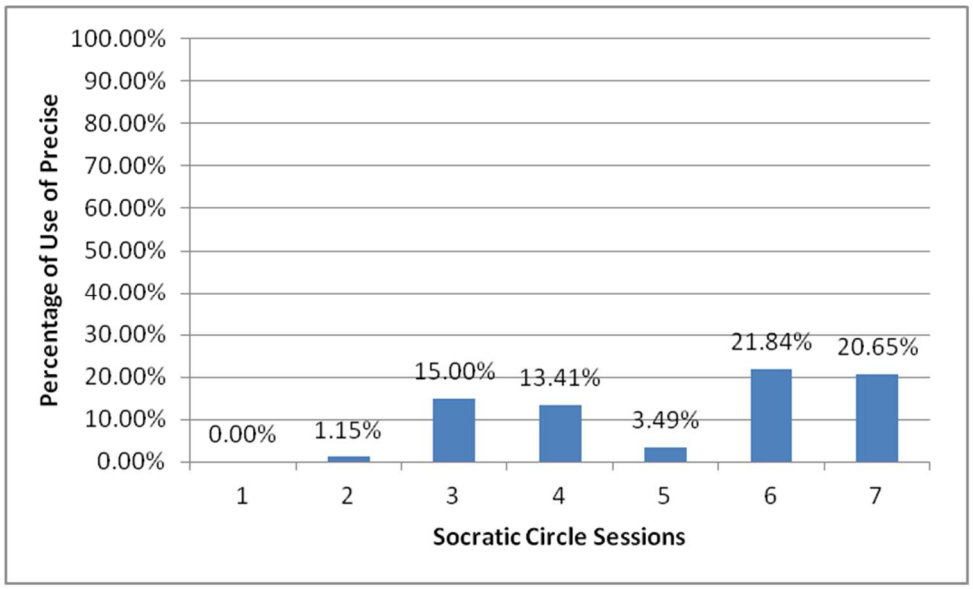

Figure 7. Group percentages of responses using the intellectual standard of precision.

Breadth. Breadth of thinking was a line of reasoning encompassing multiple viewpoints, a broadminded perspective, comprehensive. Similar to precision, overall students used very little breadth in their responses during sessions. Across all sessions, less than 24% of responses were considered to have breadth in any one session. However, the use of breadth increased from 1% in the first two sessions to 10% in the third session, more than doubled in the fourth session, and dropped back to a more consistent rate of around 13% for the last three sessions (see Figure 8).

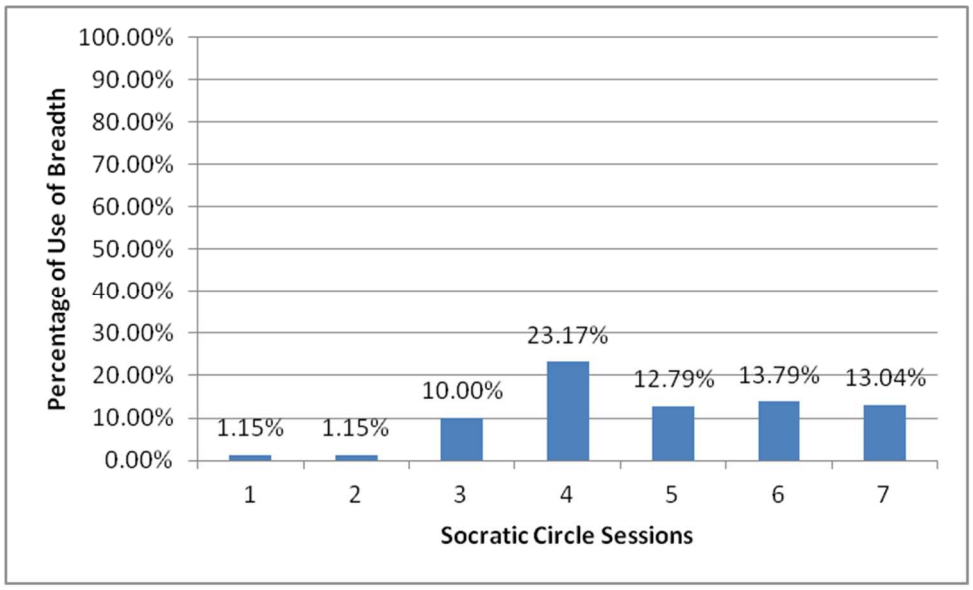

Figure 8. Group percentages of responses using the intellectual standard of breadth.

Students increased their use of clarity, accuracy, relevance, logic, precision, and breadth across all sessions. The use of instruction around the intellectual standards paired with Socratic circles appeared to deepen their understanding of the importance of these standards as students practiced applying these skills to their reasoning in their social interactions with their peers during the sessions.

Research Question Two

How, and to what extent, did Socratic circles provoke and improve students' evaluation of competing ideas during reasoned discourse?

The data used to answer this question included the transcribed videotapes from the seven Socratic circles and student reflection journals.

Transcribed videotapes. Videotapes were transcribed from each Socratic circle and open coded to identify patterns, trends, and themes in order to explore students'

claims, signs of agreement or disagreement with others' responses, indications of any changes in claims, and use of group discourse to make meaning.

Table 2

Transcribed Videotape Codebook

Category	Code	Explanation
Claims	CNS	Claim, no support
	CU	Claim, unsupportable
	CTS-R	Claim, text referenced
	CTS-Q	Claim, text quoted
Agree	ANS	Agree, no support
	AU	Agree, unsupportable
	ATS-R	Agree, text referenced
	ATS-Q	Agree, text quoted
Disagree	DNS	Disagree, no support
	DU	Disagree, unsupportable
	DTS-R	Disagree, text referenced
	DTS-Q	Disagree, text quoted
Change	CHNG	Change in claim
Clarification	CLARIF	Clarification
	CLARIFQ	Clarification question
Exploring Meaning	MM	Exploring meaning, meaning making
Question	STQ	Student question
	STDPROBQ	Student probing question
Irrelevant	OT	Off topic
Teacher Responses	TPROBQ	Teacher probing question
	TCLARIFQ	Teacher clarification question
	CLLSTDNT	Call on student

Transcriptions provided data for three different types of claims: unsupported claims, unsupportable claims, and claims with support that included text referenced claims and text quoted claims. Data indicated that in the first two sessions, 90% of all claims were either unsupported or unsupportable. For example, an unsupportable claim was, “The rich man did it so that the shoemaker would know what it was like to be rich and for him not to sleep." Another example of an unsupported claim was, “The rich man is nocturnal.” The first claim was unsupportable because it is a statement of the student’s opinion and lacked any possibility of supportive text. The second claim was based on the student’s own conclusion of information that was in the text, but this evidence was not provided by the student during the discourse. During the third session, students began to support their claims. From the fourth session on, students frequently made supportive claims by quoting or referencing the text. For example a student stated, “Myron is a good class president because he is responsible. When he heard something, he saved the dog instead of worrying about turning off the light. He also showed that [responsibility] when he walked over two miles to the vet, walked back, and didn’t care if he got anything for it.” An example of a claim supported by a quote occurred in another student’s response, “It says he didn’t care in the text, ‘Myron didn’t mind. He thought that was what being class president was all about.’” This argument with another student’s previous response demonstrated that this student had evaluated a competing idea and supported the argument with a quote.

In order to determine whether students were socially constructing meaning, their claims provided a measure of assessment. Data extrapolated from the coded transcribed videotapes demonstrated that students initially made rudimentary claims that lacked

strength in support; by the fourth session their responses indicated that Socratic circles provoked and improved their evaluation of competing ideas during reasoned discourse allowing them to make strongly supported claims. Both the presence of maintaining original claims with increased supporting evidence and the occurrence of changing claims with supporting evidence indicated that students were listening to each other, were evaluating peer contributions, and were comparing new data during discussions with their preconceived notions.

During their discussions, students verbalized either agreement or disagreement with others. The transcription provided data for three different types of agreement or disagreement: unsupported agreement or disagreement, unsupportable agreement or disagreement, and responses with support that included agreement or disagreement that was either text referenced or quoted. In the first three sessions, students rarely acknowledged each other or addressed peer responses. Students zealously, randomly, and often simultaneously, offered their own perspectives regardless of what others contributed. For example, there were twelve incidences in session two when it was impossible to decipher students' responses because all participants were speaking at once.

By the third session, students reduced the degree to which they spoke over one another and began to interact; their discourse included statements of agreement or disagreement often providing text support. Whether responses were in agreement or disagreement was, in itself, irrelevant. However, it acknowledged their awareness of competing ideas. For example a student stated, "I agree with you that it really depends on happiness. It depends on the type of happiness that the younger brother found. It may not match what kind of happiness the older brother wants." By the seventh session, students

consistently interacted with each other, listened closely, and provided supportive evidence, even quoting from the text. For example, a student stated, "Oh, I see it now. I see what you are saying. It also says it here, 'He was lonely and had no one to love.'"

Beyond simply agreeing or disagreeing with peer comments, the transcribed videotapes provided data for identifying changes in students' perspectives as a result of the discussion. Changing perspectives and providing evidence supporting a change was as important as providing strong evidence to support keeping the original claim because they both indicated, once again, that students were examining competing ideas and evaluating their reasoning. All seven Socratic circles began with students stating their own perspectives. In the first three sessions, none of the students acknowledged change in perspectives. However, by the fourth session, as students listened to each other and interacted, their ability to present their perspectives with strong evidence increased, and thus, they were able to influence others' perspectives. For example, after hearing other students' claims with their supportive evidence, one student responded, "Oh, I see it now! I see what you are saying. It also says it here in the text. 'He was lonely and had no one to love.' Then he met the waiter and finally had someone to love and to love him." This represents dialogue that took place in the three latter sessions compared to earlier sessions that allowed students to consider facts and ideas in order to evaluate their own original thinking and resulted in changes in claims.

The transcribed videotapes also provided data identifying students' capacity to explore and make meaning in a collaborative setting. In the first three sessions, students' comments were independent of and unconnected to others; students appeared to vie for their own opinions. In the fourth session, students awareness of useful responses by peers

helped improve their ability to collaborate for mutual understanding. The following is an excerpt from the transcription of the fifth session that illustrated students constructing shared understanding:

> *Student 9: "The whole thing is really just an illusion because it just seems that the mouse is wisdom."*
>
> *Student 4:"Yeah, by bringing back the mouse and thinking it was wisdom, it gave them confidence to feel like they have wisdom."*
>
> *Student 8:"I think that means they are successful. I don't know what else to add, but by having the mouse still in the boat, or them thinking it is in the boat, it gives them wisdom."*
>
> *Student 1:"Okay, I just need to say this. The mouse, any mouse, cannot be wisdom. Wisdom is not a thing that you can hold and actually feel; it is what lies within you."*
>
> *Student 9:"It's what you believe."*
>
> *Student 7:"It's inside you; that is part of you. It's invisible."*
>
> *Student 4:"It's the same as smart. You can't hold smart but you can be smart."*
>
> *Student 2:"It can't be in a mouse even if it is a special mouse."*
>
> *Student 10:"It could be a smart mouse, but a smart mouse isn't going to make those peasants smarter."*
>
> *Student 6:"The only thing that is going to help the men is that they believe the mouse is wise and that might help them."*
>
> *Student 5:"Yeah, it gives them the belief that they have wisdom."*
>
> *Student 1:"So we can look at it as they brought back wisdom because they brought back the belief that they brought back wisdom, and because they believe they brought back wisdom, they have confidence to act like they have wisdom."*

In sessions five, six, and seven students began to rely on each other's responses instead of individuals blurting out their isolated thoughts. Group cohesion, students

thinking and problem-solving together, became apparent and resulted in dialogues similar to this excerpt.

Student reflection journals. Student reflection journals were open-coded to identify patterns, trends, and themes in order to explore students' claims (unsupported, unsupportable, vague or specific support with text reference, or supported with quotation) and evidence to support their claims *before* discussion in the Socratic circle. The identity of patterns, trends, and themes from the open coding in the student reflection journals also provided exploration of new or stronger evidence in support of keeping or changing their original claim *after* the Socratic circle.

Table 3

Student Reflection Journals Codebook

Category	Code	Explanation
Claims	C-NS	Claim, no support
	C-U	Claim, unsupportable
	C-MS	Claim, minimal support; vague or weak support
	C-DS	Claim, detailed support; text referenced or quoted
	C-PEERINFL	Claim, peer influence
	C-NEWEVID	Claim, new evidence
	C-RET	Claim, retained
	C-CHNG	Claim, changed

In the first two sessions, entries in reflection journals included answers before the discussion on their claims about the story, and a minimal response about the sources of support for those claims. Most student responses were unsupported or unsupportable. An unsupported claim was a statement that was accurate but the student did not include any evidence to support it. For example, "The lion was full of himself." An unsupportable claim was information that was not in the text or even suggested by the author. For example, "The lion was afraid that the hunters were coming back." Students' entries in their reflection journals after the first two sessions included what they learned from the discussion. Half of students' responses were one to three words in length, and included answers such as, "Nothing really," and "The same thing." The responses from the other half were vague, minimal, and simply restated claims.

Students began to make supported claims in their reflection journals before and after the Socratic circle in session three, although most of these were vague. A vague claim was a true but general statement that indicated the student read and understood the topic, but the response was minimal and weak. For example, "She's afraid to go get water."

During the last four sessions, improvement was apparent. Session four appeared to be pivotal. They began making specific claims both before and after their discussions. A specific claim provided explicit detail from the text. For example,

> The younger brother made the better choice because he was able to go through all those adventures of crossing the river, carrying the cubs, and going up the mountain. It made him king. The book even says, 'When he reached the top of the mountain, the people came out to meet him with a carriage to take him into the city, where they made him their king.'

This example demonstrated a student's increased detail and specificity in the presentation of evidence to support a claim.

In session four, six out of ten students showed changes in their perceptions as a result of the discussion. Most changes in thinking were supported with new and stronger claims and new and stronger evidence. By the seventh session, following the discussion, every student had stronger supportive evidence whether they kept or changed their claims. Their journals included detailed support of their decisions. For example,

> Solomon Singer makes himself love things because he believes they are things he loves. In the text it says, 'So much of Indiana was mixed into his blood that even now fifty-odd years later, he could not give up being a boy in Indiana.' Then he talks about all of the things that Indiana has that he loves so much and tries to connect them with New York. He said it's like the streets are like fields and like the lights in the windows are like stars.

This student demonstrated growth in ability to support claims. The written response in the journal prior to the circle was indicative of a student who understood the text, made a claim, and provided solid supportive evidence in a short and succinct paragraph. The complete entry after the circle from which the above excerpt was taken, provided strong and detailed statements of supporting evidence that covered the allotted space (for a short paragraph) and over half of the reverse side. This example illustrated how students' thinking and ideas were extended and expanded after partaking in Socratic circles.

Overall, open coded student reflection journals provided data that demonstrated students' written responses improved from undeveloped statements in their first three sessions to statements that indicated awareness of changes in their thinking due to evaluation of competing ideas during their reasoned discourse in the last four sessions.

Research Question Three

How, and to what extent, did Socratic circles provoke and increase participation in student-centered dialogue?

Response table. The response table was a numerical tally of responses by students and the teacher for each Socratic circle. Through transcribed videotapes, student responses could be identified and charted. The data from the response table was used to determine how many students participated, if any students tended to have a higher number of responses compared to others per session, and to determine whether the participation of any one student tended to increase. See Table 4 for a summary of the responses by each individual across sessions.

Table 4

Number of Responses of Each Student and Teacher Across Sessions

	Session Number						
	1	2	3	4	5	6	7
Student 1	20	15	11	20	18	13	17
Student 2	4	9	4	5	10	7	8
Student 3	7	5	4	9	2	6	6
Student 4	15	8	9	8	12	15	19
Student 5	3	1	3	4	5	9	7
Student 6	2	0	2	5	7	6	7
Student 7	7	17	12	8	7	7	3
Student 8	11	5	0	7	7	7	8
Student 9	12	17	5	10	6	9	9
Student 10	6	10	10	6	12	8	8
Teacher	17	21	15	10	8	5	4
Average Student-to-Student Responses							
M	5.94	5.50	4.79	9.33	12.57	22.25	18.40
(SD)	(5.52)	(5.40)	(3.49)	(6.06)	(9.32)	(15.65)	(16.16)

The data provided by the response table indicated that in all sessions, there was 100% participation in five of the seven Socratic circles and at least 90% of the students participated in every session. No one student led in the number of responses and no one student had the fewest responses over the seven sessions. The students with less than five responses each in the first four sessions also increased to a minimum of five responses each in the remaining three Socratic circles. One student that tended to respond frequently did not dominate as other students either responded close to as often (within

two responses) or had more responses in different sessions. The students who tended to have fewer responses than the majority also varied in their number of responses.

The response table demonstrated that every student participated and no one student dominated during Socratic circles. By the last three sessions, there was a more even distribution of responses. The number of responses by the teacher decreased dramatically from 21 responses in the second session to only four teacher responses in the seventh session.

Student-to-student interaction chart. The student-to-student interaction chart was used to identify the number of continuous student-to-student exchanges that took place in-between teacher facilitation (see Table 4). Data was used to calculate the mean of student-to-student exchanges for each session. The means of each of the first three sessions were less than six. The teacher intervened an average of every six exchanges by students. However, the mean almost doubled in session four and increased to 12.57 in session five, 22.5 in session six, and 18.40 in session 7. The increase in means demonstrated the extent that Socratic circles provoked and increased participation in the student-centered dialogue during Socratic circles.

Chapter 5 Conclusion

Government mandates have changed the teaching focus in schools to student achievement on high stakes tests measuring basic skills. This has resulted in training students for factual recall, not for learning. In order to sustain a democratic society, students' education must consist of augmenting content with more complex thinking skills involving problem solving, reasoning, and deeper understanding of factual knowledge.

This study investigated whether implementation of a 15-week innovation of Comprehensive Socratic Circles fostered critical thinking among fourth grade students. Overall, Socratic circles was a successful teaching platform on which students could practice the critical thinking skills of argument and inquiry and the application of the intellectual standards of critical thinking to their reasoned discourse.

This chapter includes a discussion of the major results of the investigation to answer each research question, a comparison of these results to the supporting literature and theories, and implications of this study.

Research Question One

How, and to what, extent did students apply the intellectual standards for critical thinking to reasoning during Comprehensive Socratic Circles?

Data demonstrated that students were able to apply the intellectual standards for critical thinking to their reasoning during Comprehensive Socratic Circles, and their use of these standards increased over the course of the innovation. Students' learning about each of the critical thinking concepts using P-E Three Thinkers characters was an important preliminary step for them to gain awareness of and begin to think about their

thinking. The P-E Three Thinkers characters focus on fair-mindedness, selfishness, and naivety. The explicit teaching of the intellectual standards of critical thinking also appeared to help students in defining, describing, and applying the standards to improving their reasoning and problem solving during their collaborative discussions.

The repetitious references to the types of thinkers and the intellectual standards provided opportunities for identification and application of the strategies throughout each day. This stirred students' consciousness and was a start toward the standards becoming second nature to them. Additionally, the activities surrounding the teaching of each standard were engaging and the students felt positive about them and their use. For example, students were given an activity designed to assess their comprehension of each of the intellectual standards. Through student generated illustrations and writings, their definitions and applications could be assessed for understanding. When the handouts were distributed to the class, students cheered and expressed excitement. Once they began the activity, they were focused and worked quietly.

When examining the results of this investigation, several factors affected the results of the application of the standards. It was not surprising that clarity and accuracy were the most frequently used standards across sessions. First, clarity was considered a gateway standard; if a statement was made without clarity, the other standards could not be determined (Paul & Elder, 2007a). In order to be understood, children have to practice applying clarity to their communications throughout their lives and teachers seek to reinforce clarity and accuracy as normal classroom pedagogy. Both of these key standards were also taught earlier than the other standards, so students had the opportunity to practice them more explicitly from the beginning of the innovation. Clarity

and accuracy also appeared easier for students to grasp because developmentally these students were absolutists and tended to think more concretely (Kuhn, 2005).

While students regularly communicated clear and accurate statements, they had greater difficulty recognizing, grasping, and applying the other standards to statements. For example, these fourth grade students could not always recognize when they were not being relevant. They could speak to the topic, but tended to lack awareness of when they had departed from pertinent evidence and were expounding on their own unrelated ideas. In the story of the mouse and lion, the lion became tangled in a net in the hunter's trap. Several students became engrossed in discussing their own assumptions about the kind of net and how it was constructed, instead of the reactions of the lion and mouse to the lion's entrapment as described in the story.

Logic was also difficult because it made students question whether all of the parts made sense together and this interpretation required them to step back and consider an overview of the big picture (Paul & Elder, 2007a). Not only were the other standards more abstract and difficult for students to grasp (than clarity and accuracy), they were also taught later in the course which meant they were less understood because there was less time to practice application. Yet, students were able to apply these new concepts (at least a couple of times) and showed improvement in their application during Socratic circles. Initially, students did not use precision and breadth, the last two standards to be taught, but their application still increased, and at times, up to 23% of their comments showed application of these standards. This increase could be attributed to students' social learning, or constructivism, which resulted from practicing argument and inquiry (Kuhn, 2005). Their use of breadth likely increased because their interactions improved.

Consideration of other viewpoints provided strength to their arguments and they began to value multiple perspectives.

It was necessary to explicitly teach the P-E intellectual standards in order for students to gain an awareness of their thinking and their ability to assert mindful control when applying these skills (Paul & Elder, 2009). These results suggest that all of the intellectual standards of critical thinking should be taught before conducting any Socratic circles, thus, allowing time for the teacher to know the students and determine which of the intellectual standards to select based upon their academic readiness. For example, a teacher with an academically low class may find that students are overwhelmed with the concept of precision. By implementing Socratic circles later in the school year, students would have had more opportunities to engage in application of the standards during regular classroom communications.

Research studies on Socratic circles and other strategies for fostering critical thinking in elementary school age students are wanting. Connerly (2006), a teacher, stated students earned excellent grades but their work and thinking lacked depth. Connerly investigated critical thinking as a potential solution and studied 10 fourth grade gifted and talented students and focused on their ability to think independently while applying the intellectual standards of clarity, accuracy, relevance, logic, and fair-mindedness. The researcher concluded that students' understanding and application of the standards increased, the use of P-E Three Thinkers benefitted student understanding by providing awareness of their thinking and identification with the characters, and students gained an awareness of their thinking. The evidence of critical thinking in Connerly's study was consistent with the findings in this study. Students of this age can benefit from

strategies that teach critical thinking and include the explicit teaching of the intellectual standards of critical thinking, identification of critical thinking characters, and their application to and practice in real life situations. This further demonstrated that critical thinking can be fostered to students in elementary school.

With research focusing on critical thinking and Socratic circles in middle and high school students, there is a lack of research on a comprehensive approach for elementary students that includes critical thinking skills, Socratic circles, and defined preparatory work.

Research Question Two

How, and to what extent, did Socratic circles provoke and improve students' evaluation of competing ideas during reasoned discourse?

Students exhibited increased shared understanding and the ability to evaluate competing ideas across Socratic circles as they gained experience in reasoned discourse. Before participating in Socratic circles, students rarely, if ever, had to interpret written or verbal statements or make claims based on ambiguous material, especially with more than one answer possible in a collaborative discussion. Initially their claims were most often unsupported or unsupportable. Students lacked experience in reading critically, had no experience in defending their stance, and had no practice in analyzing text and evaluating differing ideas. In fact, students initially did not even realize their claims might differ. As close reading strategies were included in the regular teaching curriculum, students' ability to acquire accurate and detailed supporting evidence improved. Similarly, students' awareness of the importance of gathering accurate and detailed supporting evidence improved their ability to read critically. These results support

constructivists who recognize the reinforcing cyclical learning of Socratic circles. Socratic circles stimulated reading, speaking, and listening standards that are at the heart of critical thinking (Adler, 1982; Billings & Roberts, 2012; Copeland, 2005; Paul & Elder, 2007b).

After the first three sessions, students began to listen to each other and appeared to realize that they could glean ideas and supporting evidence from other participants and they began to consider multiple perspectives. They evaluated these ideas and stated either agreement or disagreement with others. "There is no concept of 'winning an argument' in a Socratic circle; there is only the search for deeper and more thorough understanding" (Copeland, 2005, p. 26). Students became aware of the need for stronger and more influential support for their claims as they learned how to communicate same or differing views and how to justify those views with supporting evidence. A primary goal of education is for students to become liberated learners by seeking answers to their own questions, an exercise that develops inquiry skills. As students sought to justify their own claims as well as the claims of others during argumentative discourse, they learned that collaborative thinking was advantageous in reasoning and problem solving, and progress was made in a shorter period of time compared to thinking alone (Kuhn, 2005; Paul & Elder, 2007b).

Students' reflection journals also illustrated that Socratic circles provoked and improved their evaluation of competing ideas during reasoned discourse. In the first two sessions, students stated weak claims and provided few examples of evidence. While they did complete their journals, they did not appear to understand how the process was connected to the circles. By the fourth Socratic circle, students appeared to understand

how the journal was a written representation of what they learned in the circle and they were eager to return to their desks in order to write down their insights. Socratic circles improved students' abilities to make claims and provide strong supportive evidence with substantial detail; and, their journaling expanded as their discussion's improved. Students began to see their collaborative problem solving as purposeful and rewarding with their new understanding leading to knowing (Kuhn, 2005).

Student learning in a series of Socratic circles was a process and each circle was unique. By examining the results and experiences during the first two sessions, it appeared that students were adapting to the new environment and discovering their role in collaborative dialogue versus traditional classroom discussions. The first two sessions appeared to be more about the students acclimating than thinking critically about the text. This may have explained some of the more complex thinking that emerged in later sessions, once students were more comfortable with the format and activities around the sessions themselves.

The style of facilitation of the circles could have also affected results. "First, teachers must be flexible, adaptable, and willing to move with the ebb and flow of the chosen course of student conversation" (Copeland, 2005, p. 31). As the facilitator of these sessions, it was sometimes difficult to remain quiet, however students adapted more quickly without guidance; they learned to listen to each other, effectively and appropriately agreed and disagreed with each other, and relied on each other to construct meaning.

Socratic circles was an ideal platform to facilitate the practice of argument and inquiry for fourth grade students. It was a user-friendly setting for students to present opposing ideas and evaluate them against their classmates' claims.

Research Question Three

How, and to what extent, did Socratic circles provoke and increase participation in student-centered dialogue?

Students' participation was over 90% in every Socratic circle with no one student having the greatest or least number of responses across sessions. No one student dominated discussions and the majority varied their levels of participation. During Socratic circles, students sat facing each other, did not have to raise their hands, and spoke directly to each other; they controlled the discussion. Socratic circles provided a safe and nurturing setting in which students could feel free, without expectations or judgment, to participate and develop their own voices (Copeland, 2005). Students built understanding during the collaborative process and appeared motivated by joint problem solving and meaning making. These findings were in agreement with scholars such as Paul and Elder (2007b) who stated, "These [Socratic] discussions give students experience in engaging in an extended, ordered, and integrated dialogue in which they discover, develop, and share ideas and insights" (p. 50).

Students were enthusiastic about the stories and excited when it was time to receive each new text. For example, upon receiving the third text, one student asked, "Oh good. Do we get to do a Sarcastic [*sic*] circle today?" The stories chosen appeared to have considerable impact on the success of the student-centered dialogue. Data collected from session four illustrated a sharp increase in students' ability to dialogue

independently of the teacher. The sudden improvement in their ability may have been due to the particular text and focus question for that session. The story offered only two positions for argument; both were viable and the supporting evidence was plentiful. Even during their dialogue, there was a clear and sudden improvement in their student-centered discourse. It appeared the group experienced an awakening—they grasped what each other had to contribute and recognized that they were all important participants working together in finding a common understanding; they understood that a group of thinkers was more effective than one. This was pivotal because they were impressed that their thinking had changed as a result of the input of others. Regardless of the ambiguity of the texts for the following sessions, this experience in circle four appeared to establish a new benchmark for future discussions. It also impacted their motivation for writing in their journals. They cheered when it was time for their group to go with the teacher to the vacant room to sit in a circle for discussion and independently, started rating sessions in their journals following the discussions. For example, one student wrote, "I absalootly loved the descution [*sic*] and the story!!!!!!!!!!!!!!!!!!!!!!!!"

Selecting the texts for discussion can be an important influence in motivating students to participate in Socratic circles. Fourth grade students love to share. A student of this age also loves to be an authority on a subject. It was important to select an age appropriate text with characters that students could relate to and identify with, especially if it was relevant to their own lives or learning. The stories provoked participation in the discussion. Students' comments indicated that their enthusiasm intensified when the story interested them. For example, one student commented after reading the story, "This is a *really* good one." Other students voiced similar excitement. Choosing stories that were

age-appropriate coupled with the physical setting (students seated in a circle) was instrumental in promoting engagement in the student-centered dialogue. This finding was in agreement with Copeland (2005), who stated:

To build collaborative understanding through cooperative inquiry students must be able,

> to see purpose and value in the text they are discussing. The text should also be thought-provoking and examine a concept or idea in a philosophical manner that allows them to use the higher-order thinking skills of analysis, synthesis, and evaluation. Good text raises questions in the minds of students, and these questions become the basis of dialogue. (p. 116)

Several other factors may have contributed to provoking and increasing participation in student-centered discourse. The innovation took place at the beginning of the school year. During the 15-week course of study, students may have improved in dialoguing because they knew each other and the teacher better, they had matured, and they were learning to read more critically and answer more accurately and thoroughly. Students had a better understanding of routine and procedures in the Socratic circle arrangement and were motivated by the student-centered format. Socratic circles are designed specifically to have minimal facilitator involvement in order to be student-centered, thus providing students' ownership of the conversation (Copeland, 2005).

Students readily adapted to looking at each other rather than the teacher—no adult was standing up in front of the students directing activities. Their dialogues were self-perpetuating, energized by their own thinking, their own language, and the freedom to contribute. Students showed increased motivation to share their thinking as they learned how to argue with each other *from each other*.

Limitations

There were multiple limitations to this study that need to be considered. The sample size in this study was small. Only 10 of 25 fourth grade students were randomly selected. However, the size of the sample fell within the number of participants recommended by Copeland (2005) as desirable for an inner circle. This is a concern for classrooms in conducting Socratic circles in the future, however, as students in large classrooms (more than 15) need to be broken apart for effective discussions. In this case, there was an additional teacher available to take the other half of the class, but this may not be available to most teachers on a regular basis.

The time of the innovation was also a limitation. Comprehensive Socratic Circles and data collection was limited to 15 weeks and began the third week of the new school year. Although the results of the study were positive, more time would have afforded more than seven Socratic circles and additional data. Being able to continue the circles throughout the year would allow additional practice opportunities for all the intellectual standards that were taught later in the semester, and would hopefully increase their use beyond what was found in this study.

Because the study started so early in the new school year, there were some issues in the timing that also likely affected findings. It was a new class, so students often lacked spontaneity and were guarded at the beginning of the innovation. Students were not familiar with classroom routines and procedures, and since they were just out of third grade, they lacked critical reading skills. Therefore, in the beginning circles, students may have focused more on the establishment of the norms for the group rather than the deeper investigation of the text. Socratic circles continued throughout the school year would

allow students to become more comfortable in the process of the circles and would provide the opportunity to delve deeper into the text.

The teacher and facilitator of Socratic circles was new to this group of students at the beginning of the year as well. The selected texts were based on general knowledge of fourth graders versus these specific fourth graders. The teacher was also new to selecting Socratic focus questions and developing effective strategies for teaching P-E's intellectual standards.

There are several changes that would enhance the effectiveness of Socratic circles and possibly eliminate some of the student confusion in the first two sessions. Without interfering in student control during the circles or student responses in their journals, it would benefit students to reflect on areas of behavior that impaired the discussion. For example, remind students of the importance of supporting their claims with evidence found in the stories. These gentle reminders would take place several days before the next circle so that students would not feel the suggestions were in any way critical of their conduct. It was important for the teacher to serve only as a guide, not as an authority figure during circles.

Additionally, as part of their preliminary work, students appeared to need more time in understanding and responding to open-ended questioning (Socratic questioning). The more practice both the teacher and the students get in questioning, the more natural and fluid the questions and answers. Finally, time spent in developing a strong and insightful focus question was critical to the success of the circle.

Model for Future Practice

Socratic circles is a teaching method that can be adapted for students ranging in ages from elementary through college (Copeland, 2005; Roberts & Billings, 2012). It is a teaching strategy that fosters critical thinking and that can be used to enrich the learning of most subjects (Copeland, 2005; Roberts & Billings, 2012).

Although it may require some time for teachers to prepare for implementing Socratic circles, the amount of time it took was feasible for teachers to implement, and the results were invaluable. Based on the experiences in this study, several recommendations have been developed. In order to incorporate Socratic circles into a classroom in the future, teachers must:

1. Obtain professional development in the area of using Socratic circles. This training helps with creating appropriate questions that challenge students to engage with and discuss the text in meaningful ways.
2. Teach the P-E Three Thinkers: introduce, provide descriptions, and afford opportunities for students to identify and apply thinkers' character traits throughout specific activities.
3. Explicitly teach the intellectual standards—define and describe each intellectual standard individually through multiple approaches, allow opportunities for application, and provide continuous reinforcement.
4. Select engaging texts (age appropriate, relevant to students, students can identify with them, and interpretive) that will solicit participation from all members of the group.

5. Dedicate a brief time (approximately 20 minutes) to each circle, with no more than 15 students.
6. Meet with groups in a quiet location (while other students in the class are engaged in simultaneous activities with appropriate supervision) with guidelines or norms established for the process of how students should engage and participate.
7. Be flexible and adaptive to the needs of students during the sessions and greatly reduce teacher involvement during the circles.

Conclusion

The success of this study suggests that Comprehensive Socratic Circles was a highly effective teaching strategy. It combined direct instruction in primary critical thinking concepts, explicit teaching of intellectual standards of critical thinking, lessons in open- and closed-ended questioning, and guidance in critical reading with direct opportunities for students to practice those skills. Students gained an awareness of their thinking and valued the experience, which was an important step for maximizing future learning (Roberts & Billings, 2012; Copeland, 2005; Kuhn, 2005; Paul & Elder, 2007a).

Students' performance during this comprehensive approach demonstrated that Socratic circles was a strong, effective, constructivist vehicle for practicing argument. It nurtured students' reasoning to the point that it enabled them to actually value competing ideas. Discussions revealed students analyzing and evaluating their thinking as they worked together to improve their conclusions. This concept, a comprehensive approach to teaching critical thinking, can be generalized and applied to multiple subjects and multiple settings.

This study suggested that fourth grade students can learn to argue and inquire at this young age. Future investigations need to examine the effects of the early use of Socratic circles in the classroom and the impact of this strategy on the development of middle and high school students' ability to practice argument and inquiry.

Additionally, more research in Comprehensive Socratic Circles needs to expand across third, fourth, and fifth grades with a variety of subjects as the focus. Following the innovation, students demonstrated evidence of the impact of the innovation on their thinking. For example, unprompted, they referred to the intellectual standards both in using the terms ("We need to be precise when we explain it and use our science words") and in identifying a need for a certain skill ("You have to use logic before you decide if the answer is right"). Similarly, in deciding between one of two fun activities, students suggested they needed a discussion prior to voting in order to be able to consider all viewpoints, and requested a whole class Socratic circle. Consensus was reached.

Furthermore, evidence of the impact the innovation had on student achievement occurred when the results of the fourth grade School Improvement Plan (SIP) assessments were presented. While it was beyond the scope of this study to directly use test scores as an outcome of Comprehensive Socratic Circles, there was academic progress observed within this class. The class in this study performed comparably to the other two fourth grade classes in the assessment at the beginning of the school year. The results of the next SIP assessment, following the 15-week innovation, demonstrated the class in this study noticeably outperformed both of the other two classes. Because there are many additional confounding factors that could have influenced the outcome, these results cannot be directly tied to the innovation. However, one section of the assessment

required students to determine the "best answer" and identifying evidence that "best supports the statement," while another section required a written response to text in which students were required to provide an answer with supporting evidence—utilizing the type of reasoning and problem solving fostered in Socratic circles. It would follow that students would improve in their abilities to make claims and support their claims in this section of the assessment because of their experiences in Comprehensive Socratic Circles.

Similarly, the positive impact of the innovation was recognized in the responses of some students' that typically do not test well on standardized tests and assessments. Comprehensive Socratic Circles offered an opportunity to gain insight into students' thinking and understanding, a means to measure it, and a vehicle for students' to recognize their own contributions in thinking and belonging. Regardless of students' academic levels, this approach goes beyond standardization and allows all students to learn, understand, and expand their thinking. These results indicate a need for continued investigation into the merits of Comprehensive Socratic Circles on student achievement in elementary school students.

Developing a teaching strategy that is time effective, comprehensive, and versatile is crucial in a time when teachers and schools need to recognize the impact of critical thinking on life-long learning and individuals capable of sustaining a democratic society in the 21st century. In light of the current demands on teachers and the latest government initiatives, Comprehensive Socratic Circles goes beyond standardization and offers a promising solution for fostering critical thinking in the elementary classroom.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Erin Rotheram-Fuller
Division of Educational Leadership and Innovation - Tempe
-
Erin.Rotheram-Fuller@asu.edu

Dear Erin Rotheram-Fuller:

On 8/12/2014 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Fostering Critical Thinking in a Fourth Grade Classroom through Comprehensive Socratic Circles
Investigator:	Erin Rotheram-Fuller
IRB ID:	STUDY00001400
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• Approval Letter from School Principal, Category: Consent Form; • Parent Consent, Category: Consent Form; • Student Assent, Category: Consent Form; • Julie Cleveland IRB Application (3).docx, Category: IRB Protocol;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (1) Educational settings on 8/12/2014.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Julie Cleveland

APPENDIX B

CONSENT FORM

Fostering Critical Thinking in Fourth Grade Students through Comprehensive Socratic Circles

PARENTAL LETTER OF PERMISSION

Dear Parent:

I am a graduate student under the direction of Professor Erin Rotheram-Fuller in the Mary Lou Fulton Teacher's College, Division of Educational Leadership and Innovation at Arizona State University. I am conducting a research study using Comprehensive Socratic Circles to foster critical thinking in fourth grade students.

I am inviting your child's participation, which will involve the entire class experiencing lessons on critical thinking as well as participating in seven Socratic circles over a period of 15 weeks. The lessons and activities are part of the standard classroom practices and all students will still need to complete the activities as part of their class grade. By giving your consent you are giving permission for me to use your child's class work as data for the research. If you choose not to have your child participate or to withdraw your child from the study at any time, there will be no penalty and it will not affect your child's grade. Likewise, if your child chooses not to participate or to withdraw from the study at any time, there will be no penalty. The results of the research study may be published, but your child's name will not be used.

Although there may be no direct benefit to your child, the possible benefit of your child's participation is to become aware of their thinking, learn to analyze their thinking, and to question their own thinking and strategies. Fostering critical thinking in students benefits their learning by enhancing their cognitive skills and understanding. There are no foreseeable risks or discomforts to your child's participation.

The following methods will be used to assure confidentiality. The entire class will participate in the lessons and activities. Participant confidentiality will be protected in accordance with accepted ethical protocols for the protection of human subjects. I will remain responsible for ensuring the security of all study data and records. The results of this study may be used in reports, presentations, or publications but your child's name will not be used.

If you have any questions concerning the research study or your child's participation in this study, please call me (480-541-3137) or Dr. Rotheram-Fuller (480-965-6156) or erf@asu.edu.

Sincerely,

Julie Cleveland

By signing below, you are giving consent for your child _____ (Child's name) to participate in the above study. This consent includes permission for your child to be videotaped during the Socratic circle discussions. Videotapes will be used for transcribing purposes only.

_____	_____	_____
Signature	Printed Name	Date

If you have any questions about you or your child's rights as a subject/participant in this research, or if you feel you or your child have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the Office of Research Integrity and Assurance, at (480) 965-6788.

CHILD ASSENT FORM

Fostering Critical Thinking

I have been told that my parents (mom or dad) have given permission (said it's okay) for me to take part in a project about learning about my thinking and being in a discussion circle to talk about what we've read.

I will be asked to talk about my ideas and listen to the ideas of other students. There will be lessons and activities over 15 weeks.

I will take part in the lessons and activities because they are normal classroom procedures and part of the standard fourth grade curriculum. However, I know that at any time I can ask that my work or responses not be used in the study and it will be okay.

_____	_____
Sign Your Name Here	Print Your Name Here

_____
Date

APPENDIX C

SELECTED INTERPRETIVE TEXTS

Selected Interpretive Texts

Session	Story Title	Author
1	The Rich Man and the Shoemaker	Jean de La Fontaine
2	Lion and Mouse	Aesop
3	Two Pairs of Eyes	Crockett Johnson
4	The Two Brothers	Leo Tolstoy
5	How the Peasants Bought Wisdom	Serbian folktale as told by Nada Curcija-Prodanovic
6	Myron	Louis Sachar
7	An Angel for Solomon Singer	Cynthia Rylant

Junior Great Books, 2010. *Starting off strong: Beginning shared inquiry in your classroom.* Chicago, IL: The Great Books Foundation.

APPENDIX D

15 WEEK INNOVATION PLAN

Week	Instructional Activities	Data Collection Tools
Week 1	Story about Socrates Introduce P-E Three Thinkers P-E Three Thinker Activities	Field notes
Week 2	P-E Three Thinker Activities C-A-R standards Discussion vs Dialogue	Field notes
Week 3	Types of questions Circle etiquette Text 1 Reflection Journal Socratic circle C-A-R standards	Field notes Videotape/transcribe Reflection journal Intellectual skills matrix Response table Student-to-student interaction chart
Week 4	Dialogue review Types of questions C-A-R-L standards Close reading	Field notes
Week 5	Circle etiquette Text 2 Reflection Journal Socratic circle C-A-R-L standards	Videotape/transcribe Reflection journal Intellectual skills matrix Response table Student-to-student interaction chart Field notes
Week 6	Types of questions C-A-R-L-P standards Close reading	Field notes
Week 7	Circle etiquette Text 3 Reflection Journal Socratic circle C-A-R-L-P standards	Videotape/transcribe Reflection journal Intellectual skills matrix Response table Student-to-student interaction chart Field notes
Week 8	C-A-R-L-P-B standards Close reading	Field notes
Week 9	Circle etiquette Text 4 Reflection Journal Socratic circle C-A-R-L-P-B standards	Videotape/transcribe Reflection journal Intellectual skills matrix Response table Student-to-student interaction chart Field notes
Week 10	C-A-R-L-P-B standards Close reading	Field notes
Week 11	Circle etiquette Text 5 Reflection Journal Socratic circle C-A-R-L-P-B standards	Videotape/transcribe Reflection journal Intellectual skills matrix Response table Student-to-student interaction chart Field notes
Week 12	C-A-R-L-P-B standards Close reading	Field notes

Week 13	Circle etiquette Text 6 Reflection Journal Socratic circle C-A-R-L-P-B standards	Videotape/transcribe Reflection journal Intellectual skills matrix Response table Student-to-student interaction chart Field notes
Week 14	C-A-R-L-P-B standards Close reading	Field notes
Week 15	Circle etiquette Text 7 Reflection Journal Socratic circle C-A-R-L-P-B standards	Videotape/transcribe Reflection journal Intellectual skills matrix Response table Student-to-student interaction chart Field notes

APPENDIX E

INTELLECTUAL STANDARDS FOR CRITICAL THINKING MATRIX

Socratic Circle Intellectual Skills Matrix

Session: _____

Students	**Clarity:** Understandable, the meaning can be grasped	**Accuracy:** Free from errors or distortions, true	**Relevance:** Relating to the matter at hand	**Logic:** The parts make sense together, no contradictions	**Precision:** Exact to the necessary level of detail	**Breadth:** Encompassing multiple viewpoints

APPENDIX F

STUDENT REFLECTION JOURNAL

Text _____

BEFORE THE DISCUSSION

The focus question:

_____

My answer is

_____

_____

_____

I think this because

_____

_____

_____

_____

AFTER THE DISCUSSION

What I heard in the Socratic circle that made me think more about my answer is

_____

_____

_____

_____

The answer that makes the most sense to me now is

_____

_____

_____

_____

Circle one:

- I changed my mind.
- I added more evidence to my answer.