

CRITICAL THINKING IN THE 21<sup>ST</sup> CENTURY: PRE-SERVICE ELEMENTARY  
TEACHERS PERCEPTIONS AND APPLICATION OF CRITICAL  
THINKING IN A SOCIAL STUDIES METHODS COURSE

by

Dallas Ann Dallman

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## ABSTRACT

Critical thinking can be described as the process by which an individual or group of individuals collects, organizes and evaluates information with the purpose of making judgments that guide beliefs and actions. While the development of critical thinking skills has long been a goal of education, and is thought to be even more critical in the world of the 21<sup>st</sup> century, there is evidence to suggest it is not an easy outcome to realize. It is unknown whether today's pre-service teachers are prepared to encourage and support the development of critical thinking skills in the k-8 classroom.

This mixed methods study explores the perceptions of elementary pre-service teachers with regard to their personal application of critical thinking skills and their ability to promote the development and application of critical thinking skills in a k-8 classroom. Both quantitative and qualitative data were collected from participants who were enrolled in an elementary social studies methods course. Data collection included a self-reporting survey of everyday critical thinking, a document analysis of civics and government lesson plans, and face to face interviews. These three different data points help build a complete picture of the ways in which critical thinking is or is not promoted in elementary classrooms.

The results demonstrated that pre-service elementary teachers believe themselves to be critical thinkers at least some of the time, however, few critical thinking skills were required in the lesson plans designed by participants. While the interviews help to shed some light on the reasons, the study is not conclusive in this area. The study certainly reinforces the idea that critical thinking is a complex and abstract idea – difficult to define, measure or teach at any age level.



## CHAPTER 1: INTRODUCTION

The 21<sup>st</sup> Century and Critical Thinking

The technological revolution that ushered in the 21<sup>st</sup> Century means we live in a very different world from that of 10 years ago. In 1973 French economist Georges Anderla developed a statistical model to quantify the rate at which repository of human knowledge had been increasing. His model indicated that knowledge has been doubling exponentially since the mid-19<sup>th</sup> century. Current estimates based on that model suggest that knowledge is now doubling every 18 – 24 months or faster. International Data Corporation (IDC) (2011), a company specializing in technology research, predicts that digital content will increase by 50% in 2012 and increase by nearly 300% by 2015. Furthermore, IDC predicts that “intelligent communicating devices” will outnumber traditional computing devices by 2 to 1 within 24 months (Gens, 2011). This rate of growth in conjunction with increased access to that information transforms our strategies for effective communication, marketing, decision making, learning and teaching. Today, leaders in education, business and government agree that the twenty-first century skills essential to success as “effective citizens, workers, and leaders” must include not only the “3Rs” but the “4Cs”. According to the Partnership for 21<sup>st</sup> Century Skills, these higher-level thinking skills include:

- critical thinking and problem solving – the ability to make decisions, solve problems and take action as appropriate

- effective communication – the ability to synthesize and transmit ideas in both written and oral formats
- collaboration – the ability to work effectively with others, including those from diverse groups and with opposing points of view
- creativity and innovation – the ability to see what’s not there and make something happen (Partnership for 21<sup>st</sup> Century Skills, 2011).

Each of the four skills outlined by the Partnership for 21<sup>st</sup> Century Skills is an element of the overall critical thinking process. Critical thinking is a complex and challenging term to fully grasp. One way to define critical thinking is a process by which an individual or group of individuals collect and evaluate information with the purpose of making judgments that guide beliefs and actions. The emphasis on critical thinking in education is not new. Critical thinking has been considered an essential element of a well-educated individual from the early years of Greek civilization. Richard Paul (2004) in his “Brief History of Critical Thinking” credits Socrates as having

. . . set the agenda for the tradition of critical thinking, namely, to reflectively question common beliefs and explanations, carefully distinguishing those beliefs that are reasonable and logical from those which — however appealing they may be to our native egocentrism, however much they serve our vested interests, however comfortable or comforting they may be — lack adequate evidence or rational foundation to warrant our belief. (p. 1)

Scholars through time continued that tradition, supporting and developing strategies and methods for critical reflection of established beliefs and practices. Thomas Aquinas, Francis Bacon, Descartes, Sir Thomas Moore, Machiavelli, Locke, and others set the

stage for new ideas and developments in science, politics, economics, history, and society in general (Paul, 2004).

The emphasis on critical thinking in American education is also not new. From the time John Dewey added a chapter on “Why Reflective Thinking Must Be an Educational Aim” to the 1933 revision of his 1909 work *How We Think*, critical thinking has been widely promoted as a principal component of American education. There has been broad agreement across the community that critical thinking is a vital and necessary goal of education to support the development of a responsible and engaged citizenry. *A Nation at Risk* (1983) reiterated the goal of education that all students “attain the mature and informed judgment needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society” (The Risk, para. 6). The vast majority of educational organizations include the idea of critical thinking in their mission, guiding principles, and standards. Principle Two of the *Educational Excellence: Nine Principles* adopted in 2011 by the National Education Association (NEA) states: “students must become questioners and explorers, not just passive recipients of information.” The Interstate Teacher Assessment and Support Consortium (INTASC) in standard 8 specifically expects teachers to develop critical thinking skills in their students: “the teacher understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections and to build skills to apply knowledge in meaningful ways” (p. 17). Further definition of the standard specifically addresses stimulation of students’

critical and creative thinking as well as development of higher order questioning skills and metacognitive processes.

In response to the challenge of preparing all students for success, educators, parents, and community members from across the nation have come together in the last several years to develop what is now known as the Common Core Standards. Published by the National Governors Association Center for Best Practices in 2010, these standards focus on grade level expectations for the mastering core concepts and skills considered necessary to prepare students for success in college, the modern workplace, and the global economy. The Common Core standards, while structured around math and language arts, encourage integration of social studies, science and communication skills as necessary components of a high quality education (National Governors Association, 2010).

### Critical Thinking in the Social Studies

Social studies education in particular lends itself to teaching and learning critical thinking skills. Social studies is often the umbrella under which many students learn to make informed decisions as future voters, consumers, parents, and citizens of the world. Indeed, the National Council for Social Studies (NCSS) and other social studies organizations specifically address critical thinking as a fundamental element of an effective social studies curriculum.

The NCSS was founded in 1921 to provide leadership, service, and support for all social studies educators. The NCSS Mission Statement highlights the goal for social studies educators to “teach students the content knowledge, intellectual skills, and civic

values necessary for fulfilling the duties of citizenship in a participatory democracy” (2012). The National Center for History in Schools at the University of California at Los Angeles (NCHS) specifically states, “. . . without historical knowledge and inquiry, we cannot achieve the informed, discriminating citizenship essential to effective participation in the democratic processes of governance and the fulfillment for all our citizens of the nation’s democratic ideals” (1996). The Council for Economic Education (CEE) includes in the organization’s mission statement a commitment to “delivers the fourth ‘R’ – a real-world understanding of how to build fruitful lives – to America’s young people. Our goal is to reach and teach every child to create a more informed citizenry capable of making better decisions as savers, investors, borrowers, voters and participants in the global economy” (2010). Finally, the Center for Civic Education, a non-profit, non-partisan educational corporation, dedicates itself to promoting an “enlightened and responsible citizenry committed to democratic principles and actively engaged in the practice of democracy in the United States and other countries” (2012).

As one can see from these statements, a central mission for each of these social studies organizations is the development of competent and engaged citizens and each includes a call for the development of critical thinking skills within their national standards. This focus combined with the capacity for integration of social studies skills and content across disciplines - reinforced with the new Common Core standards - places social studies educators in a key position with regard to the development of 21<sup>st</sup> century skills.

### Critical Thinking in Education

There seems to be a consensus across a wide range of individuals and organizations that critical thinking adds value to the workplace and to society. Moreover, research studies confirm that the development of sound critical thinking skills also results in improved student confidence, increased perceptions of academic control, better grades, and greater academic achievement (Facione 2009; Stupnisky 2008). A wide range of research shows that development and application of critical thinking skills not only correspond to increased academic achievement at every level, but also are essential for the protection of an effective democratic society (Facione 2009, NCSS 2002, Pithers 2000, Stupnisky 2008).

Yet, while many in the community seem committed to the goal of teaching students to think independently and reflectively, there are clearly gaps in the development of applicable critical thinking skills. A study released in 2008 by Peter D. Hart Research Associates surveyed 300 employers about needed improvements in college education. Business participants identified critical thinking as one of five key areas in which college graduates are not well prepared and one area that severely hindered their ability to advance or be promoted within the organization (Association of American Colleges and Universities, 2008). Further, the National Center on Education Statistics (NCES) (2012) reports that in the 2007-2008 academic year 36% of first year undergraduate students enrolled in at least one remedial education course; while not specifically measuring critical thinking, well-developed critical thinking skills are built upon a foundation of well-developed literacy and mathematical skills (Table 270). As noted, critical thinking

is becoming increasingly important for college graduates; however, without a solid foundation from their k-12 education, college students have limited time to engage in coursework that helps to develop critical thinking skills.

Finally, there is substantial anecdotal evidence to suggest that the No Child Left Behind Act (NCLB) and the resultant emphasis on standardized test scores as the way to measure learning has contributed to a lack of higher level thinking and creative skills in recent generations of high school graduates. Brent McKim (2007), a Kentucky physics teacher and president of the Jefferson County Teacher's Association offers this opinion:

Most fundamentally, NCLB fails to address the needs of the whole child and reduces the guiding purpose of public education from the development of effective and contributing citizens to an unending quest for higher scores on tests that cannot assess what we value most in a democratic society — things like critical and creative thinking, problem solving, effective and persuasive communication, cooperation, perseverance, caring, respect, and appreciation for diversity (p. 298).

Mr. McKim is not alone. In January 2011 NEA president Dennis Van Roekel stated:

Nine years ago this week President George Bush signed into law the No Child Left Behind Act that: a. Stunted the creativity and critical thinking skills of American public school children, b. Prevented teachers from tapping into the full potential of their students, c. Fostered a school environment that values test-taking skills above all others, d. Stole the joy from teaching and learning, e. All of the above.

To illuminate he related a story from a California middle school teacher in which a student asked, "Will there be anything we will need to remember after the test?" In January 2012, Van Roekel summarized additional stories he had heard from educators as he traveled throughout the country,

From high-stakes testing to narrowing of the curriculum, this law has missed the mark. Instead of creating a generation of critical thinkers, we are

graduating a generation of test takers. Let's get back to the core purpose of public education and let's re-balance the federal role: ensuring every student has access to a great education that prepares them for lifelong learning and success in the 21st century.

It looks as if we may be asking a generation of teachers with potentially limited critical thinking skills to prepare the students of the 21<sup>st</sup> century, whose need for critical thinking skills may be greater than any time in history. This generation of teachers includes those undergraduate education students currently enrolled in social studies methods courses around the country, who according to the NCSS National Standards for Social Studies Teachers (rev. 2004), should possess the knowledge, capability, and the dispositions to encourage student development of critical thinking. This standard presupposes that social studies teachers have both the ability and tendency to think critically themselves as well as the capacity and skill to transfer critical thinking skills and application of those skills to students in their social studies classroom. There is a question as to the whether this assumption is realistic.

While some critical thinking research has investigated undergraduate students' experiences with and perceptions of critical thinking (Pithers 2004, Tapper 2004, Cherubini 2009) as well as faculty perceptions of student reasoning capacity (Halx 2005), knowledge is limited regarding the relationship between an undergraduate student's experiences with critical thinking and the effect of those experiences on that student's practical application of the skill. Even more relevant to the connection between social studies education and critical thinking skills, knowledge is very limited with regard to pre-service social studies teachers' dispositions, personal application and capacity to develop critical thinking skills in their students.



### Purpose of Research

This mixed method research study has been designed to explore the perceptions of elementary social studies methods pre-service teachers regarding their everyday application of critical thinking skills and examine their demonstrated capacity to promote the development and application of critical thinking skills by k-8 students in the lesson plans they create.

The goal for this study, which focuses on a group of 48 students from one elementary social studies methods class at a public university in the Rocky Mountain region, is to identify similarities and/or differences between a student's perception of his or her use of critical thinking skills and his or her demonstrated transfer of those skills to students through lesson planning.

This research study is guided by the following research questions:

1. What are pre-service elementary teachers' perceptions of the frequency with which they use critical thinking skills in everyday life?
2. Of the nine critical thinking skills recommended by the National Council on the Social Studies (NCSS), which ones are most frequently used by pre-service elementary teachers in the civics and government lesson plans? Why?
3. Of the nine critical thinking skills recommended by the National Council on the Social Studies (NCSS), which ones are least frequently used by pre-service elementary teachers in the civics and government lesson plans? Why?

Data collection included: 1) a voluntary student survey of everyday critical thinking, 2) a document analysis of student developed civics and government lesson

plans, and 3) follow-up interviews with students who developed the analyzed lesson plans. Additionally, the surveys and interviews were designed to help to identify some strategies that promote the development of social studies methods students' critical thinking abilities as well as their ability to transfer those skills to the students in their classrooms. The results will contribute to existing literature about pre-service teacher characteristics and provide focus for further research intended to enhance the successful development of highly effective teachers. The hope is to establish a direction for further research that will seek to discover the most effective methods and strategies for incorporating the best practices of social studies education, including the development of critical thinking, into teacher training programs and thus help to improve social studies education overall. Identifying effective pedagogy for developing competent thinking skills in the social studies methods class ultimately ensures the effective development and application of critical thinking skills in the social studies classroom.

## CHAPTER 2: LITERATURE REVIEW

This chapter will provide relevant theoretical and empirical data regarding the call for critical thinking skills in 21<sup>st</sup> Century, the value of critical thinking in the teaching and learning process, and the role of social studies education in the development of critical thinking skills. 21<sup>st</sup> Century Education will discuss technological and societal changes in the world of the 21<sup>st</sup> century and the corresponding need to focus on the parameters of quality education. Furthermore, this section will highlight a recommended framework for 21<sup>st</sup> century education. The Benefits of 21<sup>st</sup> Century Education will narrow the focus of the conversation to the theme of critical thinking and the impact of critical decision making in business, academia and as a civic duty. The History of Critical Thinking in Education addresses the historical ways in which critical thinking has been defined, envisioned, and enacted within the field of education, and more specifically in social studies and civic education. Expectations Regarding Critical Thinking for Teachers outlines expectations for teachers in general as well as the explicit expectations for teachers of social studies and by extension, teacher educators. Finally, Methodologies used in Critical Thinking Research overviews the methodologies used to conduct research into critical thinking, its application, challenges, and transfer of skills through the teaching and learning process.

21<sup>st</sup> Century Education

The term “21<sup>st</sup> century education” surfaced as early as the 1980s focusing on the rapid growth in both information and technology. In a 1983 glimpse into the 21<sup>st</sup> century

Arthur Lewis reflected, “. . . our image of the future is not merely one of accelerated technological development but of acceleration itself” (p. 9). Accelerated technology, accelerated information, and the idea of preparing students for jobs that did not yet exist all led to a national conversation about the goals for education. Lewis continued his observations about the future of education to highlight educational quality, “An effort to improve the quality of education is emerging as a national priority. Definitions of quality vary from achieving high scores on standardized tests to adding more required courses to the curriculum” (Lewis, 1983, p. 10). The definition of educational quality is as diverse today as the debate continues with regard to education reform, standardized testing, NCLB waivers, and the Common Core.

Taking into account the rapid growth of information, knowledge, and technology – those yet to be imagined 21<sup>st</sup> century jobs were not specifically imaginable. Given that teachers could not focus education and learning toward a specific career or even job market, the issue for both the business community and educators became what teachers should do to prepare students to succeed in an unknown universe.

Examining a diverse array of responses to this issue – what should teachers be doing – highlights a common theme of early literature: complex critical thinking skills are potentially more important to one’s ability to function successfully than at any previous time in history (e.g. Katz 1992, Pithers 2000). Lewis (1983) stated “. . . skills that today are considered higher level, such as problem solving, creativity, analysis, synthesis, critical thinking, and communication, will become essential for many workers in the future” (p. 10). Knapp (1984), former director of the National Science Foundation

observed that “. . . a liberal-arts education should provide an understanding, at some level, of the mental discipline and plain hard work required to wrest knowledge from nature” (p. 98). Knapp (1984) emphasizes the need to link the problem solving experience closely associated with science to other types of problem solving across disciplines, “The system has worked very well, producing world leaders over the entire spectrum of academic disciplines, because it is based on the premise that, by solving a significant independent research problem, a student will gain the confidence and flexibility required to define and solve other, possibly very different, problems in the future” (p. 98). And Ramler (1991), Chair of the ASCD Commission for Global/International Education focuses his attention on the global nature of 21<sup>st</sup> century needs including the ability to look at the world through another’s eyes, “To build citizens for the 21<sup>st</sup> century we must continuously strive to offer instruction that helps students learn to see “through the eyes, minds, and hearts of others” (p. 44). Two colleagues from the Harlandale School District discussed redefining success for public education. “It seems,” wrote the authors, that “we must aim to empower our students with a higher and broader literacy than the kind we have in the past been satisfied to give them.” They advocate adding three C’s to literacy – connectedness, creativity and choice – which they explain are the ability to connect disparate ideas, synthesize information to create new connections and solutions, and to make informed choices (Katz and Chedester, 1993, pp. 5-8).

These ideas about the future of teaching originate from diverse perspectives, yet each point to an obligation for teachers to develop students’ abilities to think more

deeply, analyze, evaluate, problem solve and make informed decisions in order to be well prepared for the 21<sup>st</sup> century. In light of this obligation, researchers, educators, parents and business people have attempted to define and measure quality education in context of the global, national, economic, social and educational needs of the 21<sup>st</sup> century. The answers became the framework developed by the Partnership for 21<sup>st</sup> Century Skills to define the goals and values of 21<sup>st</sup> century education. Searching for common denominators to success in education and in business led the Partnership for 21<sup>st</sup> Century Skills to focus on a framework which integrates the traditional 3 R's (core subjects), the new 4 C's (foreshadowed by Yvonne Katz in 1993). The Partnership offers a guiding principle for this recommendation, "Learning and innovation skills are what separate students who are prepared for increasingly complex life and work environments in today's world and those who are not. They include: creativity and innovation, critical thinking and problem solving, communication and collaboration" (Partnership for 21<sup>st</sup> Century Skills, 2011).

For each of these 4 C's the Partnership's framework focuses on aspects that help students develop skills which allow them to participate fully and effectively in the workplace, society, and the world. Creativity and Innovation should enhance the individual's ability to think creatively, to work with others in the creative process and to implement innovations. Students also need to develop critical thinking and problem solving skills like the ability to reason, analyze systems, make judgments and decisions, and solve problems in both traditional and creative ways. Communication skills enhance one's ability to articulate one's ideas in a variety of methods and mediums and to listen

effectively to the thoughts and ideas of others. Finally, the ability to collaborate in all of these areas is another critical element – individuals working in a respectful environment to create and problem solve with shared responsibility for the end goal (Partnership for 21<sup>st</sup> Century Skills, 2011).

### The Benefits of Critical Thinking

For purposes of this investigation critical thinking has been chosen as an area of focus because of the importance to quality education and preparation for life beyond school. A wide range of literature shows that development and application of critical thinking skills correspond to effective participation in the workplace, increased academic achievement at every level, and also is essential for the protection of an effective democratic society. To allow for focused and quality analysis and reflection, this research will confine its scope to the area of critical thinking.

There exists substantial research surrounding the theme of critical thinking including definitions (e.g. Facione 2009), measurement (e.g. Bissell 2006), development (e.g. Halx 2005), teaching (e.g. Tapper 2004) and application (e.g. Phillips 2004). Pithers (2000) reviewed research literature related to critical thinking in education; he found that existing literature indicated a consensus as to the need: “While the contemporary education curriculum is a highly contested arena, there seems to be consensus that it should help students to think well and to think for themselves” (p. 237). In deed, it seems that at all levels – government, business, education, parents – people believe that graduates should be able to make thoughtful decisions. In an introduction to his work Facione (2009) helps to explain very simply why this is so,

Teach people to make good decisions and you equip them to improve their own futures and become contributing members of society, rather than burdens on society. Becoming educated and practicing good judgment does not absolutely guarantee a life of happiness, virtue, or economic success, but it surely offers a better chance at those things. And it is clearly better than enduring the consequences of making bad decisions and better than burdening friends, family, and all the rest of us with the unwanted and avoidable consequences of those poor choices (p. 2).

This has become increasingly more important with the rise of new technology and unrestricted access to both proven and unsubstantiated information. Stupnisky (2008) and colleagues also tied the increased demand for critical thinking skills to new developments in technology and access to information, “In recent years, the development of rapid, global means of disseminating information has coincided with a rising demand for critically thinking ‘knowledge workers’ . . . [because] easier access to information does not ensure the ability, or motivation, to use the knowledge astutely to facilitate problem solving or decision making” (p. 513).

As noted in an Association of American Colleges and Universities study conducted by the Peter Hart group (2008) employers consider critical thinking a basic area of competence necessary for advancement or promotion within an organization. Recently Casserly (2012) and her team undertook an exercise to identify the top ten in-demand skills for 2013. Their findings revealed critical thinking, complex problem solving, and judgment and decision making ranked one, two, and three respectively. Similarly, Bieda (2011) prepared a white paper on behalf of the Accrediting Council for Independent Colleges and Schools (ACICS) identifying skill gaps between education and employer expectations. Using the results of an ACICS survey completed by hiring decision makers Bieda (2011) points out key gaps in skill sets which “range from sense-



making and novel and adaptive thinking to cross-cultural competency and computational thinking. They represent a unique but compelling inventory of knowledge concentrations that cover a broad array of cognitive and social skills” (p. 9).

As referenced previously, critical thinking skills impact one’s ability to function successfully in higher education as well. A study published by Robert Stupnisky (2009) and colleagues investigated the connections between critical thinking, perceptions of academic control and academic success in first year students. The results of the data compiled over 13 years suggested that increased use of critical thinking could enhance students’ perceptions of control over their academic success leading in turn to greater academic success demonstrated through better grades, faculty recognition and earned scholarships. In a reciprocal relationship, a greater sense of academic control also led in many cases to greater use of critical thinking (Stupnisky, 2009, p. 527).

One gauge of academic success is retention and graduation. One study investigated the impact of a critical thinking course, “Methods of Inquiry,” (MOI) on the retention rate of students successfully completing the course (Ahuna, 2010). The stated purpose of the MOI course was to provide students the skills they needed to become “autonomous learners who take control of their academic lives” (p. 257). The study examined three classes of students and found that the MOI students outperformed non-MOI students in both the areas of retention and graduation. Study participants that completed the MOI course graduated at a rate of 77.3 percent in five years, much higher than the national average of 55 percent in six years (Ahuna, 2010). This study certainly

supports the idea that there is a beneficial relationship between the ability to think well and academic achievement.

Finally, an essential goal of education is the development of well-informed citizens able to make well-founded decisions both personally and on behalf of the greater community. Facione (2009) pointed out the social benefits of critical thinking. Halpern (2003), in her text *Thought and Knowledge: An Introduction to Critical Thinking*, presented a potential impact of voter choices,

For example, in a recent election, voters had to decide . . . (about) property taxes, the construction of a canal, . . . mandatory AIDS testing for criminals, and a rent control ordinance, in addition to deciding which candidate they preferred for diverse political offices . . . . Because every citizen is required to make countless important decisions, it may seem obvious that, as a society, we should be concerned with the way these decisions are made (p. 3).

The development of an individual's critical thinking skills offers benefits that both individuals and society can embrace. It has been and is a principal element of an exceptional education.

### The History of Critical Thinking in Education

The ability to think critically, commonly considered a tremendously important outcome of education, has also been one of the more difficult concepts to define and measure. As a result, it is a challenging goal for teachers to facilitate the development and application of critical thinking skills by their students. Much of the confusion regarding the conceptualization of critical thinking results from the broad range of skills and dispositions of which it is composed. Dewey (1910), considered one of the first modern proponents of “reflective thinking” defined his perspective as “active, persistent

and careful consideration of any belief or supposed form of knowledge in the light of the grounds which support it and the further conclusions to which it tends.” (p 6).

In a relatively recent attempt to capture the essence of critical thinking, Facione (1987), on behalf of the American Philosophical Association, convened the Delphi project, a panel of 46 experts who came together over a period of 22 months to create a consensus statement with regard to critical thinking and the ideal critical thinker. The group’s “definition” includes three aspects that comprise critical thought. These aspects include: dispositions or the propensity to think critically; common characteristics of critical thought; and skills needed in order to think critically. A summary of the elements identified by the Delphi group can be found in Table 1.

Table 1 Three Aspects of Critical Thought

Dispositions that facilitate CT	Characteristics of CT	Skills
Habitually inquisitive Well-informed Trustful of reason Open-minded Flexible Fair-minded Willing to reconsider	Purposeful Self-regulatory Pervasive Self-Rectifying Reasonable Focused Persistent Honest Prudent Clear about issues Orderly in complex matters Diligent	Inquiry Interpretation Analysis Evaluation Inference Explanation Judgment Information gathering Criteria selection Identifying personal bias Seeking precise results

(Facione, 1987, p. 22)

Definitions of critical thinking used in the research since 1987 have included many of the elements documented by the Delphi group although not comprehensively by

any one researcher. Pithers' (2000) research suggests that critical thinking involves abilities such as problem identification, clarification, analysis, inference (inductive and deductive reasoning), and evaluation along with an attitude or disposition such as a "spirit of inquiry" and that thinking occurs in an explicitly social dimension. In looking at the ways in which university faculty members approached critical thinking, Halx (2005) found that most were committed to the promotion of critical thinking, few had actually been trained to promote critical thinking and each experimented with pedagogy based upon his or her own personal definition of critical thinking. In seeking to broaden the perspective Karakas (2010) summarizes a range of definitions looking for congruence between critical and creative thinking. His paper demonstrates the complex nature of pinning down critical thought.

While Bloom's taxonomy is often used to operationalize and measure a range of thinking skills within education, there are still challenges in the actual application of critical thinking goals. Critical thinking can be described as one's ability to analyze and evaluate existing material or it can include the ability to synthesize existing information and develop something altogether new. Thus, educators can focus on thinking skills without encouraging the critical analysis or can combine critical and creative thought processes. Much of the research regarding the development and assessment of critical thinking addresses the difficulty of this endeavor due to the lack of a clear definition, clear direction, and effective assessment strategies or instruments. Bissell and Lemon (2006) identified an additional impediment to the teaching and assessment of critical thinking in the undergraduate classroom. Because critical thinking skills include a wide

range of complex abilities that develop over time they are not only difficult to define, but also difficult and time consuming to assess, traditionally or otherwise. In addition, there is the simple fact that measuring students' content knowledge is easier, less time consuming and meets clearly defined expectations. This suggests that there is still work to be done to demonstrate that the value in developing effective critical thinking offsets the investment of time and effort in promoting and assessing that development.

One step in this process is to understand the perceptions of the learners with regard to their critical thinking capacity and their critical thinking experience. Most investigation into critical thinking capabilities of undergraduate students relies on testing of actual capacity rather than examining students' individual experiences. However, some studies have looked into this phenomenon from the students' perspective. Phillips and Bond (2004) found that students struggled to verbalize what is meant by critical reflection and the majority of students did not apply true critical reflection to a problem solving task. Results led the authors to question whether "we" or the students have a "proper account" of critical thinking and to conclude that embedding critical thinking skills within a degree program is probably not sufficient to ensure that students are developing those skills.

Tapper's (2004) examination of student perceptions of how critical thinking is embedded into a degree program supports such a conclusion. He found that the majority of the students perceived critical thinking primarily in terms of written assignments, did not identify critical thinking in a variety of other types of assignments, and did not

connect their perceived development as critical thinkers with explicit teaching, feedback or expectation as they progressed through their degree program.

### Expectations Regarding Critical Thinking for Teachers

The US Department of Education began measuring academic performance annually in the early 70s. The “Nation’s Report Card” was one of many pieces of data leading President Ronald Regan to convene a National Commission on Education to assess the quality of education in America. The resulting eighteen month study entitled *A Nation at Risk* (1983) pointed out that on average American schools were failing to prepare students for life in a changing world. In fact the report cited evidence that the average graduate in the 1980s was not as well education as the average graduate of the 1950s. Expectations regarding the development of critical thinking skills in the classroom received a push when recommendations from the commission included a call for higher standards in education, “Our goal must be to develop the talents of all to their fullest. Attaining that goal requires that we expect and assist all students to work to the limits of their capabilities. We should expect schools to have genuinely high standards rather than minimum ones, and parents to support and encourage their children to make the most of their talents and abilities” (National Commission on Excellence in Education, 1983, Excellence in Education, para. 3).

In response to a nation-wide bipartisan demand for an improved school system, education organizations across the nation advocated changes to and the addition of new educational standards. These standards, applicable to both students and teachers, included the call for improved thinking skills. The National Education Association

(NEA) outlined the Nine Principles of Educational Excellence (1984) which included student mastery of content and skills, active learning, and rigorous teacher preparation. Across the nation and across disciplines educational organizations from the National Council of Teachers of Mathematics (NCTM) to the National Council for the Social Studies (NCSS) developed national content standards intended to guide improved educational opportunities and outcomes. For example, the Principles and Standards outlined by the NCTM (2000) updates the original 1989 “Curriculum and Evaluation Standards for School Mathematics.” The current Executive Summary focuses on the goal of “High but attainable curriculum standards . . . to produce a society that has both the capability to think and reason mathematically and a useful base of mathematical knowledge and skills needed in any walk of life” (p. 3). The NCSS (2011) likewise has recently updated the original 1994 standards with a focus on societal outcomes. In this case the NCSS (2011) focuses on the promotion of civic competence – helping young people to make “informed and reasoned decisions for public good as citizens of a culturally diverse, democratic society in an interdependent world” (p 3). The primary skills required for informed decision making and mathematical problem solving are those included in the above definitions of critical thinking and both student standards and teacher standards for the 21<sup>st</sup> century embrace the development of critical thinking skills.

Paul and Elder (2013), experts in the study of critical thinking, expressed and substantiated the need for standards related to critical thinking:

Students live in world of thoughts. They accept some thoughts as true. They reject others as false. But the thoughts they perceive as true are sometimes false, unsound, or misleading. And the thoughts they perceive as false and trivial are sometimes true and significant. The mind does not

naturally grasp the truth or naturally see things as they are. . . . Distorting reality is common in human life. Everyone falls prey to this phenomenon. . . . A system for intellectual intervention – a method for pre-empting bad thinking – is necessary . . . (p. 34).

Paul and Elder (2013) then identified what they consider to be essential intellectual standards and proposed competency standards for critical thinking.

The NEA (2012) recently published “An Educator’s Guide to the Four Cs” in which president Roedel outlined the role of the NEA as a founding member of the Partnership for 21<sup>st</sup> Century Skills and stressed the importance of advancing the “Four Cs” in the classroom. The Guide summarizes the importance of critical thinking for students and for society. “Learning critical thinking skills leads students to develop other skills, such as a higher level of concentration, deeper analytical abilities, and improved thought processing. Today’s citizens must be active critical thinkers if they are to compare evidence, evaluate competing claims, and make sensible decisions” (NEA, 2012, p. 8). The message articulates the need to prepare the next generation for success in the 21<sup>st</sup> century – and advocates critical thinking as one of the tools in the arsenal.

Alongside the movement toward “21<sup>st</sup> Century Education” and the common sense approach taken by Paul and Elder (2013), the Common Core Standards also emphasize critical thinking in Language, Literacy, History and Social Studies. Specific standards at various age levels and across disciplines address the expectation that students will cite evidence, evaluate sources of evidence taking into account bias, relevancy, and sufficiency of evidence, determine whether an explanation or claim is corroborated or challenged by the evidence, and integrate all the evidence to understand the whole of an event or account. Hess (2013), in partnership with the Common Core Institute,



developed an educator's "Guide for Using Webb's Depth of Knowledge (DOK) with Common Core State Standards" specifically tailored to the promotion of higher level thinking skills by students. Hess (2013) describes Webb's DOK schema as a "key tool educators can use to analyze the cognitive demand (complexity) intended by the standards, curricular activities, and assessment tasks" (p. 4) and aligns it with Bloom's Taxonomy, as mentioned previously a known quantity by most educators.

Specifically in the realm of social studies the NCSS has included Essential Social Studies Skills and Strategies which include Literacy Skills, Critical Thinking Skills, Research Strategies, Learning Strategies, and Personal Interaction and Civic Engagement Strategies. Objectives and goals for students of social studies include gathering, organizing, evaluating, analyzing and synthesizing information to develop the ability to make informed decisions, understand and assess opposing points of view, creatively solve problems, and contribute to society in meaningful ways. Furthermore, since 2002 the NCSS has advocated for teachers to plan and implement lessons which include the five "essential characteristics of powerful social studies" which are described as meaningful, integrative, values-based, challenging, and active.

Finally, in response to or in alignment with the Common Core State Standards, the Council of Chief State School Officers (CCSSO) has developed the "C3" Framework for Social Studies State Standards (2013) intended to guide enhanced rigor in K-12 civics, economics, geography and history. The C3 Framework adds the idea of Civic Life to College and Career as goals for education. The C3 Framework is organized into four dimensions which support an inquiry based program for social studies education:

Dimension 1 - Developing Questions and Planning Inquiries; Dimension 2 - Applying Disciplinary Concepts and Tools; Dimension 3 – Evaluating Sources and Using Evidence; and Dimension 4 – Communication Conclusions and Taking Informed Action. The purpose is to promote critical thinking in a flexible framework that is not dependent upon any one curriculum or content decision in social studies.

As the nation, the world, and the realm of education move further into the 21<sup>st</sup> century, the expectation and the need to develop critical thinking skills is becoming more focused and pronounced. Expectations for student learning have consequences for teachers and subsequently for teacher education programs. As standards and expectations increase in rigor, so must the preparation of new teachers that they may successfully meet the requirements of 21<sup>st</sup> century education.

Research regarding the application of critical thinking skills by pre-service teachers or the capacity of those pre-service teachers is limited, and the literature brings as many questions as answers. In a case study in which teachers and pre-service teachers engaged in contextual thinking while thinking aloud, Wineburg (2001) identifies one of the challenges in historical and contextual thinking, “If we never recognize that our individual experience is limited, what hope is there of understanding people whose logic defies our own, whose choices and beliefs appear inscrutable when judged against our own standards” (p. 110)? As he goes on to say, “We do not know how, exactly, people learn to think contextually. We do not know where they learn it when they do. We do not even know the role of formal study in its development” (p. 110). These gaps highlight the possibility that the skill is not being taught, per se, and that as a society we

are hoping that it develops with maturity. However, it seems very likely that teachers who do not know how or how they learned might be ill equipped to pass it on.

VanSledright (2002) highlights a handful of dilemmas for teachers who try to incorporate more historical thinking in the elementary grades. In his work with 5<sup>th</sup> graders he asks himself, “is it appropriate for 10-year-olds to begin losing their sense of faith in the veracity of history textbooks, to be encouraged to abandon their sublime trust in the authoritativeness of what they may have been taught to think of as beyond question” (p. 1102)? It may very well be the best thing that we can do, however, one must consider the potential consequences.

While asking questions and seeking evidence to support conclusions is an important element of critical thinking and is a goal of education in general and of all social studies disciplines, students must be guided through the process. VanSledright’s students quickly moved beyond the idea that history is interpretive to the idea that one could not trust any historical evidence because historical agents are all lying. VanSledright notes that “managing the dilemma appears to require grit and endurance” and that learning to interpret the past “involves some peculiarly unnatural acts of thought by both students and their teachers” (p. 1105). These ideas help to reinforce the need to instill in teachers both strategies and skills that will allow them to encourage and guide these ways of thinking for their students.

Despite the focus on critical thinking in the standards and the work by some to integrate more active learning and critical thinking into social studies education, there continues to be a heavy reliance on textbook based education. VanSledright notes in his

conclusion, “I continued to be most haunted by the specter of high-stakes tests that my students were required to take. . . . I continue to worry about this” (p. 1108). He goes on to offer an explanation for the choice made in many classrooms, “I also imagine that many eventually trade in their own convictions for a different definition of necessity – that is, test-result accountability- emanating from outside their classrooms” (p. 1109). Yet we can see through these efforts that social studies disciplines such as history offer not only natural tools and strategies for critical thinking but also rich contextual opportunities for practice.

#### Methodologies used in Critical Thinking Research

As mentioned previously, measurement of critical thinking has been an area of difficulty in education as well as research about critical thinking. While a variety of assessments have been used to explore questions related to critical thinking in education, Tsui (2002) suggests that there is a substantial reliance on quantitative data in this area. For example, Flowers, Pascarella and Pierson (1999) used the critical thinking test from the Collegiate Assessment of Academic Proficiency (CAAP) to measure the “extent to which computer and email use influenced standardized measures of cognitive or intellectual growth during the first year of college” (Flowers, p. 641). Similarly, Clifford, Boufal and Kurtz (2004) relied upon results of the Watson-Glaser Critical Thinking Appraisal (WGCTA) and the Wechsler Adult Intelligence Scale to analyze the relationship between critical thinking skills and personality traits among college students.

Tsui (2002) raises the idea that “valued research knowledge comes largely from the accumulation of contested and confirmed findings culled from skillfully conducted

studies that are diverse in methodology” to advocate the inclusion of more qualitative data in this arena (p 742). Tsui (2002) used a combination of classroom observations, participant interviews, and focus groups to conduct institutional case studies in her investigation into the relationship between pedagogy and critical thinking. While Tsui (2002) involved a wide range of participants in her data collection – students, faculty, and administrators – her focus was on pedagogy as a driving force behind critical thinking education and thus primarily focused on the actions of the faculty and its impact on students.

Halx (2005) followed Tsui’s lead in using a case study to examine faculty perspectives of undergraduate critical thinking. Analyzing the results of semi-structured interviews with faculty, the researchers looked at faculty members’ definitions of critical thinking, their pedagogical choices as a result of the definition, faculty opinions regarding the capacity of students to think critically, and thoughts regarding institutional and faculty ideology on student development of critical thinking. While Halx (2005) explored the concept of student capacity, it was from the perspective of faculty and did not take into account the perceptions of individual students.

Tapper (2004) takes a more student centered approach and provides evidence in support of self-reporting as an acceptable method of investigating academic development including Tsui’s (2002) use of student self-reporting as a variable measuring Institutional Growth in Critical Thinking. Tapper (2004) additionally discusses the use of student self-reporting by Pike (1995) and McMillan (1987). Tapper (2004) employed semi-structured interviews to capture student perceptions regarding critical thinking within a

degree program and compared first year students to students further in their academic career. Tapper's (2004) study is limited to the perceptions of students and as he himself states, does not address "how effective the approach to critical thinking is within the particular degree program, nor on whether the students are 'good' or 'bad' critical thinkers, nor on the conceptions of critical thinking held by the academics involved in teaching these students" (p. 216). Rather he examines the development of student perceptions about critical thinking as they progress through the degree program.

Phillips and Bond (2004) add another element to the examination of student experiences with critical thinking. Using a combination of semi-structured student interviews and completion of a series of problem solving tasks, the researchers examined both the student's understanding of critical thinking and the application of critical thinking skills. The focus of this study is the students' experience with critical thinking, therefore while the researchers had students engage in the application of critical thinking the analysis focuses upon the students' experience rather than their ability to apply critical thinking skills well.

Stupnisky (2008) and colleagues focused more on the tendencies of students to apply critical thinking skills. They were particularly interested in the factors contributing to development of the tendency to think critically and the impact of critical thinking disposition on academic achievement. In this study the research team relied upon students' self-reported survey data to examine the correlations between critical thinking and perceived academic control as well as the impact of each on academic performance. Again, the examination of critical thinking is limited to the students' tendency to apply

critical thinking skills, but does not examine the possession, actual application nor the proficiency of any specific thinking skill(s).

In light of the claim that social studies teachers are expressly well positioned to guide the development of critical thinking skills for K-12 students, there is a gap in the literature as to whether teachers have the capacity to do so. In addition to understanding the tendencies of pre-service teachers to apply and use critical thinking skills themselves, it is important to evaluate the proficiency with which they can guide and encourage their students to develop and employ critical thinking skills. Such findings can help to ensure that teacher education programs are providing the tools and strategies that will support the ability of future social studies teachers to meet the 21<sup>st</sup> century needs of the next generations.

### CHAPTER 3: METHODS AND PROCEDURES

This chapter provides a brief summary of the context, data collection, and analyses for this research study. Research Context describes the research setting focusing on the characteristics of the location and the participant pool. Participants provides detail about the research participants and explains the rationale behind choosing these participants. Additionally, information is provided about the researcher's relationship to the participants and the invitation to participate. Instruments and Procedures for Data Collection focuses on the instruments, tools and methods used to collect the data. An explanation of the instrument development process is included as is the basis for choosing particular methods and/or combinations of data collection methods. Data Preparation outlines the processes used to prepare the data for analysis. It covers the collection, scoring, and process of analysis for the three different types of data collected and emphasizes the connection between the various data points and the research questions addressed.

#### Research Context

This study explores the individual understanding and application of critical thinking by undergraduate students in an elementary social studies methods course, both in their everyday life as well as within their planning and teaching process. The setting for this study is a large 4-year land-grant university located in the northwest Rocky Mountain region. The university is classified as having very high research activity by the Carnegie Foundation for the Advancement of Teaching. This public university located in



a primarily residential setting has a high undergraduate enrollment. Enrollment in the fall of 2014 was 15,421 of which 13,271 were undergraduate students; 85% of undergraduates were enrolled full time. Demographic breakdown of this undergraduate group reveals a population that is 53% male and 47% female. Self-reported ethnic background is predominantly white (83%) with the next largest ethnic group being Hispanic or Latino students and those reporting to be of mixed race (3% each). The average age for undergraduate students is 22 and for graduate students is 32. 65% of undergraduate students enrolled in the fall of 2014 were in state residents. The Non-resident student body represented all 50 US states and 72 foreign countries. Slightly more than half of the student body (52%) received some level of need-based financial aid including scholarships, grants, work-study and student loans. (Office of Planning and Analysis, 2014)

The Department of Education, housed within the College of Education, Health and Human Development offers undergraduate degrees in teacher preparation for both elementary and secondary education. Graduate degrees are offered in educational leadership, adult and higher education and curriculum and instruction. In the fall of 2014, 1,439 undergraduate students were enrolled in the College of Education, Health and Human Development including 171 freshman. (Office of Planning and Analysis, 2014) In 2013 the Department of Education conferred 115 bachelor's degrees, 67 of which were in the area of elementary education and teaching (Office of Planning and Analysis, 2014).

### Participants

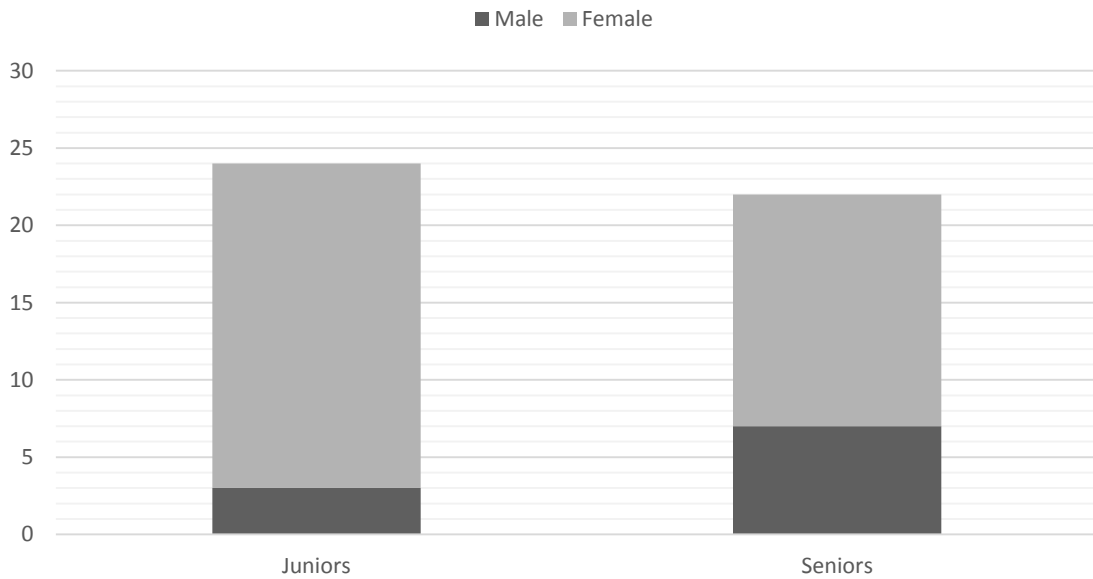
The participants for this study were selected from an elementary social studies methods course in which the researcher was assisting with instruction. The selection of this group is appropriate for a variety of reasons. The class was an atypically large group as two sections were combined with two instructors, thus offering a larger sample from which to draw easily. The outcomes of the course include the introduction and use of active learning strategies to support social studies education across disciplines in elementary education. The key assignment for the course is development of a unit of social studies instruction that promotes a variety of social studies disciplinary and critical thinking skills. In alignment with the purpose of the study to examine the readiness of pre-service teachers to promote the development of critical thinking skills in social studies education, this group of pre-service elementary social studies teachers, in addition to be a sample of convenience, is also a suitable target population for the research questions.

Additionally, the researchers' work as an assistant in the course provided accessibility to participants and to their work product as well as a level of familiarity that helped to create a sense of comfort and trust for participants. Participation was voluntary; there was no expectation that participation would impact positively or negatively the assessment or grading of student work product. In addition, participants were assured of confidentiality. To minimize any risk or perception of grading bias or influence, the selection, analysis and scoring of research materials was conducted after

final grades for the course had been posted. Furthermore, the researcher was not solely responsible for the final grade of any materials examined for purposes of the study.

The social studies methods course is a requirement for those seeking a bachelor’s degree in elementary (K-8) education and included a total of 46 students. The demographic characteristics by gender and class of the sample can be seen in Figure 1. As one can see, the class is balanced between juniors and seniors and is predominantly female. All but two students were of traditional age with one non-traditional female student and one non-traditional male veteran.

Figure 1 Demographic Characteristics by Gender and Class



Members of the class participated in the research study at varying levels. Data collection included a self-reporting survey completed by 40 participants, analysis of 18 lesson plans, and 2 face-to-face interviews. Students participating in the interview process signed a subject consent form and received a \$10 gift card for use in the University book store.

### Instruments and Procedures for Data Collection

This study employed a mixed methodology using three sets of data to examine the characteristics of pre-service teachers and to identify gaps, if any existed, between their self-reported inclination to think critically and their ability to design lessons which promote the development and application of critical thinking skills for their students. The choice of mixed methodology serves to provide support for the findings. Combining the quantitative data from the student survey along with the qualitative evaluation of the lesson plans and the interpretation of the interviews gives diverse measures from which to draw stronger conclusions. Data collection included three elements:

- a student survey of everyday critical thinking activity (Appendix A);
- a document analysis of civics and government lesson plans developed by participants (Rubric in Appendix B);
- follow-up interviews with students who developed the analyzed lesson plans.

The use of the self-reporting survey to answer the first research question regarding the perceptions of the frequency with which the participants use critical thinking skills in everyday life was intentional. Concerns with self-reported answers in research include potential for dishonest answers, lack of introspective ability, and inconsistent interpretation both of the questions and of the scale. All of these issues can result in less valid findings. Because this study intended to evaluate similarities and differences between pre-service teacher's perceptions and demonstrated application of skills, a self-reporting survey is the best choice for understanding the participants'

perceptions about their own critical thinking. The responses to 10 questions were assessed on a Likert scale for which 1 is equal to never (engage in the behavior), 2 is equal to rarely, 3 is equal to sometimes, 4 is equal to often, and 5 is equal to always. Questions 1, 4, 6, and 8, were reverse worded in an attempt to avoid question/response bias in the survey.

A pilot survey was voluntarily and confidentially completed by 89 undergraduate students participating in an Assessment, Curriculum, and Instruction course. The results of the pilot survey (Appendix C) were intended to help validate the results of the smaller sample completed by 40 social studies methods preservice teachers. In each case students were asked at the end of a class period to complete the survey by rating their use of specific critical thinking activities across a range of undertakings including both academic and non-academic activity. The average time taken to complete the survey was approximately 10 minutes.

The purpose of the document analysis was to analyze the level of engagement in critical thinking expected and required by K-8 students participating in the lesson plan activities. This analysis provided data to answer the second and third research questions concerning which of the nine critical thinking skills recommended by the National Council on the Social Studies (NCSS) were most and least frequently used by pre-service elementary teachers in the civics and government lesson plans.

In a document analysis the researcher examines the text of a document to identify specific themes, trends, or to answer particular questions. In this case the purpose was to identify specific references or instructions that would require k-8 students to engage in a

critical thinking process. For purposes of coding the lesson plans a rubric was developed to assess varying levels of critical thinking. The nine detailed critical thinking skills outlined by the NCSS were used to develop the rubric. The details of each skill were translated into criteria that would measure the level of critical thinking required by k-8 students. The rubric was scored on a scale which ranged from 0 (expectations for the skill are not present) to 4 (Distinguished – all defined criteria are included in the lesson plan documentation).

Eighteen individual lesson plans were designed by pre-service teachers for civics and government discipline lessons. The learning outcomes, procedure and assessment for each lesson plan were evaluated for each of the nine NCSS critical thinking skills in accordance with the critical thinking rubric. The researcher was looking for an expectation of critical thinking that was aligned in all three areas of the lesson plan. For example a lesson which asked students to seek information from multiple sources (more than one) would score a 2 or basic competency for the skill of Seek Information, while a lesson that asked students to seek information from 3 or more diverse sources would meet criteria for a score of 4 or distinguished competency for that skill. If this lesson plan has the teacher giving all of the needed information to the students then the score would be 0.

The document analysis focused on the inclusion of critical thinking skill application within the lesson plan rather than the complexity of thinking required; therefore the assessment can be used across grade levels. As an example a second grader is unlikely to be able to evaluate the credibility of a source independently, however, a teacher can provide criteria, a tool, and the specific instructions needed to apply this skill.

Therefore, a second grader may use a teacher provided checklist to assess and document the credibility of a source. This in turn provides both the source evaluation and the supporting evidence and would merit a distinguished score for the skill of evaluate sources.

Finally, two interviews were conducted to uncover additional insight into the thought processes of the teacher candidates during their lesson design activities and to help to answer the “why” part of the second and third research questions. Students volunteered to be interviewed, signed a permission form and arranged to meet for approximately 30 minutes. A copy of the student’s lesson plan was provided to the student and guided the questions which were designed and intended to help the students remember and walk through their design process. Questions were used to capture thoughts and intentions specifically regarding k-8 student critical thinking during the design process as well as motivation for design choices. Participants were ensured confidentiality and offered a book store gift card.

### Data Preparation

This section summarizes the steps taken to prepare the various data points for coding and for analysis. The first set of data came from the results of the student survey of critical thinking administered both to students present in a regularly scheduled meeting of an undergraduate assessment class and to all students present in a regularly scheduled meeting of an elementary social studies methods class. For both the pilot group and the research study group the responses from the student survey of critical thinking were tabulated using the 5 point Likert scale. Responses to questions 1, 4, 6, and 8 were then

assigned reversed scoring (i.e. 5 was changed to 1, 4 was changed to 2, etc.) to accurately reflect the intention of the questions. Total “critical thinking” scores and a mean “critical thinking score was calculated for individual participants and mean scores were also calculated for each question. Finally, for the research study group, the mean was also calculated separately by gender and grade level.

The second set of data came from the analysis of the civics and government lesson plans developed by the research study group. Eighteen civics and government lesson plans were analyzed using the critical thinking rubric described previously and found in Appendix B. The researcher reviewed the learning outcomes, procedures and assessments of each lesson to identify inclusion of critical thinking expectations and alignment between the various sections of the lesson plan. For example, a learning outcome may call for “synthesizing information” while the described procedure asks for a summary, analysis or evaluation of the information. All of the parts of the lesson plan were considered in assigning a score. This process was repeated for each of the nine NCSS critical thinking skillsets for all 18 lesson plans.

Rubric scores were then tabulated for each of the NCSS critical thinking skillsets, along with a total score and mean score per student. Total and mean scores were calculated for the individual skillsets as well.

Finally there is data from two student interviews, EB and PH. Audio tapes of the interviews were transcribed verbatim into a text document along with interview questions. Key words associated with critical thinking, lesson planning, and student teacher motives were identified and highlighted to draw attention to potential themes



from the interview data and to help answer why specific critical thinking skills were incorporated in lesson design and others were not.

Interview responses were read multiple times and notes taken in the margins to capture the main ideas from each interview. There was no one direct answer to the specific research questions, therefore, interpretation was required to make connections between the interview content and the research questions. Common themes surfaced and were designated as specific categories that focused on the teaching and learning goals, strategies for achieving those goals, and the thought processes which explain the planning and design decisions.

Teaching and learning goals included references to the participant's motives, goals for effective teaching, and learning objectives for students. For example EB indicated that she wanted students to "really grasp" an idea and to "really critically think about it and not just think "it's bad". PH stated that he wanted to "incorporate multiple perspectives" and wanted students to "analyze and synthesize" information.

Comments about strategies included all references to the ways in which the lesson would be taught and the ways in which students would interact with the lesson material. Working in groups and conducting research were strategies used by both EB and PH in their lesson plans. Both had several comments regarding the ways in which they would scaffold the activities for their students as well.

Finally, explanations as to why decisions were made or particular strategies chosen fall in the last categorical area. For example, participants included cooperative group work and critical thinking skills as distinct learning objectives to ensure proper

focus on those goals, “If I have something that is an actual objective it is something I am going to look more at, whereas if it wasn’t you (sic) might overlook it when you’re trying to get everything else done.” (EB) Explanations for student engagement include making concepts relevant and developmentally appropriate.

The participants’ complete interview answers fell into multiple categorical areas. Therefore, answers were dissected and divided into separate distinct ideas that aligned with the larger category areas. The criteria for a distinct idea was that it be a complete and solitary idea that could be examined. Student answers were then analyzed to define each categorical area more specifically and to classify the themes in relation to the research questions.

## CHAPTER 4: RESULTS

The purpose of this study is twofold. First the study explores how pre-service elementary teachers personally use critical thinking skills. Second, the study seeks to identify the critical thinking strategies most employed by pre-service elementary teachers in their development of social studies lesson plans and the reasons for their choices. For purposes of this study the measured elements of critical thinking are taken from the list of nine critical thinking skills provided by the NCSS (2010). The NCSS (2010) defines critical thinking skills to be those skills which demonstrate the ability of an individual to “reflect on content in order to form a solid judgment based on both evidence and common sense” (p.164). Thus, critical thinkers acquire knowledge and understanding through a process of gathering, analyzing and evaluation to identify connections to determine the accuracy, validity, relevance and importance of what they have learned through the research process. This list of critical thinking skills is outlined in the rubric in Appendix B (NCSS, 2010, p. 164).

This chapter presents the results of the data collection and analysis outlined in the methodology chapter of this paper and is organized by the data collection instrument to answer the following research questions:

1. What are pre-service elementary teachers’ perceptions of the frequency with which they use critical thinking skills in everyday life?
2. Of the nine critical thinking skills recommended by the National Council on the Social Studies (NCSS), which ones are most frequently used by pre-service elementary teachers in the civics and government lesson plans? Why?

3. Of the nine critical thinking skills recommended by the National Council on the Social Studies (NCSS), which ones are least frequently used by pre-service elementary teachers in the civics and government lesson plans? Why?

Participant Surveys summarizes the results of the survey of self-reported critical thinking, Lesson Plan Document Analysis presents the results of the critical thinking found in the student lesson plans, and Participant Interviews summarizes the input from the two student face-to-face interviews.

### Participant Surveys

The survey of students' critical thinking was designed to answer the first research question regarding pre-service elementary teachers' perceptions of the frequency with which they use critical thinking skills in everyday life. Mean scores along with range and standard deviation by question can be found in Table 2.

Table 2 Self-Reported Critical Thinking Activity

Question	Mean Score	Range	Standard Deviation
1. I focus on one or two main sources of information to make decisions.	2.38	1-4	.70
2. I dig into information to see what lies below the surface content.	3.55	2-5	.78
3. I evaluate the credibility of information by examining both the content and the source.	3.80	2-5	.97
4. I begin with what is commonly known and use additional research to augment understanding.	2.05	1-4	.60

Table 2 Continued

5. I draw conclusions that are supported by factual evidence.	4.10	2-5	.71
6. I rely on my instructors' evaluation of my work to make appropriate adjustments.	2.00	1-5	.91
7. I make connections between new and prior knowledge.	4.43	3-5	.59
8. I have one standard method of inquiry I use in all situations.	3.00	1-4	.64
9. I ask questions that require my peers and me to access higher levels of thinking.	3.85	2-5	.77
10. I seek authentic, real-world connections to better understand content.	4.43	3-5	.64

Note. N= 40. Questions 1, 4, 6, and 8 were reverse scored.

The lowest overall score was found in responses to question # 6 “I rely on my instructors’ evaluation of my work to make appropriate adjustments.” The score for this question is reversed, indicating a strong reliance on instructor feedback involved a lower level of critical thought. The mean score for this item was 2.00. Scores ranged from 1 to 5 with a standard deviation of 0.91. Only one student scored 5 on this question; all other scores were 3 and below. The highest overall score was found in responses to question # 7, “I make connections between new and prior knowledge” and question # 10, “I seek authentic, real-world, connections to better understand content.” The scores for each question ranged from 3 to 5 and the mean score for each was 4.43. The standard deviation for question 7 was 0.59. The standard deviation for question 10 was .64. Question # 5, “I draw conclusions that are supported by factual evidence” also resulted in

a mean score greater than 4, 4.10 and only one student scored the behavior lower than 3. The range for question # 5 was 2 to 3 and the standard deviation was 0.71.

On average, students perceive that they are engaging in critical thinking skills at least some of the time and that they are engaging in critical thinking more often than not. The mean score for each student ranged from 3.1 – 3.8 and the average mean score for the group was 3.37 with a standard deviation of 0.24. There is a slight difference between males and females. Mean scores for female participants ranged from 2.7 to 3.8 with an average mean score of 3.35 and a standard deviation 0.25. Mean scores for male participants ranged from 3.1 to 3.7 with an average mean score of 3.39 and standard deviation of 0.21. There was also a slight difference between seniors and juniors. The mean student score for senior class participants ranged from 2.7 to 3.8 with an average mean of 3.38 and a standard deviation of .29. The mean student score for junior class participants ranged from 3.0 to 3.8 with an average mean score of 3.33 and a standard deviation of 0.22.

#### Lesson Plan Document Analysis

This section presents the results of the assessment of student created lesson plans using a critical thinking rubric developed by the researcher and based up on the NCSS critical thinking skills which can be found in Appendix B. The rubric was designed to answer part one of the second and third research questions concerning which of the nine critical thinking skills recommended by the National Council on the Social Studies (NCSS) are most and least frequently used by pre-service elementary teachers in the civics and government lesson plans.

Lesson plans selected for this analysis were civics and government lesson plans designed by individual students working to prepare a group unit. The grade level of the lesson plans ranged from 2<sup>nd</sup> grade to 8<sup>th</sup> grade. Eighteen students self-selected civics and government disciplines for their lesson plans; these civics and government lesson plans were analyzed for purposes of this study. Lesson plans were developed by 15 female students (6 seniors and 9 juniors) and 3 male students (2 seniors and 1 junior).

Rubric scores for each of the 9 skill sets ranged from 0 meaning application of the skill is not required within the lesson activities to 4 meaning that all aspects of a particular skill set are required within the lesson activities. Mean scores along with range and standard deviation can be found in Table 3.

Table 3 Critical Thinking Skills Required in Civics and Government Lesson Plans

Question	Mean Score	Range	Standard Deviation
<b>Seek Information:</b> students seek information from multiple and diverse sources.	1.17	0-2	0.62
<b>Explore Information:</b> students identify relevant data, interpret meanings, make connections, and identify bias.	1.83	1-3	0.79
<b>Evaluate Sources:</b> students evaluate the credibility of the sources they use and provide evidence to support the source choices they have made.	0.00	0-0	0.00
<b>Interpret and Organize Information:</b> students interpret and organize content for diverse purposes.	1.89	1-4	0.83

Table 3 Continued

<b>Integrate Technology:</b> students integrate technology for various purposes including the collection, organization, analysis, and evaluation of information.	.94	0-3	0.80
<b>Analyze Information:</b> students examine relationships between topics and themes, identify key concepts or meanings, and compare differing ideas.	2.00	0-3	0.77
<b>Synthesize Information:</b> students develop new ideas from existing knowledge, integrate ideas from multiple sources or disciplines to create new understandings and present those ideas in a variety of methods.	1.67	0-3	0.91
<b>Evaluate Information:</b> students evaluate information for validity, adequacy, objectivity, relevance, and diversity of perspective.	0.39	0-1	0.50
<b>Use inquiry and evidence to draw conclusions:</b> students engage in inquiry and gather evidence for the purpose of forming conclusions and provide credible evidence in support of those conclusions.	1.56	0-2	0.62

Note: N=18

The lowest scoring categories were those related to the critical thinking skill of evaluation. The least required critical thinking strategy in these lessons plans was evaluate sources. None of the participant lesson plans required the use of this skill, meaning the requirement to evaluate the source(s) of information was not evident. The second least required critical thinking strategy was evaluate information; the mean score for this skill was 0.39 with a range from 0-1 and the standard deviation was 0.50. The mean score of 0.94 for integrating technology was also less than 1; the score ranged from 0-3 and had a standard deviation of 0.80.



The highest scoring critical thinking skill category was analyze information. The scores for this category ranged from 0-3, the mean score was 2.00 and the standard deviation was 0.77. The next highest mean score was for the category of interpret and organize information. The mean score of 1.89 was lower than analyze information, however, the scores for this category ranged from 1-4. The standard deviation was 0.83. The category of explore information had a mean score of 1.83 and ranged from 1-3 and the standard deviation was 0.79. The critical thinking skill categories of interpret and organize information and explore information were the only two critical thinking skill categories to score at least 1 for each of the 18 lesson plans.

The remaining critical thinking skill categories from lowest mean score to highest mean score were seek information ( $M=1.17$ ,  $SD=0.62$ ), use inquiry and evidence ( $M=1.56$ ,  $SD=0.62$ ), and synthesize information ( $M=1.67$ ,  $SD=0.91$ ).

Mean scores across critical thinking skill categories for individual lesson plans ranged from 0.56 to 2.22, the average mean lesson plan score was 1.22 with a standard deviation of 0.47. Total cumulative scores for each lesson plan ranged from 5 to 20, the mean total score was 11.44 with the standard deviation equal to 4.25. There was a substantial difference between lower and higher critical thinking scores for individual lesson plans.

### Participant Interviews

The examination and analysis of participant interviews was intended to help answer the part of research questions 2 and 3 regarding the reasons pre-service teachers did or did not incorporate particular critical thinking skills in the development of their

lesson plans. Common themes which applied to the research question fell into three categories. The first theme, *Intentional Critical Thinking Goals*, dealt with the participant having an intentional goal that k-8 students gain a deeper understanding of content and concepts through the use of higher level thinking questions, multiple perspectives, and metacognition. The second theme, *Developmental Levels and Needs*, focused on planning for the age related characteristics and needs of students. This focus included attention to both skill development and personal development. The third theme, *Scaffolding*, while overlapping the student centered approach of theme two, included a more specific focus on scaffolding the learning process to support effective learning and project success for the students. Specific answers from the interview along with contextual questions were then aligned within each of these categories to try to answer the research question regarding the reason(s) why preservice elementary teachers use particular critical thinking skills and not others.

The first theme, *Intentional Critical Thinking Goals*, indicated a motivation for and highlighted methods of incorporating critical thinking skills into lesson plans. When asked which goals for students were in the forefront as she developed her lesson objectives, EB several times focused on her desire to have students “really think.” Her first response was that “I wanted students to really grasp not only the difference between production, consumption and distribution, but also how the government actually affects all of those areas through taxation, through regulation, through tariffs.” Throughout the conversation about her lesson she indicated a variety of critical thinking skills that would be needed, she wanted them to “compare and contrast the state, federal, and tribal taxes”

and to “have them think about what that means (starting a pizza business) in a different community, and problem solving and thinking of causes and effects.” She wanted them to specifically think critically about potential misconceptions about the topic of reservations and had some ideas about how to do that, “you can push them to question their own misperceptions without saying ‘no, you’re wrong’ but saying ‘hey, why don’t you look into this and then you’ll know.”

EB also included an objective for collaborative work because she wanted students to “engage, collaborate and build on each other’s ideas.” She wanted them to own the process and the project rather than “just Sam’s going to do this project and we’re all going to sign our names on it.” She made it an objective because she knew that “if I have something that is an actual objective it is something I am going to look more at, whereas if it wasn’t an objective you might overlook it when you are trying to get everything else done.” Using her own critical thought processes, she set herself up for ownership and accountability in teaching this skill.

PH also included development of specific critical thinking skills in his lesson objectives. When asked about his reasoning he answered, “I wanted to align with my standards, but also the idea that you always want to shoot for those higher level Bloom verbs – you know, analyze, synthesize. And everything in the NCSS standard for Time, Continuity, and Change was about understanding these really deep concepts. You can’t just define words to understand concepts – you have to get past that – compare, contrast and more to get concepts.” His primary goal for this lesson was to incorporate multiple perspectives, “the biggest thing I wanted to do, and it stems back to the first NCSS

standard I listed – demonstrate an understanding that different people describe the same event differently.”

The final product for the unit PH helped to develop was a timeline. The instructions and the assessment criteria for the timeline required that students to move beyond adding dates and facts to explaining historical connections and evaluating trends over time. PH highlighted that activity to explain the thought process of his group as a whole, “Our primary focus was that – a timeline obviously will have dates and events, but what makes it really rich, what makes history really rich, are these concepts that tie it all together – and the trends you see happen over time. I see it as a linear dataset that you can use to understand how and why things happen the way that they do.”

Interestingly, when asked how intentional they were about the way in which they designed and included critical thinking in the development of their lesson plans, both students felt that at least some of it just happened. EB said, “Some of it is and some of it isn’t. I intentionally wanted them to work in groups and I wanted them to critically think.” And PH indicated that “it really happened kind of naturally. I think it happens more naturally because social studies is my thing – I know when I was writing unit plans in science I was having to be more on the ball and more intentional.”

The second theme, *Developmental Levels and Needs*, focused on the developmental levels and needs of the student group for whom they were planning. Both EB and PH took a very student centered approach in this area. Both made strategy choices based upon students developmental ages. EB wanted students to work in collaborative groups because “6<sup>th</sup> grade is when kids are starting to just be weird about

themselves and everyone around them.” She also wanted to tap into their desire for more freedom, “I figured a group project with some vague things to research – it seems kind of strange to be so vague, but I wanted the kids to look and then have the freedom once they found something to say, I want to build off of this, this is a good idea.” She also felt that working collaboratively would make the research effort more manageable, “it is hard to research by yourself, especially in the 6<sup>th</sup> grade – you don’t know where to look – and a teacher does not have time to stand over every shoulder and go ‘look here’ or ‘look there. With a group they have the ability to work it out, driven by the information they find. They will learn to work collaboratively because if they don’t work together they won’t be successful.”

PH choose to incorporate multiple perspectives for similar reasons. “I really think it is important in middle school because everyone is trying to battle with identity; everyone’s got a different perspective and the idea is that you want everyone to see those different perspectives. We need to see them all and understand them rather than judge them.” He also used initial research as a way to “give them a bit of information and get them excited without overwhelming them.” His unit team chose the topic of communication technology for these reasons as well. “We would divide the class up and get their take on how they use communication technology – to deal with their own lives and opinions – 8<sup>th</sup> graders just love to tell you what they are interested in. Then we wanted to flip them and say okay, now I want you to answer the same questions about these other designated groups that we are going to give you.”

The third theme, *Scaffolding*, dealt more specifically with the idea of how one might support effective learning. Scaffolding choices certainly relied upon the developmental levels of students, but the focus of these responses was about the framework around the learning activity. Both EB and PH were explicit about the need to scaffold student learning, particularly with regard to research.

EB talks about the necessity to aid students in locating and using appropriate and credible sources. “Since they (6<sup>th</sup> graders) are still really learning how to research, I’d give them a specific list of ‘here are some really good resources for you guys to find this. Because there is a lot of bad information out there and when you’re a 6<sup>th</sup> grader you are not necessarily going to recognize that it is ludicrous.” She also indicated that she’d check in with them daily, asking things like, “how is this fitting into this? Because they are 6<sup>th</sup> graders. If this was a senior in high school project you’d be a lot more hands off.” EB also built in ownership of the outcome for students to help develop their problem solving skills. Rather than defining a standard exercise and outcome, she allowed students to decide “how will we fit pizza into this? Critically think about how can we tie these two things together?” Her intent was to create ownership of the outcome and to require collaborative problem solving skills to get there.

PH similarly felt that a substantial amount of support might be needed for 8<sup>th</sup> graders in the area of research. “Obviously you really need to scaffold for that – research skills at the 8<sup>th</sup> grade level. You never know – you are going to have to develop that with support.” He indicated he would provide support in a variety of ways, “give them (students) graphic organizers, get the info down, then outline – help them manage their

thoughts and ideas.” PH referred specifically to this idea of scaffolding in his lesson plan as well, “students will develop a research and presentation plan for their topic.” PH explained, “Research for 8<sup>th</sup> graders and even for college students does not naturally come easy. Everyone just goes to Google and starts searching, but maybe, fundamentally you can come up with a plan that has an outline of the things you are going to look for, the questions you want to answer so that you know what to look for and where to put it.”

While he asked students to find their own sources of information, PH also intended scaffolding here, “One of the things that happens with our technology now is that there is a boatload of information and how do you syphon through it? So that is part of that scaffolding.”

As the interview data is limited to two individuals, there is not sufficient evidence to offer a broad-based or general answer to the reasons that pre-service elementary students use or do not use critical thinking strategies in developing lesson plans. Rather the answers from these two participants provide insight into their personal thought processes. Each offered a glimpse into the process they personally used to design individual lesson plans and construct a cohesive group unit plan. Additionally, it should be noted that these two participants scored the highest on the lesson plan critical thinking rubric and therefore do not necessarily shed additional light on reasons behind the choices of those participants that used fewer critical thinking strategies.

While these responses mostly provide insight regarding the motivations and intentions of two individuals, they do add to the knowledge about the ways in which pre-service elementary teachers promote critical thinking in K-8 classrooms. They may also

offer some strategies for pre-service elementary teachers to use in promoting the development of critical thinking skills in a social studies context.

It is interesting that both EB and PH discussed the importance of credible sources in the interview. While it is clearly consideration in their lesson planning process, student use of that particular skill was not explicitly apparent in the developed lesson plans.



## CHAPTER 5: DISCUSSION

The purpose of this study was to examine the ways in which elementary preservice teachers engage in critical thinking activity and the ways in which they transfer critical thinking skills to their students. The study was guided by three research questions: what is the frequency with which elementary pre-service teachers engage in critical thinking in their day to day lives; which of the nine critical thinking skills outlined by the NCSS are used in lesson plans most frequently and why; and which of the nine critical thinking skills are used least frequently and why. The results of the research offer some insight into these questions and suggest areas for additional investigation. This discussion is organized by Research Question: first Frequency of Critical Thinking Activity by Pre-Service Elementary Teachers, followed by Frequency of Critical Thinking Skills Required in Lesson Plans, and Reasons for Including Particular Thinking Skills in Lesson Plans. Two additional sections, Limitations and Conclusions, round out the Discussion.

Frequency of Critical Thinking  
Activity by Pre-Service Elementary Teachers

To answer the first research question, the researcher examined pre-service elementary teachers' perceptions of the frequency with which they engaged in critical thinking activities on a daily basis. On average, the participants who completed the critical thinking survey reported that they engage in critical thinking activity at least some of the time and that they engage in critical thinking activities more often than not.

The most frequently used critical thinking activities reported by participants fall in the area of evaluating and using information to support claims and make decisions. These specific activities include evaluating the credibility of information and sources, using factual evidence to draw conclusions, drawing connections between new and prior knowledge, as well as identifying connections between content and real world situations. These particular skills are closely associated with academic writing in higher education. Therefore, this makes sense and aligns with Tapper's (2004) finding that students associate critical thinking skills with written assignments.

The least frequently used critical thinking skills are associated with gathering information and evaluating one's own work. These activities include the tendency to begin with what is commonly known, use of one or two primary sources of information to make decisions and to rely upon instructor feedback to make adjustments. The Delphi group convened by Facione (1987) concluded that an important element of critical thinking was the willingness to reconsider what is commonly known or accepted. The ability to do so often requires digging beyond one or two sources and seeking out diverse perspectives. Additionally, a crucial characteristic of critical thinking is self-regulatory evaluation of oneself. This apparent lack of critical thinking in these areas aligns with research that suggests students entering the workforce or college have not adequately developed the skills needed to think critically (ACICS, 2008; Bieda, 2011). According to Paul and Elder (2013) "students live in a world of thoughts. They accept some thoughts as true. They reject others as false. But the thoughts they perceive as true are sometimes

false, unsound, or misleading” (p.34). The goal of critical thinking is to circumvent “bad thinking.”

The implication for teacher educators is the need to be aware of students’ engagement in critical thinking activity within the academic environment. If teacher educators are aware of the ways in which their students perceive critical thinking and of the ways in which they engage in critical thinking, teacher educators can encourage students to examine sources more broadly and to ask questions about the things “they know.”

Future research would do well to examine student perceptions more closely and in a well-defined manner. In this case the results of the pilot survey completed by students in the assessment class and the survey completed by the pre-service elementary teachers were similar. This would suggest a common interpretation of the questions. However, it is possible that the interpretation made by the participants was different from that intended by the researcher. For instance, with regard to question 6 (I rely on my instructors’ evaluation of my work to make appropriate adjustments), an expectation exists in academia that students will rely on instructor feedback to improve work product. Rewording this question to say “I rely solely on my instructor’s evaluation of my work to make appropriate adjustments” may have garnered a more applicable outcome. Without clearly worded and commonly understood definitions, the questions are left open to interpretation and thus responses are open to misinterpretation.

Frequency of Critical Thinking  
Skills Required in Lesson Plans

The answer to the second and third research questions relied upon a document analysis to highlight which critical thinking skills were most and least frequently employed within civics and government lesson plans developed by pre-service elementary teachers. Critical thinking was operationalized using a set of nine critical thinking skills identified by the NCSS. A rubric was created to assess the degree to which each of these nine skills was required by students participating in the lesson.

The critical thinking skill most commonly utilized within lesson plans was analyzing information. Within this group of lesson plans, pre-service elementary teachers regularly asked students to analyze information for the purpose of examining relationships between topics, identifying key concepts, or comparing differing ideas. The critical thinking skill used next most often was that of interpreting and organizing information. This means that these pre-service elementary teachers asked students to interpret and organize content for a single purpose or for similar purposes.

As noted, critical thinking skills are challenging to define and measure. Interpretation, organization and the type of analysis used most frequently by pre-service elementary teachers in the development of their lesson plans are fairly easy to assess. For example, one can create a Venn diagram to compare differing ideas or a devise a web graphic to demonstrate connections between various topics. These strategies and product outcomes hold a great degree of familiarity among education and social studies students. It may be as Bissell and Lemon (2006) point out that it is much easier to measure content knowledge. Certainly at the college level, Halx (2005) found that individual instructors

based their pedagogy upon their own interpretation of critical thinking. It is highly likely that pre-service elementary teachers incorporate thinking strategies based upon their own understanding and level of comfort.

The least commonly employed critical thinking skills fell into the category of evaluation. The least utilized skill was evaluation of sources. Not one of the analyzed lesson plans included an expectation that source material would be evaluated. This is particularly interesting in light of the fact that evaluating the credibility of sources was a skill that most survey participants perceived themselves as doing often. Reducing the survey analysis to the smaller participant group for whom lesson plans were aligned closely with the larger group ( $M=3.86$ ,  $SD=1.10$ ).

The skill that used second least was evaluate information. Eleven of the eighteen lesson plans assessed did not ask students to evaluate information. The seven that did require evaluation simply asked students to evaluate only one aspect of the information – validity, adequacy, objectivity, relevance or diversity of perspective. The most common type of evaluation used was in determining whether students had gathered adequate information, measured by number of sources. This result is less surprising when one considers the critical thinking survey responses regarding information acquisition. The first, “I focus on one or two sources of information to make decisions,” suggests that a small number of resources may be considered adequate. The second, “I begin with what is commonly known and use additional research to augment understanding” might suggest a tendency to believe what is commonly known and a tendency to pass that inclination on to students.

If in fact, comfort and familiarity play a role in the choices made by pre-service elementary teachers, teacher educators can reinforce the use of familiar strategies to engage students in interpretation, organization and analysis of information. Then, a greater focus can be placed on instruction that offers tools and strategies for teaching less familiar and less comfortable critical thinking skills such as seeking diverse sources, synthesizing information and evaluating both sources and information.

Teacher educators may want to focus more attention on the sources from which pre-service elementary teachers acquire information. Teacher educators could encourage their students to seek out diverse sources in research and lesson planning and to explain why the sources they used are credible. Pre-service teachers could be asked to evaluate commonly known information from an alternative perspective. Practicing these skills will help pre-service elementary teachers not only develop their own critical thinking skills, but also provide strategies for teaching critical thinking skills to their future students.

Future research would be well served to evaluate the expectations for critical thinking in K-8 education, both from a developmental perspective and from an assessment perspective. One possible explanation for the lack of critical thinking expectations in these lesson plans may be the developmental level of the students for whom the lesson plans were prepared. The lesson plans were developed for a range of grade levels from 2<sup>nd</sup> grade (1 lesson plan) to 8<sup>th</sup> grade (2 lesson plans) with the majority developed for 4<sup>th</sup> grade (9) and 5<sup>th</sup> grade (5). A question to investigate is whether pre-

service teachers consider elementary school too early to ask students to become critical thinkers.

The NCSS (1988) provides a summary of developmental characteristics of children compiled by the National Association for the Education of Young Children (NAEYC). According to the literature, five-year-olds can begin to combine ideas into more complex relationships, six-year-olds are active learners who are developing problem solving skills, seven-year-olds are increasingly able to reason, listen to others, and participate in social give and take. The research also suggests that by age nine or ten children have well established prejudices that are highly resistant to change (NCSS, 1988). This suggest that we not only can, but also should, begin teaching thinking and reasoning skills in early elementary education. Further research in this area may be beneficial to overall teacher education.

A second area for further investigation with regard to the evaluation of lesson plans is a question related to grade appropriate expectations for critical thinking. While the rubric used for this study measures the level of critical thinking skills included within a lesson plan, it does not account for the instructional level of the lesson plan. In other words, which critical thinking skills should one expect to encounter in a kindergarten lesson plan and at what level of proficiency? If kindergarten students were asked to decide if they should believe a story based up on the source and explain why or why not, those students would be developing important critical thinking skills, yet the lesson plan may score less than proficient on the overall rubric. A broader window of analysis might provide greater clarity.

Reasons for Including Particular  
Critical Thinking Skills in Lesson Plans

Two interviews help to shed some light on the reasons for the use of particular critical thinking strategies. The primary themes that arose from the two pre-service elementary teacher interviews were *Intentional Critical Thinking Goals*, *Developmental Levels and Needs*, and *Scaffolding*. Both EB and PH wanted students think deeply about a topic, to seek alternative perspectives that were different from the commonly known information, and to be strategic in their research and presentation. Each had high expectations that students would engage in inquiry to seek and explore information, interpret and organize the information for specific purposes, and analyze and synthesize the findings which would be presented with corroborating evidence. It is not surprising, given their attention to these goals, that these two participants received the two highest scores on the lesson plan rubric.

The idea of intentionality in particular aligns with much of the research regarding critical thinking. McKim (2007) and Roedel (2011) both suggest that a lack of intention with regard to critical thinking processes produces a gap in those skills for high school graduates. This is supported by the National Center on Education Statistics (2008) which found that 39% of first year undergraduate students enrolled in at least one remedial education course. While a lack of skill in English or math is not specifically equated with critical thinking, well-developed critical thinking skills cannot happen without well-developed literacy and math skills. Additionally, the Hart study conducted for the Association of American Colleges and Universities (2008) employers indicated that newly graduated entrants to the workforce were lacking in critical thinking skills.



In regard to the teaching of critical thinking skills, Pithers (2004), Cherubini (2009), and Tapper (2004) found that while undergraduate students did associate critical thinking with academic writing, they did not make a connection between critical thinking and specific classroom instruction. Many assume that young adults know how to think critically, but if they have not been taught how to think critically, it is a flawed assumption to make.

Because critical thinking is a complex skill set with a diverse array of definitions and expectations, it is important that teacher educators are able to operationalize critical thinking for pre-service elementary teachers and provide strategies for teaching critical thinking skills. Modeling this behavior scaffolds effective learning and increases both familiarity and comfort with these challenging concepts.

One area of potential focus for future research may be in the area of the variance between what pre-service elementary teachers intend and what is included within a lesson plan. While they did not require that students evaluate sources and information in their written lesson plans, both EB and PH strongly identified the need to do so during the interview. EB pointed out the need to help students identify sources “because there is a lot of bad information out there and when you’re a 6<sup>th</sup> grader you are not necessarily going to recognize that it is ludicrous.” PH noted that his students would need support in the identification of reliable, credible sources, and strategies for evaluating those sources, “One of the things that happens with our technology now is that there is a boatload of information and how do you syphon through it? So that is part of that scaffolding.”

Clearly this is part of the lesson even though it is not expressly included within the lesson plan document.

Improvements to the critical thinking survey would likely enhance the understanding of the participants' application of critical thinking skills in various aspects of their own life. Another direction for analysis may be how pre-service elementary teacher apply critical thinking skills through the lesson planning process. Both EB and PH engaged in a critical thinking process as they developed their lesson plans. This process included an intentional focus on student critical thinking skills. In light of this, one possible area of future investigation might be the impact of requiring a lesson plan and/or unit learning outcome related to the development of students' critical thinking skills.

### Limitations

There are several limitations which preclude a broad generalization of the findings from this study. The sample population was taken from only one class of pre-service teachers at one university and participation was entirely voluntary. While offering some insight in to the thoughts and actions of this group of pre-service elementary teachers, the scope of information gathered is limited as regards pre-service teachers in general. The size of the sample limits all three legs of the research. The number of participants responding to the survey is too small to offer a high degree statistical reliability. Lesson plans were limited to civics and government disciplines which further narrows the scope of analysis within the field of social studies. And, information from two interview participants is challenging to infer broad understanding,

particularly in this case when the two interview subjects were also the two individuals whose lesson plans included the greatest amount of critical thinking. There is no light shed on the reasons for those who included less explicit instruction regarding critical thinking skills.

In the future analyzing a greater number of lesson plans and conducting additional face-to-face interviews might improve the reliability and consequence of the research. Moreover, adding another step and following the participants into the field to analyze teaching in action might serve to further improve the understanding of the process by which critical thinking skills are taught in a k-8 classroom and the capacity of newly trained teachers to do so.

In addition, there were potentially issues with participants' interpretation of the critical thinking survey questions. Examining the survey questions through a focus group is one way to help to ensure clarity of questions and therefore improve validity of the answers and reliability of the researcher's interpretation of results. A larger sample may also generate results more generalizable to a larger population.

Finally, there are improvements that might be made to the critical thinking rubric and the lesson plan analysis. Future considerations might include alignment with grade level standards or with the C3 framework overlapping the operational definitions taken from the NCSS standards. It would be worthwhile to consider differentiation appropriate to developmental levels of elementary age children. Furthermore, having an external reviewer analyze the lesson plans using the critical thinking rubric would help to validate the results and add reliability to the findings. While this pilot study adds to the literature

surrounding critical thinking skills and pre-service elementary teachers, the impact becomes more helpful if some of the limitations were to be addressed.

### Conclusions

In general, findings from this study suggest that while these participants perceive themselves to be critical thinkers at least some of the time, this does not mean that they regularly and intentionally incorporate critical thinking skills into their lesson plans. It is difficult to draw conclusions as to the reasons without further investigation.

Analysis of the data in this study reinforces the idea that critical thinking is a complex and abstract idea - difficult to define, measure, or teach at any age level. The study offers some interesting things to think about and presents a variety of questions left unanswered. Critical thinking in education is highly complex and challenging to understand. At the same time, it is a key skill for successful integration into a rapidly growing and shrinking world. It is more important than ever that elementary students begin to develop critical thinking skills early in their education. It is therefore more important than ever that pre-service elementary teachers are given the knowledge, tools and strategies to guide that development. A key to that success lies in the methods and strategies that are and will be used to guide teaching and learning for pre-service elementary teachers.

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APPENDICES

APPENDIX A

STUDENT SURVEY OF EVERYDAY THOUGHT PROCESSES

## STUDENT SURVEY OF EVERYDAY THOUGHT PROCESSES

Please answer the questions using the following scale:

1 Never      2 Rarely      3 Sometimes      4 Often      5 Always

In my everyday life . . .

1. I focus on one or two main sources of information to make decisions  

1	2	3	4	5
---	---	---	---	---
2. I dig into information to see what lies beneath the surface content  

1	2	3	4	5
---	---	---	---	---
3. I evaluate the credibility of information by examining both the content and the source  

1	2	3	4	5
---	---	---	---	---
4. I begin with what is commonly known and use additional research to augment understanding.  

1	2	3	4	5
---	---	---	---	---
5. I draw conclusions that are supported by factual evidence  

1	2	3	4	5
---	---	---	---	---
6. I rely on my instructor's evaluation of my work to make appropriate adjustments  

1	2	3	4	5
---	---	---	---	---
7. I make connections between new and prior knowledge  

1	2	3	4	5
---	---	---	---	---
8. I have a one standard method of inquiry which I use in all situations.  

1	2	3	4	5
---	---	---	---	---
9. I ask questions that require my peers and I to access higher levels of thinking  

1	2	3	4	5
---	---	---	---	---
10. I seek authentic, real-world connections to better understand content  

1	2	3	4	5
---	---	---	---	---

APPENDIX B

RUBRIC FOR LESSON PLAN ANALYSIS

## RUBRIC FOR LESSON PLAN ANALYSIS

<b>SS CT Skills</b>	<b>Not Present – 0</b>	<b>Unsatisfactory – 1</b>	<b>Basic – 2</b>	<b>Proficient – 3</b>	<b>Distinguished – 4</b>
Seek Information	Lesson plan teaching strategies does not ask students to seek information.	Lesson plan teaching strategies ask students to seek information from an external source	Lesson plan teaching strategies ask students to seek information from multiple sources	Lesson plan teaching strategies ask students to seek information from multiple and diverse sources	Lesson plan teaching strategies ask students to seek information from multiple and diverse sources – recommends 3 or more different perspectives
Explore Information	Lesson plan teaching strategies do not ask student to explore information for relevancy, meaning, connections, or bias.	Lesson Plan teaching strategies ask students to identify relevant data or to interpret meanings, or to make connections.	Lesson Plan teaching strategies ask students to do at least two of the following: identify relevant data, interpret meanings, make connections, or identify bias.	Lesson Plan teaching strategies ask students to do at least 3 of the following: identify relevant data, interpret meanings, make connections and identify bias.	Lesson Plan teaching strategies ask student to identify relevant data, interpret meanings, make connections, and identify bias.
Evaluate Sources	Lesson plan teaching strategies do not address the credibility of source materials that they use.	Lesson plan teaching strategies mention the credibility of sources, but do not ask students to evaluate the credibility of the sources they use.	Lesson plan teaching strategies ask students to evaluate the credibility of the sources they use.	Lesson plan teaching strategies ask students to evaluate the credibility of the sources they use and explain why they have made source choices.	Lesson plan teaching strategies ask students to evaluate the credibility of the sources they use and provide evidence to support the source choices they have made.
Interpret and Organize Information	Lesson plan teaching strategies do not ask students to interpret or to organize content.	Lesson plan teaching strategies ask students to interpret or organize content for a single purpose or similar purposes.	Lesson plan teaching strategies ask students to interpret and organize content for a single purpose or similar purposes.	Lesson plan teaching strategies ask students to interpret or organize content for multiple and diverse purposes.	Lesson plan teaching strategies ask students to interpret and organize content for diverse purposes.

Integrate Technology	Lesson plan teaching strategies do not ask students to integrate the use of technology.	Lesson plan teaching strategies ask students to integrate technology for the collection or organization of information.	Lesson plan teaching strategies ask students to integrate technology for various purposes including at least 2 of the following: collection, organization, analysis, and evaluation of information.	Lesson plan teaching strategies ask students to integrate technology for various purposes including at least 3 of the following: collection, organization, analysis, and evaluation of information.	Lesson plan teaching strategies ask students to integrate technology for various purposes including the following: collection, organization, analysis, and evaluation of information.
<b>SS CT Skills</b>	<b>Not Present – 0</b>	<b>Unsatisfactory – 1</b>	<b>Basic – 2</b>	<b>Proficient – 3</b>	<b>Distinguished – 4</b>
Analyze Information	Lesson plan teaching strategies do not ask students to analyze information.	Lesson plan teaching strategies ask students to analyze information without a specified purpose.	Lesson plan teaching strategies ask students to analyze information examining relationships between topics and themes, or identifying key concepts or meanings, or comparing differing ideas.	Lesson plan teaching strategies ask students to analyze information in multiple ways by doing two of the following: examining relationships between topics and themes, or identifying key concepts or meanings, or comparing differing ideas.	Lesson plan teaching strategies ask students to analyze information in multiple ways including examining relationships between topics and themes, identifying key concepts or meanings, and comparing differing ideas.
Synthesize Information	Lesson plan teaching strategies do not ask students to synthesize information.	Lesson plan teaching strategies ask students to synthesize information by presenting information in a non-traditional method.	Lesson plan teaching strategies ask students to synthesize information by doing at least one of the following: developing new ideas from existing knowledge, integrating	Lesson plan teaching strategies ask students to synthesize information by doing at least two of the following: developing new ideas from existing knowledge, integrating	Lesson plan teaching strategies ask students to synthesize information by developing new ideas from existing knowledge, integrating ideas from multiple sources or

			ideas from multiple sources or disciplines to create new understandings or presenting those ideas in a variety of (two or more different) methods.	ideas from multiple sources or disciplines to create new understandings or presenting those ideas in a unique method.	disciplines to create new understandings and presenting those ideas in a variety of (two or more different) methods.
Evaluate Information	Lesson plan teaching strategies do not ask students to evaluate information.	Lesson plan teaching strategies ask students to evaluate information for at least 1 of the following validity, adequacy, objectivity, relevance, and diversity of perspective.	Lesson plan teaching strategies ask students to evaluate information for at least 2 of the following validity, adequacy, objectivity, relevance, and diversity of perspective.	Lesson plan teaching strategies ask students to evaluate information for at least 3 of the following validity, adequacy, objectivity, relevance, and diversity of perspective.	Lesson plan teaching strategies ask students to evaluate information for validity, adequacy, objectivity, relevance, and diversity of perspective.
Use Evidence and Inquiry to Draw Conclusions	Lesson plan teaching strategies do not ask students to form conclusions from inquiry or from evidence.	Lesson plan teaching strategies ask students to engage in inquiry or to gather evidence for the purpose of forming conclusions.	Lesson plan teaching strategies ask students to engage in inquiry and gather evidence for the purpose of forming conclusions.	Lesson plan teaching strategies ask students to engage in inquiry and gather evidence for the purpose of forming conclusions; strategies require students to provide evidence in support of those conclusions.	Lesson plan teaching strategies ask students to engage in inquiry and gather evidence for the purpose of forming conclusions; strategies require students to provide credible evidence in support of those conclusions.



APPENDIX C

SURVEY RESULTS

## Pilot Survey of Self-Reported Critical Thinking Activity Results

Question	Mean Score	Range	Standard Deviation
1. I focus on one or two main sources of information to make decisions.	2.50	1-5	.90
2. I dig into information to see what lies below the surface content.	3.43	1-5	.86
3. I evaluate the credibility of information by examining both the content and the source.	3.41	1-5	.94
4. I begin with what is commonly known and use additional research to augment understanding.	2.21	1-4	.76
5. I draw conclusions that are supported by factual evidence.	3.91	2-5	.70
6. I rely on my instructors' evaluation of my work to make appropriate adjustments.	1.95	1-5	.83
7. I make connections between new and prior knowledge.	4.24	3-5	.66
8. I have one standard method of inquiry I use in all situations.	3.26	1-5	.82
9. I ask questions that require my peers and me to access higher levels of thinking.	3.34	1-5	.84
10. I seek authentic, real-world connections to better understand content.	4.06	1-5	.89