Exploratory study of graduate-level instructor's perception of teaching critical thinking

by

Jay A. Van Der Werff

B.A., University of Nebraska at Lincoln, 1989
M.S., Liberty University, 2009

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Educational Leadership
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2016

Abstract

Higher learning institutions identify the teaching of critical thinking skills to students as a goal of the academic programs offered. This study examined faculty perceptions for teaching critical thinking skills at the U.S. Army's Command and General Staff College (CGSC). CGSC is charged with educating the nation's mid-career military officers for the world's complexities that will challenge them during the next 5 to 10 years of their career. To accomplish this task, CGSC has a dedicated faculty development program to expose new faculty to critical thinking concepts and principles, and a curriculum that integrates critical thinking throughout the lesson plans designed to improve the students' critical thinking skills during the course of the academic year.

An exploratory mixed methods approach was used to examine the research questions. Faculty participated in a survey providing quantitative results ($n = 83$), and eight volunteers were interviewed expanding upon the quantitative results. Analysis of the quantitative results showed that instructors believe the most effective teaching techniques for fostering critical thinking skills are small group facilitated discussion, role play/simulation – which is manifested in planning exercises – and the use of case studies. Instructors identified monitoring classroom discussions and providing feedback on argumentative essays as the most effective techniques for assessing critical thinking.

Analysis of the qualitative results uncovered three themes for effective teaching of critical thinking skills–use of instructional strategies, effectiveness in teaching, and faculty development–and four areas viewed as inhibitors to fostering critical thinking skills among students–faculty development, doctrine as a constraint, student experience, and time restraints in the curriculum. Those interviewed believed the institution has an effective

program for fostering critical thinking skills among students, but identified areas for improvement in the faculty development program and the curriculum.

Instructors considered the faculty development program at CGSC an effective program that provides a foundation for teaching critical thinking skills, and offered recommendations to improve the existing program. The study showed that faculty perceptions for fostering critical thinking skills among students are positive, with a belief that critical thinking skills may be taught at the graduate level.

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Major Professor
Dr. Royce Ann Collins

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"Get wisdom – how much better it is than gold! And get understanding – it is preferable to silver." Proverbs 16:16

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Chapter 1 - Introduction

"*…all human action, including thinking as an important part of action, has consequences; and the vital difference which men in general and philosophers especially are concerned about is whether responsibility for those consequences is accepted or not* [italics in original]" (Black, Lottich, & Seckinger, 1972, p. 617). A study conducted by the Society for Human Resource Management (2008) noted "employers placed the greatest weight on employee adaptability and critical thinking skills" (p. 6). The question is whether or not undergraduate and graduate programs are meeting the need in delivering graduates with critical thinking skills. Recently, the Wall Street Journal (Belkin, Jan 2015) reported on a study conducted by the Council for Aid to Education that found "four out of 10 U.S. college students graduate without the complex reasoning skills" (p. A.5).

The goal of improving decision-making is not new, and may be traced back to Plato's time as a student of Socrates for the purpose of creating a better society in Ancient Greece (Gutek, 2001). Early in the 20th century, Dewey (1916) refreshes the movement which continues to today. More recent history focuses on the increasingly complex world, and in order to discern the myriad claims for better health, improving wealth, or for whom to vote; critical thinking is necessary to meet social, economic, and political challenges (Browne & Keeley, 2010; Myers, 1986; Paul, 1993; Tsui, 2002). Within the discipline of education the task falls to educators, who recognize the teaching of critical thinking skills is "invaluable to students' futures" (Tsui, 2002, p. 740), yet a goal often not met in our institutions (Willingham, 2007).

This chapter outlines the research that examined the faculty's perception of how well he or she teaches the critical thinking curriculum by exploring the U.S. Army's Command

and General Staff College (CGSC). Within the chapter, the researcher points to CGSC's

focused curriculum and faculty development program charged with growing the thinking

skills necessary for a military officer to critically analyze complex issues in an uncertain

environment (Gerges, 2014). Concluding, the chapter will review the problem, the purpose

of the study, definitions used throughout the work, and limitations of the study. To begin, an

exploration into the reason the military requires critical thinkers.

Background

"The military profession is a thinking profession. Every Marine is expected to be a
student of the art and science of war. Officers especially are expected to have a solid
foundation in military theory and knowledge of military history and the timeless lessons to be
gained from it.
Leaders must have a strong sense of the great responsibility of their office; the
resources they will expend in war are human lives."
– Marine Corps Doctrinal Publication 1, *Warfighting*

The necessity for critical thinking among military officers is clear (Dana, 1999; Fink,

1993; Hendrickson, 2002; Stephensen, 2011; United States Army (USA), Aug 2012; USA,

Sep 2012). In 1989 the original work of *Warfighting* (USMC, 1997) was published, bringing

professional military education and a requirement for Marine officers to be students of

military theory and history to the forefront of discussion. This was not the first attempt to

focus audiences on a need to improve the Marines' educational system for developing the

thinking habits of its leaders. Donnelly (1965) echoes early leaders with a call to foster

thinking abilities among military professionals. The question is what has transpired over the

last 50 years to develop the thinking skills of military leaders?

Reviewing the archives of the *Marine Corps Gazette* revealed a cyclical pattern of

addressing professional military education in the journal. From 1965-2007 no less than 42

articles were written calling for reform of the military educational system. Donnelly (1965),

Etter (1988) and Wyly (1990) addressed military education as consistently behind civilian institutions focusing on the traditions of military education–tactics, planning, and leadership– and antiquated "pedagogical methodology [holding] us back…since World War II" (Wyly, 1990, p. 90). Included in the articles were discussions to institute faculty development programs, with an aim toward improving instructional techniques (Anderson, 1999; McNamara, 1994; Reynolds & Sorensen, 1974; Snow III, 1999). More recently (Benes & Ferguson, 2004; Lukas, Pankhurst, & Hogg, 2007; Middleton, 2009; Munson, 2007), there has been a rekindling of the educational debate within the *Gazette*, with the argument on a five to seven year cycle. This is not to say the desire to encourage critical thinking is declining, nor is it a discussion solely within the U.S. Marine Corps.

Senior leaders within the U.S. Army outlined a strategy to meet the demands of educating leaders to operate in ambiguity, noted those characteristics desirable in a future leader, and described a means to accomplish this task along a learning continuum (U.S. Army Center for Army Leadership (CAL), 2009). General Raymond Odierno (*Hearing to consider*, 2011) emphasized the importance of developing mental agility and adaptability among young leaders to respond to an ever changing operational environment. Critical thinking is an attribute foundational to this effort and faculty members at CGSC strive to instill the trait in field grade officers attending the Army's intermediate level education within the service's officer professional military education (PME) system (Chairman of the Joint Chiefs of Staff (CJCS), 2009).

View a television news program, open a news program web site, or listen to talk radio and within a few stories the topic of the military and politics will feasibly surface. Commentary among pundits oftentimes characterizes the challenges facing the nation's

military as complex and filled with uncertainty. A valid question exists, "How is the military equipping service members to make decisions in this complex environment?" The response is found in the U.S. Army's doctrine requiring the teaching of critical thinking skills to its leaders (U.S. Army Training and Doctrine Command (TRADOC), 2011a, 2011b, 2014). This document sets the course for Army leaders to train and educate soldiers for the ambiguities of the future.

As noted earlier, critical thinking is also needed in the workforce (Braun, 2004; Maneval et al., 2012; Zimmerman, Lester Short, Hendrix, & Timson, 2011). A *Chronicle of Higher Education* (2012) survey of executives, managers, and employees found that "job candidates are lacking most in written and oral communications skills, adaptability and managing multiple priorities, and making decisions and problem solving" (p. 12). Two key items stand out—adaptability and making decisions—that may be directly associated with the skills necessary for critical thinking addressed in the review of literature. Employers also believed equipping graduates with these skills is the responsibility of colleges, as the "college degree…teaches you how to think" (Chronicle of Higher Education, 2012, p. 40). However, Brill, Gilfoil, and Doll (2014) noted while "soft skills (specifically, leadership teamwork, critical and holistic thinking, logical reasoning, and communication skills)" (p. 175) are traits sought by employers; they claimed educators may be falling short in providing graduates with the skills, largely due to the inability to assess the learning outcomes for soft skills. With the exception of nursing programs (Seldomridge & Walsh, 2006), there is little research exploring the assessment and teaching of critical thinking skills in graduate-level education.

Cognitive Levels as an Indicator of Critical Thinking

Dewey (1910/1991) described the elements of thought, provided an approach to develop better thinking skills, and instructed educators how best to teach better thinking. Upon reading this work it becomes apparent that critical thinking is a learned skill, which one does not come by naturally. Dewey (1910/1991) focused on the mental discipline of an individual to refine these skills referring to the process as a "Training of [the] Mind" (p. 28). A component of the training Dewey explained is learning to analyze facts revealing the truths behind any uncertainties. As one explores a piece of information, reliance upon knowledge gathered from known *facts*, or more accurately something one believes to be true based upon past incidents, will help to determine the significance of this detail. He emphasized an individual's reliance upon knowledge to help make meaning out of ambiguous situations, or better stated one attempts to make familiar the unfamiliar. This occurs by building upon one's experiences (Dewey, 1910/1991, 1997).

Resnick's (1987) work provided several characteristics of "higher order thinking" (p. 3) echoing Dewey's (1910/1991, 1997) observations and complimenting Perry's (1981, 1999) cognitive developmental schema reinforcing the premise that critical thinking is not a casual pastime. Perry's seminal research at Harvard in the 1950s and 1960s provided a context for understanding the cognitive development of individuals allowing one to infer that a person demonstrating higher cognitive levels is likely to exhibit those characteristics Resnick (1987) describes.

Perry's (1981, 1999) work described the developmental process among college students. His research provided the cornerstone for many (Kegan, 1994; King & Kitchener, 1994; Moore, 1989). The premise behind Perry's (1981, 1999) developmental scheme is the

evidence of scaffolding among learners and that the learner progresses through cognitive phases. Perry (1981/1999) identified nine stages of development progressing from a dualist perspective at stage 1, through one able to accept multiple views in the middle of the scheme at stage 4, completing the scale with an individual able to make meaning of experiences relative to the world in which we live. The higher levels of Perry's scheme show a person able to consider several points of view, while making a decision to which point of view best aligns with one's own values.

Moore (1989, 1994) recognized the significance of Perry's work and set out in the late-1980s to develop an instrument to accurately measure Perry's scheme of development among learners. Moore's (1989) research produced the *Learning Environment Preferences (LEP)* to assess an individual's level of cognitive development as it correlates to Perry's schema assigning a "Cognitive Complexity Index (CCI)" (Moore, 1989, p. 506). The *LEP* is not limited to the field of education and is used extensively across many disciplines to measure cognitive development (Felder & Brent, 2004; Zygmont & Schaefer, 2006).

This study applied a revision of Dike's (2001) instrument, *Air Force Professional Military Education Survey: Faculty Perceptions of Critical Thinking*, used in research at the U.S. Air Force's Air University to gain an appreciation of faculty members' perceptions of critical thinking and how best to teach critical thinking. Dike adapted the instrument from one developed through iterative research with nursing students and faculty and veterinarian faculty. Dike, Kochan, Reed, & Ross (2006) asserted that faculty must "have a thorough understanding of critical thinking and model critical thinking behaviours for their students" (p. 48). If the goal of an institution is to foster critical thinking skills among students, then one must turn to the credibility and expertise of the faculty required to teach the skills.

Without a knowledgeable faculty exhibiting those desired critical thinking traits, the task of transferring critical thinking skills to the student becomes increasingly difficult (Allen & Gerras, 2009; Brookfield, 2012; McPeck, 1981; Paul, 1995; Willingham, 2007). Dewey (1991) and other researchers (Brookfield, 1987; Ennis, 1962; Ennis, 1996; Facione, 1990; Halpern, 2003; King & Kitchener, 1994; Paul, 1993; Resnick, 1987) shared the premise that critical thinking requires one to train the mind to operate at a higher levels of cognition.

The Command and General Staff School Learning Environment

Three things are required for a learning environment to be conducive for teaching critical thinking. First, the institution must have faculty capable of teaching critical thinking (Dike, Kochan, Reed, & Ross, 2006). Second, there must be a curriculum targeting the development of critical thinking skills (Brookfield, 1987; Dewey, 1991; Halpern, 1999; Halpern, 2003; Heuer, 1999). "Successful leading of students from concrete operations and simple mental structures to more abstract modes of thinking *always* [italics in original] begins by building on past experiences and existing mental structures" (Meyers, 1986, p. 49). Lastly, teaching critical thinking must be student centered, modeled, and allow for an exploration of ideas and values (Nugent, 1990). All these elements – Faculty + Curriculum + Student – make up the learning environment.

The faculty. Instrumental in the approach for educating leaders is providing individuals with the tools to be critical thinkers. Two common threads emerged throughout the literature. Earlier in the discussion the first theme is evident; the task of critical thinking requires a high level of cognitive abilities often including reflection and discernment leading to *better* decision-making (Brookfield, 1997; Dike, Kochan, Reed, & Ross, 2006; Ennis, 1996; Facione, 1990; Halpern, 1998; Halpern, 1999; Resnick, 1987). Second, the

undertaking of critical thinking is simply having an ability to deconstruct an argument by identifying biases, fallacies, assumptions, and misleading statements (Browne & Keeley, 2010; Halpern, 2003; Heuer, 1999). Both approaches are necessary to effectively think critically, but too often individuals will stop short of reflecting and analyzing the situation. The difficulty of deciding upon a comprehensive approach to critical thinking is compounded by the task of teaching those skills required (Dewey, 1991; Paul & Elder, 2006, 2007). How can students be assured that faculty in the classroom have the requisite knowledge and abilities to teach critical thinking?

The curriculum. Critical thinking curriculum at CGSC claims to teach students "how to think rather than on what to do" (Stephensen, 2011a, p. 1). The curriculum format is in a block of instruction given to the students at the beginning of the academic year that "sets the conditions for all subsequent learning" (U.S. Army Command and General Staff College (CGSC), 2011, p. 3). Critical thinking is to be applied throughout the remainder of the academic year during subsequent courses.

The curriculum block is 25.5 hours of instruction, facilitated discussion, presentation of a case study, and a planning problem. The first lesson introduces the student to the concepts that "[c]ritical thinking follows a formal, patterned process and can be learned; Facione's [2015] core critical thinking skills are a process that can be an effective means to improve thinking; [and] [c]reative thinking provides multiple options for solving problems" (Gerges, 2014, p. LP-2). The second lesson focuses the students on Paul and Elder's (2009) model of critical thinking, "creative thinking and intuitive and analytical decision-making" (Turner, 2015, p. LP-1) and incorporates a case study. The third lesson examines creative thinking and its barriers, encouraging students to look at options and think unconstrained

(Kem, 2015). The fourth lesson addresses barriers to effective critical thinking, such as fallacies and biases (McConnell, 2015). The fifth lesson "introduces the Army's systematic approach to problem solving" (Daze, 2015, p. 1). The sixth lesson allows students to apply the creative and critical thinking skills in a structured environment through a case study (Linton, 2015), running through the critical thinking tools and mental models from the previous instruction. The final lesson expands upon the understanding the students have with the problem solving process, and the use of critical thinking skills requiring students to "closely examine some key aspect of or topic related" (Long & Laurence, 2015, p. 1) to a complex problem facing today's Army.

   The student. The last element of the learning environment is the student. Great care is taken when designing the student staff groups at CGSC to provide a breadth of experience and diversity across the services, international military officers, and interagency personnel. The student body consists of approximately 1,400 students. Student demographics from the academic year class 2014-15 are included in the Table 1.1.

Table 1.1

CGSC Academic Year 2014-2015 Student Summary

Service or Agency	
US Army	
Active Duty	1039
Reserve Components	89
US Air Force	91
US Marine Corps	30
US Navy	56
US Coast Guard	0
US Interagency	17
International Military Students	116
Total	1438

Source: CGSC, 2014, p. 1.

The learning environment. CGSC cultivates a culture encouraging the development of critical and creative thinking skills among faculty and students (Gerges, 2014). Faculty members are required to participate in the college's faculty development program. The initial phase is one week of instruction focusing on adult learning theory, learning styles, the experiential learning model (ELM), and two practicums demonstrating the ELM to faculty development instructors. Throughout the week, new faculty are coached in the principles of critical thinking that CGSC uses throughout the curriculum (Bakian, 2007).

As noted earlier, the CGSC curriculum includes critical thinking as one of the first blocks of instruction. The purpose is to set the foundation to build upon the critical and creative thinking tools throughout the entire CGSC academic year; but, more importantly, to familiarize students with effective critical thinking skills to use for the remainder of her or his military career. Gerges (2014) describes the relationship as such:

> **Links to Other Parts of the Curriculum: This lesson sets the framework for virtually all of the courses in CGSOC (Command and General Staff Officer Course). We expect the students to apply the aspects of critical and creative to all of their academic endeavors while in CGSOC.** [emphasis in original] (Gerges, 2014, LP-3)

Additionally, the core curriculum required by the Chairman of the Joint Chiefs of Staff Instruction 1800.01D, Officer Professional Military Education Policy (OPMEP) (2009) includes an element of critical thinking throughout. Lesson plans are written for instructors teaching the core curriculum by colleagues within the respective departments to ensure commonality across the institution fulfilling the requirements set forth in the OPMEP.

Prior to each academic year, faculty members attend faculty development phase 2 (FDP-2). Phase 2 involves a one to two hour overview of each module of instruction. In the case of critical and creative thinking, the 10 hour module is presented and discussed in FDP-2 by the lesson authors. The purpose is to highlight the key points faculty are to stress with the students, and the learning objective for the curriculum module. CGSC focuses faculty and purposely incorporates critical thinking instruction in the curriculum, and creates an environment among faculty and students emphasizing the growth in critical thinking skills.

Problem Statement

Critical thinking skills are crucial for leaders in civilian and military disciplines (Braun, 2004; Center for Army Leadership, 2009; Maneval et al., 2012). The cost of poor thinking and poor decision-making is high; and in the case of the military leader, the responsibility rests solely on the shoulders of the leader. Dewey's (1897) comment accentuates the burden of responsibility for the leader:

> We are responsible for our deeds because they are our own…I am myself, I am conscious of myself in my deeds (self-conscious), I am responsible, name not three facts, but one fact....One is liable, accountable, *held* responsible *for* his acts, because they are himself. (p. 124)

The challenges faced by military leaders are many (*Hearing to consider*, 2011). Military educators are charged with providing a foundation of critical thinking skills to a cadre of leaders equipping them with the abilities to operate within the complex environment the present and future holds (CJCS, 2009; CGSC, 2011).

Accomplishing the task requires the instructor to model and engage in critical thinking (Lunney et al, 2008: Meyers, 1986; Tsui, 2001), and demonstrate a comprehensive

knowledge of the subject matter taught (Allen & Gerras, 2009; Brookfield, 2012; McPeck, 1981; Willingham, 2007). Dike's (2001) study is the only previous research focusing on faculty members teaching critical thinking at a graduate-level institution. This study expanded upon Dike's research by including interviews for a more in-depth understanding of faculty perceptions of teaching critical thinking skills.

Purpose for the Study

Because of the critical thinking culture at CGSC, the purpose of this study was to examine the perceptions of CGSC faculty teaching in a graduate-level program, and their ability to teach critical thinking skills. The researcher anticipated faculty would have a positive, confident view in their ability to teach critical thinking skills due to the focused curriculum and dedicated faculty development program. To examine this phenomenon the following questions were addressed.

Research Questions

The study used a mixed-methods approach to investigate the following primary research question and three sub questions:

What are CGSC instructors' perceptions of teaching methods and assessments incorporated to promote the development of critical thinking skills?

    a. According to faculty members what is the most effective approach to teaching critical thinking skills in a graduate level education environment?

    b. According to faculty members what is the most effective approach to assess critical thinking skills of their students?

    c. How do the faculty members define critical thinking?

Research Design Overview

Mixed methods research was used in the course of the study. The mixed methods approach was chosen, since no quantitative instrument exists to explore the phenomenon of faculty perceptions. Johnson, Onwuegbuzie, and Turner (2009) stated, "mixed methods research is an intellectual and practical synthesis based on qualitative and quantitative research" (p. 129). It is this synthesis the researcher sought to achieve with an exploratory approach in the qualitative method to gain a deeper understanding of faculty perceptions for teaching and evaluating critical thinking, based upon quantitative analysis using the Friedman test to determine if instructor responses are consistent with each other (Friedman, 1937).

Creswell (2007) described five qualitative approaches to research design. A narrative design was not appropriate in this research, as the study goes beyond an individual's story. Creswell (2007) described a grounded theory study as going beyond the phenomenological approach to develop a theory of a concept or process. The ethnography examines "cultural group[s]" (Creswell, 2007, p. 68); and the case study explores a single case, or multiple cases, over a period of time to describe the theme within the case, or cases, as appropriate. An exploratory approach was the most suitable for this study, as the researcher sought to understand the experience of teaching critical thinking skills shared by all participants and further explain the concept.

Population

Chapter 2 illustrates that the need for teaching critical thinking exists in graduate education; however, few programs exist outside of the nursing discipline and studies to examine effective "teaching strategies…are largely anecdotal" (Seldomridge & Walsh, 2006,

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p. 135). As noted earlier, the faculty play a significant role in teaching critical thinking skills. Instructors must have the requisite subject matter expertise in the material, as well as the ability to model the skills for students in the classroom (Allen & Gerras, 2009; Brookfield, 2012; Luney et al., 2008; Willingham, 2007).

This study was conducted at the U.S. Army's Command and General Staff School, Fort Leavenworth, Kansas, due to the unique learning environment focusing on the teaching of critical thinking. The sample for the study was drawn from the resident faculty population for the intermediate level of professional military education at CGSC teaching graduate level curriculum. The program of study at CGSC meets the requirements outlined in the OPMEP; and, as previously shown, emphasizes the growth of critical thinking skills in its students (Gerges, 2014).

Studying faculty at CGSC met the definition of a purposive sample (Creswell, 2007; Fraenkel & Wallen, 2009; Gliner, Morgan, & Leech, 2009), as the sample is representative of the population of CGSC faculty responsible for providing instruction in critical thinking. The sample was a "convenience sample" (Fraenkel & Wallen, 2009, p. 98) due to location and availability for the study.

Instrument

Dike's (2001) instrument surveyed faculty perceptions of instructional strategies and evaluation strategies for teaching critical thinking. This information allowed the researcher to understand the faculty's perception of teaching techniques to effectively teach critical thinking skills. Permission to use the instrument was obtained (S. Dike, personal communication, July 19, 2011).

Respondents were asked to participate in interviews. A sample was drawn from the volunteers for interview, and the researcher was able to gather a deeper view of faculty perceptions through the interviews. The data from Dike's instrument combined with the interviews provided a richer, in-depth understanding of the faculty's perceptions for teaching critical thinking skills.

Rationale and Significance

The mission of the U.S. Army's Command and General Staff College includes the obligation to "[educate] and [develop] leaders for full spectrum joint, interagency, and multinational operations" ("About…Mission", n.d.). Found within the principles of the college is the need to develop officers capable of thinking critically in an uncertain, complex operational environment ("About…Principles", n.d.). Clausewitz (1989) noted that "intellectual inadequacy will be shown up by indifferent achievement" (p. 101). The consequences of an inability to reason and think critically are dire, and our nation has a responsibility to provide the best leaders for its military (Freeman, 1949; Lejeune, 1920).

This study also expanded the discussion of teaching critical thinking in postsecondary education to provide a perspective for other faculty in graduate-level institutions to consider when teaching critical thinking. Paul and Elder (2007) and Brookfield (2012) emphasized the instructor must be engaged with the students, while modeling the complex task of critical thinking. Building upon the theoretical framework of cognitive development (Baxter Magolda, 1992; Belenky et al., 1997; King & Kitchener, 1994; Perry, 1999), and the premise that one must possess critical thinking skills in order to teach critical thinking (Halpern, 1998; Willingham, 2007), the study delivers faculty views on teaching for critical thinking to

benefit instructors considering ways to improve her or his pedagogical approach to critical thinking.

Researcher Background

The researcher is a retired military officer with over 23 years on active duty, and whose last military assignment was as a faculty member at CGSC. His first exposure to the concept of critical thinking occurred as a student at CGSC in 2001, when critical thinking curriculum was discussed. As a student, the researcher was not a proponent of teaching for critical thinking, nor held the belief that critical thinking is unique.

Experiences at follow-on duty assignments began to change this perception. The transition point is not clear, however, prior to his return to CGSC the researcher became an advocate for critical thinking. Arriving at CGSC in 2008, the researcher found that critical thinking had developed into a formalized portion of the curriculum. The researcher participated in the faculty development program described earlier, taught the critical thinking curriculum, served as an adjunct faculty with the faculty development program, and engaged in discussions with lesson authors as an advocate for advancing the critical thinking curriculum. The researcher's attention turned toward how to better teach for critical thinking, which led to a desire to research the topic. Since transitioning from the military, the researcher continues to encourage the development of critical thinking skills in co-workers, as an adjunct faculty, and in the work environment.

Definition of Terms

The following list includes major terms used throughout the research and in the dissertation.

Critical thinking. Entails reflective thought allowing an amount of significant analysis to determine facts from assumptions, as best as one may determine, to arrive at a judgment based upon one's conclusions of the information available.

Critical thinking environment. The context of the faculty member, the curriculum, and the student. All three items are needed to create a learning environment that fosters critical thinking.

Field grade officer. A commissioned officer in the United States military holding the rank of major, lieutenant colonel, or colonel.

Full-time equivalent faculty. An accountability term for the Joint Staff to determine the number of faculty on staff to meet Joint Professional Military Education accreditation requirements. The vast majority of faculty members are full-time equivalents, but some faculty positions (curriculum developer) do not allow a faculty member to be in the classroom 100-percent of the time. For accountability, these faculty members are counted as 0.33 or 0.66 full-time equivalent faculty.

Interagency. Refers to the interaction between government agencies, and at times including the U.S. Services. Examples of other government agencies include, but not limited to, Department of State, Department of Justice, U.S. Agency for International Development, agencies within the Department of Defense (Defense Intelligence Agency, National Geospatial and Intelligence Agency, Defense Threat Reduction Agency, et cetera).

Intermediate level education. Professional military education "focus[ing] on warfighting within the context of operational art…expand[ing] [the] understanding of joint force deployment and employment at the operational and tactical levels of war….[Students]

are introduced to joint plans, national military strategy, joint doctrine, joint command and control, and joint force requirements" (CJCS, 2009, p. A-A-4).

Operational environment. "A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander" (Joint Publication 1-02 (JP 1-02), 2011, p. 262).

Professional military education. "conveys the broad body of knowledge and develops the habits of mind essential to the military professional's expertise in the art and science of war" (CJCS, 2009, p. GL-8).

Assumptions

The researcher made the following assumptions:

1. The research assumed instructors at a graduate-level institution possess higher order thinking skills (King & Kitchener, 1994; Resnick, 1987; Willingham, 2007) enabling her or him to teach critical thinking.

2. The interviewees provided truthful responses.

3. The researcher successfully guarded himself against bias due to familiarity with the learning environment and the topic.

Limitations of the Study

This study has the following limitations:

1. The research was limited to the resident faculty at Fort Leavenworth, KS, and did not include participation from the satellite campuses.

2. The research was limited to one institution—the U.S. Army's CGSC vice sister-service intermediate level colleges.

3. The research is not generalizable due to the qualitative focus.

4. The research setting has a curriculum designed to foster critical thinking skills, and requires faculty participation in a faculty development program that promotes critical thinking.

5. CGSC has approximately 245 instructors who actively teach in the college. The response for the quantitative survey was roughly one-third ($n = 83$) of the instructor cadre.

Chapter Summary

This chapter raised the argument that critical thinking is important in the workplace, yet institutions may be falling short of providing graduates with the ability to think critically (Belkin, 2015). The researcher also identified the requirement for military officers to possess the ability to think critically in uncertain, oftentimes crucial moments, raising the question of the adeptness of CGSC faculty to teach critical thinking skills. Through the use of an adaptation of Dike's (2001) faculty perceptions instrument, and an exploratory approach through faculty interviews, this study sought to understand faculty perceptions of the teaching of critical thinking at CGSC.

Chapter 2 - Literature Review

"War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of uncertainty. A sensitive and discriminating judgment is called for; a skilled intelligence to scent out the truth."

– Carl von Clausewitz

Introduction

U.S. military doctrine emphasizes that critical thinking is necessary for a leader to remain adaptive to changing situations (US Army, 2012). Calma (2013) noted that internationally, higher education is in need of developing "essential skills considered important by universities and employers" (p. 35)—one of the identified skills is critical thinking. This chapter examines the literature on critical thinking, focuses on the cultivation of critical thinking skills by understanding four cognitive development models (Baxter Magolda, 1992; Belenky et al., 1997; King & Kitchener, 1994; Perry, 1999) beginning with Perry's foundational work, investigates the role of education in developing critical thinking skills, and briefly considers the military's requirement for critical thinking. The chapter concludes with the study's conceptual framework.

Critical Thinking

Dewey (1910/1997, 1916) was consistent in his definition of *good* thinking. He did not provide a definition of critical thinking, but two excerpts come close to the definitions that will be examined shortly. In *How We Think* (1910/1997), Dewey explained the opposite of:

> uncritical thinking [is]….To turn the thing over in the mind, to reflect, means to hunt for additional evidence, for new data, that will develop the suggestion, and will either, as we say, bear it out or else make obvious its absurdity and irrelevance….Reflective thinking, in short, means judgment suspended during further inquiry… (p. 13)

Several years later, Dewey (1916) wrote *Democracy and Education* again focusing on reflection as an integral part of thinking. In this work, Dewey laid out a systematic approach to thinking, "Thinking includes all of these steps,—the sense of a problem, the observation of conditions, the formation and rational elaboration of a suggested conclusion, and the active experimental testing" (p. 177). Both definitions speak of a method to analyzing a problem, providing a model for logical thinking.

The origins of *critical thinking* are traceable back to Socrates nearly 2500 years ago. It is not until the mid-20th century that the term *critical thinking* enters into the vocabulary of educators, philosophers, and psychologists (Cosgrove, 2009; Fasko, 2003; Hale, 2009; Morgan, 1995; Paul, 1993, 1995). An early instance of the phrase, which is the basis for later works, is in Glaser's (1941) dissertation, *An Experiment in the Development of Critical Thinking*. Glaser's definition involved one's ability to thoughtfully consider aspects of a problem in light of a person's experience and perspective, while applying an amount of logic and reasoning.

Since Glaser's (1941) foundational work, practitioners and academicians continue to study the phenomenon in an attempt to define the term clearly. Critical thinking permeates nearly every discipline today. A review of the literature found no consensus exists on a single definition of critical thinking (Fasko, 2003; Morgan, 1995). Appendix A presents 25 definitions ranging from Glaser to modern academicians and the military.

Ennis (1962) began the examination of definitions with his early definition of critical thinking as "*the correct assessing of statements* [italics in original]" (p. 83). Paraphrasing his thoughts, critical thinking is a systematic approach to examine an issue or problem relying upon one's evaluation of the evidence and critical reflection on past experience to decide on

a solution. Ennis (1962) highlighted three dimensions required for critical thinking—"logical dimension, a criteria dimension, and a pragmatic dimension" (p. 84). Regarding the pragmatic dimension Ennis (1962) further explained, "inclusion of this dimension requires the admission that complete criteria can not be established for critical thinking. An element of intelligent judgment is usually required in addition to applying criteria and knowing the meaning" (p. 85). In context of the military leader, an officer never fully understands the problem or the situation when the enemy is involved (USMC, 1997) requiring the use of critical thinking during the planning and execution of operations.

A couple years later Ennis (1964) revisited critical thinking and expanded upon his definition offering nine characteristics of the critical thinker:

1. A statement follows from the premises.

2. Something is an assumption.

3. An observation statement is reliable.

4. A simple generalization is warranted.

5. A hypothesis is warranted.

6. A theory is warranted.

7. An argument depends on an ambiguity.

8. A statement is overvague or overspecific.

9. An alleged authority is reliable. (pp. 599-600)

Ennis' (1964) characteristics provide a pattern of steps, or criteria to consider, for effective critical thinking.

Later Ennis (2003) was critical of his own early work. Quoting his definition from 1962, he noted the vague nature of the definition and attempted to clarify with a more current

description, "Critical thinking is reasonable reflective thinking focused on deciding what to believe or do" (Ennis, 2003, p. 295). Ennis (2003) considered this explanation incomplete as well, and provided additional insight with several traits reminiscent of, and expanding beyond, his nine characteristics above. Ennis (2003) provided a systematic approach, which will emerge while examining the evolution of critical thinking definitions.

Brookfield (1987) did not provide a succinct definition of critical thinking, but provided a conceptual approach to understanding the topic. A summation that approximated a definition is, "[b]eing a critical thinker involves more than cognitive activities such as logical reasoning or scrutinizing arguments for assertions unsupported by empirical evidence. Thinking critically involves our recognizing the assumptions underlying our beliefs and behaviors" (Brookfield, 1987, p.1 3). This excerpt compliments Dewey's principle that reflective thought is based upon one's experiences—a person is a product of his or her past experiences, and this greatly influences how the individual approaches the task of critical thinking.

Resnick (1987) examined how reasoning and more advanced thinking skills may be taught in the classroom. Acknowledging the different approaches to thinking by the three main disciplines noted earlier, Resnick chose to use an operational definition of the term "higher order skills" (p. 1). For accuracy, the operational definition includes nine traits associated with higher order thinking early in the work. Her concluding remarks provided an active description of higher order thinking:

> [it] involves a cluster of elaborative mental activities requiring nuanced judgment and analysis of complex situations according to multiple criteria. Higher order thinking is effortful and depends on self-regulation. The path of action or correct answers are

not fully specified in advance. The thinker's task is to construct meaning and impose

structure on situations rather than to expect to find them already apparent. (Resnick,

1987, p. 44)

Common elements with other definitions of critical thinking included reflective thought

(Cosgrove, 2009; Dike et al., 2006; Morgan, 1995), making meaning of the situation

(Resnick, 1987; Paul, 1993, 1995), and having a self-awareness of possible bias (Browne &

Keeley, 2010; Porter-O'Grady et al., 2005). A significant aspect of Resnick's (1987) work is

the notion that an individual must have a positive opinion of his or her thinking abilities. A

person should believe that he or she can actually solve the problem, or at least arrive at a

working solution.

This period also produced one of the most recognized studies in the field of critical

thinking (Facione, 1990). Forty-six scholars from across North America participated in the

"qualitative research methodology known as the Delphi Method" (Facione, 1990, p. 4),

consisting of a panel of experts with the aim to exchange ideas and arrive at a level of

agreement. The purpose of the research was to determine the educational goals for teaching

critical thinking skills and identify ways to assess students' progress. Panelists concluded

critical thinking skills may be taught and there are several methods to assess the

performance, or acquiring of the skills. There are many nuances and perspectives in the

pursuit of these goals, and Facione reported upon the consensus of the panel.

This period also produced the panel's description of critical thinking was lengthy, and the core of the definition

is critical thinking is "purposeful, self-regulatory judgment which results in interpretation,

analysis, evaluation, and inference, as well as explanation of the evidential, conceptual,

methodological, criteriological, or contextual considerations upon which that judgment is

based" (Facione, 1990, p. 3). Facione noted two traits of critical thinking emerge from the panel's explanation. First, the group began negotiating the definition with the presumption that critical thinking is comprised of cognitive skills. What the panel uncovered is that critical thinking also has an affective domain associated with employing the skills. Dewey (1910/1997, 1916, 1938/1991) described this association between one's act of thinking, which has a foundation in past experience, and how this influences the decision making process. As Dewey noted, critical thinking and its application has a goal of bettering society.

Paul and Elder (2007a; 2009) concentrated on analysis, logic, and reasoning as key elements an individual must use in the task of critical thinking. Reviewing the definitions of critical thinking to this point, including the additional definitions in Appendix A, Paul and Elder (2007a; 2009) supported the notion that critical thinking may be distilled down to a process. Countering this viewpoint are several definitions addressing the vagueness and uncertainty associated with critical thinking, thus echoing Clausewitz's (1989) weight given to the need of the military officer to possess *coup d'oeil*.

Morgan (1995) provided a concise overview of the foundations of the term *critical thinking*, noting the overuse of the term results in less clarity on a collective definition of the term. Drawing from the numerous definitions presented, and the additional definitions in Appendix A, the operational definition for this study is *critical thinking entails reflective thought allowing an amount of significant analysis to determine facts from assumptions, as best as one may determine, to arrive at a judgment based upon one's conclusions of the information available*.

Cognitive Development Models and Critical Thinking

The writings of Clausewitz (1989) influenced, and continue to influence, modern professional military education and describe why a military officer must be capable of thinking critically; and the discussion of critical thinking highlights the notion that critical thinking is determined, higher order thinking. Acknowledging the requirement for critical thinking, and critical thinking involves higher order thinking, points to a consideration of how individuals may achieve the skills to critically think. Following is an assessment of four cognitive developmental models with an association to more complex thinking skills at the higher levels of each model.

Moore (2002) noted that "the most explicit extensions of the Perry model" (p. 23) include King and Kitchener's (1994) Reflective Judgment Model; Belenky, Clinchy, Goldberger, and Tarule's (1997) *Women's Ways of Knowing*; and Baxter Magolda's (1992) Epistemological Reflection Model. Moore (2002) posited, "while these authors have generally claimed that their work represents theories separate from the Perry scheme, there is no compelling evidence that these frameworks in fact define distinct theories" (p. 23). The works are very similar in construct and general conclusions.

Perry's Schema

Perry (1999) was a Harvard University professor interested in the student's developmental experience in college. Perry conducted a longitudinal, phenomenological study in the 1950s and 1960s with members of the student body. Students were selected from the incoming freshman class, and over the course of the individual's college experience Perry interviewed the men. Perry hypothesized as students progress in academic years and

experience, a recognizable improvement in cognitive skills will result (Merriam, Caffarella, Baumgartner, 2007; Perry, 1999).

Perry's conclusions result in a cognitive development model demonstrating a progression through nine "positions" (Perry, 1999, p. 10) in cognitive skills. Perry explained the premise that as an individual increases in experience, whether academically or practically, the person develops intellectually. He described critical thinking as one's ability to examine his or her own thoughts comparing the thinking and opinion of others to determine wherein lies reality, as this "reality" reflects his or her understanding of the world. This is congruent with Dewey's (1916) explanation of reflective thinking and the importance he placed upon experience as one grows.

Perry (1999) also addressed "alternatives to growth" (p. 198), when an individual stagnates in growth, regresses to previous positions, or seeks to separate from any intellectual growth. The three alternatives are "Temporizing, Retreat, and Escape" (Perry, 1999, p. 198).

Perry (1999) defined temporizing as a "pause in growth over a full academic year" (p. 199), and describes it as a period when a student suspends his or her intellectual growth. Although temporizing may lead to escape, temporizing is not to be mistaken for escape, which is an abandonment of a person's growth leaving all to chance.

Retreat is narrowly defined as the regression to dualism. However, Perry (1999) noted the early definition of the term was too restrictive, and should have allowed for its use throughout the entire schema. The onset of retreat is the result of an individual determining the higher positions are too complex or intimidating. Even with Perry's confined definition, his study evidenced retreat across any of the positions on rare occasions (Perry, 1999).

Table 2.1 depicts Perry's (1999) Schema illustrating the development of a person's thinking ability as he or she moves to higher positions.

Table 2.1

Perry's Schema

		Position 1	*Right vs. Wrong, Black vs. White*
Dualism		"Basic duality" (Perry, 1999, p. 66)	The person believes in absolutes unable to see different views.
		Position 2	*Other's views are simply wrong.*
	Multiplicity	"Multiplicity pre-legitimate" (Perry, 1999, p. 80)	Still believing in concrete "knowns", the person recognizes that other's have opinions. However, opinions not matching one's own are due to the other person being mis-informed, or not yet knowing the truth.
		Position 3	*Perhaps no one knows the answer.*
		"Multiplicity subordinate" (Perry, 1999, p. 99)	Individuals begin to accept that there are many things in this world we simply do not know.
		Position 4	*Since there is no "truth", how can I be wrong?* or *Understanding it is not "what" to think, but "how" to think.*
Contextual Relativism		"Multiplicity correlate or Relativism subordinate" (Perry, 1999, p. 105)	A person recognizes there are many different views arguing, "How can you refute my position?" *or* The opposite perspective is while there are many different views, I must determine how to examine the arguments vice accepting a notion
		Position 5	*Everything is relative.*
		"Relativism Correlate, Competing, or Diffuse" (Perry, 1999, p. 121)	An individual perceives his or her own thought acknowledging the thinking is "relative" to the situation, yet unclear how this fits in with the rest of the world.
		Position 6	*I know who I think I am.*
	Commitment with Relativism	"Commitment Foreseen" (Perry, 1999, p. 149)	One begins to see himself or herself in the world. Recognition also exists that who I think I am is relative to the context in which one perceives the circumstance.
		Position 7	*This is who I am.*
		"Initial Commitment" (Perry, 1999, p. 170)	Establishing himself or herself as a person with an identity in the world.
		Position 8	*What does "who I am" mean?*
		"Orientation in Implications of Commitment" (Perry, 1999, p. 170)	Previously recognizing who one is now must be reconciled with how he or she relates to the rest of humanity.
		Position 9	*Knowing I have a role.*
		"Developing Commitment(s)" (Perry, 1999, p. 170)	The person understands the shaping life experiences have on his or her thinking. An individual's values and morals influence the decision to commit to a choice.

Perry's (1999) scheme is organized in four categories and nine positions along a hierarchical model of increasing cognitive development. King and Kitchener (1994) organized their model in three categories and seven stages. Belenky et al. (1997) did not arrange their hierarchical description of knowing with sub-categories, but within each stage the authors described various aspects of the phase. Baxter Magolda (1992) described her model in stages and expands upon each portion with explanations of the type of knowing based upon gender differences.

Reflective Judgment Model

King and Kitchener's (1994) "Reflective Judgment Model" (p.5) segments into three phases and seven stages: "Pre-Reflective Thinking" (p. 14) include stages one through three, "Quasi-Reflective Thinking" (p.14) stages four and five, and "Reflective Thinking" (p.15) stages six and seven. Stage 1 represents an individual without the ability to consider alternatives. The description King and Kitchener (1994) provided places this stage earlier in the cognitive development than Perry's (1999) position 1 and its dualistic, black-and-white perspective. King and Kitchener (1994) provided early high school students as examples of learners in stage 1.

The pre-reflective phase continues with stage 2 representing the dualistic, right-or-wrong beliefs found in Perry's (1999) position 1. In this stage, individuals hold the idea that a "true reality" (King & Kitchener, 1994, p. 51) exists. Stage 3 exposes learners to the possibility of uncertainty. Convictions held by the learner begin to reveal inconsistencies in "truth" opening the possibility for alternative meanings of the problem, or simply no solution exists to the problem.

Quasi-reflective thinking moves the individual from stage 4, where "one cannot know with certainty" (King & Kitchener, 1994, p. 58), to stage 5 and contextual knowledge based upon one's beliefs formed in the progression through earlier stages. These stages in King and Kitchener's (1994) model mirror positions 4 and 5 of Perry's (1999) schema, where the individual is beginning to realize his or her own belief structure and how that affects one's viewpoint. The transition from stage 5 to stage 6 brings the person into reflective thinking.

These final two stages of King and Kitchener's (1994) model accurately depicts meta-cognition. In stage 6, a mulling over of the problem occurs before the individual is able to reach a conclusion. The complexity of a problem is tacit requiring an examination of indistinguishable causes and alternative solutions. An individual moves from this stage to the final stage, where he or she recognizes some knowledge may be truer than other determinations. Stage 7 represents individuals who, through reflective thinking, participate in an ongoing process of constructing knowledge.

King and Kitchener (1994) summarized the model asserting that individuals tend to display higher reflective judgment results, which may be correlated with a person's level of education. A person with a baccalaureate will likely score lower in reflective judgment than a post-doctoral researcher. Two items of note from their findings relevant to this research, "people…engaged in educational activities tend to improve in their reasoning about ill-structured problems…[and] being in an educational setting seems to facilitate development" (King & Kitchener, 1994, p. 187). The presumption is that faculty members charged with facilitating the development of critical thinking skills will score higher on a measured scale of cognitive development.

At the early stages in all the models, the knower looks to some authority to help determine meaning of the event or circumstance. Individuals generally follow a progression in the positions (Baxter Magolda, 1992; King & Kitchener, 1994; Perry, 1999), but the learner may not necessarily stop at each level. The student may move quickly through or bypass one of the sub-stages within the greater position, or remain in a position for a length of time. As Perry (1999) noted, "It's all up to the individual in the end" (p. 42), referring to the personal aspect of cognitive growth.

As referred to earlier, Moore (2002) highlighted the foundation of Perry's work to the others. King and Kitchener (1994) acknowledged their research built upon Perry's, but the authors felt Perry's work falls short in the later stages of his model. Examining Perry's (1999) work shows a more in-depth discussion of the first six positions of his model, than the last three. Perry explained that the latter positions are "more qualitative than structural, and its steps are not readily demarked by major changes in forms….[likening the maturation in positions to varying] degrees of ripening in an art" (p. 170). One may conclude the apparent trailing off of content in the later positions correlate to the ethical considerations inherent in Perry's scheme. Like art, ethics are often interpreted by one's own meaning of right and wrong. Perhaps this explains Perry's minimal expansion on the last three positions.

Unlike Perry's (1999) study focusing on undergraduate students, King and Kitchener's (1994) longitudinal study included graduate students in their research. This pursuit allowed for a more introspective look into one's cognitive abilities as a person continues with his or her education, further expanding the upper levels of the model in which they claim Perry falls short. In fact, the research "suggests that intense study in a discipline may provide…[for] more complex epistemic cognition and true reflective thinking" (King &

Kitchener, 2002, p. 47). In this vein, many others (Halpern, 2003; Heuer, 1999; Paul, 1993; Resnick, 1987) either implied or affirmed King and Kitchener's (1994) assertion that higher order thinking requires continual practice and application.

Women's Ways of Knowing

Belenky et al. (1997) focused their study on gender differences in cognitive development. A criticism of early cognitive development study, including Perry's (1999) work, is nearly all the research used male respondents (Belenky et al., 1997). Belenky and Tarule completed their dissertations at Harvard and had studies with Perry. As each began her post-doctoral research, she concentrated on cognitive development within women (Belenky et al., 1997). Collaboration with colleagues led to the four women—Belenky, Clinchy, Goldberger, and Tarule—forming a partnership to conduct a study of cognitive development with only female participants.

Belenky et al. (1997) share a staged development theory with the other models. The difference, and significance, in their work is revealed in the connectedness women share in meaning-making. This connectedness of knowing is in stark contrast to Perry's scheme, which described a more independent style of knowing and development. While Belenky et al. described a developmental model, the focus is not on intellectual growth and higher order thinking; instead their study concentrated on understanding the relational aspect of learning for women. This leads to the final model for consideration, Baxter Magolda's (1992) Epistemological Reflection Model.

Epistemological Reflection Model

Baxter Magolda's (1992) study benefited from the research and critiques of the previous three models. Like her colleagues' models, the Epistemological Reflection Model

follows a staged approach in cognitive development. One significant note Baxter Magolda (2002) asserted, which was not readily apparent in the other works, is an individual's knowledge is based upon "their epistemic assumptions and particular experiences" (p. 91). A person understands how he or she knows something by previous experience and the context in which those events occurred. This thought echoes Dewey's (1997) comment, "every experience influences in some degree the objective conditions under which further experiences are had" (p. 37).

Another aspect Baxter Magolda (1992) offered, which the other models do not emphasize, is a comparison of meaning-making for females and males. She described a generalization across the genders where males tend to be more independent and self-reliant in the acquiring of knowledge, while females trend toward a communal or connected approach to meaning-making supporting the work of Belenky et al. (1997).

The four models of cognitive development share a structure, and were significant contributions to the fields of cognitive psychology and education. The models provided a foundation for the contemporary view of advanced cognitive skills in critical thinking. The relationship these models have with critical thinking is also important.

Critical Thinking and Cognition

"Every human thinks. Thinking is intrinsic to human life….Everything that humans do is 'thought-full'" (Paul, 1993), but oftentimes humans fail to think critically. Why is this so? An inclination toward an answer lies in two of Resnick's (1987) characterizations of "higher order thinking" (p. 3)—complexity and effort. Morgan (1995) identified more than 12 definitions of critical thinking suggesting two common traits. First, critical thinking involves a "deeper processing" (p. 338) of thought suggesting an individual's thinking is at

the higher levels of the models examined, and goes beyond simply determining what a person wants for dinner. Second, echoing Resnick's (1987) premise that effort is involved, Morgan (1995) believed he or she must have a "willingness to use [critical] thinking skills" (p. 338) due to the energy required to employ these skills.

Critical thinking and the complex process it involves requires focused attention. The military leader faces an even greater challenge in combat overcoming physical and mental fatigue due to prolonged periods of little sleep, food, and the stress associated with fear, all while trying to remain mentally agile to effectively apply critical thinking skills to the situation at hand (USMC, 1995; USMC, 2011).

Morgan's (1995) traits identify critical thinking as a deep process. The previous literature shows that critical thinking involves skills associated with a higher order of thinking (Brookfield, 1987; Mulnix, 2010; Paul, 1993, 1995; Resnick, 1987; Scriven & Paul, 1987), then it follows that these skills are resident in the higher stages of cognitive development depicted in the cognitive development models described earlier. King and Kitchener (2002) proposed the emergence of this thinking may begin to occur in the quasi-reflective thinking stage. Perry's (1999) Schema supports a similar conclusion between positions 5 and 6, where the learner begins to see himself or herself as a maker of meaning. Baxter Magolda's (2002) model placed the learner late in the independent knowing stage for exhibiting higher order thinking skills. Her research with college students documented many individuals did not reach a position of "self-authorship" (p. 95) until leaving the university environment and having to resolve complex issues in the workplace.

Reinforcing the theme that critical thinking is associated with a higher level of cognitive development, King and Kitchener (1994) demonstrated in their research that the

complexity of a person's thinking is positively associated with their level of education. College students were found to exhibit better judgment than high school students, graduate students display higher cognitive levels than undergraduate students, and doctoral and post-doctoral students operate at a greater cognitive level than graduate students. Continuing education past high school results in furthering an individual's ability to conduct more complex thinking (King & Kitchener, 1994). The professional military education continuum addresses the educational needs for individuals' careers from pre-commissioning through senior officers (CJCS, 2009; TRADOC, 2011). Individuals receive education on increasingly complex subjects as an individual continues to achieve higher rank. The construct allows the military leader to "[build] upon the knowledge and values gained in previous levels" (p. A-A-1), consistent with King and Kitchener's (1994) research.

Perhaps the most basic principle of critical thinking is to recognize a situation in which a person is unfamiliar and to simply "'stop and think'" (Dewey, 1997, p. 64). Dewey applied an orderly approach to viewing a problem by drawing upon past experience and knowledge to develop possible explanations or solutions to what one is experiencing at present. All too often, individuals will jump to a conclusion relying upon "what worked last time" in a similar circumstance. This is not an application of critical thinking, which Dewey (1991) described as a suspension of judgment "to determine the nature of the problem" (p. 74).

Critical thinking is not a skill an individual comes by naturally, or by happenstance. According to Dewey (1991) a person must train the mind to develop the skills required for thinking critically. Just as a military officer must train physically, training of the mind occurs through formal PME in schools and self-directed learning focusing on "the art and

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science of war" (USMC, 1997, p. 63). The U.S. Army's CGSC must be seen as training the mind, as "the mind is the officer's principal weapon" (p. 64).

King and Kitchener (2002) affirmed Dewey's (1991) claim as noted earlier, and Moore (2002) explained the goal of education is to encourage "the evolution of individuals' thinking structures and meaning-making toward greater and more adaptive complexity" (p. 26). Paul (1993) devoted an entire book to address the development of critical thinking skills characterizing critical thinking as a "multilogical thinking, [which is] the ability to think accurately and fair-mindedly within opposing points of view and contradictory frames of reference" (p. 205).

Paul (1993) was explicit in his claim that critical thinking skills are required to raise a society with intellectual virtues promoting moral citizenship. Without an ability to apply critical thinking skills to challenging issues of ethics and morality, the citizen is unable to holistically view the situation and make an impartial decision. Instead, a person is likely to determine which outcome serves the individual best, while not taking into consideration any second or third order effects within the community. Perry (1999) also emphasized the importance of the use of higher cognitive skills while discussing the difference between an informed decision and "blind conformity" (p. 234). Johnson's (2002) examination of late-20th century conflicts from Somalia to post-September 11 supports the application of this characteristic trait to a military officer—the ability to exercise critical thinking in complex ethical and moral situations.

Philosophers through the ages have called upon education as a means to create a more just society (Elias & Merriam, 2005; Rorty, 1998). The complexity of issues facing the world today requires an officer equipped with the skills necessary to make informed

decisions. Professional military education serves a role in developing the military officer to achieve higher levels of cognitive development associated with critical thinking (CJCS, 2009; TRADOC, 2001; USMC, 1997; USMC, 2011).

Experience, Education, and Thinking

John Dewey is significant to the American educational system (Kasworm, Rose, & Ross-Gordon, 2010; Price, 1962; Ryan, 1998). His writings in the late-19th and early-20th centuries influenced philosophers and educators alike, spawning an epistemological approach to critical thinking through his works on experiential learning and reflective thought (Dewey, 1916, 1910/1991, 1938/1997). Three areas of his work are necessary to highlight, as they provide a roadmap for understanding the evolution of Dewey's foundational thoughts to the pursuit of modern day critical thinking.

First, Dewey (1897a) emphasized the importance of experience as an educative process early in his works. Dewey stressed the importance of subject matter relevancy in developing the student—"The progress [of education] is not in the succession of studies, but in the development of new attitudes towards, and new interests in, experience….education must be conceived as a continuing reconstruction of experience…" (Dewey, 1897a, pp. 12-13). To be effective at recognizing and making connections an individual must train the mind to seek the outcomes of one's experiences, or the lessons drawn from others. Thinking, whether termed critical, inquisitive, or deductive, does not occur happenstance and requires some amount of training to realize one's potential. He likened the "Training of [the] Mind" (Dewey, 1910/1991, p.28) to the training commitment an athlete or musician requires to perfect a sport or an instrument (Dewey, 1916).

Secondly, consider the role of education in preparing the mind for in-depth thinking, or, more specifically, the role of the learner and the educator. Dewey (1897a, 1916) was emphatic in his opinion that the teacher must have a participatory role in the education of the learner, and the learner must also be an active participant. The function of education, as it relates to training of the mind, is to teach the student in such a manner that he or she develops the habit to continuously pursue the facts mulling over the details to prove or disprove with the goal to arrive at a logical conclusion.

Dewey's (1910/1991) third area of how to think focused on the practice of "reflective thought" (p. 2). Dewey (1910/1991) defined reflective thought as, "*Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends* [italics in original]" (p. 6). "…[*T*]*he value* of an experience lies in the perception of relationships or continuities to which it leads up [italics in original]" (Dewey, 1916, p. 164).

Teaching for Critical Thinking

Socrates set the foundation for the teaching of critical thinking (Gutek, 2005). Two and a half millennia later, the focus of educators remains to improve students' ability to think (Brookfield, 2012; Paul & Elder, 2003; Simpson & Courtney, 2002). However, little research focuses on the teaching of critical thinking, instead addressing "how" to critically think. Compounding the matter, "how" to think critically is simplified in the training of critical thinking skills concentrating on questions to ask, examination of the argument from different viewpoints, seeking the validity of facts, and so on (Browne & Keeley, 2010; Halpern, 2003; Paul, 1995; Paul & Elder, 2009). Halpern (1998) provided a model for teaching critical thinking, with two of the four parts expanding beyond a skill-based

approach—an individual must have the temperament toward critical thinking, and acknowledge that metacognition is necessary to "direct and assess thinking" (p. 451).

Literature in the last ten years emphasized the teaching of critical thinking in the nursing discipline. Banning (2006) identified a key consideration in nursing education and the dichotomy between academia's approach to improving an individual's cognitive skills and nursing's desire to enhance "technical and practical reflection" (p. 460) involving patient care.

Table 2.2

Teaching for Critical Thinking in the Literature

Allen & Gerras, 2009	- Develop requisite skills [for teaching critical thinking] among faculty – most important is ability to facilitate dialogue. - Instructors need to be of high quality with the "background intelligence, and requisite knowledge, skills, and abilities to ensure success" (p. 80).
Borg & Borg, 2001	- Interdisciplinary team teaching of graduate-level honors course coupling Economists with English teachers. - Base definition and understanding of critical thinking on Perry's Schema. - No formal assessment of critical thinking abilities. - Rely upon student feedback and instructor observations that students had higher quality discussions in class.
Brookfield, 2012	- Teaching critical thinking is as complex as the activity itself. - Modeling of critical thinking and mirror students' attempts at critical thinking. - Establishing an environment that encourages critical thinking. - Continual feedback and active listening.
Dike, 2001	- Identifies five instructional strategies: "Small Group Discussion with Facilitator; Lecture with Discussion; Student Presentation of Assignment; Questioning; and Research or Formal Paper" (p. 160).

	- Small group discussion, questioning, and the research paper are the strategies most favorable for teaching and improving critical thinking.
Kaplan & Kies, 1994	- Identifies two strategies: 1) questioning associated with Bloom's Taxonomy and the level of thinking the instructor is trying to get the student to achieve; and 2) wait time for questioning and response – three to five seconds optimal according to Kaplan's literature review. - Both strategies must include feedback (reflection) for the student's answer.
Lunney, Frederickson, Spark & McDuffie, 2008	- Engaged and active participation by the instructor. - Skilled questioning. - Writing in an online course provides for the opportunity of reflection. - Coaching to affirm the student's use of critical thinking.
Meyers, 1986	- Emphasizes the affect critical thinking may have on students. - Three areas "missing" (p. 103) from the educational discipline to assist faculty development of critical thinking teaching: 1. Allow time for a teacher to understand how he or she thinks critically. 2. Institutional environment encouraging the development of critical thinking skills in faculty and students. 3. "Accountability" (p. 103) in teaching critical thinking.
Nugent, 1990	- An older reference grounded in the literature at the time. 25 years later many of the prerequisites are common practice in Adult Education. 1. Liberal definition of CT, "critical thinking is an active process in which the thinker seeks to understand varying perspectives, evaluates those perspectives, synthesizes information to form own perspective, and acts accordingly" (p. 85). 2. Student respect – finding voice (Tsui, 2002). 3. Willingness to discuss values. 4. Receptive to change. 5. Understand how one came to know the subject. - Teaching critical thinking must be student-centered, modeled, and allow for exploration of ideas and values.
Paul & Elder, 2007b	- Engaged instruction – instructor is an active participant in the course guiding students in learning. - Model thinking for the students. - Writing is an emphasis, both papers and journaling.

	- Socratic questioning of students.
Schumm, Webb, Turek, Jones & Ballard, 2006	- Review of U.S. Army's Command and General Staff Officer Course and Combined Arms and Service Staff School distance learning courses. - Weak on statistics and infers conclusions. - Support for classroom discussion and student diversity seems to be supported—no definition of student diversity, although this is considered important for fostering critical thinking.
Simpson & Courtney, 2002	- Evaluating case studies and formally or informally writing observations. - Socratic questioning and responding with organized thoughts based upon knowledge. - Discussions of complex problems.
Staib, 2003	- Predominately a literature and instrument review. - Identifies seven teaching techniques for teaching critical thinking to nursing students from various sources. 1. Reflection –"Thinking about thinking" (p. 499). 2. Simulation – mock cases in a laboratory environment with faculty as observers. 3. Concept maps and imagery to examine one's thinking. 4. "Comparing discourse to standardized test scores" (p. 502). 5. One on one interaction with a teacher through e-mail – "Changes the Delivery Technique" (p. 503). 6. Computer-aided instruction with interactive case scenarios. 7. Case studies.
Thoma, 1993	- Provides four to five teaching techniques for Perry's lower levels of dualism and multiplicity, yet falls short in recommending teaching techniques for contextual relativism and commitment with relativism. The latter levels are "difficult" to teach toward.
Tsui, 2001	- Qualitative research concluding that faculty attitudes toward students effect the ability of students to grow critical thinking skills. Three highlighted conclusions: 1. Faculty must believe their students possess the ability to critically think. 2. Faculty must possess an enthusiasm for teaching and continually hone their skills in pedagogy. 3. Faculty must accept the classroom may be an environment for mutual learning (re: Brookfield, 1986, p. 86 and discussion of teacher requiring "humility").

Willingham, 2007	- Critical of teaching for critical thinking skills proposing critical thinking is not skill-based, but knowledge-based. - Without subject matter expertise, "deep knowledge" (p. 11), and practicing metacognition skills, can critical thinking be taught? Yes, with SME-level knowledge and practice. - Willingham's argument is congruent with Dewey's (1991, 1997) claim that experience creates better thinking, and Clausewitz's (1989) *coup d'oeil* that relies upon the innate sense of knowing what to do.

Four areas emerged from the authors above. First, teaching for critical thinking requires a focus on the student and creation of a learning environment that encourages critical thinking. Instructors must ensure all participants are accepting of other viewpoints, and not judgmental toward one view or another. Considering other perspectives allows a person to examine his or her beliefs, while expressing thoughts offers evidence of critical thinking for others (Brookfield, 2012; Lunney et al, 2008; Meyers, 1986; Nugent, 1990; Tsui, 2001).

Second, encouraging and facilitating dialogue allows students to express their critical thinking verbally, which offers the instructor an opportunity to mirror students' attempts and respond through Socratic questioning. Class dialogue may include time for a student to engage in reflective thought and metacognition, providing the learner an examination of his or her own thinking (Allen & Gerras, 2009; Dike, 2001; Lunney et al, 2008; Paul & Elder, 2007b; Schumm et al, 2006; Simpson & Courtney, 2002).

Third, modeling critical thinking is imperative for the instructor (Allen & Gerras, 2009; Brookfield, 2012; Lunney et al, 2008; Paul & Elder, 2003; Resnick, 1987). Faculty participation in the process of critical thinking demonstrates the level of thinking the classroom is in pursuit of achieving. Modeling and engaging in critical thinking also creates a mutual learning environment, where the students may receive coaching in critical thinking through questioning and feedback (Lunney et al, 2008; Meyers, 1986; Tsui, 2001).

Lastly, the instructor must possess background knowledge of the subject matter (Allen & Gerras, 2009; Brookfield, 2012; McPeck, 1981; Paul, 1995; Willingham, 2007). Possessing a high degree of intellect on the subject, and topics supportive or contrasting the subject matter allows for the coaching and encouraging of higher order thinking skills. Dewey (1991) echoed the trait of subject matter expertise describing "*insight* [italics in original]…[as a] long familiarity with like operations in the past" (p. 105). Meyers' (1986) discussion highlights the responsibility of the teacher to understand and present all opinions of the topic to challenge the students' perceptions of reality. In the context of Perry's (1999) Schema, the teaching of critical thinking skills is an attempt to move the student from a concrete perception of his or her world "…to more abstract modes of thinking…by building on past experiences and existing mental structures" (Meyers, 1986, p. 49).

Faculty Perceptions of Critical Thinking

Research addressing faculty perceptions of effective and ineffective critical thinking is scarce. Dike (2001) conducted a study within the U.S. Air Force's professional military institutions focusing on faculty perceptions in teaching and assessing critical thinking skills. The research was predominately quantitative querying faculty members through a survey on instructional strategies to promote critical thinking, and assessment strategies for measuring the effectiveness of critical thinking. Dike's (2001) results documented faculty members' perception that "critical thinking [consists] of habits of the mind" (Dike, 2001, p. 155), which was congruent with the literature; and the faculty tended to rely upon traditional teaching methodology vice incorporating strategies to promote meta-cognition and the modeling of critical thinking skills to students (Dike, 2001).

Dike (2001) provided a recommendation to further examine why faculty members chose to incorporate some critical thinking teaching methodologies over another. Rather than focus on the teaching methodologies identified previously in this section, this study attempted to understand the faculty's perceptions toward the teaching of critical thinking and the *why* and *how*.

On *Military Genius*

"Everything in war is very simple, but the simplest thing is difficult. The difficulties accumulate and end by producing a kind of friction that is inconceivable unless one has experienced war."

– Carl von Clausewitz

The importance of thinking, more specifically *critical* thinking, is crucial for the military officer. During the early-19th century the Prussian military officer and theorist, von Clausewitz (1989), penned his seminal work, *On War*. Within the first 150 pages of the tome, Clausewitz (1989) outlined the need for study in the theory and art of war. "[Theory] is meant to educate the mind of the future commander…[and] to guide him in his self-education" (Clausewitz, 1989, p. 141) of the conduct of war. Widen (2007) expanded upon the importance of theory comparing the works of three foundational military theorists – von Clausewitz, Jomini, and Corbett. Widen (2007) showed that all three theorists emphasize the study of war to uncover the principles for better decision-making in the conduct of war. The importance of having the ability to critically think is that thinking has consequences (Black et al., 1972), especially in the case of the military leader.

Clausewitz (1989) addressed the intellectual requirements for the military leader. It is worth noting that Clausewitz (1989) downplayed the importance of "mental aptitude" (p. 100) and stressed the significance of the whole of the individual—cognitive level, mental

agility, and character—calling the trait "*the essence of military genius* [italics in original]" (p. 100). He described two components essential to military genius:

> *…first, an intellect that, even in the darkest hour, retains some glimmerings of the inner light which leads to truth; and second, the courage to follow this faint light wherever it may lead.* The first of these qualities is described by the French term, *coup d'oeil*; the second is *determination*. [italics in original] (Clausewitz, 1989, p. 102)

Understanding the term, *coup d'oeil*, is crucial as it conveys the concept of reflective thought (Dewey, 1991; King & Kitchener, 1994) on the part of the military commander and an innate ability to see the nature of the situation causing the commander to act decisively (Strachan, 2007). Clausewitz (1989) affirmed not all in the military possess the trait of *coup d'oeil*, but that the attribute is more common in the experienced leader.

Personal and professional development of the military officer is congruent with principles found in the discipline of adult education and self-directed learning (Merriam, Caffarella, & Baumgartner, 2007; Merriam & Clark, 2006; Wlodkowski, 2008). The burden of self-development for the military officer rests on the individual (CJCS, 2009; Johnson, 2002; USMC, 1997). This study focused on the improvement of critical thinking skills from a cognitive development perspective. Clausewitz (1989) addressed the need for military genius relying on his experience of war in the late-18th and early-19th centuries. Clausewitz's insight is largely attributed to his personal observations. Today, the mid-career military officer likely has significant experience in tactical operations, but lacks experience at the operational and strategic levels of war. Puryear (2009) noted the cost of providing this experience is prohibitive, at a high risk, and consumes significant time. Compensating for a

lack of experience requires an officer to learn the lessons from the past through determined study. Dewey (1997) captured this perspective when asking, "How shall the young become acquainted with the past in such a way that the acquaintance is a potent agent in appreciation of the living present" (p. 23)? Skelton (2004) replied, "Through the study of history…[a] student of military history can accumulate over 3,000 years of fighting experience at the price of time spent reading and analyzing the whispers of warriors past" (pp. 86-87).

Marine Corps doctrine (USMC, 1997) reflects the necessity for independent and self-reliant decision-making, which the leader gains the ability through "experience, education, and intelligence" (p. 85). The previous examination of cognitive development models illustrated a scaffolding approach to a higher level of thinking. The problems being addressed by military leaders becomes increasingly more complex as the leader achieves more senior rank requiring greater knowledge than junior leaders (CJCS, 2009; TRADOC, 2011; USMC, 2011).

Conceptual Framework

Figure 2.1 graphically depicts the conceptual framework showing the relationship between the focus on faculty development and a dedicated curriculum designed to teach critical thinking, the CGSC instructor, and the teaching of critical thinking. As noted earlier, CGSC cultivates a learning environment focused on teaching and developing critical thinking skills among its faculty and students (Bakian, 2007; Gerges, 2014). All new instructors attend the faculty development program with emphasis on adult learning theory, the ELM, and the principles of critical thinking taught at CGSC that are interlaced throughout the curriculum (Bakian, 2007; Gerges, 2014).

Figure 2.1

Faculty Development Focus on Critical Thinking

Curriculum Focus on Critical Thinking

CGSS Instructors

Teaching Critical Thinking
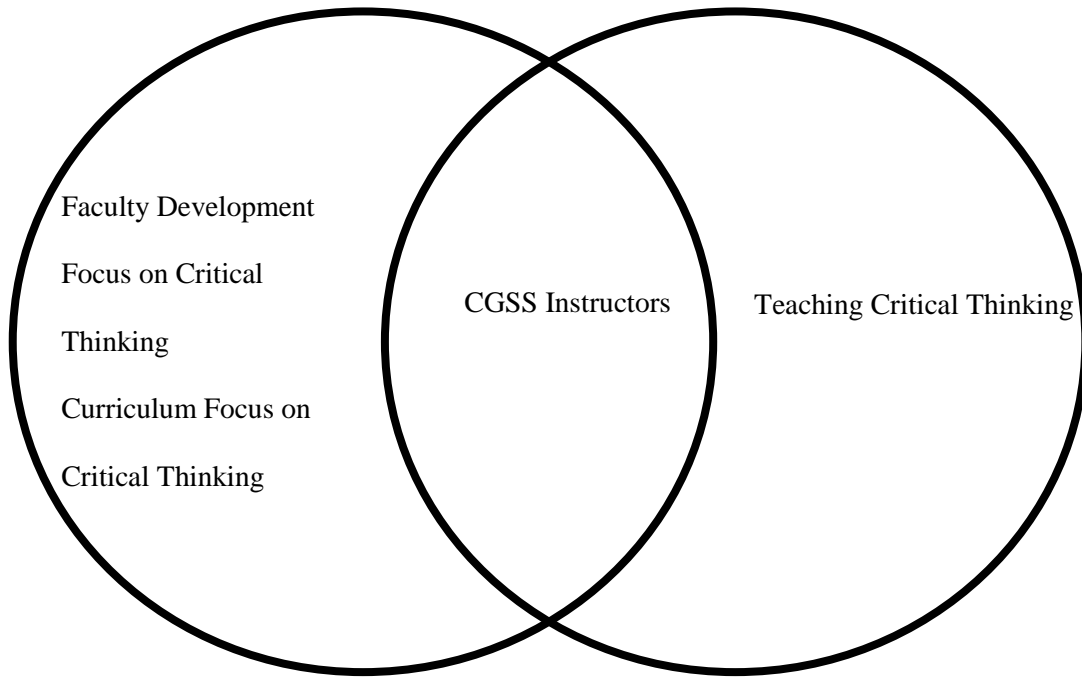
The emphasis of critical thinking toward CGSC's mission and goal of preparing military officers for the complexities of the future, combined with the prominence of critical thinking in the faculty development program, should lead to instructors focused on teaching critical thinking. The figure depicts the basis for the study. What are instructors' perceptions of teaching methods—the right side of the figure—to promote new students' development of critical thinking skills? The study will rely upon Dike's (2001) instrument and interviews with instructors to examine perceptions.

Summary

Critical thinking is a characteristic trait the military seeks to develop in its officers (CAL, 2009; CGSC, 2011; CJCS, 2009; *Hearing to* consider, 2011; Joint Staff, 2010; USMC, 1995; USMC, 2011). The concept of a wise commander is not new, from Sun Tzu's writings in the fourth century B.C. (Tzu & Griffith, 1971) through Clausewitz's (1989) in the early-19th century to modern military doctrine (CJCS, 2009). Examining the development of

the military officer—specifically the trait of critical thinking and relating it to cognitive development—Clausewitz (1989) attributed the increased knowledge required of senior officers to "reflection, study, and thought" (p. 146). Dewey (1991) also emphasized the importance of reflection, and through review of four cognitive models higher order thinking is attributable to greater cognitive thinking skills (Baxter Magolda, 1992; Belenky et al., 1997; King & Kitchener, 1994; Perry, 1999).

Exploring the teaching of critical thinking, scholars contend the instructor teaching critical thinking skills must possess a higher intellectual capacity. Faculty must model critical thinking and possess subject matter expertise in the area, if he or she is to effectively teach students to think critically. (Allen & Gerras, 2009; Brookfield, 2012; McPeck, 1981; Paul, 1995; Willingham, 2007).

Chapter 3 - Methodology

The purpose of this study was to examine current U.S. Army Command and General Staff College (CGSC) faculty and their perceived ability to teach critical thinking skills. CGSC is a unique graduate-level institution with an intentional focus on developing the critical thinking skills of its students. As noted earlier, the learning environment is comprised of instructors required to participate in the institution's faculty development program that coaches new faculty in the principles of critical thinking (Bakian, 2007). The dedicated faculty development and incorporation of critical thinking instruction into the curriculum should create an environment focused on cultivating critical thinking skills for CGSC students.

This chapter explains the research methodology expanding upon the research design, the research population, data collection methods, analysis and synthesis of the data, ethical considerations, and trustworthiness of the data. The chapter concludes with a brief summary.

Research Questions

Examining this matter, the study addressed the following primary research question and three sub questions:

What are CGSC instructors' perceptions of teaching methods and assessments incorporated to promote the development of critical thinking skills?

    a. According to faculty members what is the most effective approach to teaching critical thinking skills in a graduate level education environment?

    b. According to faculty members what is the most effective approach to assess critical thinking skills of their students?

    c. How do the faculty members define critical thinking?

Research Design

Rationale for Mixed Methods Research Design

The researcher chose a "partially mixed methods" (Leech & Onwuegbuzie, 2009) research design for this study. The mixed methods design surfaced in the early 20th century with sociologists and anthropologists who sought a synthesis of qualitative and quantitative data (Johnson, Onwuegbuzie, & Turner, 2007). However, purists exist on each side of the quantitative and qualitative debate, and the mixed methods approach only recently has begun to receive acceptance as a third methodology (Johnson et al., 2007; Morgan, 2007; Onwuegbuzie & Leech, 2004).

Johnson, Onwuegbuzie, and Turner (2007) described mixed methods research as "an approach to knowledge (theory and practice) that attempts to consider multiple viewpoints, perspectives, positions, and standpoints (always including the standpoints of qualitative and quantitative research)" (p. 113). Dike's (2001) instrument provided descriptive statistics, while the qualitative exploratory approach to interviews sought "to expand [the researcher's] understanding" (Johnson & Onwuegbuzie, 2004) of faculty perceptions of teaching critical thinking.

Mixed methods research may be broken down into eight designs based upon how the mixing occurs—fully mixed or partially mixed; the timing of the data collection—sequentially or simultaneously; and the emphasis of the data—qualitative dominant, quantitative dominant, or equal weight (Johnson & Onwuegbuzie, 2004; Leech & Onwuegbuzie, 2009). The researcher's "partially mixed sequential equal status design" (Leech & Onwuegbuzie, 2009, p. 270) analyzed the quantitative and qualitative data

separately and the mixing occurred in the interpretation phase intending to "enhance the interpretation of *significant* [italics in original] findings" (Onwuegbuzie & Leech, 2004).

Research Population and Sample

CGSC instructors are exposed to a military culture focused on the development of critical thinking. As noted previously, all instructors must participate in critical thinking faculty development sessions. Additionally, the college's instructor cadre is organized into teaching teams allowing for subject matter expertise in five separate domains—history, leadership, sustainment operations (logistics), tactics, and joint, interagency, and multi-national operations. Each teaching team is responsible for teaching the 25.5-hour block of instruction on critical thinking. Earlier it was noted, the nexus of the year-long academic curriculum is critical thinking.

Fifty-nine percent of the CGSC faculty are civilian, while 40% are active duty service members. The majority of civilian faculty members have prior experience with the military and are retired senior officers (lieutenant colonels or colonels). The civilian faculty population's educational background requires a minimum of a master's degree to teach at CGSC. The active duty faculty is predominately lieutenant colonels, with a presumed small number of majors. Active duty faculty members are not required to have a master's degree to teach, however, the preponderance of active duty faculty possess a master's degree (B. G. Lawson, personal communication, July 29, 2011 and August 10, 2011).

The college reported the following data in Table 3.1 (CGSC, 2014, p. 1).

Table 3.1

CGSC Faculty Demographics

Faculty Category	Total FTE[1]	Doctorate	SLC Grad[2]
US Army	129	3	3
US Air Force	10.67		6
US Navy	4		
US Marine Corps	3.33		3
US Coast Guard	0		
International Officers	4		
DOD Civilians	219.33	54	17
Interagency Civilians	2	1	
Contractors	0		
Total	372.33	58	26

Notes: [1]FTE indicates the full time equivalent faculty by category. [2]SLC Grad indicates the number of faculty members who are graduates of a senior-level college (e.g. Army War College, Naval War College, National War College, etc.).

Sampling Procedures

Robinson (2014) described a "four-point approach to sampling" (p. 25) for qualitative research. First, the "sample universe…the totality of persons from which cases may legitimately be sampled in an interview study" (Robinson, 2014, p. 25-26). The sample universe is further delineated by "inclusive…[and] exclusive" (Robinson, 2014, p. 26) criteria to fully describe the sample population. Figure 3.1 depicts the sample universe and the criteria to get to the sample.

Figure 3.1. "Sample universe, inclusion/exclusion criteria and sample"
(Robinson, 2014, p. 27).
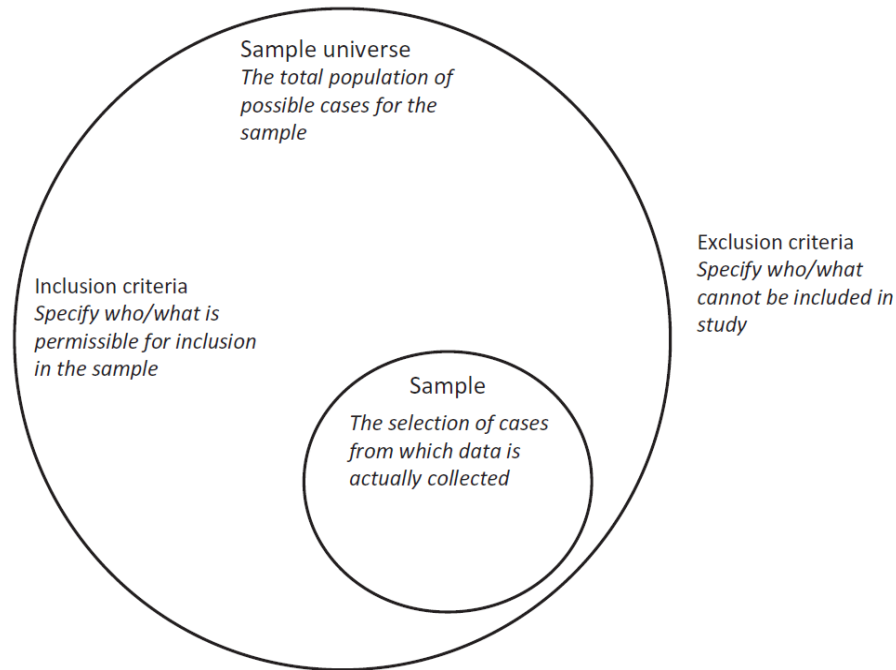
Inclusion criteria for this study required: CGSC faculty member and participation in the *Faculty Perceptions of Critical Thinking* survey instrument. An exclusion criterion for this study is no outside CGSC faculty. The study focused on the perceptions of teaching critical thinking in a professional military education setting to meet Department of Defense policy (CJCS, 2009). This results in a "homogenous" (Robinson, 2014, p. 27) sample sharing three of the five areas of homogeneity Robinson describes.

Participants in the study may be categorized according to "Demographic homogeneity…Geographical homogeneity…Life history homogeneity" (Robinson, 2014, p. 28). All CGSC faculty associate in the same socio-economic group of middle- to upper-middle income and possess a graduate degree or have received a diploma from a military intermediate level education (graduate-level) institution—demographic homogeneity. All study participants geographically reside and teach in the Midwest—geographical

homogeneity. Lastly, the preponderance of study participants possess prior military

experience including deployments or combat, and teaching experience at CGSC—life history

demographics.

Gliner, Morgan, and Leech (2009) emphasized the importance of ensuring the sample

is representative of the population. Sample size matters little if those in the study do not

represent the population of focus. The research included an idiographic approach to focus on

the individual interviews with a determination to find a voice among the faculty members

(Luthans & Davis, 1982; Robinson, 2014) targeting a sample size of nine. Only eight

interviews were conducted, yet this sample size is large enough to capture "cross-case

generalities" (Robinson, 2014, p. 29), while having the ability to manage the data.

The sampling strategy used purposive sampling (Creswell, 2007; Fraenkel & Wallen,

2009; Gliner, Morgan, & Leech, 2009) based upon an *a priori* understanding of the

investigated matter. The researcher is a former faculty member of the institution used in the

study, taught the critical thinking curriculum, and is knowledgeable of the faculty

development practices.

Lastly, sourcing the interview sample presented the risk of self-selection bias among

participants, as individuals volunteered to be contacted in the demographics section of the

survey instrument. Robinson (2014) noted, "self-selection bias is not possible to circumvent

in interview-based research, as voluntary participation is central to ethical good practice" (p.

36), going on to note the only means approaching mitigation is researcher awareness.

Acknowledging this insight, the researcher used random sampling of interview volunteers in

an attempt to mitigate self-selection bias.

Methodology

Quantitative survey. Dike's (2001) "Air Force Professional Military Education Survey: Faculty Perceptions of Critical Thinking" instrument originated out of Baker's (1992) questionnaire for nursing faculty teaching strategies. Baker's instrument was adapted by Tate (1996), again for nursing faculty, which was subsequently used by Walsh (1997) for veterinary faculty. Baker's (1992) instrument was developed after careful review of the literature and consultation with nursing educators "hav[ing] expertise related to critical thinking" (p. 74) and resulted in 49 closed questions asking for agreement or disagreement with the strategy. No previous instrument existed, which required Baker (1992) to rely upon a panel of five experts to evaluate the questionnaire for construct and face validity. A pilot study was conducted, as well as a Cronbach's alpha statistical analysis to determine reliability. The analysis returned a reliability of 0.86 indicating a degree of dependability that the instrument is measuring traits of critical thinking teaching strategies.

Tate (1996) adapted the instrument for use again in a nursing environment. Relying upon the basic structure of Baker's (1992) questionnaire, Tate (1996) reduced the 49 closed questions to 40 teaching strategies asking respondents to rank the effectiveness of the strategy along a Likert scale. She opened the survey with an open-ended question requiring the respondent to define critical thinking, and concluded the instrument asking the person to rank the five most effective teaching strategies and provide a narrative description of one of the ranked teaching strategies. Tate (1996) also relied upon a panel of educators to establish content and face validity; however, she did not use Cronbach's alpha to determine reliability, instead referencing Baker's (1992) reliability.

Walsh (1997) further refined the instrument by reducing Tate's (1996) survey down to 29 teaching strategies, while maintaining the Likert scale construct and the open ended questions at the end. Walsh also chose to use Baker's reliability coefficient, instead of reanalyzing for reliability with Cronbach's alpha.

A significant revision was made to the instrument by Dike (2001) following a review of the literature and Walsh's (1997) instrument. Dike (2001) "distinguished between instructional strategies and evaluation method" (p. 89), which expanded the survey to 50 total strategies and methods to be marked on a Likert scale. She established content validity after the instrument was reviewed by "seven experts" (Dike, 2001, p. 70) from Air University, and a small pilot study with an additional group of faculty. As a result of the panel review and pilot study, an additional option for response was added indicating a person was not familiar with a particular teaching strategy or evaluation method.

Dike (2001) chose to reevaluate the reliability of the instrument due to her significant changes. The teaching strategies and evaluation methods were separated into two Likert scale parts. Using Cronbach's alpha for both, Dike found a reliability coefficient of 0.86 for instructional strategies and 0.88 for evaluation methods to assess critical thinking.

The researcher modified Dike's (2001) instrument to reflect the demographics of CGSC by removing "Air Force" from the title of the instrument. Additionally, "Part I – Demographic Information" (Dike, 2001, p. 220) is changed to remove items specific to Air University making the information applicable to CGSC faculty. Demographic information included the following items: adult-level teaching experience; highest degree earned; major area of study for highest degree; civilian or military; teaching subject area; faculty

development program (FDP) hours attended in last three years; and how many FDP hours were devoted to critical thinking.

Qualitative rationale. The researcher wanted to understand the perspective and understanding CGSC faculty members have regarding the teaching of critical thinking. No quantitative research instrument exists designed to describe the affective domain of teaching and comprehending critical thinking. This exploratory study was appropriate for achieving an impression of faculty views on critical thinking with the desire to go beyond the surface of critical thinking definitions and accepted steps to think critically.

As seen in Chapter 2, several definitions exist for the term critical thinking. While a common theme is present—critical thinking requires a level of higher order thinking—this study investigated whether or not there is ability for higher order thinking among a single institution's instructor team, and their views on critical thinking and the effectiveness for teaching critical thinking skills. The study sought to examine critical thinking and the practice of teaching critical thinking.

Qualitative research required the researcher to suspend his own views and past knowledge of critical thinking in order to gain an in-depth understanding of faculty perceptions on teaching for critical thinking (Creswell, 2007). Through the conduct of several semi-structured interviews, the researcher discovered common themes and perceptions among faculty members.

Issues of trustworthiness. Qualitative research must rely upon measures other than statistical comparison focusing instead on the richness of the data and an in-depth analysis of the findings (Bloomberg & Volpe, 2012; Creswell, 2007; Robinson, 2014; Yardley, 2000). This study examined the interview transcripts using the criteria of

"credibility…dependability…[and] transferability" (Bloomberg & Volpe, 2012, pp. 112-113) to achieve the "trustworthiness" (Lincoln & Guba, 1985, p. 290) in this qualitative study.

   Credibility. Creswell (2007) identified eight strategies, while Bloomberg and Volpe (2012) presented seven strategies for achieving credibility in a qualitative study. Both sources have common approaches allowing the researcher to focus on the following four items to construct credibility—identifying and describing researcher bias, "peer review" (Creswell, 2007, p. 208), "member checks" (Bloomberg & Volpe, 2012, p. 113), and "triangulation" (Bloomberg & Volpe, 2012, p. 113; Creswell, 2007, p. 208).

   In order to establish credibility within the study, the researcher recognized and acknowledge his own bias. As a former faculty member having taught the critical thinking curriculum, and immersing in the literature on critical thinking, the researcher holds a perspective on teaching for critical thinking. The researcher attempted to withhold his own views during the interviews, compiled field notes during the interview process, and kept a reflective journal throughout the data gathering and analysis period.

   The researcher used "peer review" (Creswell, 2007, p. 208) or "peer debriefing" (Bloomberg & Volpe, 2012, p. 113). This process involves a peer reviewing the data for accuracy, asking questions regarding the findings, questioning the methodology and how the researcher came to the conclusions based upon the data. The researcher included this exchange in the reflective journal, which offered additional insight during the analysis and conclusions stage of the study.

   "Member checking" (Creswell, 2007, p. 208) is another approach to ensuring credibility of the research. In this instance, the researcher provided the interviewees with summary findings of the research and requested feedback, and clarification of themes

presented in the findings. No participants provided additional feedback or clarification, and it was determined that the researcher accurately captured the voice of the participants.

Lastly, the researcher examined all the data gathered substantiating conclusions revealed to the researcher through the process of "triangulation" (Bloomberg & Volpe, 2012, p. 208; Creswell, 2007, p. 113). The method involved examination and re-examination of the data presented cross-checking inferences with other pieces of data to present the richness and depth of the interviews to highlight the voice of the participants.

Dependability. Bloomberg and Volpe (2012) described dependability as "whether one can track the processes and procedures used to collect and interpret the data" (p. 113). This description aligns with Yardley's (2000) criteria of rigor and coherence. Providing dependability necessitates the researcher perform an "audit trail" (Bloomberg & Volpe, 2012, p. 113) for others to understand the process carried out to determine the results.

Inter-rater reliability is another important facet to prove dependability (Bloomberg & Volpe, 2013; Creswell, 2007). The researcher had a colleague familiar with the topic of critical thinking perform coding of an interview to compare with the researcher's results for similarity in the categories and themes.

Transferability. Bloomberg and Volpe (2012) emphasize the significance of depth and thickness in the portrayal of the phenomenon. The burden of transferability lies with the researcher to prove how well this study applies to the discipline of teaching for critical thinking, and whether or not others within the community accept the processes and findings as transferable.

Overview of the Research Design

The following steps summarize the research design:

1. Presented the proposal to the dissertation committee.

2. Submitted the Kansas State University IRB application for approval.

3. Submitted the Command and General Staff College IRB application for approval.

4. Requested an e-mail distribution list of CGSC instructors for disseminating the online instrument link.

5. The researcher provided an introductory email, and CGSC emailed the online instrument link and login information to the instructor distribution list.

6. The informed consent was presented to participants on the first screen of the online instrument.

7. Accepting the consent form allowed the participant to proceed.

8. Rejecting the consent form did not allow the individual to complete the online instrument.

9. The *Faculty Perceptions of Critical Thinking* results were collected by CGSC and provided to the researcher in raw form.

10. The researcher conducted quantitative analysis of the *Faculty Perceptions of Critical Thinking* results using the Friedman Test nonparametric statistic.

11. The informed consent was presented to interview participants.

12. Accepting the consent form allowed the interview to proceed.

13. The researcher conducted eight interviews with participants selected from the pool of interview volunteers.

14. The researcher member checked the interview synopses and findings with interviewees, and no corrections were necessary.

15. The researcher conducted qualitative analysis of the interview data.

16. The researcher developed categories of themes from the interview transcripts, and researcher field notes.

Human Rights Protection

The researcher received approval from the Committee for Research Involving Human Subjects (IRB) at Kansas State University and the Command and General Staff College to conduct the study. Consideration for the anonymity of the participants and the protection of rights is paramount in research. This study ensured all participants were volunteers, and included an informed consent form on the initial web page prior to responding to the *Faculty Perceptions of Critical Thinking* instrument. Participants wishing to be considered for participation in the qualitative data collection, interviews, voluntarily included a contact e-mail address at the end of the informed consent form. The researcher safeguarded, and will continue to safeguard, the anonymity of the participants by keeping identifying characteristics of the individuals confidential.

Data Collection Procedures

Quantitative Survey Instrument

CGSC required that the institution send the link to an online version of the *Faculty Perceptions of Critical Thinking* to prospective participants. The researcher provided an invitation email to CGSC that accompanied the link. A request for voluntary participation in a qualitative interview was included in the demographics section. Results of the *Faculty Perceptions of Critical Thinking* were retrieved by CGSC, converted into a spreadsheet, and provided to the researcher for data interpretation and analysis.

Potential interviewees were selected randomly from the individuals that included an e-mail address in the online survey. The demographic portion of the survey requested the

teaching department of the participant. The researcher chose the number of interviewees

from the volunteer pool based upon the percentage of respondents from each department.

The researcher made contact with the individuals who provided an e-mail address and

confirmed her or his willingness to participate in the interview. Nine participants were

selected and scheduled for the interviews.

Qualitative Interviews

The interviews were conducted at a location convenient for the instructor. The

majority of the interviews were conducted at the research library; however, two were

conducted in the instructor's office. The locations were free from distractions and

interruptions. The interview was scheduled to last 45 minutes, although the actual length

varied depending upon the interviewee's responses.

Interviews were recorded with a digital voice recorder allowing for transcription by

the researcher. Prior to the interview beginning, the faculty member was provided with

information about the research study and an informed consent form. The information was

reviewed, the participants were asked if they understand the purpose of the project and if they

still chose to participate.

<center>**Methods for Data Analysis and Synthesis**</center>

Quantitative

Quantitative data gathered was demographic information, instructional, and

evaluation strategies. The purpose of the demographic information was to describe the

instructors participating in the study, and provide a transparent view of the participants in the

research.

The instructional and evaluation strategies were constructed in a summated scale providing "attitudes, beliefs, and opinions" (Coladarci, Cobb, Minium, & Clarke, 2008, p. 7) of the instructors toward the strategies. Ordinal values are limited in the information provided (Coladarci, et al., 2008).

The characteristics of the data obtained in the *Faculty Perceptions of Critical Thinking* was qualitative in nature, which does not lend itself to an analysis of variance (Coladarci, et al., 2008; Friedman, 1937). In order to provide a statistical level of analysis, the researcher used the "*method of ranks* [italics in original]" (Friedman, 1937, p. 676), more commonly referred to as the Friedman test, to examine the Likert-scale data. This study augmented the results of the Friedman test with descriptive statistics to determine frequencies and percentages of strategies used by instructors.

Qualitative

Data collection, data organization, and data analysis are some of the more challenging aspects of qualitative studies (Bloomberg & Volpe, 2012; Creswell, 2007). To successfully organize the data for effective analysis, the researcher intended to use the computer software application NVivo by QSR International. Familiarity with the program prevented its efficient and effective use, and interview recordings were transcribed by the researcher.

Analysis grouped common terms and phrases relating to the teaching for critical thinking. These groupings led toward classification of codes. Creswell (2007) suggested keeping codes to a manageable level that will benefit the researcher in placing the codes into a smaller number of categories or themes. Through the interpretation and presentation of the themes, the researcher holistically represented the data and constructed an understanding of

the phenomenon fusing the voices of the faculty. The purpose of the research was to explore instructor's perceptions of teaching critical thinking.

Chapter Summary

The chapter described why the researcher chose a mixed methods research design to study the perceptions of faculty members following Johnson and Onwuegbuzie's (2004) premise that mixed methods research "attempt[s] to fit together insights provided by qualitative and quantitative research into a workable solution" (p. 16). Through qualitative inquiry the study explored a deeper understanding of the instructor's view than may be achieved through a quantitative study alone. Robinson's (2014) approach to determining the sample is described, as well as a description of Dike's (2001) instrument for faculty perceptions. Issues of trustworthiness were addressed followed by the protection measures for the participants, the data collection process, and the data analysis. As mentioned previously, this study provided a bridge across critical thinking to the practice of teaching critical thinking.

Chapter 4 - Findings

Introduction

Quantitative and qualitative data were collected for this study, and the results of the analysis are presented in this chapter. The quantitative data addresses the first two subordinate research questions. The qualitative data from the online instrument and eight interviews of faculty members reflects the perceptions of the instructors, and focuses on the primary research question.

Research Questions

The study addressed the following primary research question and three sub questions:

What are CGSC instructors' perceptions of teaching methods and assessments incorporated to promote the development of critical thinking skills?

    a. According to faculty members what is the most effective approach to teaching critical thinking skills in a graduate level education environment?

    b. According to faculty members what is the most effective approach to assess critical thinking skills of their students?

c. How do the faculty members define critical thinking?

Quantitative Results

Quantitative data were collected in January and February 2016. The researcher intended to focus solely on resident instructors at the U.S. Army's Command and General Staff College (CGSC); however, the researcher was unable to collaborate with CGSC to sanitize the participant invitation list. The result is the survey was sent to 271 individuals that included faculty and staff members on January 21, 2016, a reminder email was sent to the invitees on February 4, 2016, and the survey was closed on February 24, 2016. There

were 89 respondents to the survey who completed portions of the demographic data, and 83 participants who completed the demographic data and Parts II through IV of the survey instrument.

The characteristics of the data obtained in the survey was qualitative in nature and consisted of ordinal values, which does not lend itself to an analysis of variance (Coladarci, et al., 2008; Friedman, 1937). The researcher chose the Friedman test (Friedman, 1937) as an appropriate nonparametric statistical test to examine the Likert-scale data.

Demographics

The sample was comprised of 91.5% male and 8.4% female, and all respondents identifying as white apart from one individual identifying as American Indian. Participants responding were 75.9% civilian and 24.1% active duty military. All participants hold a Master's degree or higher, with 66.2% reporting a Master's degree, 15.6% claim post-Master's accomplishments, and 18.1% possess a Doctorate. Over 50% of respondents have greater than 10 years teaching experience with adults, and when combined with faculty members replying with 5 to 10 years of adult teaching experience, the result is greater than 80% of faculty at CGSC having five years or more of experience teaching adults. The academic disciplines and teaching experience of participants are identified in Table 4.1.

Table 4.1

Academic Disciplines and Adult-Level Teaching Experience.

	Academic disciplines		
	Master's	Post-master's	Doctorate
Business	15	2	-
Education	7	5	4
History	3	1	5
International Studies	7	2	1
Military Operations	5	1	-
Other[a]	10	-	3
Political Science	3	-	1
Psychology	2	-	1
Public Administration	1	1	-
Science/Technology	1	1	-
Totals	54	13	15
Percent of sample	66.2%	15.6%	18.1%

Adult-Level Teaching Experience				
1 year or less	-	-	-	-
More than 1 year less than 5 years	14	-	-	16.8%
5 to 10 years	18	5	-	27.7%
More than 10 years	22	8	15	54.2%

Note. [a]The academic disciplines at the Master's identified include Engineering (1), National Security and Strategic Studies (1), Leadership (2), Logistics (2), Management (2), and Strategic Intelligence (2); and the Doctorate degrees identified encompass Leadership (1), Military and Strategic Studies (1), and Organizational Development (1).

Participants were also queried on the number of faculty development hours attended during the last three years, and how many of those hours were devoted to the teaching of critical thinking. A majority of faculty, 68.3%, report attending more than 40 hours of dedicated faculty development, and those responding indicate nearly 31% of the time is devoted to the teaching of critical thinking. Table 4.2 delineates the number of hours attended and dedicated to teaching critical thinking.

Table 4.2

Faculty Development Hours Attended and Devoted to Critical Thinking

Faculty Reporting Faculty Development Hours Attended in Last 3 Years		Faculty Development Hours Devoted to CT				
		None	8<	8 to 24	24> <40	40>
None	-					
Less than 8	2	2 (2.4%)	-	-	-	-
8 to 24	5	4 (4.8%)	1 (1.2%)	-	-	-
More than 24, less than 40	19	-	14 (17.1%)	4 (4.8%)	1 (1.2%)	-
More than 40	56	-	31 (37.8%)	19 (23.7%)	4 (4.8%)	2 (2.4%)

The demographic data were received and distinguishable by teaching departments within CGSC. Ranking the results, $n = 83$, allowed for the Friedman test to be applied to the larger data set. The researcher then analyzed data per various demographic discriminators. However, attempting to analyze the ranked data by distinguishable demographic data did not produce accurate results due to the low n-number, and the repetition of "0" for the ranked columns.

Instructional strategies that foster critical thinking. Table 4.3 shows the total responses for the instructional strategies, and Table 4.4 displays the responses ranked for the Friedman test. The Friedman test statistic was used to examine the Likert-scale responses, where:

$$F_R = \frac{12}{nk(k+1)} \sum_{i=1}^{k} R_j^2 - 3n(k+1)$$

n = number of blocks
k = number of groups

The null hypothesis tested states all instructional strategies that foster critical thinking are equal. The alternative hypothesis is that at least one of the instructional strategies differ from the others.

$H_0 = \Theta_{T1} = \Theta_{T2} = \Theta_{T3} = \Theta_{T4}... = \Theta_{T27}$

$H_1 =$ One or more of the instructional strategies foster critical thinking.

Table 4.3

Instructional Strategies that Foster Critical Thinking

#	Strategy	Unsure of Strategy of its Effectiveness	Highly Ineffective	Somewhat Ineffective	Somewhat Effective	Highly Effective
1	Small group discussion with Facilitator	0	0	0	19	57
2	Programmed Instruction	3	13	16	40	2
3	Computer-Aided Instruction	4	14	32	26	
4	Interactive Video	7	7	18	40	4
5	Role Play/Simulation	0	1	8	30	37
6	Case Studies	0	1	6	31	45
7	Wargaming (computer simulations)	2	3	20	44	14
8	Brainstorming	2	2	5	32	41
9	Formal Debate, Argument	1	1	3	20	58
10	Analogy/Metaphor Activities	5	1	10	48	19
11	Visual Thinking (visualize a solution/plan)	4	2	4	49	24
12	Lecture without Discussion	4	41	24	13	0
13	Lecture with Discussion	0	4	24	42	13
14	Research or Formal Paper	1	1	12	39	30
15	Student Presentation of Assignment	1	1	10	55	16
16	Meta-cognition (monitoring one's own thinking)	2	1	9	33	37
17	Journal/Log (reflective writing)	2	2	18	35	26
18	Communication Dialogs (taped interviews, process recordings)	16	5	27	32	3
19	Deductive Reasoning Techniques	4	0	3	56	20
20	Inductive Reasoning Techniques	7	0	4	52	19
21	Abstract or Critique of Book Article, or Video	3	1	15	46	18
22	Writing (short responses to concepts/situations)	1	4	11	49	17
23	Questioning (high order; reflective; open-ended)	1	2	1	31	48
24	Group Collaboration or Problem Solving	0	3	6	37	37
25	Experiential	3	2	5	38	35
26	Outdoor Activities with Follow-up Discussion	8	2	14	44	15
27	Role Modeling/Mentoring by Instructor	3	2	11	44	22

Table 4.4

Ranked Instructional Strategies that Foster Critical Thinking

		Unsure of Strategy of its Effectiveness	Highly Ineffective	Somewhat Ineffective	Somewhat Effective	Highly Effective
1	Small group discussion with Facilitator	2	2	2	4	5
2	Programmed Instruction	2	3	4	5	1
3	Computer-Aided Instruction	2	3	5	4	1
4	Interactive Video	2.5	2.5	4	5	1
5	Role Play/Simulation	1	2	3	4	5
6	Case Studies	1	2	3	4	5
7	Wargaming (computer simulations)	1	2	4	5	3
8	Brainstorming	1.5	1.5	3	4	5
9	Formal Debate, Argument	1.5	1.5	3	4	5
10	Analogy/Metaphor Activities	2	1	3	5	4
11	Visual Thinking (visualize a solution/plan)	2.5	1	2.5	5	4
12	Lecture without Discussion	2	5	4	3	1
13	Lecture with Discussion	1	2	4	5	3
14	Research or Formal Paper	1.5	1.5	3	5	4
15	Student Presentation of Assignment	1.5	1.5	3	5	4
16	Meta-cognition (monitoring one's own thinking)	2	1	3	4	5
17	Journal/Log (reflective writing)	1.5	1.5	3	5	4
18	Communication Dialogs (taped interviews, process recordings)	3	2	4	5	1
19	Deductive Reasoning Techniques	3	1	2	5	4
20	Inductive Reasoning Techniques	3	1	2	5	4
21	Abstract or Critique of Book Article, or Video	2	1	3	5	4
22	Writing (short responses to concepts/situations)	1	2	3	5	4
23	Questioning (high order; reflective; open-ended)	1.5	3	1.5	4	5
24	Group Collaboration or Problem Solving	1	2	3	4.5	4.5
25	Experiential	2	1	3	5	4
26	Outdoor Acitivties with Follow-up Discussion	2	1	3	5	4
27	Role Modeling/Mentoring by Instructor	2	1	3	5	4

Table 4.5 depicts the results of the Friedman test. The computed *p*-value is 6.64E-13,

considerably less than α = 0.05, indicating that one or more of the instructional strategies are

believed to foster critical thinking in students, thus the null hypothesis must be rejected.

Table 4.5

Friedman Test for Instructional Strategies that Foster Critical Thinking

Data	
Level of significance α	**0.05**
Intermediate Calculations	
Number of blocks	27
Number of groups	5
First intermediate term	0.01481
Sum of rank total squares	37060.5
Second intermediate term	486
Degrees of freedom *df*	4
Test Result	
Friedman Test Statistic F_R	**63.044**
Critical Value χ^2	**9.4877**
p-Value	**0.0000**
Reject the null hypothesis	

The researcher then looked at those instructional strategies ranked highest on the

Likert-scale. To separate these strategies out, the researcher selected all strategies that

received a "5" ranking for "Highly Effective" and a "4" ranking for "Somewhat Effective".

One strategy received equal ranking – a tie – resulting in a "4.5" for both "Highly Effective"

and "Somewhat Effective".

Table 4.6

Top Likert-rated Instructional Strategies
Small group discussion with Facilitator
Role Play/Simulation
Case Studies
Brainstorming
Formal Debate, Argument
Meta-cognition (monitoring one's own thinking)
Questioning (high order; reflective; open-ended)

Participants then selected which instructional strategies he or she use in teaching for

critical thinking. The researcher selected the top and bottom five instructional strategies

from the data.

Table 4.7

Top Five Teaching Techniques Used	
Small group discussion with Facilitator	100%
Group Collaboration or Problem Solving	97.5%
Brainstorming	93.8%
Questioning (high order; reflective; open-ended)	92.6%
Student Presentation of Assignment	91.4%

Bottom Five Teaching Techniques Used	
Communication Dialogues (taped interviews, process recordings)	5%
Interactive Video	16%
Outdoor Activities with Follow-up Discussion	19%
Lecture without Discussion	21%
Computer-Aided Instruction	37%

Lastly, the faculty members were asked to rank the instructional strategies from 1 to

5, with 1 being the lowest ranking and 5 being the highest. Table 4.8 displays the results,

which are congruent with the Likert-scale strategies and the strategies used to foster critical

thinking in the learning environment.

Table 4.8

Top Five Ranked Instructional Strategies

	Rank
Small group discussion with Facilitator	1
Group Collaboration or Problem Solving	2
Questioning (high order; reflective; open-ended)	3
Case Studies	3
Lecture with Discussion	5

Evaluation methods that assess critical thinking. Table 4.9 shows the total

responses for the evaluation methods, and Table 4.10 displays the responses ranked for the

Friedman test. The Friedman test statistic was used to examine the Likert-scale responses,

where:

$$F_R = \frac{12}{nk(k+1)} \sum_{i=1}^{k} R_j^2 - 3n(k+1)$$

n = number of blocks
k = number of groups

The null hypothesis tested states that all evaluation methods assessing critical

thinking are equal. The alternative hypothesis is that at least one of the evaluation methods

differ from the others.

$H_0 = \Theta_{A1} = \Theta_{A2} = \Theta_{A3} = \Theta_{A4...} = \Theta_{A23}$

H_1 = One or more of the strategies are effective methods to assess critical thinking.

Table 4.9

Evaluation Methods that Assess Critical Thinking

		Unsure of Strategy of its Effectiveness	Highly Ineffective	Somewhat Ineffective	Somewhat Effective	Highly Effective
1	Assessment of Journal	14	4	8	39	12
2	Critique of Communication Dialogues	12	1	8	39	17
3	Assessment of Deductive Reasoning	13	0	3	41	21
4	Assessment of Inductive Reasoning	14	0	6	36	21
5	Feedback/Revision on Research/Formal Paper	0	0	6	40	32
6	Essay Examination	0	2	8	40	27
7	Multiple-Choice Test	3	31	27	17	0
8	Short-Answer Test	3	3	20	46	6
9	Rubric (instructor developed)	6	11	17	33	11
10	Graded Oral Presentation	0	2	8	48	19
11	Direct Observation and Documentation	0	0	7	40	31
12	Commercially Available Critical Thinking Tests	39	2	14	17	6
13	Feedback on Argumentative Essays	1	1	4	33	39
14	Feedback on Individual Interviews	9	1	4	43	21
15	Monitoring Classroom Discussions	1	4	5	44	24
16	Student Self-Assessment	4	3	24	35	11
17	Graded Review of Book, Article, Video, etc.	7	3	16	40	12
18	Student-Developed Learning Contract	27	6	13	23	7
19	Self-Appraisal Exercises (reaction papers, personal philosophy)	13	5	8	39	13
20	Peer Evaluation	6	2	12	41	17
21	Assessment of Team Activity	4	2	16	48	8
22	Pre-test/Post-test	8	6	16	32	15
23	Concept-Mapping Assessment	25	1	4	28	20

Table 4.10

Ranked Evaluation Methods that Assess Critical Thinking

	Unsure of Strategy of its Effectiveness	Highly Ineffective	Somewhat Ineffective	Somewhat Effective	Highly Effective
1 Assessment of Journal	4	1	2	5	3
2 Critique of Communication Dialogues	3	1	2	5	4
3 Assessment of Deductive Reasoning	3	1	2	5	4
4 Assessment of Inductive Reasoning	3	1	2	5	4
5 Feedback/Revision on Research/Formal Paper	1.5	1.5	3	5	4
6 Essay Examination	1	2	3	5	4
7 Multiple-Choice Test	2	5	4	3	1
8 Short-Answer Test	1.5	1.5	4	5	3
9 Rubric (instructor developed)	1	2.5	4	5	2.5
10 Graded Oral Presentation	1	2	3	5	4
11 Direct Observation and Documentation	1.5	1.5	3	5	4
12 Commercially Available Critical Thinking Tests	5	1	3	4	2
13 Feedback on Argumentative Essays	1.5	1.5	3	4	5
14 Feedback on Individual Interviews	3	1	2	5	4
15 Monitoring Classroom Discussions	1	2	3	5	4
16 Student Self-Assessment	2	1	4	5	3
17 Graded Review of Book, Article, Video, etc.	2	1	4	5	3
18 Student-Developed Learning Contract	5	1	3	4	2
19 Self-Appraisal Exercises (reaction papers; personal philosophy)	3.5	1	2	5	3.5
20 Peer Evaluation	2	1	3	5	4
21 Assessment of Team Activity	2	1	4	5	3
22 Pre-test/Post-test	2	1	4	5	3
23 Concept-Mapping Assessment	4	1	2	5	3

The computed *p*-value for the evaluation methods is 2.63E-11, indicating that one or more of the evaluation methods are effective in assessing critical thinking, thus the null hypothesis must be rejected. Table 4.11 depicts the results of the Friedman test.

Table 4.11

Friedman Test for Evaluation Methods that Assess Critical Thinking

Data	
Level of significance α	**0.05**
Intermediate Calculations	
Number of blocks	23
Number of groups	5
First intermediate term	0.0047
Sum of rank total squares	0.00
Second intermediate term	414
Degrees of freedom *df*	4
Test Result	
Friedman Test Statistic F$_R$	**55.43**
Critical Value χ2	**9.49**
***p*-Value**	**0.0000**
Reject the null hypothesis	

The researcher followed the same procedure – used to examine the rankings of the instructional strategies – to analyze the evaluation methods that ranked highest on the Likert-scale.

Table 4.12

Top Likert-rated Assessment Techniques

Feedback on Argumentative Essays
Critique of Communication Dialogues
Assessment of Deductive Reasoning
Assessment of Inductive Reasoning
Feedback/Revision on Research/Formal Paper
Essay Examination
Graded Oral Presentation
Direct Observation and Documentation
Feedback on Individual Interviews
Monitoring Classroom Discussions
Peer Evaluation

Respondents then chose which evaluation methods he or she use in assessing for

critical thinking. The researcher selected the top and bottom five evaluation methods from

the data.

Table 4.13

Top Five Assessment Techniques Used

Monitoring Classroom Discussions	100%
Feedback on Argumentative Essays	89.7%
Direct Observation and Documentation	89.7%
Assessment of Team Activity	88.5%
Graded Oral Presentation	87.2%

Bottom Five Assessment Techniques Used

Commercially Available Critical Thinking Tests	10%
Student-Developed Learning Contract	19%
Concept-Mapping Assessment	24%
Pre-test/Post-test	24%
Graded Review of Book, Article, Video, etc.	43%

Lastly, the faculty members were asked to rank the evaluation methods from 1 to 5, lowest to highest. The results reflect the more effective Likert-scale methods, as well as the commonly used methods in the classroom.

Table 4.14

Top Five Evaluation Methods Ranked

	Rank
Monitoring Classroom Discussions	1
Feedback on Argumentative Essays	2
Essay Examination	2
Direct Observation and Documentation	4
Feedback/Revision on Research/Formal Paper	5

Qualitative Results

This study contains two means of obtaining qualitative data. First, the online *Faculty Perceptions of Critical Thinking* Survey included one open-ended question and two open-ended opportunities for the participants to reply. Second, eight interviews were conducted with volunteer participants to examine the research questions. Each interviewee was provided the opportunity to member check his or her responses, and there were no revisions provided.

Teaching for Critical Thinking

There were no new instructional strategies recognized in the qualitative feedback of the survey. The preponderance of responses identified several teaching techniques that may be classified under one instructional strategy or another. The researcher also sought congruency with the four areas identified in chapter two: focus on the student and the learning environment; facilitating dialogue; modeling critical thinking; and subject matter expertise. Only two of the four areas presented themselves in the qualitative survey

responses – focus on the student, and encouraging and facilitating discussion. The responses demonstrate a commitment to create a learning environment that encourages student participation and higher order thinking. Over two-thirds of faculty members also address or suggest that discussion encouraged critical thinking among their students. However, all four areas were represented by those interviewed – focus on the student, encouraging and facilitating discussion, modeling critical thinking, and subject matter expertise in the teaching area.

Instructional strategies. Three instructional strategies – role modeling (critical thinking), small group facilitated discussion, and questioning – were addressed through the interviews and small group facilitated discussion was also supported in the survey qualitative responses. All eight participants provided comments indicating they model critical thinking in the classroom. The instructors described ways in which they engaged the students pushing them to consider other perspectives and alternatives in order to defend the chosen position. One instructor described teaching critical thinking "as part of a whole" focusing on deconstructing an argument, or problem, to examine the parts separating facts from assumptions in an attempt to get students from thinking one-dimensionally. Another faculty member interviewed demonstrated modeling critical thinking by "motivat[ing] them to believe that there could be other solutions…don't tell them what to do, but you somehow have to lead them to believe that there may be other solutions, and then they start to explore them". Another participant described being a participant in the learning environment, as his class discusses challenging concepts or participates in planning exercises.

Small group facilitated discussion was specifically mentioned by four of the eight interviewees, although each interviewee described a learning environment built upon

facilitated discussion. This instructional strategy was also noted by over 45% of the 89

respondents to the open-ended question on the survey. Only one response from the survey

provided the connection between modeling critical thinking and facilitating discussion,

"fostering critical thinking is reliant on both the facilitator and the students' abilities".

Three of those interviewed highlight the fact that they work to include teaching for

critical thinking daily into the curriculum. One interviewee illustrated how he challenges the

students each day through an exercise to practically apply critical thinking techniques.

Another interviewee referred to challenging the students to go beyond their comfort zones, "I

certainly bring [critical thinking] into the lexicon of my classes, and that's what the

expectation is that they are going to extend themselves".

Lastly, five of the interviews focused on questioning that requires a higher order of

thinking. One interviewee explained how he asks "probing questions" in an effort to show

students when they "got superficial on [the problem] and [they] need to go back and rethink

how [they] were going to try and tackle this problem". His purpose is to provide freedom for

the students to be creative and consider alternatives. Another interviewee described his

attempt to achieve critical thought by his students through in-depth questioning in the

classroom, "if you can go seven questions deep, then you have a thorough understanding of

something". The responses in the surveys and interviews revealed the techniques of

facilitated discussion and quality questioning were dominate to teach critical thinking skills

in a collaborative learning environment.

Effectiveness in teaching. A common idea throughout the interviews was

effectiveness of teaching for critical thinking depends upon faculty experience. An interview

participant expressed how he examines the curriculum and determines how best to achieve

the learning objectives. He continued by emphasizing the need for faculty members to exercise initiative and self-develop as instructors. Another instructor addressed the requirement for faculty to pursue "cognitive mind training", which is an ability that must be developed. Yet another interviewee identified the obligation to create an effective learning environment requires "good preparation, [and] experienced instructors".

Three of the interviewees and two of the survey responses refer to "red teaming". The U.S. Army's University of Foreign Military and Cultural Studies (UFMCS) offer "red team" courses at Fort Leavenworth. The website states, "The core of our curriculum is based on applied critical thinking, fostering cultural empathy, self-awareness and reflection, and groupthink mitigation" (UFMCS, n.d., para. 1). The interviewees were very familiar with the curriculum and teaching methods, advocating for a similar curriculum structure at CGSC. One commented, "if I could have my way, everybody would do it, but that's not a widely held [belief]". Both describe UFMCS's approach to teaching critical thinking as effective, focusing on the vibrant discussions, exposure to red teaming tools, and the dedicated time for reflection.

Faculty development. The faculty development program was addressed by five interviewees. Six of the interviewees stated the first time they had heard the term critical thinking was at CGSC, although upon reflection four of the six believed they had been practicing critical thinking under another name. Three acknowledged that the faculty development program provides a good introduction to critical thinking by providing a basic understanding of the concepts and terminology for all instructors to use in the curriculum. One faculty member in describing the curriculum and what improvements he would make to

encourage critical thinking stated, "I think there's a lot of things we do [well]…we need to…make it a little bit more organized and self-supporting".

Inhibitors to teaching for critical thinking.

Faculty development. The interviews did provide support for the faculty development program and areas for improvement. Two key points were stressed relating to the development of faculty members: 1) the faculty development program introduces instructors to the terminology of critical thinking, but does not provide instructions on how to teach critical thinking skills; and 2) there is no credible evaluation of instructors in the classroom and whether or not they foster critical thinking skills. The points are congruent, in that instructors who may not know how to effectively teach critical thinking skills are also not evaluated in the classroom environment on their teaching effectiveness.

While all eight interviewees described teaching critical thinking skills for their students, no one acknowledged that the faculty development program provided the teaching tools to facilitate the learning of critical thinking skills among the students. One interviewee described the faculty development program:

> That doesn't mean that somebody that goes through that thing actually understands what they just sort of did, and then…everybody walks out there with, "that's a cool idea", "that's a really great idea". Now they are expected to model it in the classroom, and there's no help to make sure that they are: 1) they are actually doing it; 2) if they're struggling there is a place for them to kind of say, "what can I do better?" None of that kind of stuff. So, at the end of the day, what you wind up with, I think is a policy that the school has, but no real mechanism to enforce the policy or to help somebody who may not be a natural creative thinker. A natural instructor.

Another interviewed also addressed the issue,

> …the mixed result is it's just such an individual instructor area. I don't think that [CGSC] have, here's a new instructor, here's an experienced instructor, here's the best way to get at and have your students critically think. I've never received that training.

Yet another explained:

> I don't think the school does a very good job of…they talk a good game about critical thinking, but there's no training on critical thinking, there's no effort to help the faculty understand what really is critical thinking? And how should that then be displayed in the classroom? Or how is that then inculcated into a student? There's none of that.

The interviews demonstrated that the instructors took it upon themselves to determine the best teaching techniques to facilitate growth in their students' critical thinking skills.

The second point highlights a perceived weakness in the faculty development program. All of the interviewees identify that teaching is an individual effort in the classroom, and five of the interviewees go beyond this belief to describe circumstances focusing on quality control. It was noted earlier in chapter one that critical thinking is interwoven throughout the curriculum. Three of the interviewees point out that only one-fourth of the faculty teaching teams teach the critical thinking curriculum. One noted, "I can guarantee there are…probably four to six on every team that are completely clueless and have no clue…some probably don't even know we teach [critical thinking]". Another instructor emphasized a need for quality control:

you've had these folks in their former lives have all been in positions of authority, where they're working in the classic Bavarian pyramid structure bureaucracy and they tended to be higher up in that food chain. I don't think the school does a very good job of…they talk a good game about critical thinking, but there's no training on critical thinking, there's no effort to help the faculty understand what really is critical thinking? And how should that then be displayed in the classroom? Or how is that then inculcated into a student? There's none of that.

He goes on to contend that there is no one checking on the effectiveness of the faculty member in the classroom. This is supported by another interviewee's observation, "It is a blank check, largely, to the faculty to kind of [teach critical thinking] in the classroom the way they think they should do it".

Interviewees expressed that no mechanism is in place to effectively check on instructors in the classroom. One conveyed his frustration:

What makes the determination that an instructor is effective? …the one time any representative has been in my classroom, was clueless completely about what I was doing and what I was trying to present. Couldn't evaluate me if you had to. The next thing about that is, I have never, this is just me, I have never gotten the results of, was I effective with my staff group. There is no pre-test. There is no post-test, unless I make it up and do it myself, which I do on occasion. But at the end of the year, I don't get any feedback. I don't know, I could have ruined sixteen people. I have no clue. And I have asked repeatedly, they said, no, we can't do that, because there's privacy issues. Well, that's all well and good, but that doesn't help me get better.

Another instructor commented, "…at the end of the day what you wind up with, I think, is a policy that the school has, but no real mechanism to enforce the policy or to help somebody who may not be a natural creative thinker". The interviews attest to the need for a faculty development program that includes observation in the classroom and feedback for the instructors to ensure instructors are effective in the classroom fostering critical thinking skills in the students. One interviewee recommended:

You need a master instructor in each department. And that instructor needs to be able to…he needs to be a communicator, not a…like right now we have something of that in my department, where [leadership] sends the curriculum developers into the classroom to see…you know, write up a little sheet on…did you follow the thing? Did you hit the TLOs (terminal learning objectives) and ELOs (enabling learning objectives)? That doesn't mean that they were effective instructors. It means they kind of went through the stuff that was in the lesson plan. What I recommended…is the guy [who]…was one of the best instructors we ever had in that department. Not because he was a master of the curriculum. I mean, he knew it as well as anybody else, but he had a gift with the students. He could communicate very effectively with them. That's what you need in the classroom, is someone who can communicate ideas, have an open dialogue with students, not preach down to them. And you need someone who can spot that in an instructor, or spot the lack of it in an instructor, and help them get there.

In the context of effective teaching for critical thinking, the research indicated a need for equipping instructors with the techniques to competently and purposefully teach critical thinking skills. The research also identified a requirement to improve upon, what two of the

interviewees described as an ineffectual system, or establish a revised method for quality control among the instructors as part of a faculty development program.

Doctrine as a constraint. Another inhibitor to teaching for critical thinking is the reliance upon doctrine by faculty and students. In his definition for critical thinking, an interviewee described the need for a "non-parochial approach" to thinking and noted that this sometimes may be a challenge as "it's probably a particular problem in an Army organization, just because we can easily end up constrained by doctrine" in exercising critical thinking skills. Another interviewed mentioned in the context of doctrine that "people are comfortable with the mental model and paradigms that they've used over a period of time". A more direct comment on how the reliability on doctrine may be an inhibitor, "…while we talk about, well, we want them to be critical thinkers then we follow that up immediately with, 'and here's what doctrine says.' Which almost flies in the face of being a critical thinker".

Student experience. Seven instructors interviewed provided remarks concerning experience as the basis for critical thinking, or the perceived lack of experience inhibiting the growth of their students critical thinking skills. Three of the instructors interviewed described a deficiency in experience of students entering the school, and their comments placed the students in the range of "multiplicity" and "contextual relativism" in Perry's Schema (1999) found in chapter two.

One interview participant stressed that "[critical thinking] is a matter of life experiences…if I don't have that experience connection with it, then it's like a tool. You don't remember how you use a hammer, you remember what you make". Another offered support in his remarks indicating there must be a foundation, or experience, for the thinker, "…the

thinker has to be somewhat informed in order to be critical". Four others also address the issue of experience by highlighting the perception that younger students are arriving at the college. One observed:

> We are now seeing more junior students. Half this class got here as captains, and so they don't have that…data point of maybe an additional assignment where they could have run into planning [at an operational] level. So that's kind of a challenge. I mean part of this is really based on, what is your experience level when you walk in the door?

Another's comments also address the students' lack of experience leads to less critical thinking:

> Students are younger now.... So, it ah…I think that makes it a little harder. You might of thought it might made it a little easier, being a little bit younger thinkers and stuff; but, they're just more interested in solutions.

An interviewee also provided an example:

> I think it's a problem….They're coming here now, they're younger. And I think it's more of a challenge. I had one student early on this year, I pulled her aside. She's bright, but I said, look, you have to be open to other points

> The last two observations reflect a position within Perry's Schema (1999) that does not correspond to what is being sought after by the curriculum and instructors. An interview participant provided a summation to this inhibitor, "if they haven't got the foundation, then it sometimes gets tough to go higher…go more into critical thinking, analysis".

Time restraints in the curriculum. Lastly, all those interviewed, as well as four survey respondents, expressed that it is necessary to allow students time to reflect in order to

achieve critical thinking. Each interviewee discussed a lack of time in the classroom to allow students to explore other alternatives or perspectives. An instructor remarked, ""You've got to be able to give [students] the time to take that, to savor that question, to read, to challenge, and to go from there". Another interviewee expressed struggles with time and said, "…[there] was just a lack of base knowledge, and a lack of time to develop it". One of the survey responses captured the perceived frustration of faculty members, "A person needs time to think. Time is the first thing we [the college] take away".

Assessing critical thinking

Eleven responses were provided in the open-ended portion of the survey asking for additional assessment strategies. The comments reflect additional teaching techniques vice evaluation methods, which are congruent with the interviewees observations. Two main techniques for assessing critical thinking were evident in the transcripts and used by all instructors, and two additional methods were described by a small number of instructors.

Monitoring classroom discussions is the prominent assessment technique explained by the interviewees. The predominant teaching methods are facilitated discussion and group participation in planning exercises, as seen in the quantitative results and expressed in both the survey and interview qualitative results. Instructors describe subjective assessment criteria during the discussions by observing and providing feedback on the students' thought processes, and seeing if there is evidence that the decision is supported. One instructor states that the student must have a "basis to [his or her] argument", while another is "looking for examples of original thought".

The second technique illustrated both in the quantitative results and in the interviews is the assessment of a team activity. Students are given scenarios and work through a

planning process to present a credible plan for the situation. One type of exercise is developing a strategic estimate, which one instructor explained as a disciplined approach to problem solving. Congruent with the facilitated discussion, instructors are observing how the students solve the problem and "push them beyond a simple, doctrinal solution…or worse yet a 'hand wave' solution that lacks the detail and clarity to actually solve the problem or address the problem".

Evaluating writing was identified by two of the interviewees. The faculty members believed that they can gain a better appreciation for the students' thinking abilities.

> …[W]e pose some kind of question for them to write a one page paper on…every week. And it is usually some topic where they have to apply the readings to some opinionated problem, and paint an argument as to why they believe something.

The other instructor incorporated a discussion board forum into the curriculum. He required that the student "post an original idea…and respond to somebody else's in a very concrete way, they agree or disagree. And then they have to explain why". He continued explaining that this technique compels the student to think about his or her response, where the classroom allows for "impulsive moment[s]" discussing contentious issues.

Two instructors describe using the curriculum provided rubrics for assessing critical thinking. However, upon closer examination both describe subjectivity in their approach for using the rubric. One explained, "I think we're driven by rubrics and stuff we're given, though I try to be flexible. If I think somebody's done well and maybe doesn't match, but for me, I get it. It's not wrong. It's different." The other described, "…where the rubric does not make sense to me, I deviate in a way that makes sense….there's a little bit of gut feel that goes into it".

Finally, one interviewee offered a perspective counter to assessing critical thinking within planning exercises, and in the facilitated discussion format, "…you would have to take them out of the groupthink process. You would have to make it individual work. If you really want to assess critical thinking individually, it has to be an individual problem".

Definition of critical thinking

The definition of critical thinking by participants was varied in the survey results and the interviews. Prior to examining the responses, the researcher categorized the operational definition of critical thinking for this study into five areas: reflective thought, significant analysis, facts from assumptions, arrive at a judgment, and problem solving. These areas were then used to examine the definitions.

Survey results. The first question on the survey asked participants to define critical thinking in the context of professional military education. Eighty-two participants provided a definition of critical thinking.

Reflection was directly addressed in seven of the definitions, and an additional five definitions address the concept of reflective thought. Nine definitions include in-depth analysis, and 24 speak to some requirement for analysis or evaluation. A small number of definitions focus on determining facts from assumptions. Three definitions specifically focus on identifying facts from assumptions, while another six emphasize the need to separate facts from assumptions. Lastly, 12 definitions delineate a need to arrive at a judgment, involve decision-making, or provide a solution. An additional 15 definitions also imply decision-making and providing solutions as part of the process of critical thinking.

Viewing the definitions holistically, 39% of the responses focus on a requirement for significant analysis. Additionally, almost 33% reveal problem solving as a component of critical thinking's definition.

All of the participants described critical thinking as a deliberate act. One participant defined critical thinking as:

a personal philosophy/mindset gained through study, constant self reflection, continuous practice, and an enduring, sincere desire to improve the quality of one's thinking and the communication of that thinking. It aims to mitigate unintentional analytical biases and eliminate logical fallacies/fallacies of relevance in one's own arguments and identify them in the arguments of others. Accordingly, it develops a high degree of skill in questioning the thinking of oneself and others. The immediate goal is to communicate the reasons behind different points of view as quickly as possible to get at the crux of an issue, not necessarily to resolve such differences.

Another participant defined critical thinking as, "…the examination, analysis, and evaluation…of a subject…and may include existential experiences". The participant described "existential experiences as those momentary intuitions from which we gain a deeper, more complete, more all-to-one kind of understanding than we normally do". While another described critical thinking encompassing "purposeful and reflective judgment". The consensus among the definitions is two-fold; thinking critically aims to gain a deeper understanding of the issue, and critical thinking is an ability requiring a cognitive skill.

Eleven definitions included experience as a key component of critical thinking. The clarity of experience as a component of critical thinking is as basic as one observed, "using one's judgment (based on experiences and reflection)", or another stated, "[critical thinking]

means treating problems as new events and not just repeating what we did last time". Other definitions were more complex as seen previously with the definition including existential experiences, another identifying "experience-based understanding", or one response that combines both experience and the deliberate act:

Critical thinking is questioning an idea or proposal in the light of other experiences. It includes considering second and third order effects. The ability to think critically increases with experience and learning. It also involves being able to project past experiences and understanding into unknown or new situations. Critical thinking appears to require conscious effort, attention, and focus of thought and does not occur automatically.

The researcher found 40 of the 82 (48.7%) definitions draw a parallel to the upper levels of Perry's Schema (Perry, 1999) described as a "commitment with relativism". In order to categorize the definitions, the focus turned to the participants' use of multiple perspectives and addressing bias recognition. These two terms, conceptually, place the critical thinker in the upper reaches of Perry's Schema as he or she considers, and values, outside perspectives, as described in Position 9 of Table 2.1. Definitions addressing critical thinking without considering multiple perspectives were not categorized in Perry's upper levels, even though the definition may accurately describe higher order thinking. The definitions were excluded due to a focus on the individual and the process of thinking vice external perspectives.

Interview results. Using the same criteria as above, the researcher found that none of the interviewees included reflective thought in their definition, five imply a need for analysis, four address separating facts from assumptions, no one incorporated judgment in the

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definition, and two contained problem solving. The preponderance of definitions focus on the separation of facts from assumptions, and being aware of biases that may influence the thinking process.

Logic involved with critical thinking. Three of the definitions rely upon logic to perform critical thinking, although no one describes fully how logic is involved in the process of critical thinking. Instead, logic is "free of intentional or unintentional fail, logic failures, such as fallacies, assumption, biases". Another definition included, "logic that's supported by facts, not opinions". This appears to parallel the operational definition segment separating facts from assumptions.

Unconstrained thinking. The other area revealed in the interviews was the requirement to think without constraints. One instructor phrased this as thinking "outside the box", where another stated critical thinking is looking at things "holistically". Two others identify considering other perspectives as a component of critical thinking.

Holistic thinking. Only one instructor did not "equate [critical thinking] with problem solving", while the others interviewed described critical thinking as part of the problem solving process. Instead, he explained that "critical thinking is that cognitive thinking that I may then use going through…a process". The definition is similar to those requiring individuals to think outside the box, but may be closer to thinking holistically about the problem. The distinction is that in this description, the person thinking is trying to consider the totality of the situation before embarking upon the problem solving models. This resonates with the inhibitor identified earlier, and the possible constraint doctrine has on critical thinking.

Revised definition. Analyzing the results of the survey and the interviews reveals two commonalities. First, critical thinking is an ability requiring a cognitive skill. The descriptors found in the results suggest that critical thinking is a higher order thinking requiring some level of intelligence. Second, consideration of other perspectives is necessary to effectively rule out one's own bias. The result is a revision of the operational definition to capture the qualitative results. *Critical thinking entails reflective thought – based upon experience and considering one's own and others' bias – allowing an amount of significant analysis to determine facts from assumptions, while considering other perspectives, as best as one may determine, to arrive at a judgment based upon one's conclusions of the information available.*

Findings Addressing the Research Questions

The findings demonstrate congruity among the quantitative and qualitative results supporting the research questions. Responding to, "what is the most effective approach to teaching critical thinking skills?", participants in the survey and the interviews share the view that facilitated discussion is the most effective technique for teaching critical thinking skills. Those interviewed also discussed the technique of questioning, which is closely aligned to the approach of facilitated discussion. In fact, the instructors interviewed described the questioning techniques they use in order to facilitate the discussion leading one to conclude the techniques are not easily separated.

Similarly, participants responded to the "most effective approach to assess critical thinking" and identified the monitoring of classroom discussions as the most effective technique for assessing critical thinking. This technique was detected in the quantitative results and was also present in the interviews. The challenge described during the interviews

is the subjectivity of observation. The majority of those interviewed sought to judge the

quality of the student's thinking by the depth of the response, and the evidence that the

student had gone beyond a cursory examination of the issue.

The last sub-question asked faculty members to define critical thinking. Respondents

were consistent in defining critical thinking as a skill requiring the ability to think at a higher

level. The definitions also included identifying bias, or seeking to negate bias, in the process

of thinking critically through self-awareness of its existence. The result of the findings was a

revision to the operational definition to reflect the agreement among the offered definitions.

The results of the study – and the primary research question of "what are CGSC

instructors' perceptions of teaching methods and assessments incorporated to promote the

development of critical thinking skills?" – illustrated the instructors at CGSC perceive the

teaching and assessment methods are somewhat effective in developing the critical thinking

skills of students. Foundational to the research question is, can critical thinking be taught?

Participant responses on the survey and in the interviews infer that yes, critical thinking is a

skill that may be taught. How well the college is doing in teaching these skills is generally

viewed as favorable. There is a perception that, while the college desires to improve the

critical thinking skills for its students, the curriculum does not necessarily lend itself to the

development of these skills. Specifically, instructors share a belief that not enough time is

provided for students to reflect on the curriculum. Those interviewed, as well as remarks

provided in the survey, indicate to effectively think critically an individual must have the

time to reflect.

Summary

The chapter presented the quantitative and qualitative results from the research. Quantitative results were examined using the Friedman statistical test. The results showed that one or more of the instructional strategies and evaluation methods were effective in fostering critical thinking among students. Strategies were also separated by use and instructor ratings for effectiveness.

Qualitative results were organized by the research questions and addressed the teaching for critical thinking skills. Instructional strategies were examined and highlighted effective means for teaching critical thinking skills, and explored inhibitors to teaching these skills. The findings for assessing critical thinking skills were presented and identified two main techniques practiced at CGSC for measuring students' thinking – monitoring classroom discussions and evaluating team activities. Lastly, results were presented defining the term critical thinking and a revision to the operational definition was presented, based upon the qualitative results.

The final section provided a synopsis of the findings as they relate to the research questions. Quantitative and qualitative results were agreeable. Perceptions among the faculty members who responded generally reflect an attitude that critical thinking may be taught, although there is not adequate time in the curriculum to allow students to reflect – a key component to critical thinking.

Chapter 5 - Conclusion

Introduction

The previous chapter presented the findings and an analysis of the results. The final chapter of this study addresses the relation of the findings to the literature, implications for teaching for critical thinking skills, and recommendations.

Relation of the Findings to the Literature

Examining chapter two major themes emerge that may be linked to the findings of this study. The themes are categorized into requirements for critical thinking and teaching techniques to foster critical thinking skills.

Requirements for Critical Thinking

Training the mind. As noted previously, critical thinking is a skill that must be developed by an individual, requiring a person to train the mind in order to improve his or her critical thinking skills (Dewey, 1991). The literature affirms the goal of education is to improve the thinking skills of the student, and to increase the complexity of issues one is able to consider (Dewey, 1991; King & Kitchener, 2002; Moore, 2002; Paul, 1993). Those interviewed acknowledged the intent of the curriculum at CGSC is to grow the critical thinking skills of the students, and described a process throughout the academic year that increasingly challenges their students. The results and the literature demonstrate that critical thinking is not a skill that comes by happenstance, and requires self-development or development as part of an education.

Complexity and effort. Resnick's (1987) description of "higher order thinking" (p. 3) includes the characteristics of complexity and effort. CGSC's curriculum exposes the students to the complexity of the world, as one interviewee stated, "My charter is to teach

them about the strategic world, teach them about the operational world, and try and think about how to put these pieces together". He continues later, "My job is to make sure…they understand range of military operations, that they understand that there's a strategic level, and an operational level, and the differences between and how they nest together". The instructors interviewed described a student population with little familiarity with the operational and strategic levels, which leads to the complexity of the curriculum for the student.

Interviewees also expressed that to think critically requires effort. This manifested itself in faculty requiring students to deconstruct an argument or problem in search of a solution free from bias and assumptions. Another demonstration is the questioning and dialogue that takes place in the classroom. One interviewee described his technique of seven questions, "…if you can go seven questions deep, then you have a thorough understanding of something". While another explained that "the expectation is that [the students] are going to extend themselves", referring to his challenging the students to go beyond their comfort zone. Yet another emphasized, "…we have to find a way to make [critical thinking] more of a personal decision on each student's perspectives, to make that step, and to get uncomfortable, and to exercise [the mind]."

Necessity for reflection. The literature also supports reflection as a component of critical thinking (Cosgrove, 2009; Dewey, 1910/1997; Dike et al., 2006; Ennis, 2003; Morgan, 1995). In order to effectively apply or improve the critical thinking skills of their students, those interviewed were unanimous in the necessity for reflection. The challenge described in the findings is that the curriculum and the institution place a constraint on the amount of time dedicated for reflection.

Self-awareness of bias. Three faculty members interviewed addressed the need to be aware of the possibility of bias entering into one's thinking. The self-awareness of bias is a common element of critical thinking (Brown & Keeley, 2010; Porter-O'Grady et al., 2005). A review of the transcripts revealed that the others infer about the awareness and avoidance of bias by gathering other perspectives and viewpoints, while separating facts from assumptions during the process of evaluating a problem.

Experience. Experience is a foundational requirement to develop as a critical thinker (Brookfield, 1987; Dewey, 1897a, 1910/1991, 1938/1997; Ennis, 1962; Glaser, 1941; Joint Staff, J-7, 2010; Scriven & Paul, 1987; U.S. Army, 2006, 2011). The researcher found that nearly 50% of those surveyed placed critical thinking in the area of "commitment with relativism", which is in the upper three levels of Perry's (1999) Schema. This exhibits a clear challenge for faculty members, and the potential need to re-evaluate the goals of the curriculum, to grow students from the first few levels of Perry's Schema to its upper reaches.

Teaching Techniques

The literature identified four common themes for teaching critical thinking skills - focus on the student and classroom environment, facilitating discussion, modeling critical thinking, and instructor subject matter expertise.

Focus on the student and classroom environment. The classroom is an important component in teaching for critical thinking, setting the environment for the students to explore their beliefs and thoughts. Tsui (2002) describes the relationship that must be forged between the student and the instructor allowing students to find their voice, which in the context of this study permits students to challenge their own beliefs by considering other worldviews as they seek recommendations and solutions to the complex problems posed by

the curriculum. Accordingly, this requires the instructor to be an active participant in the classroom (Brookfield, 2012; Meyers, 1986; Paul & Elder, 2007b) pushing the students to refine their thinking skills. Results indicate that instructors participating in this study were actively engaged in the learning environment. The researcher believes the faculty members interviewed were committed to improving the critical thinking skills of their students by creating a learning environment that challenged the students' paradigms and require that they "extend themselves", as one interviewee noted.

Tsui (2001) concluded that faculty attitudes toward their students also affected the ability of students to enhance critical thinking skills. Students attending the course have established themselves professionally as a service member. Those interviewed indicated a respect for their students during the dialogue, and acknowledged the experience of students and their ability to think critically.

Facilitated discussion. This study exhibits congruency with Dike's (2001) research at a similar institution with faculty members relying upon small group facilitated discussion and questioning as the primary means for fostering critical thinking skills. The two teaching techniques are closely aligned, and are predominate in the literature for teaching critical thinking skills (Brookfield, 2012; Dike, 2001; Kaplan & Kies, 1994; Lunney et al., 2008; Paul & Elder, 2007b; Schumm et al., 2006; Simpson & Courtney, 2002). The researcher found the description of facilitated discussions in the interviews reflect Borg and Borg's (2001) conclusion that instructors relied upon subjective observation of student discussions in class to determine whether or not critical thinking was exhibited. Quantitative results also showed that all participants assess critical thinking by monitoring classroom discussions.

Modeling critical thinking. The literature supports that modeling critical thinking demonstrates to students the degree of thinking they are working toward (Allen & Gerras, 2009; Brookfield, 2012; Lunney et al., 2008; Paul & Elder, 2003; Resnick, 1987). Those interviewed described the questions posed to students, and how they attempt to have students think beyond the stated problem. When asked whether or not the interviewees thought they modeled critical thinking to their students, all believed that they do exhibit critical thinking characteristics in the classroom.

Instructor subject matter expertise. Meyers (1986) and Willingham (2007) addressed the necessity of the instructor to possess expertise in the subject material. An interviewee described the credentials sought by CGSC that focus on the instructor's operational experience, "…did you wear a uniform? Did you deploy? Did you ever do any real-world planning?" According to this instructor, these qualifications provide the specialized experience needed to teach in one of the five departments. Meyers (1986) suggested the experience allows the teacher to present all views encompassing the topic and provoking students to think more deeply about the subject.

As demonstrated above, the results of the research and the literature are generally congruous. Participants in the research suggest an understanding of critical thinking and an appreciation for teaching critical thinking skills. There does not appear to be much depth in familiarity with critical thinking literature beyond Paul and Elder, but this does not seem to be a hindrance in the effort to improve their students' critical thinking skills.

Implications for Teaching for Critical Thinking

The results of this study provide three considerations for graduate-level faculty to incorporate in practice facilitating critical thinking skills among students: incorporate Socratic questioning, model critical thinking, and faculty development.

Socratic Questioning

Two primary teaching techniques emerged from the study – small group facilitated discussion and questioning. One may presume that without effective questioning on the part of the instructor, facilitated discussion may not achieve the higher order thinking sought after in the curriculum. Those interviewed all described a method of questioning in the classroom, but only two specifically addressed Socratic questioning.

According to Fasko (2003), Socratic questioning "consisted of probing questions that led students beyond speculation and belief to understanding and knowledge" (p. 3). This echoes Dewey's (1910/1991) definition of the process of reflective thought, "the ground or basis for a belief is deliberately sought and its adequacy to support the belief is examined" (p. 1). Considering these two definitions and the intent behind Socratic questioning – to probe and gain a more in-depth understanding – the intellectual level pursued may be found in Perry's Schema (1999) at the upper positions categorized as commitment with relativism. Previously in chapter two, when addressing Perry's Schema, critical thinking was described as comparing one's own thinking with the thoughts and opinions of others. Combining all three, the premise that Socratic questioning encourages a higher order of thinking emerges allowing students to approach, if not achieve, the upper positions of Perry's Schema.

Facilitating small group discussion should include Socratic questioning to be successful. It must also be noted, based upon the results of the study, that time is necessary

for reflection on the part of the student. The interviews, as well as responses on the survey, indicated that not enough time was provided in the curriculum to allow for reflective thought leading toward characteristics of critical thinking. In order to foster the critical thinking skills of students, instructors must be proficient and effective in the teaching technique of Socratic questioning, and have time within the curriculum for students to reflect upon the issue or question posed. One may conclude that if an instructor is effective in questioning with the Socratic method and displays reflective thought, then the instructor is also modeling critical thinking to the students.

Modeling Critical Thinking

As noted in chapter two, faculty must be participants in the learning environment and model critical thinking for the students (Brookfield, 2012; Resnick, 1987; Tsui, 2001). Each of the interviewees illustrated how they modeled critical thinking in the classroom. Whether through Socratic questioning or assisting the class through complex real-world planning exercises, the instructors described an environment where they acted as participants in the learning by modeling critical thinking skills to the student.

The interviews also revealed that instructors believe some students arrive at the course lacking experience. While the instructors may not compensate for their students' experience level, the faculty may foster critical thinking skills by modeling the characteristics of higher order thinking during facilitated discussions and problem solving planning exercises. Students observing the thinking process of faculty and peers may be encouraged to actively participate in the learning environment, which will have a positive effect toward learning and exhibiting critical thinking skills (Lunney et al., 2008; Nugent, 1990; Tsui, 2001).

Faculty Development

In chapter one faculty development at CGSC was addressed illustrating the purpose of the initial phase is to introduce new faculty to adult learning theory, critical thinking based upon Paul and Elder's (2009) universal intellectual standards and parts of thinking, and the experiential learning model. What became apparent in the interviews was that not all faculty are equipped to teach critical thinking skills, and noting that no job aid exists to assist faculty in how to teach for critical thinking. Another element emphasized is that there is no one checking on the effectiveness of the faculty member.

From this two issues are highlighted. First, the faculty development program needs to go beyond exposing new faculty members to the terminology and concepts of critical thinking, and address critical thinking pedagogy. Second, the interviews indicate that there is no quality control across the faculty members. The research findings indicated that not all faculty are familiar with critical thinking, and others interpret and incorporate critical thinking skills as they see fit in the classroom.

Addressing the pedagogy of critical thinking, faculty members need to be proficient in the technique of Socratic questioning and modeling of critical thinking. However, if faculty are not provided the tools to effectively question in the classroom, then doubt exists if critical thinking is fostered among students. The formal faculty development program provides an opportunity to instill questioning techniques and the facilitation of classroom discussion with new faculty. Yet the instruction must not stop here at first exposure. As one instructor noted, he attends the formal faculty development once every five years. Just as the instructors believed that repetition helps to improve their students' critical thinking skills, the formal faculty development program should be revised to include more frequent

opportunities to assist instructors seeking to improve their teaching and critical thinking skills.

There is an occasion to expand upon the teaching for critical thinking during the annual faculty development phase 2 (FDP-2) prior to each academic year, and the FDP-2 focusing on each block of instruction. During FDP-2, lesson authors may present how they intended to incorporate critical thinking teaching techniques into the lesson. This also presents the point at which faculty members may see the critical thinking theme across the curriculum. Attempting to improve upon and equipping faculty members with the teaching techniques to foster critical thinking skills among students must be purposeful, and will require support across the academic departments and the college.

Equipping instructors with the teaching techniques to foster critical thinking is a necessity, and providing feedback to the instructor on their ability to facilitate a classroom environment that encourages critical thinking will help to improve the program. Whether the individual responsible for observing the classroom is a master instructor in each department, or part of the faculty development staff, the argument is for a dedicated program to assist faculty in developing as effective practitioners that foster critical thinking skills among the students.

A faculty development program exists at CGSC, nevertheless the study indicated the program can be expanded to more effectively prepare and develop instructors in the classroom. Two areas were indicated above – exposure and instruction in Socratic questioning during the initial faculty development that offers the tools to successfully foster critical thinking skills among students; and a thorough system for evaluating classroom instruction and providing feedback to develop instructors in the pedagogy of critical thinking.

Recommendations for Future Research

From the findings and analysis there are recommendations for further research associated with critical thinking and outside the scope of this study.

First, military doctrine appears to constrain faculty through an unspoken limitation in the classroom. At first glance, this may appear to be limited to the professional military education programs; however, the researcher contemplated that graduate-level institutions may also experience a perceived constraint toward critical thinking in the field of study. Are there ingrained psychological barriers to teaching critical thinking skills? The study showed that doctrine may impact faculty at professional military education institutions. Are there differences between the services and their individual service cultures? How do the cultural biases, political beliefs, and other parts that make up one's values affect the learning of critical thinking skills?

Another area of interest is the motivation among faculty. Several of the interviewees compared their colleagues' methods in the classroom. The researcher drew the conclusion that all interviewees have an understanding and generally share a positive view toward teaching critical thinking skills; yet this may likely be attributed to the self-selection process for participating in the survey and volunteering to be interviewed. One instructor commented, "I get paid to teach ELOs [enabling learning objectives] and TLOs [terminal learning objectives], not critical thinking". Does this comment, and the views shared of their colleagues in the interviews, describe faculty members who may be complacent, apathetic, or satisfied with the status quo? What is the effect on fostering critical thinking skills? Are civilian graduate-level institutions faced with a similar challenge with faculty motivation?

This study focused on faculty perceptions of teaching critical thinking skills. In chapter one, it was noted the faculty account for one-fourth of the learning environment. Pratt (2005) provided five different teaching perspectives in describing the elements of the learning environment, raising the question which perspective is more effective in teaching for critical thinking? What is the role of the student in learning to think critically? Focusing on the student, four interviewees described a younger group of military officers attending CGSC. How does the student's experience affect thinking critically? Is there a point in the officer's career, when he or she has a base of experience, that is more suitable for attendance at CGSC? What level of experience is fitting for students enrolling in a Master's program?

An area not touched upon in this study, because of the desire to conduct face-to-face interviews during the qualitative data gathering phase, is teaching for critical thinking in the online learning environment. Institutions can reach a much larger student population through online courses. How does online learning affect teaching for critical thinking skills? Are there distinguishable differences in the growth of students' critical thinking skills between online and traditional classrooms?

Lastly, chapter two identified a requirement for faculty to be subject matter experts in their field (Allen & Gerras, 2009; Brookfield, 2012; McPeck, 1981; Paul, 1995; Willingham, 2007), but the literature does not shed light on whether or not expertise in critical thinking is necessary. This study indicated that a level of proficiency in Socratic questioning is necessary to teach critical thinking skills. Does teaching, or incorporating, critical thinking skills require the faculty to be subject matter experts on critical thinking?

Conclusions

The study sought to learn the perceptions of faculty teaching critical thinking at a graduate-level institution. Quantitative survey results showed that faculty believe facilitated discussion, group collaboration during problem solving, and questioning are among the most effective teaching techniques to foster critical thinking. Following the premise that facilitated discussion and group collaboration are most effective teaching techniques, participants identified the monitoring of classroom discussions as the most prevalent means for evaluating critical thinking among their students.

Addressing the research question – what are CGSC instructors' perceptions of teaching methods and assessments incorporated to promote the development of critical thinking skills – it is apparent in the results of the study that faculty members believe critical thinking may be fostered. The interviews provided additional context and uncovered a feeling among faculty that they teach critical thinking skills, but there was a belief that the institution could do better. They underscored the fact that teaching is an individual endeavor, and some instructors are good at promoting critical thinking and others are not. The challenge for CGSC was expressed by one instructor, "I do think the college wants to do [teach critical thinking]. The problem is they haven't been able to figure out how to mass produce it and bottle it, so that everyone gets a similar experience".

In order to provide that experience, three items focusing on faculty are apparent. First, teaching critical thinking skills is a challenging enterprise, and faculty must be determined and work toward perfecting their craft in the classroom. Second, Socratic questioning is a necessary teaching technique and required skill for use by the instructor. This links back to the determination on the part of faculty to improve his or her ability to

implement Socratic questioning in the classroom, and throughout the curriculum. Thirdly, the faculty development program requires refinement to assure consistency across the faculty in teaching for critical thinking. Focusing the program on critical thinking teaching techniques, as well as providing effective feedback following classroom observation, will help to equip faculty with the tools and provide uniformity across the classrooms.

Finally, thinking takes time, and critical thinking requires that an individual set aside a period for reflection. This study revealed a frustration on the part of faculty that not enough time exists in the curriculum to allow for reflection, and to effectively teach critical thinking skills. The goal of CGSC is to prepare military officers and equip them with the tools for the complexities they will face in the next five to ten years of their career. Arguably, the most valuable tool is their mind. The teaching of critical thinking skills serves to achieve, "The aim of education is precisely to develop intelligence of this independent and effective type – *a disciplined mind* [italics in original] (Dewey, 1910/1991, p. 63)".

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Appendix A - Critical Thinking Defined

Source	Definitions – with researcher's comments in *italics*
Glaser, 1941	"The ability to think critically…involves three things: (1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within range of one's experiences, (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill in applying those methods. Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of the evidence that supports it and the further conclusions to which it tends" (pp. 5-6).
Ennis, 1962	"*the correct assessing of statements* [italics in original]" (p. 83) *Paraphrasing Ennis' thoughts, critical thinking is a systematic approach to examine an issue or problem relying upon one's evaluation of the evidence and critical reflection on past experience to decide on a solution. Highlights three dimensions required for critical thinking*—"logical dimension, a criteria dimension, and a pragmatic dimension" (p. 84) *Regarding the pragmatic dimension Ennis further explains*, "inclusion of this dimension requires the admission that complete criteria can not be established for critical thinking. An element of intelligent judgment is usually required in addition to applying criteria and knowing the meaning." (p. 85) *Applying this to the military leader exercising critical thinking during planning and execution of operations, one never fully understands the problem or the situation when the enemy is involved. Revisit the fog and friction of war of which Clausewitz speaks.*
Ennis, 1964	"A critical thinker is characterized by proficiency in judging whether: 1. A statement follows from the premises. 2. Something is an assumption. 3. An observation statement is reliable. 4. A simple generalization is warranted. 5. A hypothesis is warranted. 6. A theory is warranted. 7. An argument depends on an ambiguity. 8. A statement is overvague or overspecific. 9. An alleged authority is reliable." (pp. 599-600) *Ennis goes on to expand upon the nine characteristics to justify inclusion in the list. What begins to emerge is a pattern of steps, or criteria to consider, for effective critical thinking.*
Ennis, 1996	"Critical thinking is reasonable reflective thinking that is focused on deciding what to believe or do" (p. 396).
Brookfield, 1987	*Brookfield does not provide a succinct definition of critical thinking but provides a conceptual approach to understanding the topic. A summation that approximates a definition is*: "[b]eing a critical thinker involves more than cognitive activities such as logical reasoning or scrutinizing arguments for assertions unsupported by

	empirical evidence. Thinking critically involves our recognizing the assumptions underlying our beliefs and behaviors" (p. 13). *This excerpt compliments Dewey's principle that reflective thought is based upon one's experiences—a person is a product of his or her past experiences, and this greatly influences how the individual approaches critical thinking.*
Brookfield, 2012	"Critical thinking is a process of hunting assumptions—discovering what assumptions we and others hold, and then checking to see how much sense those assumptions make" (p. 24). *Brookfield later goes on to address critical thinking across disciplines and poignantly comments*, "the point of getting students to think critically is to get them to recognize, and question, the assumptions that determine how knowledge in that discipline is recognized as legitimate" (p. 28).
Resnick, 1987	"Higher order thinking [critical thinking] involves a cluster of elaborative mental activities requiring nuanced judgment and analysis of complex situations according to multiple criteria. Higher order thinking is effortful and depends on self-regulation. The path of action or correct answers are not fully specified in advance. The thinker's task is to construct meaning and impose structure on situations rather than to expect to find them already apparent" (p. 44). *Common to other definitions—reflective thought, making meaning of the situation, having a self-awareness of possible bias—significant in her work is the notion that an individual must have a positive opinion (self-efficacy) of his or her thinking abilities. One has to believe that he or she can actually solve the problem, or at least arrive at a working solution.*
Facione, 1990	"purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based" (p. 3).
Paul, 1993, 1995	"Critical thinking is a systematic way to form and shape one's thinking. It functions purposefully and exactingly. It is thought that is disciplined, comprehensive, based on intellectual standards, and, as a result, well-reasoned" (p. 20). "What is critical thinking? A unique kind of purposeful thinking in which the thinker systematically and habitually imposes criteria and intellectual standards upon the thinking, taking charge of the construction of thinking, guiding the construction of the thinking according to the standards, [and] assessing the effectiveness of the thinking according to the purpose, the criteria, and the standards" (adapted from p. 21).
Dörner, 1989/1996	*Thinking is an emotional process, influencing our outcome.* "Thought is embedded in a context of feeling and affect; thought influences, and is in turn influenced by, that context" (p. 8). "Thought is also always rooted in values and motivations" (p. 8).

	"…our thinking, with its subtle interplay of emotion and calculation, conscience and ambition, reflects the richness of the world around us" (p. 9).
Erwin, 2000	"Critical thinking is a broader term describing reasoning in an open-ended manner, with an unlimited number of solutions. The critical thinking process involves constructing the situation and supporting the reasoning behind a solution" (p. 11).
Fasko, 2003	*Provides overview of the history of critical thinking and the study of. Fasko's definition is a hybrid taken from the disciplines of philosophy, psychology, and education.* "Critical thinking is the propensity and skills to engage in activity and 'mental activity' with reflective skepticism focused on deciding what to believe or do, 'and that can be justified'" (p. 8).
Halpern, 2003	"Critical thinking is the use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is used to describe thinking that is purposeful, reasoned, and goal directed—the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions, when the thinker is using skills that are thoughtful and effective for the particular context and type of thinking task" (p. 6).
Porter-O'Grady, Igein, Alexander, Blaylock, McComb, & Williams, 2005	*The authors do not provide a definition of critical thinking, but identify elements common to the myriad definitions available. The common characteristics of critical thinking include:* "interpretation" *of the facts and information;* "analysis" *of the data to determine facts, assumptions, and relevance to the issue at hand;* "inference" *to determine a start point for the decision-making process;* "evaluation" *of the information available, how it relates to the task, and possible second- and third-order effects;* "explanation" *of the proposed action based upon the previous analysis and evaluation of available data;* "self-regulation" *permits the individual to guard against personal bias in the decision-making process; and finally,* "pervasive" *in the sense that critical thinking must be ever-present, particularly in the case of organizational culture.* (terms taken from pp. 29-30)
Paul & Elder, 2007	"Critical thinking is the process of analyzing and assessing thinking with a view to improving it. Critical thinking presupposes knowledge of the most basic structures in thinking (the elements of thought) and the most basic intellectual standards for thinking (universal intellectual standards). The key to the creative side of critical thinking (the actual improving of thought) is in restructuring thinking as a result of analyzing and effectively assessing it" (p. 6).
Paul & Elder, 2009	"Critical thinking is the art of analyzing and evaluating thinking with a view to improving it" (p. 2).
Scriven & Paul, 1987	"Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief

	and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue, assumptions, concepts, empirical grounding; reasoning leading to conclusions, implications and consequences, objections from alternative viewpoints, and frame of reference. Critical thinking - in being responsive to variable subject matter, issues, and purposes – is incorporated in a family of interwoven modes of thinking, among them: scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking." *This definition is included, albeit the longest, to highlight the commonality across a majority of the authors that critical thinking is all-encompassing of the individual, his or her experiences, values, and beliefs. Attempting to make critical thinking a sterile intellectual process, as Mulnix (2010) intimates is not recognizing the reality of the individual and the world in which he or she lives. One cannot help but be influenced by his or her ethical and moral beliefs, which are grounded in one's experiences, when thinking through an issue to arrive at some judgment.*
Rudd, 2007	"Critical thinking is reasoned, purposive and reflective thinking used to make decisions, solve problems and master concepts" (p. 47).
Mulnix, 2010	"…critical thinking is a process, a skilled activity of thought….[as] an attempt to understand what it is for a belief to be rationally justified" (p. 8).
McPeck, 1981	"…the most notable characteristic of critical thought is that it involves a certain scepticism, or suspension of assent, towards a given statement, established norm or mode of doing things" (p. 6). "…it [critical thinking] is the appropriate use of *reflective scepticism* [emphasis in original] within the problem area under consideration. And knowing how and when to apply this reflective scepticism effectively requires, among other things, knowing something about the field in question" (p. 7).
Cosgrove, 2009 Dike, et al., 2006 Morgan, 1995	*Fitting with the previous writers, these authors show that the number of definitions for critical thinking is equal to the number of authors. Everyone seems to take a turn at "reinventing the wheel" when it comes to defining critical thinking. Common themes exist across all definitions including reflective thought, ferreting out assumptions, and arriving at a judgment based upon one's conclusions of the information available.*
FM 6-22, Oct 2006	"Critical thinking is a thought process that aims to find truth in situations where direct observation is insufficient, impossible, or impractical. It allows thinking through and solving problems and is central to decision making. Critical thinking is the key to understanding changing situations, finding causes, arriving at justifiable conclusions, making good judgments, and learning from experience.

	Critical thinking implies examining a problem in depth, from multiple points of view, and not settling for the first answer that comes to mind" (p. 6-1). "A deliberate process of thought whose purpose is to discern truth in situations where direct observation is insufficient, impossible or impractical" (p. Glossary-2).
Joint Officer Handbook Staffing and Action Guide, Aug 2010	"Critical thinking is the process of making thoughtful judgments to respond to situations, answer questions, solve problems, and address issues. Critical thinking is based on experience, research, observations, and input from others; it is the process of making decisions for what to believe or do in a given situation, or to solve problems, answer questions, and address issues" (p. 22).
TRADOC Pam 525-8-2 w/Ch 1, Jun 2011	*Critical thinking is one of nine core competencies the Army sees as a key characteristic of soldiers to effectively operate in the 21st century.*
FM 6-0, Sep 2011	"Critical thinking is a deliberate process of thought whose purpose is to discern. Critical thinkers are purposeful and reflective thinkers who apply judgment about what to believe or what to do in response to known facts, observations, experience, oral or written information sources, or arguments. It also involves determining whether adequate justification exists to accept conclusions as true based on a given inference or argument. Critical thinking contributes to situational understanding, identifying problems, finding causes, arriving at justifiable conclusions, making quality plans, and assessing the progress of operations" (p. 1-7).

Appendix B - Interview Questions

Interview Question	Supporting Research Question
1. How do you define critical thinking? Are you aware of other definitions of critical thinking? Is your definition congruent with others? *In what way? or Why not?*	1.c.
2. Tell me about the first time you were introduced to the concept of critical thinking. Were you a student or instructor? How has your understanding of critical thinking changed since then?	1. 1.a.
3. Tell me about how you teach critical thinking in the classroom. Are you the instructor for the C120 block?	1.

How do you teach for critical thinking in your subject area? What do you feel is the most effective teaching method for critical thinking? Do you make a conscious effort to teach critical thinking skills? *Can you provide some examples?*	1.a. 1.b.
4. How do you assess critical thinking? What do you believe is the most effective means for assessing critical thinking? Are there ineffective assessments for critical thinking? *Describe some examples.*	1. 1.b.
5. Is there anything else you wish to add?	1.

Appendix C – Quantitative Instrument

**Professional Military Education Survey:
Faculty Perceptions of Critical Thinking**

Part I – Demographic Information

Circle the choice that best represents your situation.

1. **Gender:** Female   Male

2. **Choose one or more racial identities (regardless of ethnicity):**

   American Indian or Alaska Native   Asian   Black or African American

   Native Hawaiian or other Pacific Islander   White

3. **Choose one ethnic identity:**   Hispanic/Latino   Not Hispanic/Latino

4. **Adult-Level Teaching Experience:** 1 yr or Less   More than 1 yr/Less than 5 yrs   5-10 yrs   More than 10 yrs

5. **Highest Degree Earned:**   Bachelors   Masters   Post-Masters   Doctorate

6. **Major Area of Study (from #3):** Science/Technical   Education   History   International Studies   Business

   Military Operations   Psychology   Political Science   Public Administration   Other (specify): _____

7. **Status:**   Military   Civilian

8. **Teaching Subject Area:**   (Circle all that apply.)

   Military History   Sustainment   Tactics   Leadership

   Joint, Interagency, and Multi-National Operations   Other (specify): _____

9. **Within the last 3 years, how many <u>hours</u> of faculty development (FDPs) have you attended:**

   None   Less than 8   8-24   More than 24, but Less than 40   40 or more

10. **How many of those <u>hours</u> were devoted to Critical Thinking:**

    None   Less than 8   8-24   More than 24, but Less than 40   40 or more

11. **I would like to be considered for participation in an interview and may be contacted at the following e-mail address:**

    _____

Part II – Define Critical Thinking

Define, in your own words, Critical Thinking, in the context of professional military education.

_____

_____

_____

_____

_____

GO TO PART III

Part III – Instructional Strategies that Foster Critical Thinking

There are 5 steps to complete Part III. Review all strategies in column 2. Respond in column 1 to indicate whether you use each strategy. Circle *Y* for *Yes*. Circle *N* for *No*. Respond in column 3 to indicate whether you would like to know more about each strategy. Circle *Y* for *Yes* or *N* for *No*. In columns 4-8, mark X in the block to indicate your perception of each strategy's effectiveness in fostering critical thinking. In column 9, mark X in 5 blocks to indicate your perception of the 5 most effective strategies in fostering critical thinking.

I use this strategy	Instructional Strategy	I would like to learn more about this strategy	Unsure of strategy or its effectiveness	Highly Ineffective	Somewhat Ineffective	Somewhat Effective	Highly Effective	
1	2	3	4-8: Only one X per strategy/row					9
Y N	Small Group Discussion with Facilitator	Y N						
Y N	Programmed Instruction	Y N						
Y N	Computer-Assisted Instruction	Y N						
Y N	Interactive Video	Y N						
Y N	Role Play/Simulation	Y N						
Y N	Case Studies	Y N						
Y N	War-gaming (computer simulations)	Y N						
Y N	Brainstorming	Y N						
Y N	Formal Debate, Argument	Y N						
Y N	Analogy/Metaphor Activities	Y N						
Y N	Visual Thinking (visualize a solution/plan)	Y N						
Y N	Lecture without Discussion	Y N						
Y N	Lecture with Discussion	Y N						
Y N	Research or Formal Paper	Y N						
Y N	Student Presentation of Assignment	Y N						
Y N	Meta-cognition (monitoring one's own thinking)	Y N						
Y N	Journal/Log (reflective writing)	Y N						
Y N	Communication Dialogs (taped interviews, process recordings)	Y N						
Y N	Deductive Reasoning Techniques	Y N						
Y N	Inductive Reasoning Techniques	Y N						
Y N	Abstract or Critique of Book, Article, or Video	Y N						
Y N	Writing (short responses to concepts/situations)	Y N						
Y N	Questioning (high order; reflective; open-end)	Y N						
Y N	Group Collaboration or Problem Solving	Y N						
Y N	Experiential	Y N						
Y N	Outdoor Activities with Follow-up Discussion	Y N						
Y N	Role Modeling/Mentoring by Instructor	Y N						

List other instructional strategies that you use and believe are effective in fostering critical thinking.

_____

_____

GO TO PART IV

Part IV – Evaluation Methods that Assess Critical Thinking

There are 5 steps to complete Part IV. Review all methods in column 2. Respond in column 1 to indicate whether you use each method. Circle *Y* for *Yes*. Circle *N* for *No*. Respond in column 3 to indicate whether you would like to know more about each method. Circle *Y* for *Yes* or *N* for *No*. In columns 4-7, mark X in the block to indicate your perception of each method's effectiveness in assessing critical thinking. In column 9, mark X in 5 blocks to indicate your perception of the 5 most effective methods in assessing critical thinking.

I use this method	Evaluation Method	I would like to learn more about this evaluation method	Unsure about method or its effectiveness	Highly Ineffective	Some-what Ineffective	Some-what Effective	Highly Effective	Place an X by 5 most effective methods
1	2	3	4-8: Place only one X per method/ row					9
Y N	Assessment of Journal	Y N						
Y N	Critique of Communication Dialogues	Y N						
Y N	Assessment of Deductive Reasoning	Y N						
Y N	Assessment of Inductive Reasoning	Y N						
Y N	Feedback/Revision on Research/Formal Paper	Y N						
Y N	Essay Examination	Y N						
Y N	Multiple-Choice Test	Y N						
Y N	Short-Answer Test	Y N						
Y N	Rubric (instructor developed)	Y N						
Y N	Graded Oral Presentation	Y N						
Y N	Direct Observation and Documentation	Y N						
Y N	Commercially Available Critical Thinking Tests	Y N						
Y N	Feedback on Argumentative Essays	Y N						
Y N	Feedback on Individual Interviews	Y N						
Y N	Monitoring Classroom Discussions	Y N						
Y N	Student Self-Assessment	Y N						
Y N	Graded Review of Book, Article, Video, etc.	Y N						
Y N	Student-Developed Learning Contract	Y N						
Y N	Self-Appraisal Exercises (reaction papers, personal philosophy)	Y N						
Y N	Peer Evaluation	Y N						
Y N	Assessment of Team Activity	Y N						
Y N	Pre-test/Post-test	Y N						
Y N	Concept-Mapping Assessment	Y N						

List other evaluation methods that you use and believe are effective in assessing critical thinking.

_____

_____

_____

Thank you for your participation. Individual survey responses are anonymous; the surveys are not coded in any way. After the data has been entered into the appropriate computer software application, individual survey responses will be destroyed. A summary of the aggregate data will be prepared, and you will be provided a copy of the results of the survey, if desired.

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Appendix D – Kansas State University IRB Approval

KANSAS STATE
UNIVERSITY | University Research and Compliance Office

TO: Royce Ann Collins   Proposal Number: 7922
        Educational Leadership
        22201 West Innovation Dr. Olathe, KS 66061

FROM: Rick Scheidt, Chair
        Committee on Research Involving Human Subjects

DATE: 10/12/2015

RE: Proposal Entitled, "Exploratory study of graduate-level instructor's perceptions of teaching critical thinking"

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §46.101, paragraph b, category: 1, subsection: ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

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Appendix E – U.S. Army Combined Arms Center IRB Approval

DEPARTMENT OF THE ARMY
U.S. ARMY COMBINED ARMS CENTER
LEADER DEVELOPMENT AND EDUCATION
100 STIMSON AVENUE
FORT LEAVENWORTH, KANSAS 66027-2301

REPLY TO
ATTENTION OF

ATZL-LDA   December 18, 2015

MEMORANDUM FOR: Jay Van Der Werff, Kansas State University, Manhattan, KS
66506

SUBJECT: DoD Institutional Administrative Review Approval to Conduct Human
Subjects Research

Your proposal titled *Exploratory Study of Graduate-level Instructor's Perceptions of
Teaching Critical Thinking* was administratively reviewed on December 18, 2015 in
accordance with DoDI 3216.02, *Protection of Human Subjects and Adherence to Ethical
Standards in DoD-Supported Research*. This administrative review considered your
proposal, your application to your Institutional Review Board (IRB), and your IRB's
approval of your research.

The administrative review **concurred** with the risk determination of the Kansas State
University (KSU) IRB and ensured you incorporated Department of Defense specific
protections within your proposed study.

**The KSU IRB acting as a federally assured institution under assurance number
FWA0000865 is the supervising IRB for your research study**. The Combined Arms
Center – Education (CAC-E) is the supporting IRB for your study.

Your proposal is **approved with modifications**. You will use the modified consent
form provided separately (Word document *CF_Interview_20151217(Mod)*) to inform
participants prior to conducting interviews with them. You will use a Command and
General Staff College survey system to administer your survey.

You may begin survey preparation based on your submitted survey instrument (Word
file *Faculty_Perceptions_of_Critical_Thinking_20151218*) upon receipt of this letter.
Once your survey is complete, you will need to gain a survey control number from the
CAC-E survey manager prior to initiating the survey. The expected population size for
your study is 250 faculty. In accordance with CAC-E policy, you may not exceed two
reminders to non-respondents to solicit their participation.

Your approval for this study will expire on December 17, 2016. In order to maintain
approval for this study beyond that date, you are required to submit a continuing review
report to the CAC-E IRB at least four (4) weeks prior to this expiration.

You are expected to comply with all conditions indicated in this memorandum and to
follow your approved protocol as described within your KSU IRB application. You are
subject to monitoring by a member of the CAC-E IRB to ensure compliance. Report any

ATZL-LDA
SUBJECT: DoD Institutional Administrative Review Approval to Conduct Human Subjects Research

unanticipated problems involving risks to subjects or others in research promptly to the KSU and CAC-E IRBs.

Any modifications to your study (including, but not limited to changes in recruitment materials or procedures, investigators, inclusion/exclusion criteria, interview/survey questions, or data collection procedures, or increases in the number of participants enrolled) must be submitted as a written amendment for review and approval by the KSU IRB and the CAC-E IRB prior to implementing the change.

Consistent with the KSU IRB determination, documentation of signed informed consent for each participant is waived. You will provide informed consent information at the start of your data collection instrument as described in your research proposal and prior to initiating each interview.

Failure to follow these guidelines could result in the termination of the approval for your research.

Submit a study closure report to the CAC-E Human Protections Administrator at usarmy.leavenworth.tradoc.mbx.lde-research-irb@mail.mil, upon completion of the study.

POC is the undersigned at dale.f.spurlin.civ@mail.mil or 913-684-4770.

DALE F. SPURLIN, PhD
Chair, IRB
Combined Arms Center - Education