AN EXPLORATORY STUDY OF COGNITIVE COMPLEXITY

AT A MILITARY INTERMEDIATE SERVICE SCHOOL

by

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B.S., Rice University, 1982
M.S., Auburn University – Montgomery, 1994
M.B.A., The Ohio State University, 2002

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

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Manhattan, Kansas

2015

Abstract

The military devotes significant resources and time in the development of officers through education. Recently, there has been a great deal of emphasis placed on military Intermediate Service Schools (ISS's) to enhance the ability of graduates to think with greater cognitive complexity in order to solve the kinds of problems they may face after graduation. The military environment in which these mid-career officer students will serve is highly complex and requires a significant ability to generate solutions to unique and complex problems. One hallmark of a developmental adult educational experience is the advancement of the student to higher levels of cognitive complexity.

The purpose of this research was to determine if there was a relationship between the cognitive complexity of faculty, students, and expectations for student graduates, at a military Intermediate Service School. Along with the simultaneous measure of cognitive complexity, via a survey administration of the LEP instrument, the researcher also developed a technique for translating learning objectives from Blooms taxonomy into a corresponding Perry position. This translation method was used to translate the college learning objectives into an expected Perry position for graduates of the college. The study also included demographic data to look for significant results regarding a number of independent variables. For faculty only these included teaching department, years of teaching experience, age, and military status. For both populations the variables studied included education level, gender, combat experience and combat trauma, branch of service, commissioning source, and years of active duty service.

The study found that the mean cognitive complexity of entering students (CCI = 360) was lower than the cognitive complexity required of graduates (CCI = 407). However, the faculty mean cognitive complexity (CCI = 398) was not significantly different from a student graduate. The faculty results indicated that there were no statistically significant relations between the independent variables studied and the measured cognitive complexity. For students there was a statistically significant relation between measured cognitive complexity and gender.

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Several people were instrumental in my journey to complete this degree. For any Christian, first among them must be the One through whom I am granted life. Any success, major or minor, I always owe to Jesus Christ first and foremost. Thank you, Lord.

I would also like to acknowledge the foundational support from my family, Karen, Hal, Heather, David and Emily. Karen, my beautiful and wise wife, you have been my rock solid supporter through so many years of sea time, shore duty, and academics. Thanks for never giving up on me. Kids, you were never far from my mind as I worked through night classes, research, and writing. More important than completing the degree was the example I hoped to set for you. I wanted to show all of you that you can accomplish whatever you seek, if you are willing to put in the effort to achieve it. As my high school German teacher used to tell us all, "Immer angreifen, Niemals eingraben!" (Always attack, Never dig-in).

Thank you to the Kansas State faculty and staff members that supported me in this journey. I would like to recognize Dr. Jane Fishback for her exceptional patience since it took me so long to get this completed. I couldn't have done it without you Jane, thanks for seeing this through to the end! I also must thank Dr. Cheryl Polson for her constant encouragement. You had positive words of reassurance for me at our every meeting. You are a million dollar professor for sure (paid in Nestle $100,000 bars)!

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Vincit Qui Patitur!

Dedication

The PhD is often referred to as a “Terminal Degree”. That moniker has a sobering sound to it, especially the first time you hear it. I have been blessed to reach the decade of my 50’s but not everyone is so blessed. In 1978 the word “terminal” crashed into my life when a gathering of my mother’s friends sat me down at our kitchen table to tell me my mother would soon die from terminal breast cancer that had metastasized into her brain. I was a senior in high school, very near graduation, with a full scholarship in my hand, high academic hopes, and soon to leave home for Rice University, 900 miles away. My divorced single mother parented me through my childhood. We were a great team. But at 17 years old I learned that your 50’s are not a right, instead they are a gift.

My mother, Kay Lucille Laurence, suffered bravely. She never complained as she fought the cumulative effects of the crude 1970’s era cancer treatments that left her without hair, without strength, and unable to eat. She was tired, discouraged, and troubled by her circumstances and yet still unwilling for me to remain home. Rather, she encouraged me to continue on to college. At the suggestion of a friend, I called a relative to take over caring for my mother, and left home with my head down and the heaviest of hearts that ever could be.

In the end the doctors were correct and the cancer was terminal. She died on 15 February 1979 at the age of 47, never to see her 50’s, to see me graduate from college, or to meet my wife or my children. I was home with her for that final week and I think of her often as she slipped slowly and agonizingly the bonds of this world. She always had the highest hopes for my success and I am confident she would be proud of her son, the doctor.

So I dedicate this humbling step of my lifelong learning in thanks to my mother and her superior sense of humor, courage in the face of pain, strength of character, and relentless support for me in her short life.

I still miss you mom.

CHAPTER 1 - Introduction

Overview

Modern military problems are complex. In the recent past the world was largely divided into two ideological areas of influence, referred to by Samuel Huntington as the "Cold War paradigm" (Huntington, 1993). Formerly, the Soviet Union and its allies could be counted on to support and advance Communist ideology. Their ideology was well publicized and had a global following. On the other side stood the United States and its allies supporting democratic ideals in direct opposition to the Soviets. Clear battle lines were drawn both geographically and ideologically. Most of the senior leaders in our military today entered during this time of clarity in national security purposes. Not unlike the World War II generation before them they had a clearly defined enemy. World War II was characterized by its frequently stated outcome of "unconditional surrender" of the enemies of the United States and its allies. In the Cold War the clear enemy was the USSR and the goal was containment of the enemy and his ideology (Gaddis, 2011). Containment also meant fighting in the various proxy wars that arose from 1947 to the demise of the USSR in 1991 (Walker, 1993). The clear and simple dichotomy found in nation state wars provided a less complex underpinning for problem solving (Cardon & Leonard, 2010; TRADOC Pamphlet 525-5-500 Commander's Appreciation and Campaign Design, 2008). But in 1991, the Soviet Union was suddenly gone and the United States began to realize the world had become more complex (New York Times, 1991). In his 1993 National Security Strategy President Clinton stated, "Today's challenges are more complex, ambiguous and diffuse than ever before." (United States, 1993) In the modern era the problems for the military are not as clearly laid out as they were in the Cold War era and are often characterized as increasing in complexity and uncertainty (The Army Human Dimension Strategy, 2015; TRADOC Pamphlet 525-5-500 Commander's Appreciation and Campaign Design, 2008; Zbylut, M. L., Mark, J. D., & Vowels, C., 2006).

In the modern environment the answers to the problems faced by the United States are clouded by shifting elements within the Contemporary Operational Environment or COE. Military strategists now see the actors and their actions dividing and combining rapidly and even the character of warfare shifting rapidly back and forth in hybrid warfare (Hoffman, 2009). This creates a shifting mosaic of possible problem inputs and response actions. Solutions to

intractable military and security problems seem clouded and murky. Advisors to the Army have indicated doubt in the ability of the Army to operate effectively in an environment with these complex problems (Sprenger, 2014). Two researchers at the Army War College claim officer students rank below society as a whole in their measured openness to new ideas (Sprenger, 2014). Many in the Department of Defense have charged military problem solvers to take steps to improve at the task of solving these complex modern military problems. The Army recently published pamphlet, "The U. S. Army Operating Concept: Win in a Complex World" (TRADOC Pamphlet 525-3-1, 2014) is an attempt to address this. In the document it states, "The Army cannot predict who it will fight, where it will fight, and with what coalition it will fight" (p. iii). Our post-cold war Army is echoing the strategic and security uncertainty of our times.

Officers who lead sailors, soldiers, airmen and Marines are facing a wide range of complex problems. Changes in the Post-Cold War battle environment were widely popularized in the military through writings like "The Strategic Corporal: Leadership in the Three Block War" (Krulak, 1999). In this seminal article Marine Corps General Krulak describes the battlefield of the 21st century this way, "The rapid diffusion of technology, the growth of a multitude of transnational factors, and the consequences of increasing globalization and economic interdependence, have coalesced to create national security challenges remarkable for their complexity." (Krulak, 1999, p.18) General Krulak stressed that the Marines must prepare the lowest levels of tactical leadership to be ready to make correct decisions to solve new more complex problems. Since that article was published in 1999 there have been a great number of calls for increasing the capacity of modern military leaders to gain facility in solving complex problems. More recently the Army has begun drafting a strategy regarding the "Human Dimension" of the Army of the future. It states, "First, where the Army once prepared leaders for known battlefield conditions, it must now prepare for them to thrive in chaos and ambiguity." (The Army Human Dimension Strategy, 2015, p.ii). This change in the complexity of problems officers face has intensified the drive for military intermediate service schools to raise the cognitive complexity (CC) of their graduates.

Background

Simple methods for solving problems are less valuable in a complex environment (TRADOC Pamphlet 525-5-500 Commander's Appreciation and Campaign Design, 2008;

Foster, 2009). When working to solve problems that have been seen, and solved, before, it is reasonable to look for methods for finding problem solutions that worked before. This process is not unlike a mathematician who works to return a math problem to a state where it matches a previously solved problem thus proving that a solution exists for the current problem. But reverting to previous solutions is not always possible in the modern environment. Modern problems display interactive qualities due to the ability of human beings to adapt rapidly and continuously change the nature of the problem (US Army Doctrine Reference Publication 5-0: The operations process, 2012). If each problem is unique to a single set of circumstances then it is less reasonable to look for a solution using methods that look backward to previous solutions for a similar variety of problem.

One way to look for problem solutions is through the use of a simple linear or "waterfall" type of methodology (Six-step problem solving model, 2008; US Army Field Manual FM 6-0: Commander and staff organizaion and operations, 2014). The methodology works as follows. First a problem is recognized to exist. A process is begun to look for an answer through detailed study that exactly establishes the parameters and boundaries of the problem. Once the problem is well defined a set of solutions can be postulated. These possible solutions are weighed for likelihood of success when evaluated against a desired outcome or end state. A best fit solution is selected from the possible proposed solutions. The best fit solution is put into action. The results of the actions are used as a feedback mechanism to determine if there is a need for further action. The flow of problem solving is clear and linear and can be neatly divided up into methodological steps.

The Army has a legacy problem solving method that follows this linear approach. Known as MDMP or the Military Decision Making Process, this linear approach works well when extended time is available and the problems at hand are tractable, "well-structured" or "tame"(Conklin, 2006; US Army School of Advanced Military Studies, 2010). Dr. Jeff Conklin describes so-called tame problems with the following six attributes.

1. Tame problems are well defined and can be clearly described in a stable problem statement.

2. A tame problem has a clear end state so you know when the solution has worked and the problem is solved. The problem has a definite, clear stopping point.

3. A solution to a tame problem is available. It is definable as the right solution. All that is needed is for the problem solvers to figure out the solution.

4. The tame problem fits in a category of very similar or equivalent problems that are solvable, and were solved, using similar methods.

5. Solutions for these problems are testable. If the actions taken don't work then the solution is discarded and new actions are tried on the same problem.

6. The possible answers to the problem are finite and the problem solving team can list out those finite possibilities and choose from them what appears to be the best solution.

During the Cold War there were many of these types of tame problems to solve. The US Army devoted a great deal of time and resources to write and refine the MDMP in doctrinal manuals that listed out the steps of problem solving in explicit detail (Offenhauer & Osborne, 2007). These linear processes were then meticulously followed in exercise after exercise during which military staffs would be presented with a scenario and expected to respond to the problem by painstakingly following the MDMP exactly as written in order to develop an optimal solution. Staffs and commanders were evaluated and graded on their proficiency with these procedures and careers were made or broken by how well the members of the staff could implement the MDMP to produce a clear written order for subordinate units to follow.

In the modern era the Army desires to understand and solve complex problems (Graves & Stanley, 2013). Senior leaders have directed the incorporation of new methods, e.g. the Army Design Methodology, into military problem solving doctrine (Grome, Crandall, Rasmussen, & Wolters, 2012; US Army Doctrine Publication (ADP) 5-0: The operations process, 2012). The Army prides itself on its ability to be a learning organization (Williams, 2009) and after years of war in Iraq and Afghanistan there is recognition that MDMP is not always the optimal tool for problems encountered there. In particular, the circumstances generated by the "wicked" problems seen in conflicts today are sometimes inefficiently solved by linear methods like MDMP (Conklin, 2006; Rittel & Webber, 1973; TRADOC Pamphlet 525-5-500 Commander's Appreciation and Campaign Design, 2008). A wicked problem varies from the tame because the features of the problem don't conform to the six features listed previously for tame problems. The six characteristics of a wicked problem as defined by Conklin (Conklin, 2006, 2009) are:

1. The problem is not fully understood until a solution is offered. Once a solution is examined or implemented it exposes new aspects of the problem not seen before. There is no definitive final statement of exactly what the problem is.

2. There is no stopping point for the problem. Just as there is no definitive final statement for the problem, there is no final definitive answer either. The problem solving process continues indefinitely until you run out of time or resources, but not necessarily when you have found an optimal solution.

3. The solution is not the right one or the wrong one, it is something in the middle. There are only good-enough solutions, or not-good-enough solutions.

4. Each wicked problem is unique; no two wicked problems are alike. Hence you can't use a former solution for a later problem. Each solution must be custom made for the unique problem.

5. Solutions for these wicked problems must be tested in order to learn more about the problem. Testing of solutions can be expensive and may have consequences that are be long lasting and potentially create new problems.

6. There are a wide number of possibilities to try as solutions and no conclusive alternative solutions. Judgement is required to select which solutions to try.

This description of the difficult problems military professionals must address in the post-cold war world has an implied question. If these are the security problems military officers must solve, who are these officers and how can we educate them for this challenge? Let's start to answer that by taking a look at the students and faculty of CGSC.

CGSC Students

Separate from the nature of contemporary problems and the need for new processes to solve them, there is also a requirement for people who are able to solve wicked problems. This study will explore this need by looking at the military officer students themselves and the faculty who teach them. Students who enter military intermediate service schools have some common attributes that lead to a number of expectations regarding their entry level of cognitive development and their performance at the college. First, intermediate service schools are graduate schools since the students have all completed a bachelor's degree as a minimum requirement prior to commissioning as a military officer (Shea, 2010). As a result the

expectation for students entering the college is that they have the necessary mental faculties and skills needed to complete a graduate level education.

Second, these students are expected to be ready for graduate level writing and reading. They are tested upon entry to measure their reading skills, and are given a diagnostic essay to assess their writing proficiency. Those who appear to be lagging are provided with opportunities to take voluntary remediation programs concomitant with their ongoing daily work.

Third, as stated above, these officers are mid-career and so are expected to be dedicated to a continuing military career. As a salaried professional officer they are receiving the equivalent of a fully paid one year scholarship opportunity. Military intermediate service schools are accredited by civilian associations to afford them the ability to confer master's degrees either from completion of the college curriculum alone or, as in the case of the Army CGSC, with some additional thesis and research work added to the core curriculum (Command and General Staff College, 2015).

Fourth, although there is some screening prior to selection to attend the brick and mortar version of the course, there will likely be a spectrum of cognitive complexity levels among students attending CGSC. Some will be well suited to graduate work, while others possibly less so.

Finally, as mid-career officers most students will be in their mid-thirties and consequently working through numerous extracurricular issues common to this age range. In some ways they are similar to adults returning to higher education as adults seeking promotion, intellectual enrichment, and career enrichment (Kasworm, Polson, & Fishback, 2002). Many will have immediate family with them to take care of, some have aging parents to care for, and many are still working through marital issues associated with periodic long separations due to operational deployments. Some may even have post-traumatic stress issues to work through as well (Clark, 2014; Shea, 2010; Spurlin, 2014).

In sum, these attributes make the CGSC student distinct from the undergraduate populations that are frequently the focus of researchers in adult education and provide a special significance to this study. Other studies have been done using mid-career military officers to assess relationships between cognitive complexity and creativity (Clark, 2008) at the Joint and Combined Warfighting School, and to study measures of creativity and tolerance for ambiguity (McClary, 2009) at the Army School of Advanced Military Studies (SAMS). This study will

expand on these studies to look at both students and faculty with respect to the cognitive complexity of each group. Additionally, the college has expectations for the cognitive complexity of its graduates which are conveyed by course learning objectives (Blooms, 1956). These learning objectives will be used to establish the cognitive complexity expected of graduating officers.

CGSC Faculty

The student population has unique characteristics from the typical college student body, and likewise the faculty has unique properties. The CGSC faculty is comprised of a mix of civilian and active duty military members. The school strives for a faculty mixture of roughly 60% civilian and 40% military but these percentages will vary based on external factors (Dean of academics self study report, 2014). Some factors that result in changes would include budgeting factors or the need for active duty faculty officers to be deployed to the field to support military operations.

The military faculty are generally officers at the O-4 (Major or Lieutenant Commander) or O-5 (Lieutenant Colonel or Commander) grade. They are assigned to the college by their respective services (Army, Navy, and so forth) to teach for a period of two to three years before accepting orders to a new military posting. In some cases they may have volunteered for an assignment to CGSC as a personal preference and in other cases they may have been assigned to CGSC based on the needs of the Army or their parent service and not by choice. Most will have a master's degree on arrival (if not they are required to begin pursuit of a masters degree), and some may have doctorates or other terminal degrees (Dean of academics self study report, 2014). They will typically have about 12 or more years of military service. The military faculty at CGSC will be largely US Army with a few joint service officers from the Navy, Air Force, or Marine Corps serving in small numbers (Dean of academics self study report, 2014).

The civilian faculty members are hired to teach under Title 10 federal contracts for periods of service currently capped at two years. These contracts are renewable and at times have been authorized to extend for up to five years and in some periods of downsizing for as short as one year (Dean of academics self study report, 2014). The civilian instructors are generally retired military officers who have chosen to continue to affiliate with the military through employment by the Army, although there are a small number of faculty who have not

served and were hired directly from academia. They are required to have at least a master's degree and are selected for hire by the teaching departments base on their experience and qualifications to teach the curriculum supported by their department (Dean of academics self study report, 2014).

There are five teaching departments in the Command and General Staff School (CGSS) within CGSC that teach the Command and General Staff Officers Course (CGSOC). They are as follows (Dean of academics self study report, 2014):

1. Department of Joint, Interagency, and Multinational Operations (DJIMO)
2. Department of Army Tactics (DTAC)
3. Department of Logistics and Resource Operations (DLRO)
4. Department of Military History (DMH)
5. Department of Command and Leadership (DCL)

Faculty from all 5 departments are organized into 12 person teams for day to day teaching in the classrooms. Each teaching team is comprised of four DJIMO instructors, four DTAC instructors, two DLRO instructors, and one instructor from each of the two remaining departments, DMH and DCL. Each teaching team is responsible for a 64 person section of students that is further divided into 16 person staff groups. Thus, each staff group is taught by the same DJIMO and DTAC instructor, while the DLRO instructor divides his teaching between two staff groups, and the DMH and DCL instructors teach all 64 students.

Theoretical Underpinning

Cognitive complexity underpins thinking in depth which in turn is the foundation necessary for solving the complex problems encumbering the graduate of a military Intermediate Service School (ISS). Adult education has envisioned the need for adults to be ready for solving problems in new environments. Eduard Lindeman stated, "Since life is growth – continuous change – and since environments are never static, new situations are forever arising, and each new situation confronted make fresh demands upon intelligence. Knowledge and fact are relative to situations" (Lindeman, 1926, p. 17). Multiple theorists have studied complexity of thinking and proposed ideas about the progression of thinking from rudimentary to high levels of sophistication in thinking (Belenky, Clinchy, Goldberger, & Tarule, 1997; Kasworm, Polson, & Fishback, 2002; Kegan, 1994; King & Kitchener, 1994; Perry, 1999; Piaget, 1955). Each has

seen cognitive complexity from a differing point of view relevant to the era in which they wrote and the subjects whom they studied. Many developed a set of discrete stages or "positions" of development in the cognitive processes of adults.

Cognitive Complexity Theory

William G. Perry, Jr. is a foundational thinker in the field of cognitive complexity (Perry, 1999). Perry and a team of Harvard researchers conducted interviews of students at Harvard University and Radcliffe University during the period 1954 to 1963. The purpose of the interviews was to research, organize, and describe the epistemological changes of college students as they progressed through their college experience. Using open interviews without rigid formats or questions Perry and his team of judges interviewed undergraduate college students as they progressed through their freshman to senior year. From the analysis of the resulting interview documentation Perry found that students progressing through college changed epistemologically as they were exposed to college education. Ultimately he developed a set of nine Perry positions to describe the epistemological beliefs of the students (Perry, 1999).

Other theorists have built upon Perry's work and have modified his nine Perry position model to fit results they observed with other subjects. For example in *Women's Ways of Knowing: The Development of Self, Voice, and Mind*, Mary Belenky and others (Belenky, Clinchy, Goldberger, & Tarule, 1997) focused on interviewing women and found that their development was recognizably different from the Perry model. This study organized women's developmental stages into five categories. Robert Kegan developed his concept of Orders of Consciousness to describe the development of adults into a six tiered scheme of development (Kegan, 1994).

Measuring Cognitive Complexity

The instrument chosen to measure cognitive complexity for this research is the Learning Environment Preferences, or LEP, instrument. The LEP was developed by William S. Moore as part of his dissertation research in 1987 (Moore, 2000). The original use of the instrument was to measure the cognitive complexity of the thinking of undergraduate students. Due to its relatively low cost and reliability the uses of the LEP have expanded beyond undergraduate populations. The instrument has been in wide use for many years and has been used in a variety

of settings and in numerous previous studies (Clark, 2008; Collins, 2005; Fishback, 1997; Lavis, 2005).

The instrument operationalizes Perry's scheme of intellectual development into a measureable level of cognitive complexity of a subject's thinking. The LEP consists of 65 questions subdivided into 5 domains in the following areas:

1. Course Content/View of Learning
2. Role of the Instructor
3. Role of the Student/Peers
4. Classroom Atmosphere/Activities
5. Evaluation Procedures

In each domain the subject is asked to provide strength of preference for 13 statements using a Likert scale to show weak or strong preferences. These Likert preferences are not actually used in scoring the LEP, but rather are used to clarify the subject's thinking and his or her individual preferences. After working with the 13 clarifying statements the subject will indicate a top three ranking of the 13 statements in each domain. It is those three top preferences that are used to determine the subject's Perry position.

After scoring the LEP yields a Cognitive Complexity Index (CCI) score that equates to a stage or position within the Perry Scheme of intellectual development. The LEP measures within a narrower band than the full spectrum described by Perry's theory. The original Perry scheme included 9 total stages or positions (Perry, 1999). The CCI scores range from 200 to 500 which correspond with Perry stages 2 to stage 5. Perry position 1 was not included as this position was theoretical in nature and not seen in Perry's original research (Moore, 1991). Perry positions above 5 are best determined with lengthy and expensive qualitative methods which are more sophisticated than the LEP (Moore, 2000). This limit of the LEP to position 5 is called the "Ceiling Effect" by Moore and is an important consideration when working with a population that includes post-graduate students and faculty (Moore, 1991).

Developmental Teaching

The officer graduates of CGSC are going to encounter complex problems that they must solve. Therefore, the mission of the school is not just to provide students with more professional knowledge but also to develop the student's thinking (Dean of academics self study report,

2014). There are multiple perspectives on teaching (Pratt, 1998) but the most salient to this research is developmental teaching. Developmental teaching seeks to improve the student's thinking process (Pratt, 1998). Developmental teaching desires to change the cognitive frameworks of the learner in the direction of increasingly sophisticated thought (Kegan, 2009; Taylor, Marienau, & Fiddler, 2000). The challenge for faculty at CGSC is to provide challenges with support (Sanford, 1962) that will result in an increase in the sophistication of thought. In order to do this the faculty must be of sufficiently high developmental level to observe both the level where the students are starting from, and the level where the faculty intends to take them (Pratt, 1998). Often referred to as "bridging" the faculty is charged with comprehending both sides of the bridge and taking students across (see Figure 1.1). This is accomplished through challenging a student's current ways of knowing and encouraging them to reflect and change their epistemology toward greater sophistication (Drago-Severnson, 2009).

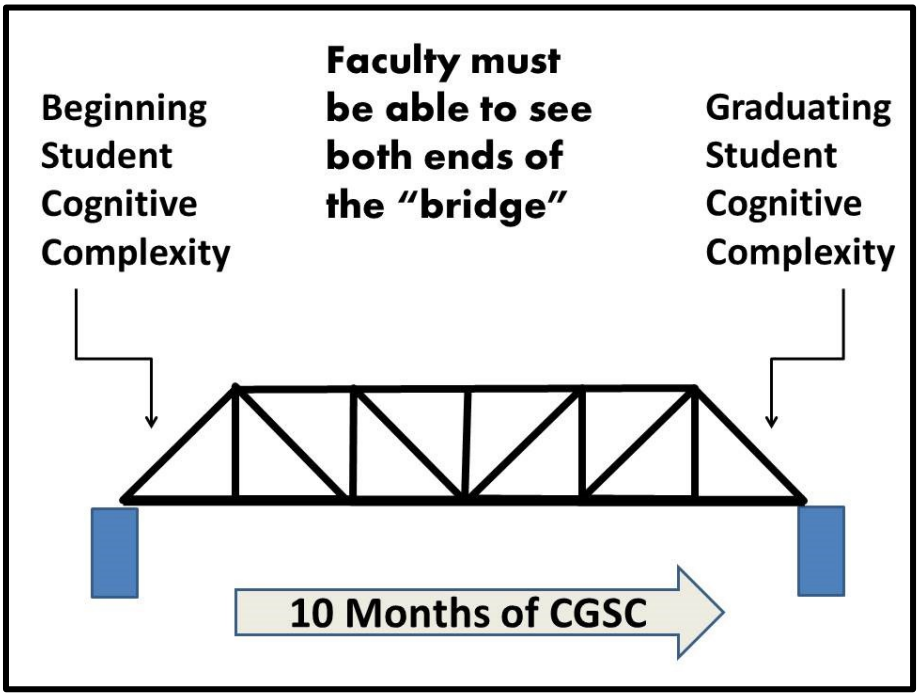

Figure 1.1. Bridge Illustration

Problem Statement

The defense of our Constitution and our national interests is the raison d'etre of our nation's military forces. The environment within which our professional military forces must operate is a complex one that often poses difficult problems for our military officers to solve. As a consequence mid-career military officers are given the opportunity to attend an education that can prepare them to solve problems fraught with ambiguity and difficulty, requiring complex thinking for them to be successful. The education these officers receive must be facilitated by a faculty with a cognitive complexity greater than the goal for graduates (and greater than the student cognitive complexity as they enter the school) in order to enable the faculty to bridge students to higher levels of cognitive complexity.

Purpose Statement

The purpose of this research is to examine the faculty and students at an intermediate service school and to measure the cognitive complexity of both groups. An analysis of the resulting measured levels of cognitive complexity will be examined to determine the difference between measured faculty levels and measured student levels of complexity of thinking and how they vary with demographic factors. Additionally the analysis will be advanced by looking at the expectations of cognitive complexity for student graduates as published by the intermediate service school learning objectives.

Research Questions

This study will be guided by the following research questions that use data collected from an instrument applied to both faculty and students at CGSC to learn more about the relationships between measured cognitive complexity (CC) for groups. Demographic data will also be collected to look for relationships among secondary characteristics of the faculty and students.

Research Question One – Faculty and Students Cognitive Complexity

Is there a difference in the measured level of faculty and student cognitive complexity as measured using the Learning Environment Preferences instrument?

Research Question Two – Faculty and Expectations for Cognitive Complexity

Is there a difference in the level of faculty cognitive complexity as measured using the Learning Environment Preferences instrument and the expected level of CC shown by the published learning objectives?

Research Question Three – Student Cognitive Complexity and Expectations for Cognitive Complexity

Is there a difference in the level of student cognitive complexity as measured using the Learning Environment Preferences instrument and the expected level of cognitive complexity shown by the published learning objectives?

Research Question Four – Demographic Relationships (faculty only)

How does measured CC differ across demographic categories for faculty?

Is there a difference among faculty measured CC (dependent variable) across independent variables (teaching department, years of CGSC teaching experience, military status, and age)? N.B. Military status has two possible conditions: active duty or civilian.

Research Question Five – Demographic Relationships (students and faculty)

How does measured CC differ across demographic categories for both students and faculty? Is there a difference in measured CC (dependent variable) across independent variables (education level, gender, combat experience, branch of service, commissioning source, and years of active duty service)?

Design of the Study

This study is non-experimental (Campbell & Stanley, 1963) in that variables are not manipulated to create effects that can be observed in the changes created (or lack of change) on other measurable variables. The design is a comparison of two groups (students and faculty) within a common college environment, and is primarily a quantitative study. In this design no treatments are applied to the populations. The goal of this research design is exploratory because there is very little information previously gathered among these groups in the area of cognitive complexity. The researcher believes there is value in looking at the relationships among the measurable results from applying an instrument to both groups (Stebbins, 2001). Exploring the

relationships between the level of cognitive complexity in two populations, the faculty and their students at the Army Command and General Staff College may uncover unusual characteristics that can only be revealed through a measurement. Additionally the expectations of cognitive complexity of the graduates will be determined by translating the learning objectives, which the college states in terms of Bloom's taxonomy, into an expectation of Perry position. This expectation of graduates will be used in conjunction with the results of the LEP testing to draw additional meaning from the findings.

Procedure

The researcher will offer the Learning Environment Preference instrument to the full population of CGSC students and faculty. The timing of the administration of the LEP is important. The faculty have a relatively slow work period in the summer prior to the commencement of teaching in the first week of August. The ideal time to administer the LEP would be after most faculty return from summer vacations to attend mandatory training, but prior to the commencement of daily classes. This was the latter weeks of July. For the student body in the few weeks prior to the start of core curriculum classes there is also a relatively light workload entailing checking-in to the school, and taking orientation classes, and completing diagnostic tests. As new students they are not yet exposed to the effects of developmental teaching at CGSC. This is the optimum time for LEP administration to gauge where students are at the start of their education, at the point where the instructors will first see them epistemologically. This time is also in the latter weeks of July.

The LEP will be offered via in-house DoD provided software (Inquisite software) used for administering various survey instruments throughout the school year. The software will be used to provide informed consent information to voluntary participants followed by collection of LEP data. Once the data is recorded it will be downloaded for scoring by the Center for the Study of Intellectual Development.

Once the LEP data is collected and scored it will also be necessary to determine the Perry level that a graduate of CGSC is expected to obtain. The college develops expectations for its graduates in the form of Learning Objectives. There are thirteen upper level Terminal Learning Objectives (TLOs) each with a series of subordinate Enabling Learning Objectives (ELOs). The thirteen TLOs and eighty ELOs are written using Bloom's Taxonomy (Bloom, 1956) to express

the learning objective level. Specifically, each TLO and ELO includes a learning level the instructors and students are responsible for achieving. The researcher will translate the Blooms learning objective levels into an equivalent expectation in Perry's position. This analysis will further enhance the value of the study by allowing for comparisons of the expectations of graduates to the measured cognitive complexity of faculty and students.

Population

There are two populations that will be explored as part of this study. The total population of student is 1307 but includes all students. The US officers out of that total are 1,193 students. These students are mid-career military officers and if they are Army officers they are pre-selected by the Army for attendance based on their prior service performance and other factors. They generally are in the O-3, O-4, and O-5 rank with the predominance being O-4. All officers must have obtained a bachelor's degree to be commissioned and many have completed degrees at the masters level or higher.

At CGSC the students are educated by five departments and therefore the curriculum and instruction can be divided into five broad subject areas. There are other topics that are taught from time to time that do not fit into these five departments exactly but these tend to be ephemeral or have small amounts of content (e.g. space operations). A prominent divide among faculty is the split between those currently serving on active duty (who are temporarily assigned by the Department of Defense) and those civilians who voluntarily teach as a matter of professional employment and often remain for a decade or longer. The total faculty was 315. The composition of the faculty will vary from year to year as the Army has need for active duty officers to stay in the field as an operating force, or returns them from the field to generating force assignments like teaching. The faculty ratio is currently in the neighborhood of 60% civilian and 40% active duty military (Dean of academics self study report, 2014).

Significance

Few studies have investigated the military officer student population. A great deal of research work using the LEP has historically centered on undergraduate student development. These are often the traditional civilian, full-time, single, males of early studies by Perry and others, and later studies of broader demographics, but still primarily civilian and mostly

undergraduate. There is a need for other groups to be studied and in particular graduate students tend to be under examined (Gardner, 2009).

The study and understanding of our military officer student population is highly significant in a number of ways. It is this group of people that are entrusted to be the primary decision makers in complex situations that protect our way of life, form of government (via the Constitution), and our homeland. These people are largely veterans of combat in two recent wars, wars that have lasted longer than any in the history of our nation. Since we will entrust so much to military officers it behooves us to build the best possible educational experiences for them in order to develop the kind of thinking skills they must have to defend the nation.

This study will deviate from the more common focus on civilian undergraduate university settings to a graduate level military intermediate service school. This study breaks new ground in investigating an under-studied population and may be the beginning for further work in this area.

Limitations

This study is unique in that not often are studies done that examine both the faculty and students simultaneously within a single college environment. This study may inspire more research in the future in this area. Within the confines of this study there are the following limitations:

1. There are limitations regarding the range of the LEP as an instrument for measuring cognitive complexity. The LEP yields a Cognitive Complexity Index (CCI) score in the range 200 to 500 that correlate to Perry Positions 2 through 5.

2. The Department of Defense requirements are changing regarding the use of DoD personnel for studies such as this one. In the past it was not unusual for leadership to be directly involved in encouraging support for studies, or to set aside time in an academic calendar for paper and pencil administration of a study instrument. Recent new regulations limit access and mandate no chain of command activity that may be seen as coercive. Consequently the response rates may be reduced in this and future studies in military environments as it is important for DoD subjects to feel free to refuse to be the subject of a study.

3. This study is exploratory and is not longitudinal. It involves a "snapshot in time" measurement of the students and faculty and does not look at changes over time. Another study of a longitudinal design may also be valuable.

4. The basis for translation of Bloom's Taxonomy levels for learning objectives into a corresponding Perry Position expectation were subject to the limitations of qualitative research. The researcher has developed a table of correlation using the behaviors described by Bloom's work and correlated them to behaviors expected by Perry position.

5. The environment at CGSC is unique, hence, the results are limited in terms of generalizability to other institutions.

Definition of Terms

Adult Development - comprises the changes that occur across a spectrum of attributes that characterize adults. In the context of this research the focus is on development of cognitive complexity among adult learners (Hoare, 2006).

Army Learning Concept – is a new model for educating people in the Army. Formerly learning was done separately in the field from that which was done in schools. Learning environments were mostly passive, instructor led, with rigid structures and duration. The Army Learning Concept envisions learner centered instruction, available where and when needed throughout the learner's career, using modern technology for delivery. The learning environment is intended to become participatory and active, with facilitators encouraging critical thinking and problem solving. (*TRADOC Pamphlet 525-8-2: The U.S. Army Learning Concept for 2015,* 2011).

Cognitive Complexity (CC) - is the ability of adults to think in sophisticated ways and to make meaning of information in ever more intricate ways. For this study cognitive complexity will be measured in terms of Perry position (Perry, 1970: Kegan 1994).

Cognitive Development - is associated with a branch of psychology that studies the changing developmental capacity of adults. It is the process by which a person gains more complex ways of thinking starting from infancy and continuing through adulthood (Stedman, 2012).

Constructivism - is the understanding that human beings make sense of the world by construction of their own meaning of reality. When experiencing the world in the cognitive,

emotional, interpersonal and intrapersonal events and inputs the person puts these stimuli together to make a personal meaning from them (Drago-Severson, 2012)

Developmentalism - is the concept that adults can change in their views and how they construct their reality, becoming more complex in their thinking. Under the correct conditions (either accidental or intentionally set up) adults will develop toward more sophisticated thinking. (Drago-Severson, 2012)

Developmental Teaching - is teaching to facilitate the change in mental frameworks used by adults when they think about and solve problems. Developmental teaching centers on emergence of increasingly complex and sophisticated thought through development of thinking. It results in irreversible changes in worldview rather that the accumulation of more pieces of information (Hoare, 2006; Pratt, 1998).

Field Grade (or Field Grade Officer) – Defined as an officer in the grades of O-4 or O-5. At this point in an officer's career he or she is expected to shift viewpoint from the lower (Company Grade) junior officer leadership roles and points of view, to an organizational level leader role (DA Pamphlet 600-3, 2014).

Holding Environment - is the set of conditions surrounding a learning activity that is intended to allow learners to feel safe and accepted so that they may experience personal growth. It has three functions, first to accept the person where they are developmentally, second it must allow for the person to let go of their current developmental level to stretch to a new one, and finally it must support the person at the new more sophisticated developmental level (Drago-Severenson, 2012).

Intermediate Service School (ISS) – Joint professional military education occurs along a continuum of schools. The ISS (also called Intermediate Level College, Intermediate Service College, Intermediate-level Service College, Intermediate Level School, or Military Education Level 4 producer) is an institution for educating mid-career officers, normally at the O-4 level (Majors and Lieutenant Commanders). There are four ISSs: the Army Command and General Staff College (CGSC) (also abbreviated USACGSC), Air Command and Staff College (ACSC), College of Naval Command and Staff (CNCS), and the Marine Corps Command and Staff College (MCCSC). They are charged with developing "an officer's analytic capabilities and creative thought processes" (*Officer professional military education policy,* 2015, p A-A-4).

Professional - as a descriptor is referring to the person who is routinely engaged in dealing with solutions for problems of great significance including problems whose consequences may involve life and death, whose work in the profession is conferred and observed by an external authority, and who is called upon to make autonomous decisions in unique circumstances (Argyris & Schön, 1974; Hughes, 1963; Schön, 1987).

Professional Competence - relates to how professionals think and apply knowledge as opposed to a reference to what the professional knows (knowledge) (Schön, 1987).

Reflective Practice - is the application of the profession with more than application of simple heuristic or linear decision making tools. The professional in reflective practice looks at problems from multiple points of view, is open to new information, and is capable of questioning their own assumptions and reframing a problem to improve the actions taken to solve that problem (Schön, 1987).

Student Development - is described as "the ways that a student grows, progresses, or increases his or her developmental capabilities as a result of enrollment in an institution of higher education" (Gardner, 2009).

Terminal Learning Objectives (TLOs) – "The main objective of a lesson. It is the performance required of the student to demonstrate competency in the material being taught" (*TRADOC Pamphlet 350-70-3: Staff and Faculty Development*, 2013, p 65). At CGSC the terminal learning objective is expressed using Blooms taxonomy for cognitive learning expectations.

Transformational Learning – is use of education to stimulate the emergence of increased cognitive, emotional, interpersonal, and intrapersonal capacities that will allow adults to manage complexity in life and work (Drago-Severson, 2009).

Wicked Problems - are problems that defy simple, linear problem solving due to the complex nature and internally self-referential changing nature of the problem (Conklin, 2006; Rittel, 1972; Rittel & Webber, 1973).

Summary

The military needs officers who can solve the complex problems of the contemporary world. This is so important that the military will pay for mid-career officers to spend almost a full year at an intermediate service school with the expectation that the officer will see a

significant gain in problem solving ability. These professionals need to think in sophisticated ways to solve problems with significant elements of ambiguity and uncertainty.

This research will examine how the Army CGSC is defining what cognitive complexity it anticipates in a graduate of the school. The military and the school state the need in broad terms via vision and mission statements. More specific to CGSC is the explicit delineation of attributes via a set of learning objectives. Using Perry's theory and Blooms taxonomy it is possible to translate these learning objectives into a form that can be measured as a Perry position.

Constructivist theorists (Kegan, 1994; Drago-Severnson 2012) believe that the complexity or sophistication of thinking is an ongoing process and can be influenced by education. Learners given appropriate challenges with support (Sanford, 1962) will develop greater and greater cognitive complexity and will rise upward on the Perry position scheme. This rise is predicated on receiving education designed to raise the student cognitive complexity (Pratt, 1998) so the curriculum and expectations of graduates are naturally going to be at differing levels with students below and expectations above. Similarly, the faculty, in order to teach a curriculum designed to lift students up, must be able to comprehend the goals or expectations and so the cognitive complexity of faculty should be higher than both the students and the expected level of sophistication of a graduate.

This research measures the cognitive complexity of both the students and faculty to see what the relationships are with respect to cognitive complexity. Conclusions will be drawn from the data measured. Other relationships using demographic factors will also be examined for significance.

CHAPTER 2 - Literature Review

Introduction

The career of a military officer is one of professional service. They are essential to the security of our nation and the preservation of our way of life. Professionalism demands certain foundational characteristics. Certainly there is an expectation of extensive knowledge within their field of practice. Usually this knowledge is demonstrated via certification processes and qualifications after extensive schooling. Professionals are dedicated to a specified code of moral and ethical conduct, in the case of a military officer that code is embodied in the Uniform Code of Military Justice and in centuries of military history and tradition. There are rules and institutions that allow professionals to internally certify members of the profession and regulate their behavior. The professional is a lifelong learner who strives to improve practice through education at various points in their career (TRADOC Pamphlet 525-8-2: The U.S. Army Learning Concept for 2015, 2011). Because of these properties professionals are trusted in society and given a high degree of authority and autonomy in practice of their field of expertise (US Army Center for the Army Profession and Ethic, 2014).

Environment and Expectations: The Needs of the Military Professional

The military recognizes the necessity for its members to be intellectually up to the challenge of solving complex problems. The literature of military professional journals is replete with references regarding the complexity of the contemporary operational environment (Davison, 2008; de Czege, 2009; Banach & Ryan, 2009; Banach, 2009; Cardon & Leonard, 2010). Concomitant with the exposition of complex environments is a common theme of preparing people to work within that complexity. The Army has recognized that you can conduct training for situations that are expected. Situations with known components and surrounding factors are drilled into sailors, soldiers, airmen, and Marines through training so that reflexes and heuristic problem solving can be applied with great speed (Zacharakis & Van Der Werff, 2012). This works well for putting out a fire aboard ship, or combating a chemical attack, but how do you ensure best performance in situations that defy the certainty of training? For example you can train a military team to efficiently break down a door, enter and clear a house. But you can't train them to deal with the complexity of creating a peaceful atmosphere among

three, four, or five opposing cultures that have never previously lived together within one district (or worse, who have been in conflict for centuries). For that situation you need leaders who can adapt to complex, ambiguous, and volatile situations. You need leaders who think creatively to develop a reasonably good solution, but is not an ideal solution, if an ideal solution even exists (Clark, 2008; McClary, 2009). Often what is needed is a solution that is sufficient instead of perfect. Where do leaders come from that are agile, adaptable and able to think of a good-enough solution for complex problems?

The leaders the military desires are forged at the intermediate service school (ISS) level. As an officer reaches roughly the halfway point in a military career she or he will often have the option of attending an ISS. The Department of Defense offers multiple institutions for mid-career training. This study will focus on the Army funded Command and General Staff College (CGSC) at Fort Leavenworth, Kansas.

Like the rest of the military, CGSC in intent and curriculum, considers intellectual development through education a primary goal. The strategic priorities of the college as delineated in its on-line website states it will, "Educate and train our students to ensure successful graduates can lead teams and solve complex problems in ambiguous environments in accordance with CGSC learning outcomes" (*CGSC mission, vision, principles & philosophy,* 2015, p. 4).

Critical thinking skills are included as part of the curriculum provided to students in the first weeks of classes. Students dive into the theory and practical application of Richard Paul and Linda Elder (Paul & Elder, 2014) and work on metacognitive analysis of their own thinking. Students are encouraged to put into practical use the eight "Elements of Thought" and the nine "Universal Intellectual Standards" as described by Paul & Elder in their guide book. This is the beginning of their ten month developmental education intended to grow the student in the ability to think in depth.

After this initial exposure to critical thinking the faculty will continue to develop students. Developmental teaching (Pratt, 1998), with an eye toward the raising of the cognitive complexity of students, is one of the missions of the faculty as they educate students to solve problems in a complex and uncertain security environment (TRADOC Pamphlet 525-3-0: The Army Capstone Concept, 2009).

Military Publication of Needs

The Army of the near future will need to be significantly different (*TRADOC Pamphlet 525-3-1: The United States Army Operating Concept:Win in a Complex World,* 2014). Specifically, there is an emphasis on developing leaders within the Army who have characteristics, driven by changes in the environment, which are different from the leaders of the past. The differences are delineated in the official writing that the Army produces through its primary division responsible for training soldiers and the officers who lead them. Looking at some of the recent publications from Training and Doctrine Command (TRADOC) is illuminating and can be best illustrated by starting with the older publications and moving to the more recent.

Army doctrine provides the foundation for describing the character of an Army leader and has been consistent in its description. The older version of FM 6-22 which was published in October 2006 (US Army Field Manual FM 6-22: Army leadership: Competent, confident, and agile, 2006) describes intellectual character. Chapter 6, titled Leader Intelligence, is highly descriptive and relevant. A leader is to be mentally agile. This mental agility characteristic is demonstrated in numerous ways. The leader is adaptable to uncertain and changing conditions. He or she has to be capable of seeing multiple points of view and competently selecting from the range of possible solutions that may be developing. He or she is a thinker who can see the future effects that result from action taken to solve problems. This is referred to in FM 6-22 as "thinking through second- and third-order effects" (p. 6-1). While thinking critically and creatively the Army leader must also use methods that allow him or her to think methodically, to choose courses of action, and to consider the consequences. Finally, the leader must be able to learn from others and from his or her own successes and failures, showing the willingness to improvise when faced with complex situations that appear to have no clear solutions.

In the most recently revised leadership doctrine publication of August 2012, now called ADRP 6-22 (ADRP stands for Army Doctrine Reference Publication), the description of leaders in Chapter 5 is very similar (*US Army Doctrine Reference Publication (ADRP) 6-22: Army leadership,* 2012). Leaders are charged with keeping their minds open to multiple ideas and possible solutions, not closing their thinking prior to reaching an optimal solution to a problem. The problems they are directed to solve are described as being "complex, ill-structured" in nature. Leaders must use critical thinking to visualize creative solutions for these problems.

In July of 2009 the leader of the Combined Arms Center and Commandant of CGSC (Lt. Gen. William B. Caldwell) testified before the House Armed Services committee regarding the purpose of Professional Military Education (PME). ISS's, such as CGSC, are a part of the overall PME system which includes pre-commissioning education (at the military academy or ROTC), Basic Officer education received prior to the ISS level and Senior Service School education received in an officer's career several years after ISS. General Caldwell testified that primary purpose of the PME is to produce leaders who have been imbued with the skill sets to allow them to produce solutions when they encounter situations never encountered before. As he put it,

> "So that when you are confronted with something that is never thought of before, it is extremely complex and difficult, and is a real challenge, you have got those skill sets inherently built into you, that allows you to process and assimilate and add some order out of this chaos." (*Investing in Our Military Leaders: The Role of Professional Military Education in Officer Development*, 2009, p.24)

He envisioned an educational process that teaches officers "…how to think, not what to think." (*Investing in Our Military Leaders: The Role of Professional Military Education in Officer Development*, 2009, p.24) so that they are capable of the mental flexibility necessary to solve unique problems.

In 2009 the Army published TRADOC Pamphlet 525-3-0 "The Army Capstone Concept" (TRADOC Pamphlet 525-3-0: The Army Capstone Concept, 2009) followed in 2010 by TRADOC Pamphlet 525-3-1 "The United States Army Operating Concept" (TRADOC Pamphlet 525-3-1: The United States Army Operating Concept, 2014). These two documents provide a basis for what the Army expects from its leaders. At numerous points the discussion turns to the need for leaders with "flexibility of thought", "adaptability", "tolerance for ambiguity" and ability to work in environments with great uncertainty. For example the introduction to Pamphlet 525-3-0 states "The training and education of our entire force must aim to develop the mindset and requisite knowledge, skills, and abilities required to operate effectively under conditions of uncertainty and complexity." (p. ii) The clear implication is that through education and learning the military leader develops the attributes needed for success in the Army.

Using the Capstone Concept as a basis for action the Army published TRADOC Pamphlet 525-8-2 in January 2011. This pamphlet titled, "The U.S. Army Learning Concept for 2015", projects more of the Army's expectations for leaders (TRADOC Pamphlet 525-8-2: The U.S. Army Learning Concept for 2015, 2011). The Army Learning Concept (ALC) encompasses a wide range of changes the Army anticipates making to keep the institution ahead of its competition. Among these are changes to curriculum, delivery methods and hiring of personnel to teach (an emphasis on the "Guide on the Side" vice a "Sage on the Stage"). The overall model of learning in the Army was previously developed largely for a relatively static enemy (most recently the Soviet Union). Officers spent time in information lectures at institutional schools like CGSC examining the likely actions of the known enemy and preparing plans and orders to allow an appropriate response. The new ALC encourages changes focused upon producing Soldiers and leaders who embody the Army's 21st Century Soldier Competencies (see diagram below, Figure 2.1 from TRADOC Pamphlet 525-8-2). Among the desired competencies, two are connected to Cognitive Complexity, "Adaptability and Initiative" and "Critical Thinking and Problem Solving". It is the intent of the Army to drive a "campaign of learning" that will use education to improve these characteristics in Army leaders. These characteristics are needed now because leaders are expected to work in conditions where the enemies are not static, not all information is available, great uncertainty exists, and where the details of problems encountered are intricately linked and complex. Professional Military Education (or PME) is a way that the Army sees to improve the ability of its officers to make good decisions and act on them quickly in these environments. In the conclusion of the ALC it sums up by saying, "The objective is achievable and worthy of the effort to create thinking Soldiers in a learning Army." (p. 31) In a very recent white paper the commanding general of the US Army Combined Arms Center (where CGSC is located) wrote in the preface to his white paper on the human dimension of the army, "Today the nation faces greater strategic uncertainty than at any time since the ending of the Cold War." (US Army, 2014, p). Finally, the Army has become so thoroughly committed to education as the way to prepare officers for a complex future that in 2015 the Army has begun a process to consolidate its schools, spread across the united states, into one consolidated unified university system (*The Army University White Paper: Educating Leaders to Win in a Complex World*, 2015). This new system will be called The Army University. The Army has stated in a white paper the purpose of The Army University

when it declares, “Preparing leaders for this complexity demands an improved approach to education.” (*The Army University White Paper: Educating Leaders to Win in a Complex World*, 2015, p. ii).

21st Century Soldier Competencies

- Character and accountability
- Comprehensive fitness
- Adaptability and initiative
- Lifelong learner (includes digital literacy)
- Teamwork and collaboration
- Communication and engagement (oral, written, negotiation)
- Critical thinking and problem solving
- Cultural and joint, interagency, intergovernmental, and multinational competence
- Tactical and technical competence (full spectrum capable)

Figure 2.1. Competencies List from TRADOC Pamphlet 525-8-2

CGSC Publications and Curriculum

The publishing of expectations for graduates of CGSC has a long history. In the journal Military Review an article appears in 1946 discussing the seven primary processes used for instruction in what was then called the Army Command and General Staff School (CGSS). Included in the article are expectations for officer graduates. One example of an expectation is an explicit desire for students that demonstrate independent thinking, "To stimulate independent thinking which will enable the student after he is in the field, to build on the foundation received at this school." (Wuertenberger, 1946, p. 66) There was an expectation of the value of the seminar method of teaching to guide students to think about multiple solutions for a given problem, "This device is of particular value when there may be a number of satisfactory, though varying, solutions to a certain staff problem." (Wuertenberger, 1964, p. 66) This aspect of the expected characteristics of graduates related to CC have not changed a great deal over time.

In more recent publications surrounding the expectations of graduates there is still an emphasis on qualities where cognitive complexity in thinking is at a premium. Looking at the

published CGSC webpage titled, “Mission, Vision, Principles, Priorities & Philosophy” the graduate of CGSC is defined in terms related to cognitive complexity. Below are a few quotations from the mission statement of the school and characteristics given for CGSC graduates (http://usacgsc.army.mil/organizations/cace/cgsc/mission).

> We must educate our graduates for the uncertainty they will surely encounter; they must know how to think and apply critical reasoning and creative thinking in complex ambiguous situations.
>
> USACGSC seeks to produce: successful graduates leading teams to solve complex problems throughout the spectrum of operations.
>
> Educate and train our students to ensure successful graduates can lead teams and solve complex problems in ambiguous environments in accordance with CGSC learning outcomes.

The last statement references the learning outcomes of CGSC as a guide to understanding the graduate of the school. What are these learning outcomes, how are they defined, and how can they be translated into a form that can be used in comparison to the measured cognitive complexity of actual students and faculty? The answers begin with examining the objectives themselves.

Bloom’s Taxonomy of Educational Objectives

At CGSC the method used to define the cognitive characteristic desired from instruction are specified in a set of Terminal Learning Objectives (TLOs). For this study it will be important to examine the TLOs and determine the relationship between Perry Positions and TLOs. Because the TLOs are the clearest definition of what the graduate of CGSC will achieve it is possible to compare the measured Perry Position of graduates to the expected levels from TLOs by translating TLOs, written with Blooms taxonomy, into Perry positions (Burge & Brinkman, 2010; Horii, 2007; Hofer & Pintrich, 1997; Irish, 1999; Ryan, 1984; Wood,1993). It will also be important to compare the measured faculty Perry positions with the expectations of

the graduate as theory shows that the faculty must be able to comprehend cognitive complexity at a high enough level to understand the level they are developing students to achieve (Drago-Severnson, 2012; Kegan, 1994; Pratt, 1998).

When building curriculum a great deal of time and effort are expended in the process of defining these TLOs with as much precision as possible because these objectives express the expectations of the Army for the graduate of the institution. To gain precision across curriculum the college uses primarily the cognitive domain educational objectives expressed by Benjamin Bloom in his 1956 form (Bloom, 1956). Although Lorin Anderson and David Krathwohl later modified his taxonomy (Anderson & Krathwohl, 2001) CGSC has continued to use the older 1956 form. Each learning objective at the college is required to specify the expected behavior based on one of the six levels of cognitive behavior from Bloom. Bloom is explicit in the description of the taxonomy that the taxonomy is hierarchical such that "complex behaviors include the simpler behaviors."(Bloom, 1956, p. 16) Students build up through the levels similarly to growing in stages in a manner similar to the theory of William Perry for cognitive complexity. Bloom intends that increasing the learning objective level is concerned with raising or bridging students from a lower order of thinking to more sophisticated levels.

Bloom organized learning objectives into six levels:

1. Knowledge – the basic ability to recall specific and isolatable bits of information. At this level students can list dates, name places, or persons, etc.

2. Comprehension – the beginning of understanding this includes describing information without actually connecting the information to other information. It is still largely the ability to repeat information given to the student.

3. Application – After learning principles, ideas, theories, rules of procedures the student can be remember them and use them. Application level cognition asks the student to employ the facts or procedures into a process more sophisticated than repeating back facts or describing an object or idea.

4. Analysis - The student now should be able to see the elements of communication and break it down looking for facts, assumptions, and hypotheses. He can see how parts of concepts are related to one another and draw conclusions regarding the parts and the whole.

5. Synthesis – This entails putting together the elements and parts of all the previous levels in order to produce a new whole idea or produce a new process with clarity and organization. The student is designing or devising from her experience and prior learning.

6. Evaluation – At the highest learning the student can make quantitative and qualitative judgments about how well material satisfies externally or internally derived criteria. The objective is to assess the value of the material learned. The student can weigh the evidence and find truth or fallacies.

After defining the objectives it will be necessary to translate them from Blooms taxonomy into a more useful form that relates them to the Perry positions we can measure.

Professional Development and Donald Schön

Military officers are professionals. Professionals, according to Everett Hughes, are those in occupations that have great knowledge and skill in matters of pronounced importance to society as a whole (Hughes, 1963). Doctors are clearly in this category and are given the responsibility and trust to make decisions influencing the life or death of patients. In exchange for the great responsibility that doctors hold, they are given latitude within society to have extensive autonomy in the practice of medicine. Society demands that they develop processes and institutions that certify their practice and internally regulate their members within the profession, establishing rules and regulations to control the practitioners. In a parallel context military officers are also given the authority to hold the power of life and death over other human beings. On the battlefield, or in the planning staff, an officer's diagnosis of the symptoms observed will lead to decisions that affect the lives of combatants and civilians on a battlefield, and could potentially injure or kill millions of people (in the case of nuclear conflicts). Like doctors the military profession has been granted great autonomy to function within its own established guidelines. The Uniform Code of Military Justice is, for example, is a separate legal system established purely to regulate the conduct of military personnel. Like doctors, military professionals are expected to first "do no harm" in the sense that they must create conditions established by political leaders in ways that minimize harm and the potential for future conflict.

As professionals the military officer needs professional school for development. Research indicates that people develop through education (Kegan, 1994; King & Kitchener, 1994). Studies of professional competence connect higher order thinking (thinking that is

needed for solving the complex problems presented to professionals) with developmental learning (Hoare, 2006, 2011). In the modern military environment officers will face what Ronald Heifetz termed adaptive challenges where the problem to be solved is unclear and there are no currently known solutions for the problem (Heifetz, 1994).

Donald Schön researched and wrote extensively on the need for professionals to develop through education (Schön 1974, 1983, 1987, 1991). Schön theorized that professional work is distinctly different. For some less challenging problems professionals were employing "knowing in action" or the largely unconscious application of known techniques to solve problems that reoccur in the profession (Schön 1983, 1987). For simple problems that works well, however professionals are expected to work beyond the simple and solve complex or "ill-structured" problems as well.

When working with ill-structured problems professionals work like artists who are engaged in creative expression. Schön called this artistic practice reflection in action (Schön 1983, 1987). Reflection in action entails more than the rote application of known techniques to create a solution. It involves the person reflecting on what effects are occurring as the professional is applying treatments to partially solve problems. From this on-going reflection the professional makes judgments and adjustments. The process is creative and often the professional will have trouble articulating exactly how they are working out the solution, but the result is a new set of actions that may be highly unique for solving a problem. The process is akin to a painter engaged in making a statement through his use of paint and brush. Other studies have been conducted using measures of creativity as it relates to professional military officers (Clark, 2008; McClary 2009) but creativity measurements will not be a focus for this research.

The professional problem solver is not educated purely in terms of rational thinking and techniques. The education is tailored to include the realm of creativity. As such professional education must take on the character of coaching of students (Schön 1983, 1987). The faculty becomes less of a teacher of technique alone but also an observer of the student response to problems posed. There is some level of demonstration of basic knowledge but the learner is then coached to solve problems in their own unique fashion. The coach recognizes where the student has developed in their ability to creatively solve cases and coaches for further depth, essentially seeing a student plateaued at one level of CC and working to set up an appropriate

level of challenge to move the student further along. The coach must be able to comprehend both the student's current level of development and a level higher which she can coach the student to achieve (Pratt, 1998). In the context of this study it means that a faculty member will need to be at a Perry position level above the student level to be able to raise the student to a higher level of cognitive complexity.

Coaches in professional education must reflect on reflection-in-action to be effective. For the faculty to develop professionals requires them not only to be proficient in reflection-in-action but to reflect on both their practice (teaching) and the reflection in action of their students (staff planning). An effective faculty coach will see how students are functioning at solving staff planning processes and reflect to recognize what needs to be developed to more sophisticated levels. In terms of Perry Positions the faculty must recognize if individual students are operating at low levels and design and adjust curriculum and teaching to suit the students (Kloss, 1994). Schön calls this the development of Reflective Practicum as the way to help students to become proficient on their own in reflection-in-action (Schön, 1987).

Given that the Army needs officers who can meet the need for professionals that have the requisite talent for solving ill-structured problems the intermediate service school is a pathway to forge these officers. They will need to be coached to obtain the artistry of a professional. They will also need to think with a high level of cognitive complexity. What does theory tell us about cognitive complexity?

Cognitive Complexity

Cognitive complexity underpins thinking in depth which in turn is the foundation necessary for solving the complex problems encumbering the graduate of a military Intermediate Service School (ISS). Theorists have examined complexity of thinking and postulated the progression of thinking from lower levels to higher levels of sophistication in thinking (Belenky, Clinchy, Goldberger, & Tarule, 1997; Kegan, 1994; King & Kitchener, 1994; Perry, 1999; Piaget, 1955). Each has seen cognitive complexity from a differing point of view relevant to the era in which they wrote and the subjects whom they studied. Most developed either a continuum of progression in thinking sophistication or a more discrete set of stages or "positions" of development in the cognitive processes of adults.

Perry

A prestigious and foundational theorist of cognitive complexity is William G. Perry, Jr. (Perry, 1999). Perry began by conducting interviews of students at Harvard University and Radcliffe University during the period 1954 to 1963. Using open interviews without rigid formats or questions Perry and his team of judges interviewed undergraduate college students as they progressed through their freshman to senior year. The sample size was relatively small encompassing 140 total students and most of the students were men (only two full reports from women). From the analysis of the resulting interview documentation Perry found that students progressing through college changed epistemologically as they were exposed to college education. The goal of his research was to organize and describe the changes.

Perry developed a model of the change in complexity of how students thought about knowledge from the earliest college experiences to the final experiences. His model describes the viewpoints of students along a scale of positions from 1 through 9. In each higher position the student has changed how they understand where knowledge comes from and their sophistication in cognitive complexity. This study will rely heavily on the foundation of Perry's nine positions described below.

Perry positions 1 and 2 are similar in their adherence to Duality. The people in these positions tend to view their world as divided (see figure 2) in two. Position 1 is the most basic level of student knowing. At this level the person is convinced that the world is very simply divided between that which is absolutely known and that which is currently unknown. There is no room for gray areas and the student at this level will talk about the world in terms Perry describes as "Authority-right-we" versus an opposing world of "Illegitimate-wrong-others". This position of Basic Duality was not actually recorded in any of the college freshmen studied by Perry but he included it as a logical bookend to his linear progression of positions. It would result in a person wholly dependent for knowledge from authorities alone with obedience the goal and no independent thinking or knowing. At this position the individual will not even recognize the existence of multiple points of view or perspectives. They see the world in a cold

bipolarity where you are either with them in believing and obeying authority or you are lost and wrong.

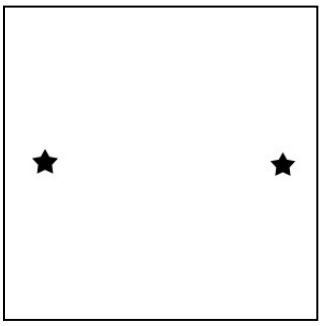

Figure 2.2. Perry Model Dualism

Position 2 was the lowest level noted in college freshmen. In position 2 the person is still dualistic in thinking but recognizes that there are others who may have a wrong answer that will eventually be corrected. Knowledge is still divided between absolute truth and absolute falsity and those who might say otherwise will need to be educated in what is correct. Authority figures still have correct answers for learners and can be expected to tell you the one right answer to your questions after maybe some academic discussions of points of view that will be shown to be wrong. The position 2 person is still confident the right answer is out there and often expresses resentment at being asked to listen to other points of view when she feels they must be wrong. This stress of resentment eventually gives way to position 3.

At position 3 the student has moved out of strict dualistic thought to a world more like shown in Figure 2.3. They begin to recognize that there are multiple points of view on knowledge. In some cases more than one answer may satisfy the problem posed. The person is willing to concede that authorities are in disagreement regarding knowledge. Perry calls this the beginnings of Multiplicity. There may be more than one right answer to a problem so the world is more complex and uncertain than they had previously imagined. Even so at this early stage there is still hope that knowledge may one day be collapsed by authorities with more information.

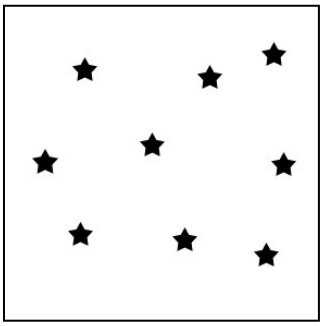

Figure 2.3. Perry Model Multiplicity

In Perry Position 4 the student believes that all the positions taken by multiple authorities just shows that you can't make judgments between the information provided to you. In some ways this is a very confusing and depressing time in intellectual development as the student throws up his hands and says if all opinions are equally valid then no one has a better opinion than anyone else. The learner purposely steps away from judging what may be more, or may be less, true as a result of the context surrounding the problem. Eveyone has a right to their opinion on the matter at hand.

At Position 5 the student sees a divided world of authorities and believes that in some areas absolute knowledge and answers do not exist. Perry contrasts fields of knowledge like Physics (with a known correct answer) and English (with shades of nuance and opinion). The person brings context and judgment into the discussion and some solutions she individually judges as more correct in the context as she sees it (see Figure 2.4). Within the universe of possible answers and knowledge the learner selects a number of answers which are of greatest validity by their own judgment. This is the world of relativity according to Perry. The context

of the problem allows for some evaluation of solutions. In a study of the students at the Army War College, where strategic thinkers are developed, the researchers describe strategic leaders as people who can recognize the need for seeing multiple competing ideas and are able to change their mind to select the best ideas (Gerras & Wong, 2013). This would seem to require a Perry level of at least 5 or higher.

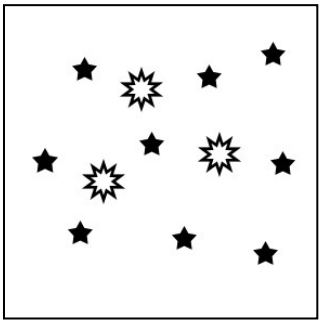

Figure 2.4. Perry Model Relativity

Perry positions above position 5 are concerned with what Perry calls Commitment. In the positions 6 through 9 the individual gains stronger commitment to selection of truth within context and their own internal compass (see figure 5). The point of view of the learner becomes personal and may result in either positive or negative consequences that they have committed to support. The person becomes challenged and decides what they truly believe for themselves and not necessarily what they are directed to believe by authorities.

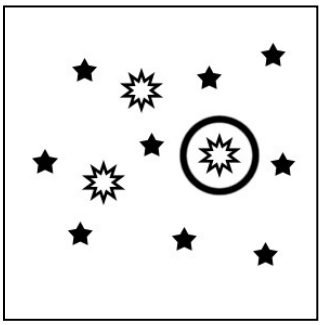

Figure 2.5. Perry Model Commitment

King and Kitchener

More support for a stepped development scheme for cognitive complexity comes from the work of Patricia King and Karen Kitchener as explained in their book Developing Reflective Judgment (King & Kitchener, 1994). Their Reflective Judgment Model (RJM) was developed from interviews of over 1700 people using the Reflective Judgment Interview. People were interviewed in a wide age range from as young as fourteen to older than sixty-five. The data from the interviews were examined for patterns of response to solving ill-structured problems. King and Kitchener found that how people view what can be known about problems will shape how they frame problems, and thence how they work at solving problems.

King and Kitchener were specifically examining the way subjects approached problems that met their definitions for ill-structured problems. They list the following characteristics of these problems in *Developing Reflective Judgement: Understanding and Promoting Intellectual Growth and Critical Thinking in Adolescents and Adults* with the following three characteristics:

1. Cannot be described with a high degree of certainty.
2. Cannot be resolved with a high degree of certainty.
3. Experts often disagree about the best solution, even when the problem can be considered solved.

Using the results of the Reflective Judgement Interviews King and Kitchener were able to develop the subjects into seven groups of epistemological assumptions based on how they described the justification for solutions to ill-structured problems. The found their data supported a sequentiality to the epistemological assumptions showing that individuals were progressing up the stages linearly and were able to understand previous stages but may not be able to see higher stages. As subjects develop they begin to recognize a new epistemology and jump to higher levels in a growth "spurt" as shown by new ways they justify solutions to problems. It is possible for instructors to teach at levels above students, to encourage growth, but without adequate support this teaching may lead to student frustration.

The seven stages of the Reflective Judgement Model can be collapsed into Pre-Reflective, Quasi-Reflective and Reflective thinking. In the Pre-Reflective (stages 1, 2, 3) the learner is thinking with absolute and concrete assumptions about knowledge. In Stage 1 they believe there is only one truth and that it can be known with certainty. The truth they know is also very personal, it requires no external justification but is based in experience. There is no

recognition of alternate points of view. By stage 2 the person may accept external information that comes from authorities but there is still only one correct truth and somewhere there is an authority that knows it. Beliefs are judged to be true if an authority has said it is true. Finally in stage 3 the person acknowledges that not all things knowable are yet known but still clings to the belief that there is one truth. At some point in the future the truth will be known if it is not clear right now. Until that ultimate truth is known everything is just hidden or authorities are guessing.

In Quasi-Reflective thinking there are two stages, 4 and 5. In stage 4 knowledge is seen as uncertain but each individual must examine what is asserted by sources and choose evidence that supports a personal position. Knowledge is seen as a personal truth and varies based on the evidence available and selected. By stage 5 knowledge is still judged personally but also contextually. There may be enough evidence that supports an alternate view by others that they can justify with alternate choices of evidence. Everyone is making an interpretation of the evidence that may be known.

In the final two stages 6 and 7 the epistemological assumptions are Reflective thinking. In stage 6 the person constructs knowledge based on using a wide variety of sources, evidence and even opinion. There is recognition that more than one solution may be adequate for an ill-structured problem and some may be more satisfactory than others. The person evaluates how sure they are of a particular solution based on evaluation criteria. The "80% solution" may be all you can achieve and is as good as it gets. In stage 7 there is recognition that the solutions to ill-structured problems are a "best fit" and must be constantly reevaluated in the light of new information or new perspectives. The evidence itself must be separately evaluated for relevance and likelihood of truth. The best answers are those that are justified by weighing the evidence against the problem, comparing multiple solutions and consequences of outcomes if applied, and risks of error in the data or the application of solutions to develop the most plausible solution to problems.

Belenky, et al.

Another model of development suggests that models developed by men, who only examined men, may be missing an alternate perspective that would be seen if women studied women. Using this as the foundational thought Belenky, Clinchy, Goldberger, and Tarule

conducted a study with only women as subjects and published Women's Ways of Knowing: The Development of Self, Voice, and Mind (1997). In contrast to other studies the researchers interviewed 135 women, 90 who were students in academic progress and 45 who were at public centers for people seeking parenting information. Using the resulting data from interviews Belenky et. al. determined that they could identify five epistemological categories that defined the way women construct knowledge. Because these ways did not completely line up with previous theory they concluded that women have a definitive way of making meaning separate from men and that has implications for the structures of education which are historically developed by men and for education of men. These same four researchers later expanded on their original study to extending it to include issues of race, social class and cultural aspects (Goldberger, Tarule, Clinchy, & Belenky, 1996).

The first category was designated Silence. Women of this view saw knowledge not as a positive for them but as a negative. They were silent because when they spoke they were often hurt by being told they were wrong, speaking out meant painful experiences. These women were very concrete thinkers with belief that absolute truth was going to be told to them by authorities and that's how they know about the world and what they should do. The world is seen in polar terms of good-bad, win-lose with little conception of gray areas. Women then were silent and had little confidence in themselves or their own ability to think for themselves. Similar to Perry's position 1 which were actually not observed in his subjects this very basic level of development was rare among the women Belenky studied.

The second category is Received Knowledge. These women are receivers of knowledge from listening to others, peers and authorities, for what is truth. They believe authority figures will have the answers they need. They still lack the development of personal opinions and generally understand the world through what they are told. The self is described through others views and they rely for self confidence on what others say they think of them. They are still relatively silent and still dualistic in perspective of bifurcating the world into right or wrong, and believing there is one right answer. They are receivers of facts.

The third category is Subjective Knowledge. It is at this stage that a woman begins to have an "inner voice" and begins to believe in her own "gut feelings" about knowledge. Truth is grounded in first hand experiences that she or others have experienced. She recognizes that there are multiple ways of seeing the world and feels that her truth resides in her understanding of it

even though it may not match that which is given by others. This stage Belenky notes is closest to the Perry Position of Multiplicity. Sometimes this realization and ability to trust the self comes from a crisis in life where the males or authorities let the woman down and she sees that she must develop her own self confidence and her own points of view. She is gaining a voice.

The fourth category is Procedural Knowledge. A woman at this level has developed her personal inner voice and can exercise it as a separate voice or connected voice. In the sense of separate voice she is tough-minded, adversarial in thinking and plays the "doubting game" of challenging truth to make a truth that she understands. She keeps herself and her feelings separate from the understanding of the world. In connected voice the approach to knowledge is formed with the input of what others think. She plays the "believing game" and works to see knowledge from the perspective of another person in an empathic way. Feelings and intuition are valid parts of her understanding and she suspends judgement in order to understand the context of another's point of view.

The final or fifth category is constructed knowledge. At this highest level the women recognized all knowledge as constructed by the person. The context and situation are central to understanding what is truth rather than purely rational analysis. They are not troubled by complexity or ambiguity but are attentive to others and feel a sense of caring and passion for knowledge. They aspire to contribute the empowerment and improvement of others in a connected way.

There are multiple theorists who have created ways to explain the cognitive complexity of adult learners. Perry developed nine postions, King and Kitchener extended Perry into the seven stages of the Reflective Judgement Model. Belenky and her associates added another facet to our understanding by studying women's ways of knowing as separate from men. The models suggest that adults develop on pathways to greater levels of cognitive complexity but the question that follows is how are they developed? For that we turn to adult development theory.

Adult Development

As noted above there are a range of theorists that have formed a number of ways to view the development of adults. The students and faculty at CGSC are in some ways divergent from the adults that are often studied in terms of adult development theory. These people have self-selected into a career field of professional military service (or in the case of some purely civilian

faculty members at least in the profession of educating military officers). Consequently they are all engaged in the profession of arms and the education they receive reflects adult education in foundation with the addition of professional development. Looking at the large field of theorists in how adults develop there are those who have more broad application to adults in general (e.g. Malcom Knowles and andragogy) and those who look more specifically at the education of those in a profession (e.g. Eleanor Drago-Severson and Donald Schön).

Knowles

In the long history of education most of the focus was placed on the education of children. In more modern times it was recognized that being educated once as a child was no longer sufficient to last for a whole life; people were living longer, and new information was accreting faster. A person would need new skills and information throughout a lifetime (Knowles, 1980). As educators wrestled with education of older (now in adulthood) learners they became aware that the underlying assumptions about learners as children did not exactly match those of adults. Ideas about adult education began developing to address the needs of adult learners. In 1926 Eduard Lindeman developed several assumptions about adult learners and separated education between conventional education and adult education (Lindeman, 1926). These ideas were further developed as scholars conducted additional research on the education of adults.

Malcom Knowles is known for introducing the concept of andragogy in the United States in 1967 (Knowles, Holton & Swanson, 2012). Knowles developed his concept initially around four basic assumptions regarding adult learners. He later fleshed them out into six assumptions to describe adult learners, as distinguishable from children, throughout a series of books (Knowles, 1973, 1980, 1984; Knowles, Holton & Swanson, 2012; Merriam & Bierema, 2014). Knowles eventually came to the conclusion that assumptions for children versus adults did not necessarily separate the resulting teaching between the two groups. He recognized that in certain circumstances the adults may respond better to pedagogical teaching and in some cases children would be able to respond well to andragogical teaching.

The first assumption behind teaching adults is their need to understand what the benefit is for them to learn. For children in school it may be enough to know that sometime in the future they will need to use math but for an adult they need to know the exact use of the math they are

learning. Adults are not as willing to learn without a recognition of the future use of the content. The adult learner needs to know why they need to learn the material they are working to master. Adult educators are adjured by Knowles to explain to an adult learner early in the education process how they will use the knowledge that is gained.

An adult is responsible for herself and her own life in a way that a child is not who is still dependent on adults. A second assumption for adult learners then is they will want to have some responsibility for choosing what to learn. Some adults may resist being placed in a situation where the curriculum is preset as a fait accomplis without their input. Adults may and will "vote with their feet" and can and will choose to leave the education process if they are not responsible for what they are learning. In contrast, children do not have the option to leave their early education experiences.

Adults, unlike most children, have many and varied life experiences. The third assumption is that adults will be able to employ these experiences as part of the learning and developing process. By virtue of being older the adult has had a great many experiences that they can draw from, or use as a scaffolding, to understand what is being taught and possibly to enable others to learn from their experience. They make analogies from their experiences. They can see relevant factors and contexts not available to children. If a group of adults is being educated the combined experiences create a fertile learning environment for the facilitator to draw from as part of the education process.

For adults the learning they require is disconnected from time of life and is more connected to a readiness to learn. A child learns in school while a child, but the adult learns throughout a lifetime at the point where overall life circumstances demand learning. Readiness to learn is associated with the necessity for learning to meet a need at that point in an adult's life and not for a vague and inexact future need. It may be necessary for the adult educator to explain the need for the learning to provide a circumstantial need for learning. Nonetheless it is assumed that an adult will need to learn at many age points in life.

The fifth assumption is that children's curriculum can be clearly sliced into academic subjects to be taught, but for adults it is different. Rather than predetermined subjects a better organizational principle for adult education is to teach in areas relevant to tasks or problems that the adult will need to understand. The material taught should be explicitly related to a problem that the adult will need to solve in some way.

The final assumption for educating adults is the source of motivation. For children the motivations were seen to be more external than internal in the sense that they were receiving education that was directed for them to obtain. They must succeed sequentially in a curriculum provided, via various assessments, to continue to advance in school. Adults may be less interested in advancement in school as a motivation, and less influenced by other external motivators. Knowles asserted that adults respond better to a learning situation if they are internally motivated. Later studies of intrinsic versus extrinsic motivation for adults show varying results for adult motivation (Sanson & Harackiewizc, 2000). Knowles believed that the most compelling motivators, however, were internal, not external.

These six assumptions regarding adult learners have implications for many areas of teaching and developing adult learners. Knowles explains that teaching is a multifaceted activity and many of the ways and applications of teaching for developing adults are affected by the assumptions chosen (either pedagogical or andragogical). Based on the circumstances there may be a case for choosing either set of assumptions, and for development purposes the circumstances may lead to adult development not only by teacher facilitators but also by fellow students. Research by Collins (Collins, 2005) demonstrated that adult students in a cohort taught class will demonstrate evidence of cognitive growth from the challenges supplied by fellow students. This same idea was demonstrated by Fishback (Fishback, 1997) in her doctoral dissertation and in other literature (Kloss, 1994)

Kegan

Robert Kegan has developed a model similar to William Perry's Positions which have significant implications in describing cognitive complexity. Kegan is situated within the field of adult development. He postulated an evolutionary process of development in the growth of an individual to make meaning of her world (Kegan, 1982). The intent of his constructive developmental model was primarily to describe for counselors the ongoing process of more and more sophisticated meaning making as a person matures. Later Kegan expanded that foundation into a set of levels described as Orders of Consciousness (Kegan, 1994). There are six levels to the scheme that describe changes as an individual develops pausing at mental plateaus or resting places at higher and higher orders of consciousness. At each plateau the person is incorporates all the previous attributes of the preceding stage and "sees" or is aware of the subject of that

order of consciousness. The six stages are numbered 0 through 5 and are named; the integrative stage, the impulsive stage, the imperial stage, the interpersonal stage, the institutional stage, and the inter-individual stage. At each successive stage the previous stage's object is integrated and seen in its fullness by the individual who is evolving and has advanced to the new stage.

To advance Kegan explains that it is not enough to just be challenged by the problems that occur as a person ages. Certainly there is some correlation between growing older and more experienced and rising in order of consciousness. But it is also possible for individuals to plateau and when challenged by a new problem to retreat and maintain in the level they are already comfortable in. Kegan says that people grow best when confronted with challenges while simultaneously offered adequate support. The converse environment that has challenges without support Kegan labels as "toxic" and may result in defensiveness and constriction of consciousness. This is consistent with the work by Sanford (Sanford, 1962) on challenge and support for learners. Kegan believes challenges to the individual can and will allow them to bridge the gaps between orders of consciousness. He calls this a process "by which the whole ("how I am") becomes gradually a part ("how I was) of a new whole ("how I am now")". Kegan talks about adults who re-enter schooling environments being asked to "go out of their minds" in order to grow further in orders of consciousness. Given a challenging and supportive environment people will grow in orders of consciousness.

Drago-Severnson

The work of Eleanor Drago-Severnson (Drago-Severnson, 2012, 2009) points the way to developing professional faculty leaders as they in turn design and implement programs to lead students and junior faculty. Her theory applies equally well to the developing of mid-career military officers who will lead their own junior personnel. Drago-Severnson envisions a model of adult development that she analogizes to the rings of a tree with the leader of development at the center and four expanding rings radiating outward from the leader. The goal of the model is to provide appropriate levels of challenge with suitable support for those challenges in what is described as a "holding environment" for the student. This is consistent with the constructivc-developmental theory (Kegan, 1994) that posits a need for adults to receive challenges with support for there to be growth. The challenge and support necessity can be found in multiple places in developmental literature. Initially described by Nevitt Sanford (Sanford 1962, Sanford

1966) in the 1960's it is echoed in most discussion of the development of adult learners including Stephen Brookfield (Brookfield, 2006) and Susan Gardner (Gardner, 2009).

Drago-Severson's developmental model begins with the individual who will be developing other leaders in the very center of the model. The leader must prepare extensively in advance to lead the development of others. Much of this model is reliant on a faculty that is volitional in the purpose of developing other adults. At the center of the model is the developer of other leaders. Surrounding that developer/leader are the four connected rings.

The first ring represents five core elements for setting a foundation for development. This foundation is a holding environment in which the adult learner able to safely grow. The core elements are care, respect, trust, collaboration, and intentionality. These core elements are working together to create the holding environment. Care is the demonstration that the leader values the person and is focused on the well-being of the person. If adults are not cared for and feel without value then a holding environment is not created and growth is less certain.

Respect is the next core element. To respect the learner is to accept them where they are currently in their development. In a holding environment it is important that individuals are comfortable with thinking beyond their experiences to examine varying perspectives. Until the person knows that their own perspective is respected they may be less inclined to accept the views of others. Drago-Severson recognized that even if a learner is not ready to accept the validity of another's point of view if they are respected they may be convinced to "rent" and idea temporarily even though they are not ready to "buy" that idea. Through this renting of other's perspectives an opportunity is provided for growth.

For growth to occur there should also be established trust. People are vulnerable when they "rent" ideas and make statements that can and will be critiqued by the leader. Trust must be established between student and leader to allow for a holding environment where risks can be taken to allow development to occur. As a developer of adults leaders should be willing to be vulnerable themselves and to make sure their actions match their words.

Collaboration is all about working jointly in teams of adult learners. The establishment of teams of learners allows for development as there is a wider source of experiences and perspectives available to each member of the group. As a part of collaboration there should be time, which is part of planning, for individuals to reflect on ideas before collaborating and also

time for post-collaboration reflection. It is in these times that the learner can solidify the benefits of group collaboration for herself.

The final core element is intentionality. The groups that are gathered to develop must be coalesced with specific intention for growth. This manifests itself in putting people together in ways that the developer selects to maximize the likelihood of growth. This affects many aspects of the holding environment including the structures of groups, facilitation, assignments, course design, group activities, etc. All elements of the education process should be directed intentionally toward a central purpose.

One primary purpose of setting up the holding environment is to create conditions for development upwards among four levels of sophistication in cognitive complexity defined by Drago-Severson as four ways of knowing. These ways of knowing are similar to other stage theories of development and track alongside Perry positions and parallel the final four of Kegan's orders of consciousness. The four defined by Drago-Severson are the instrumental way of knowing, the socializing way of knowing, the self-authoring way of knowing, and the self-transforming way of knowing.

For adults within the instrumental way of knowing the person thinks within the realm of rules and right answers. Similar to Perry position of dualistic thinkers the instrumental knower wants to be told the boundaries of expectations, the rules they must follow to know they are working hard and achieving success, and maybe how to avoid punishment. They tend to believe in one correct point of view and seek to know this truth. These thinkers are unlikely to generalize concepts from one sphere of thought into another.

The socializing way of knowing thinks more broadly about the way they may appear to others and the value they are providing to others. They are sophisticated enough to reflect on their own internal views of goals and to see other points of view regarding those goals. They may orient their reflection on what others think about them and define their thinking by the value judgement of others. It is not enough to know and define truth for themselves alone, they need affirmation from other points of view.

The self-authoring way of knowing is the beginning of making a judgment for oneself on what is of value and interest. The person has seen other points of view and is establishing a personal set of values that he or she is going to use to judge validity of external inputs. Criticism is evaluated against an internal set of consistent standards and accepted or rejected on this basis.

The individual is able to accept conflicting points of view and conflicting feelings about the same topic. The person wants to rest upon her internal feeling of competence and validity based on internal standards.

The highest level in the four ways of knowing is the self-transforming level. Here the person is able to view the other people's thinking, evaluate against personal standards and make volitional changes to their way of thinking after reflection on multiple points of view. This is a person who desires and seeks out conflicting information in order to see the whole picture and develop the optimal understanding. This person is not adverse to conflict and sees it as a normal experience in the process of growth.

Drago-Severson's model of development follows the constructivist theory in that people are believed to make meaning of what they are taught and experience within the context of current life conditions. The individual, if provided the correct conditions, is expected to rise in levels of cognitive complexity as they grow. The important part for the instructor who desires to see development of students is to provide the correct conditions. The rest of the rings in Drag-Severson's model for leader development relate to the setting of these conditions. Ring two encompasses practical applications of ring one to put into practice the five core elements. For example she discusses the need to listen with sensitivity, to use your own language thoughtfully, and to build up relationships with learners. Ring three is about the shaping of the environment around the learning. Ring three includes setting norms of behavior, providing a safe space where people can talk without threat of being humiliated for having a different point of view, and caring for basic physical needs of learners. This ring also introduces the four Pillar Practices that are developed extensively in Drago-Severson's 2009 work *Leading Adult Learning: Supporting Adult Development in Our Schools*. These pillar practices are teaming, placing people in leadership roles, collegial inquiry, and mentoring/coaching. The final ring, ring four, are the final touches or as Drago-Severson calls them, nuances that enhance the development. She describes the minor things that may make a big difference in the holding environment when you are in the room with learners. For example welcoming people, extending personal connections to them, and being transparent and clear about timing and schedules.

Drago-Severson's model is situated within the needs of developing learners and leaders. She further extends her thinking into the way of knowing, not of the student but of the teaching profession (Drago-Severson, 2011). In the center of her model was the person doing the

developing of others but she makes the point that it is also relevant to examine the level at which the developer herself is thinking. In Kegan's constructive developmental theory the person who is at one level is able to "see" or comprehend as an object the lower level from whence they came. But they may be unable to "see" or comprehend the levels above their own level. This has significant implications for faculty charged with developing students who may be more sophisticated knowers than the faculty themselves. Drago-Severson suggests that further research is needed to examine how teacher's ways of knowing will influence their ability to provide an adequate holding environment with appropriate challenges and supports. Knowing that it is theoretically possible to develop adults through education is the start of the process. What are the details of teaching with an eye toward facilitating this development to occur?

Developmental Teaching and Bridging

There are multiple ways in which the education of CGSC students may be viewed and accomplished. Because of the need for students to be problem solvers in a complex military environment there is a need for students to get more out of Intermediate Service School (ISS) education than just an increased body of information. Daniel Pratt espoused five perspectives regarding the education of adults (Pratt, 1998). In Pratt's transmission perspective the objective of the educator is to provide the student an opportunity to increase her body of information and to be able to reproduce that information at need. Increasing the accumulated professional knowledge of military officer students is certainly one portion of the goal of CGSC (CGSC 350-1 Catalog, 2015; CGSC Mission, Vision, Principles & Philosophy, 2015). Pratt also relates the perspective that education can be an apprenticeship where the student is encouraged to learn through application and practice. Once again the curriculum at CGSC has elements of application and practice in the form of small group and large group practical exercises and war simulation exercises. In the context of this research the most relevant of Pratt's perspectives on teaching in use at CGSC is developmental teaching.

Developmental teaching has at its heart a desired change in the cognitive frameworks of the learner's thinking (Pratt, 1998). The goal of developmental teaching is for students to change in the direction of increasingly complex thought (Kegan, 2009; Taylor, Marienau, & Fiddler, 2000). Teachers must provide a challenge to the students that gently confronts them with a dissonant situation that will require them to reevaluate their concepts and thinking. It is in

the reevaluation of their position that the student has an opportunity to grow (Drago-Severnson, 2009). By being challenged the student must either change their thinking to a more sophisticated level or possibly retreat from growth and ignore the inconsistencies (Perry, 1999). This change is sometimes referred to as transformational learning in that it is a fundamental epistemological change in how the student views their world (Kegan, 2000, 2009; Mezirow, 1991, 1994, 1996, 2000).

For developmental learning to occur requires some necessary components of the learning environment. The teacher who has a goal for raising the epistemological sophistication of the student will first need to know the student's current way of knowing (Drago-Severnson, 2009; Kegan, 2009). The teacher desires to bridge the student from a lower level to a higher level of thinking (Pratt, 1998; Kegan 2009). Building bridges between the way the student currently thinks and the new more sophisticated way requires the faculty member to comprehend the way the student knows. Kegan pointed out that in subject-object balance those things we can take a perspective on are things seen as an object, and those things we cannot see yet are things we are subject to (Drago-Severnson, 2009; Kegan, 1994, 2009). In the case of a typical mid-career officer this may take the form of shifting viewpoints from the company grade (junior officer) perspective (O-1 to O-3) to the field grade officer or organizational level leader perspective (O-4 to O-5) (DA Pamphlet 600-3, 2014) The faculty member must be able to hold the student's level of thinking as an object to be observed and, in developmental teaching, to be raised. It is this need for faculty to "see" that results in the need for faculty to be at a cognitive complexity level above both the student and the expectation of CC for the graduate of the school.

For an educator to have success at bridging students they must not only comprehend where the student is cognitively but also where they want to take the student. The faculty member must use this understanding to create an environment where the student can make it to the higher level. She must form a safe environment to accept the risk of bridging and also the challenge that pushes the student across the bridge (Pratt, 1998; Kegan 2009). They must challenge the student's current way of knowing and present the challenge in understandable terms for the student. This must be done gently and with enough support so the student is able to become a more sophisticated thinker without retreating or rejecting the education, in other words a holding environment must be developed (Drago-Severnson, 2012).

Measuring Cognitive Complexity and Moore

Using the Perry scheme as a vehicle for measuring a person's cognitive complexity has resulted in three distinct approaches. Perry began his work, as noted above, by conducting interviews and analyzing them. Perry's interviews at Harvard were not structured but allow investigators to ask questions aimed at drawing out the level of cognitive complexity of the student (Moore, 1991; Perry 1999). This unstructured phenomenological approach is very thorough and informative and well suited to the initial task of developing Perry's scheme, however it does have some problems. Long, unstructured interviews require significant labor to interpret and the interviewers and interpreters need to spend large amounts of time to coordinate the data for development of a theory based on the data. This level of effort is required to develop original theory but for future investigators there needs to be a more accessible method to develop a measure of cognitive complexity. New methods were needed that were not as complex or costly.

An alternative approach to the unstructured Perry interview was developed using a "production-task measure based on an open-ended essay prompt" (Moore, 1991). In this method the subject is not interviewed but rather is evaluated on written responses. Early work used writing that included sentence completion stems and semi-structured essay questions (Moore, 1989). Later the Measure of Intellectual Development, or MID, was created and tested (Knefelkamp, Widick, & Parker, 1978; Moore, 1987, 1989). For the MID the students were reflecting on personal self-evaluations regarding classroom learning environments. Like the original Perry interviews these essays were evaluated by a rater who subjectively scored the writing. The MID raters require extensive training for the purpose of gaining reliable results among raters (Moore, 1989). The process is still complex, expensive, and gaining interrater reliability is difficult to achieve for research levels of reliability (Moore, 1989).

William Moore set out to develop an instrument that would use a recognition-task measure that would be objective in the sense that the rating or scoring would be based on a "collection of forced-choice, close-ended preference items" (Moore, 1987, 1989, 1991). The instrument is the Learning Environment Preferences or LEP. The subject is given a set of 13 statements to rate on a Likert scale regarding their preference for the item in an "ideal learning environment." The 13 statements were developed from years of results and extensive analysis of the cues used by MID raters when determining Perry position from the MID essays (Moore,

1991). The statements are divided into 5 broad domains for a total of 65 statements to rate. Within each of the 5 domains the subject ranks the top three choices and it is these top 3 ranked statements that are used to score the subject in terms of Perry position. The LEP scoring results in a Cognitive Complexity Index or CCI score that corresponds to a Perry position.

The LEP has been validated to show that it accurately measures the cognitive complexity of subjects within the Perry positions 2 through 5. Moore published his validation in the *Journal of College Student Development* in November of 1989 (Moore, 1989) where he provided evidence of LEP construct validity, i.e. that the LEP is measuring what it purports to measure. He compared the results of the MID to the LEP for a sample of N = 725 people from various educational institutions including small, medium, and large size public colleges, state universities, community colleges, and others. He also examined the internal consistency of the items within the LEP using Cronbach's Alpha as a measure of internal consistency. Perry concluded that the correlation between the MID and the LEP was strong enough to provide confirmation that the two instruments are measuring the same construct (Moore, 1989).

Blooms Taxonomy and Perry Positions

As noted previously CGSC defines the graduate of the institution through the use of learning objectives. These learning objectives are characterized and designed around Bloom's taxonomy (Bloom, 1956). In total there are 13 Terminal Learning Objectives (TLOs) (see table 2.1). These TLOs are further refined into 80 subordinate objectives labeled Enabling Learning Objectives (ELOs) (see table 2.2). The exact content of the objectives is not under analysis for this research. What is under consideration is the level of learning specified for the TLOs and ELOs and how these equate to the Perry position expectation for the CGSC graduate.

When building curriculum a great deal of time and effort are expended in the process of defining these TLOs with as much precision as possible because these objectives express the expectations of the Army for the graduate of the institution. To gain precision across the body of school curriculum the college uses primarily the cognitive domain educational objectives expressed by Benjamin Bloom (Bloom, 1956). Each learning objective at the college is required to specify the expected behavior based on one of the six levels of cognitive behavior from Bloom. Bloom is explicit in the description of the taxonomy that the taxonomy is hierarchical and therefore complex behaviors include the mastery of previous simpler behaviors. Students

build up through the levels, growing in stages in a manner similar to the stage theory of William Perry for Cognitive Complexity. Bloom intends that increasing the learning objective level is concerned with raising or bridging students from a lower order of thinking to more sophisticated levels.

Work has been done to demonstrate linkages between the Bloom's taxonomy and the Perry position of students. One study (Ryan, 1984) examined the criteria students expressed regarding how they chose to study text materials by 90 undergraduates at the University of Texas at San Antonio. The researcher was specifically looking at student interview responses to see if those students he categorized as at a Perry dualist level would express their criteria for knowing when they had understood text materials varied significantly from students he classified as Perry reletivists and when they expressed how they recognized comprehension of texts. He found that there was a connection and those at the lower level (dualists) did tend to define their understanding in terms that matched Bloom's Knowledge category. The students that were in the higher level (relativist) were more likely to express text comprehension criteria in Blooms levels of Comprehension or Application. Although not a study done to directly develop a correlation of Bloom to Perry it did indicate some connection exists. Additional discussion of the need for clearer understanding of the relationships initially developed by Ryan were expressed by Barbara Hofer and Paul Pintrich (Hofer & Pintrich, 1997). They reflect on how epistemological beliefs are connected to thinking and reasoning.

Further literature made clear and specific connections of Bloom to Perry. Donald Woods (Woods, 1993) provided an explicit table that directly expresses his understanding of Bloom to Perry. In his work he notes a "strong connection" and associates Perry positions 1 and 2 with Bloom's Knowledge level, Perry position 3 with Blooms Comprehension and Application, Perry position 4 with Blooms Analysis, and finally Perry positions 5 to 9 with Evaluation and Synthesis. Woods made a very simple table however with little supporting explanations. Other literature points to the direct relationship between the selection of learning objective level (Bloom) to the eventual growth by students in Perry position (Burge & Brinkman, 2010; Horii, 2007; Irish, 1999; Kloss, 1994). Like Woods above Burge & Brinkman developed a table relating Bloom's Taxonomy directly to the Perry Scale. Their table contains a great deal more detail. Burge and Brinkman explain their association of Bloom and Perry with respect to how the selection of Bloom objective level for courseware production will aid the cognitive

development of students and create Perry level growth. Specifically they want to create environments where students who are at the dualist level will be challenged to develop and examine multiple solutions to realize there is not one "right" answer. In this way they create an opportunity for the student to gain in higher order thinking skills. Similarly Robert Irish (Irish, 1999) looks at the use of Blooms objectives in the context of engineering school writing assignments and concludes that setting higher Blooms objectives leads engineer students to grow from simply doing some calculations and accepting the first simple solution as the right answer. He also affirms that the selection of higher Blooms objectives in problem assignments relates to student growth in Perry level. In a similar way Horii (Horii, 2007), in the context of teaching more effectively, discusses the connection between the selection of higher level Blooms objectives with the development of higher Perry positions among students. Blooms level then is associated with Perry position.

Connecting Bloom's Taxonomy and Perry Position

In Table 2.1 the researcher has laid out each of the thirteen CGSC Terminal Learning Objectives by their individual Bloom's Taxonomy learning level. The educational objectives are primarily weighted toward the synthesis and analysis level with ten of thirteen in these two levels. This is the starting point for relating the Blooms levels specified for CGSC graduates to the expected Perry position of graduates. Continuing the analysis in Table 2.2 the researcher has taken excerpts from Perry (Perry, 1999) describing the preferred tasks of learners at each Perry position, and juxtaposed them with the tasks expected to be performed by learners at the Bloom's learing objective level listed (Bloom, 1956). There is a robust association between the two. The researcher has had this association independently verified by two CGSC professors who work extensively with Blooms taxonomy and who teach faculty development at CGSC. It is this association that can be used to establish how the selection of learning objectives can be quantified in a numerical relationship to the expected Perry level of students who are achieving those Bloom's objectives levels. Finally, in Table 2.3 the researcher shows the numerical correspondence between a given Perry position and a Bloom's level that will be used in the findings chapter (Chapter 4) to numerically determine the expected Perry position for CGSC officer graduates.

Table 2.1. Terminal Learning Objectives (TLOs)

TLO	Evaluation	Synthesis	Analysis	Application	Comprehension	Knowledge
1		X				
2		X				
3			X			
4			X			
5					X	
6			X			
7				X		
8				X		
9		X				
10			X			
11			X			
12		X				
13		X				
TOTALS	0	5	5	2	1	0

Table 2.2. Rationale for Connecting Bloom Level to Perry Position

Perry Preferred Tasks[a]	Perry Position	Bloom Level[b]
Position 1: Committing to information to memory. Working hard. Seeing an array of discrete items to know (the correct responses, as assigned by authority but not by himself). No question has more than one answer. Wants to hear the facts not theory.	1 Basic Duality	Knowledge – The basic ability to recall specific and isolatable bits of information. At this level students can list dates, name places, or persons, etc.
Position 2 Revolts against heterogeneity, wants know things from only one perspective. Wants concrete facts not the hemming and hawing of professors. Tell him the one true answer and stop there. Opposition to the complexity of multiple points of view. Takes a stand against the vague chaos of multiplicity. Definitions of words and concepts. Learning to identify parts.	2 Dualism	Comprehension – The beginning of understanding this includes describing information without actually connecting the information to other information. It is still largely the ability to repeat information given to the student.

Position 3 Uncertainty has become unavoidable in some areas. Awareness that definite answers may be unavailable even to authorities. There is still an absolute truth that is the domain of authorities but may not be yet known. There is a beginning of thinking about the person's own thinking, meta-thoughts. Conceiving as an act of looking at various possibilities, combinations, and orderings are tried out intellectually. Ready to compare and contrast.	3 Early Multiplicity	Application – After learning principles, ideas, theories, rules of procedures the student can remember them and use them in new situations. Application level cognition asks the student to employ the facts or procedures into a process more sophisticated than repeating back facts or describing an object or idea.
Position 4 Everyone has a right to his own opinion if authorities themselves are ambiguous on a right answer. Multiplicity in points of view are now accepted . Good at analysis. Learning to think in abstractions.	4 Late Multiplicity	Analysis - The student now should be able to see the elements of communication and break it down looking for facts, assumptions, and hypotheses. He can see how parts of concepts are related to one another and draw conclusions regarding the parts and the whole.
Position 5 Radical new perception of knowledge as created in context and also relative. Dualism is relegated to a very special case situation. Can evaluate, conclude, support own analysis. Can synthesize.	5 to 9 Relativism	Synthesis – This entails putting together the elements and parts of all the previous levels in order to produce a new whole idea or produce a new process with clarity and organization. The student is designing or devising from her experience and prior learning. Evaluation – At the highest learning the student can make quantitative and qualitative judgments about how well material satisfies externally or internally derived criteria. The objective is to assess the value of the material learned. The student can weigh the evidence and find truth or fallacies.

[a] Perry preferred tasks are taken from *Forms of Ethical and Intellectual Development in the College Years*, by William Perry, 1999. [b] Bloom Level taken from *Taxonomy of Educational Objectives: Book 1, Cognitive Domain*, by Benjiman Bloom, 1956.

Table 2.3. Translating Perry Position to Numerical Weight

LEP Score	Perry Position	Bloom's Taxonomy	Numerical Weight
200	2	Knowledge, Comprehension	2
300	3	Application	3
400	4	Analysis	4
500	5	Synthesis, Evaluation	5

Summary

This literature review demonstrated many key ideas regarding expectations, theory, and teaching in the area of teaching military officers at the mid-point of their careers. Expectations were expressed in detail from both the point of view of Army publications and from the perspective of actual cognitive outcomes. Mid-career military officers who attend CGSC are expected to develop cognitively in order to meet the military's needs for solving complex, ill-structured, wicked problems that they will face in the latter half of their careers.

Multiple models were examined regarding the development of cognitive complexity. The most important model for this study is the Perry Scheme developed from studies of students across their college years. Also discussed were the Reflective Judgment Model and the gender specific model detailed in Women's Ways of Knowing. These models provide a framework for analyzing the cognitive complexity of subjects of the study.

Next the literature review showed how environments for growth are created and how adults develop. Malcolm Knowles developed the concept of Andragogy to explain how adults learn and Drago-Severnson operationalized the model with practical ways to establish environments for adult learning. Kegan's model of orders of consciousness extended the understanding to the concept of developmental teaching and the use of bridging which is also confirmed by Pratt. Teachers must see their students where they are and help to bridge them to higher levels of cognitive complexity.

Lastly an analysis was conducted to connect Blooms learning objectives into equivalent Perry positions. This is necessary to allow the researcher to view the relative Perry levels between the two groups under study (students and faculty) with the expectations for graduates of the college.

CHAPTER 3 - Methodology

Introduction

This research was quantitative in character. To maximize the opportunity to gather information and remain within DoD guidelines that prohibited any perception of coercion of participation the data was gathered anonymously using electronic survey means. Measurements were made using the Learning Environment Preference instrument as provided via an electronic survey format. The instrument was sent to the student body and faculty departments of CGSC and responded to via Inquisite software. The participation of all subjects was purely voluntary.

Problem Statement

The defense of our Constitution and our national interests is the raison d'etre of our nation's military forces. The environment within which our professional military forces must operate is a complex one that often poses difficult problems for our military officers to solve. As a consequence mid-career military officers are given the opportunity to attend an education that can prepare them to solve problems fraught with ambiguity and difficulty, requiring complex thinking for them to be successful. The education these officers receive calls for a faculty with a cognitive complexity greater than the student cognitive complexity as they enter the school, and also greater than the end goal for graduates. This enables the bridging of students to higher levels of cognitive complexity through education (Drago-Severnson, 2009,2012; Kegan, 2009; Pratt, 1998).

Purpose Statement

The purpose of this research was to examine the faculty and students at an intermediate service school and to measure the cognitive complexity of both groups. An analysis of the resulting measured levels of cognitive complexity was examined to determine the difference between measured faculty levels and measured student levels of complexity of thinking and how they vary with demographic factors. Additionally the analysis was advanced by looking at the expectations of cognitive complexity for student graduates as published by the intermediate service school learning objectives.

Research Questions

This study was guided by the following research questions that use data collected from an instrument applied to both faculty and students at CGSC to learn more about the relationships between measured cognitive complexity (CC) for the two groups. Demographic data was also collected to look for relationships among secondary characteristics of the faculty and students.

Research Question One – Faculty and Students Cognitive Complexity

Is there a difference in the measured level of faculty and student cognitive complexity as measured using the Learning Environment Preferences instrument?

Research Question Two – Faculty and Expectations for Cognitive Complexity

Is there a difference in the level of faculty cognitive complexity as measured using the Learning Environment Preferences instrument and the expected level of CC shown by the published learning objectives?

Research Question Three – Student Cognitive Complexity and Expectations for Cognitive Complexity

Is there a difference in the level of student cognitive complexity as measured using the Learning Environment Preferences instrument and the expected level of cognitive complexity shown by the published learning objectives?

Research Question Four – Demographic Relationships (faculty only)

How does measured CC differ across demographic categories for faculty?

Is there a difference among faculty measured CC (dependent variable) across independent variables (teaching department, years of CGSC teaching experience, military status, and age)? N.B. Military status refers to either active duty military or civilian. A high percentage of the civilian faculty are also retired military.

Research Question Five – Demographic Relationships (students and faculty)

How does measured CC differ across demographic categories for both students and faculty? Is there a difference in measured CC (dependent variable) across independent variables

(education level, gender, combat experience, branch of service, commissioning source, and years of active duty service)?

Design of the Study

This study is non-experimental (Campbell & Stanley, 1963) in that variables are not manipulated to create effects that can be observed in the changes created (or lack of change) on other measurable variables. The design was a comparison of two groups (students and faculty) within a common environment and is a quantitative study. In this design no treatments were applied to the populations. The goal of this research design was exploratory in the sense that there has been very little information previously gathered regarding these groups in the area of cognitive complexity and the researcher believed there was value in looking at the how the measurable results from applying an instrument to both groups would be related (Stebbins, 2001). Exploring how the Cognitive Complexity Index (CCI) results were related between the level of cognitive complexity in two populations, the faculty and their students at the Army Command and General Staff College, revealed unusual characteristics that could only be seen by a measurement. Additionally the expectations of cognitive complexity of the graduates was determined and used in comparison with the results of the testing to draw additional significance from the findings.

Population

The student population consists of approximately 19 teaching team groups which have approximately 64 students in each team. The total student population published by CGSC was 1,307 (Appendix G). Not all students were US military officers so the population to be studied was decreased by anywhere from 2 to 3 students per staff group due to civilian students and international military officer students. The resulting population surveyed was 1193. These students were mid-career military officers and, if they are Army officers, they were pre-selected by the Army for attendance based on their prior service performance and other factors. They generally were in the O-3, O-4, and O-5 rank with the predominance being O-4. All officers must have obtained a bachelor's degree to be commissioned and many had completed masters level or above as well.

The faculty numbers around 315 total people, but the non-teaching faculty were eliminated from the study leaving 244 faculty included in the survey. At CGSC the students are educated by five departments and therefore the curriculum can be divided somewhat neatly into five areas. There are other topics that are taught from time to time that do not fit into these five departments exactly but these tend to be ephemeral. The faculty then were largely grouped into five departments with occasional faculty outliers for special topics, e.g. space operations. The faculty was divided between those currently serving on active duty who were assigned by the Department of Defense and those civilians who voluntarily teach as a matter of professional employment. The composition of the faculty will vary from year to year as the Army has need for active duty officers to stay in the field as an operating force, or returns them from the field to generating force duties like teaching. CGSC currently has a faculty ratio in the neighborhood of 60% civilian and 40% active duty. Many of the civilian faculty have prior military service.

The faculty are assigned to departments but are further assembled into 12 person teaching teams. Each team is assigned to teach 64 students in four 16 person staff groups. The faculty are habitually assigned among the 64 students largely by the amount of curriculum they teach. So for example the History instructor will teach the same curriculum 4 times, once to each staff group, to cover all 64 students. The Department of Joint and Interagency Operations (DJIMO) faculty members teach 4 times as much material and therefore teach only one group of 16 students.

Procedure

The researcher offered the opportunity to complete the Learning Environment Preference instrument to the CGSC students and faculty. Because this study was concerned with those faculty members who are currently teaching students the researcher removed the non-teaching members. A listing of all faculty e-mail addresses was generated for each of the five teaching departments. The researcher hand carried these lists to managers of the departments and asked them to eliminate the e-mail addresses of any faculty member that was not currently teaching students (either through participation on one of the 19 teaching teams, or in other routine teaching situations). This resulted in a pared down list of e-mails to use for invitations for faculty members to participate in the research. From the original 315 faculty e-mail list there remained a total of 244 e-mail addresses to be invited to complete the LEP through a survey.

Since 244 is not a large population to gain information from, and because survey return rates may be low if the faculty were engaged in teaching at the time of survey the researcher decided to invite all 244 available faculty members to participate.

Most survey preparation guides assume that populations are very large and require some method of limiting costs and time through either probability sample selections or nonprobability methods (Dillman, Smyth & Christian, 2014; Frankel & Wallen, 2006). Costs for scoring the LEP are significantly lower than that of previous instruments like the Measure of Intellectual Development (MID) and the researcher chose to pay the cost of $1 per instrument to have the instrument scored. In this case it was best to use nonprobability sampling and obtain the highest number of participants possible.

Based on principles of surveying gleaned from multiple sources (Beins, 2009; Dillman, Smyth & Christian, 2014; Fink, 2009; Frankel & Wallen, 2006; Ritter & Sue, 2007) a survey was produced. The survey consisted of two major parts, the first questions concerning demographic data regarding the independent variables and the second part consisting of the LEP, the dependent variable, in electronic form. N.B. the demographic information gathered differed slightly between the faculty survey and the student survey as there were a few more independent variables to examine for the faculty. The faculty survey is reproduced in Appendix F. The student survey will not be reproduced in an appendix because it closely mirrored the faculty survey in form and content.

Because of Department of Defense requirements that the participants not feel any coercion or pressure to participate in research surveys no incentives could be offered, even though they are a recommended part of some surveys methods (Dillman, Smyth & Christian, 2014). The survey was conducted by sending out an invitation by e-mail. One follow-up invitation e-mail was also sent. No other contact was made with the faculty invitees. A similar process was used for inviting students to participate.

The timing of the survey for faculty was important. There was a timing issue related to the use of the Inquisite software which was scheduled to be replaced with a new contract with a new software company. The researcher desired to use the Inquisite software with which CGSC technicians were proficient and comfortable, and avoid the potential for problems as the new survey software was implemented after July 2015. Another timing issue involved the teaching calendar. The initial estimate for start time of the survey was unknown (i.e. the survey may have

been delayed until the teaching year had begun). The teaching calendar for CGSC tends to focus very heavily on one department for certain periods after which that department steps off the teaching platform. That faculty department will then grade assessments and begins training on curriculum materials for the next period in which they will be heavily engaged in teaching. Because of this inherent unevenness in the teaching load surveying the faculty to complete a somewhat lengthy survey like the LEP may have led to very uneven response rates between departments. The faculty departments who would be spending a lot of time teaching during the survey period would have very little time to respond and would probably have low reply rates. The faculty have a relatively slow work period in the summer prior to the commencement of teaching in the first week of August. The ideal time to administer the LEP was after most of the faculty return from summer vacations to attend mandatory training, but prior to the commencement of daily classes. The best opportunity for maximizing response then is the summer period just prior to the beginning of teaching students. This, plus a few other factors that will be covered in the student portion of this chapter, led the researcher to implement the LEP survey from 21 to 30 July 2015.

For the purposes of conducting multiple research projects through an academic year the CGSC Quality Assurance Office (QAO) develops and maintains a list of the e-mail addresses of all the students. The researcher arranged with the CGSC QAO to send e-mail invitations to the incoming students of class AY 15/16. Timing was important because the researcher wanted to send the invitations and collect data when the students were at Fort Leavenworth, Kansas preparing for classes to begin, but had not yet received any foundational instruction in areas like critical thinking, or problem solving. Just as with the faculty there was also a timing issue related to the use of the Inquisite software which was scheduled to be replaced by a new contract with a new software company. The researcher desired to use the Inquisite software with which technicians were proficient and comfortable, and avoid the potential for problems as the new survey software was implemented after July 2015. Additionally, the students would be less busy before classes began on 11 August 2015. Surveying students who were not engaged in classes had the potential to raise response rates from what they would be after 11 August. These factors led to a survey time period of 21 to 30 July 2015, which was simultaneous to the timing of the faculty survey.

The researcher sent e-mail invitations to 1193 students requesting their participation in the survey. Like the faculty they were sent one follow-up e-mail but no other contact was made. No incentives were offered to encourage participation.

Once the data was recorded it was downloaded from Inquisite and forwarded to the Center for the Study of Intellectual Development for scoring. Each participant in the survey received an individual CCI score.

Instrumentation

To measure the cognitive complexity of the subjects of the study the research used the LEP instrument (see Appendix C). The LEP was originally created by William Moore as part of his dissertation research. It consists of "a recognition-task 'objective' measure consisting of a collection of forced-choice, closed-ended preference items" (Moore, 1991, p. 5). Moore developed the LEP from the cues used by a prior essay measurement of Perry position, the Measure of Intellectual Development (MID) (Moore, 1987;Widick & Knefelkamp, 1974). After examining years of testing using the MID Moore created the LEP from an analysis of the most frequent cues that graders for the MID used in evaluating essay responses. His initial pool contained 134 items which were narrowed down to 65 items in five domains for the present version of the LEP.

The LEP is intended to reflect the same information as the MID, which is the subject's "epistemology with respect to learning and related concerns." (Moore, 1991, p. 9) which allows for a precise measure of the subject's cognitive complexity. To ensure the LEP measures what it says it will measure the construct validity between the MID and LEP was extensively studied. Moore tested to see if ,"1) the LEP seems to be measuring underlying factor constructs which correspond to the four Perry positions two through five; 2) the LEP seems to be measuring a phenomenon which displays a hierarchical, or developmental progression."(Moore, 1991, p. 9) The data reported by Moore indicated that the instrument is valid.

LEP reliability was also tested by Moore for internal consistency and test-retest reliability Cronbach's coefficient alpha was used as a measure for each of the LEP domains measured and ranged in value from .63 to .68. Similarly the Cronbach's coefficient alpha was calculated by Perry position and ranged in value from .72 to .84 (Moore, 2000). These outcomes are consistent with a reliable instrument. The test-retest reliability was verified by a one week student done

with 30 students and showed a correlation of .89 suggesting stability over time (Moore, 2000, p.10). Taken is sum these studies of the LEP indicate reliability and validity of the instrument in measuring Perry position as compared to the extensively used MID essays.

Subjects accomplish the LEP by initially ranking their preferences on a Likert scale to each of the 13 questions contained in each of five domains. These Likert scale preferences are not used for they actual computation of the resultant CCI score. After the preferences are made the subject chooses and rank orders his or her top three items of the 13 in a given domain. These top three rankings, 15 total items, are then forwarded to the Center for the Study of Intellectual Development (CSID) for scoring. The CSID returns an individual CCI score ranging from 200 to 500 for each subject via a spreadsheet file.

Data Analysis

The LEP information provided by participants was downloaded from the Inquisite survey software into an Excel spreadsheet for analysis. A sample spreadsheet has been provided by the Center for the Study of Intellectual Development and the collected data was returned to them for scoring. Each subject received a CCI score from the LEP that equates to a measured Perry position. Once the data from the LEP was collected and scored statistical software was used to analyze the resulting data. The data was checked for normality and application of descriptive statistics. To answer research questions one through three required a summary statistic for faculty and student data. Then a comparison was developed to draw conclusions regarding these three questions.

The data collected for CCI resulted in discrete numerical data that is on an interval scale (Levine, Stephan, Krehbiel & Berenson, 2005). The demographic data was categorical data that is on a nominal scale. The data was examined for normal distribution by demographic category. It was determined that non-parametric statistics were applicable for use with the data sets due to the non-normality of the CCI data. An analysis was done to test the hypotheses in research questions four and five. Contingency table (two way cross classification) and other statistical graphic representations were used to examine the data for patterns within variables.

Dependent and Independent Variables

In this research the measured CCI was the dependent variable that was examined for effects from the independent variables. The independent variables were the demographic

categorical variables collected prior to the subject completing the LEP. For the faculty there were four faculty specific independent variables: teaching department, years of CGSC teaching experience, military status, and age. For both the students and faculty there were six independent variables: education level, gender, combat experience, branch of service, commissioning source, and years of active duty service.

The data was examined using tests for significant differences in medians via breakdowns of demographic groups and using the appropriate comparison method (e.g. Kruskal-Wallis) to make the comparisons with independent variables.

Faculty

The CGSC faculty can be broadly divided between those that are principally non-teaching faculty (which includes administrators, curriculum developers, etc.) and those that are regularly in the classroom teaching. Because this study was concerned with those faculty members who are currently teaching students the researcher removed the non-teaching members.

The faculty at CGSC is unique in comparison to other institutions. The civilian portion of the faculty is predominantly made up of retired military members because they have the background needed by the college when it is making its hiring decisions. The faculty was divided into four age groups on the survey representing 30's, 40's, 50's and 60 and older to look for effects of age on cognitive complexity. Because of requirements for accreditation, CGSC teachers will have a minimum of a masters degree level of education. Many others are hired with terminal degrees, and a few pursue terminal degrees while continuously teaching. Gender information was requested from both faculty and students with the understanding that there were very few female faculty members. Of the original 244 faculty invited to participate only 11 were female (4.5%). Because so many of the civilian faculty are retired military many, but not all, will have some amount of combat deployments. The active duty faculty will often have combat deployment experience in recent conflicts. The choice was made to separate the group into those with no deployments to those with some (1 to 5) to those with a heavy amount of deployments (more than 6). Of those who have combat experiences some were in situations where traumatic events occurred. Previous studies on the effects of combat on the classroom have been done at CGSC (Clark, 2014; Shea, 2010; Spurlin, 2014) and so the faculty were asked to indicate if they felt they had experienced trauma in combat one, or more than one, time. Military officers come

from relatively small number of commissioning sources including military academies, the Reserve Officer Training Corps (ROTC), or Officer Candidate School (OCS) so the demographic survey requested commission source information as well.

Students

The CGSC Student population for the class arriving in academic year 2015-2016 (AY 15/16) consisted of a total of 1307 students. However not all students are United States military officers. The class included a number of foreign military officers and a few US civilian students from agencies of the federal government outside the military branches. The class was 78.6% Army officers and 12.4% other services. The remaining 9% were international officers or civilians. This research developed findings related to the US military officer population and excluded the other groups. Because of the requirement to have a bachelors degree for military commissioning all student officers have at least this level of education. Many others work on a masters degree while serving and a few get the opportunity for a terminal degree. In this class the exact numbers for degrees were not published but a good estimate is about 25% bachelors, 66% masters, and 9% terminal degrees. The US Officers come from three primary sources of commissioning. In this class the breakdown was 13.7% military academies, 54% Reserve Officer Training Corps (ROTC), and 26.1% from Officer Candidate School (OCS). In Appendix G there is a demographic breakdown produced by CGSC for AY 15/16 with further details.

Expected Cognitive Complexity

The CGSC develops its goals for curriculum using the 1956 version of Bloom's taxonomy (Bloom, 1956) and these goals define the expectation for the college graduates. In Chapter 2 the researcher developed a scheme for translating the Terminal Learning Objectives (TLO) described in Blooms levels, into an equivalent Perry Position level. Using the information from Tables 2.1 and 2.3 it is possible to develop an overall Perry level expectation for graduates. Table 3.1 summarizes the weighted calculation for an overall expected Perry level expressed as a CCI score. The resulting weighted average Perry position expected for graduates is 4.07 which is the equivalent of a CCI score of 407. It is this score of 407 that will be used for determining the answers to research questions 2 and 3.

Table 3.1. Weighted Calculation of TLO to CCI

TLO	Evaluation	Synthesis	Analysis	Application	Comprehension	Knowledge
1		1				
2		1				
3			1			
4			1			
5					1	
6			1			
7				1		
8				1		
9		1				
10			1			
11			1			
12		1				
13		1				
Column Totals	0	5	5	2	1	0
Weight		5	4	3	2	1
Column Total X Weight		25	20	6	2	0
TOTAL	53					
Average	53 / 13 =	**4.07**				

Protection of Human Rights

The Institutional Review Board (IRB) process for permission to conduct research using human subjects was completed through two institutions, Kansas State University (KSU) and the U.S. Army Command and General Staff College (CGSC). KSU determined the research to be "Exempt" research under the criteria set forth in Federal Policy for the protection of human

subjects. The research is assigned Proposal Number 7636. A similar conclusion was reached by the IRB at CGSC based on the characteristics of the study. Both IRB approval letters are included as appendices to this document.

The researched used the CGSC Quality Assurance Office (QAO) of CGSC to assist in translating the pencil and paper version of the LEP into an on-line survey format. This method of delivery has been used before (using the website SurveyMonkey.com) and was deemed appropriate by the owner of the LEP, Dr. William Moore. The software used to distribute the LEP to the subjects is entirely anonymous. Using an e-mail list, invitations to participate were sent to students and to faculty. Subjects were directed to the Inquisite website where they competed the survey. The software did not identify the e-mail address with the data collected but rather assigned a unique numerical code to each participant. The data returned from the Inquisite software included the necessary answers to score the LEP in addition all the demographic data. The survey was anonymous and no data recorded identifying information by individual was provided by the Inquisite software results. The researcher eliminated all but the essential scoring information and sent the results to Dr. William Moore at the Center for the Study of Intellectual Development (CSID) in Olympia, Washington.

Summary

This study used the Learning Environment Preferences instrument to make a measurement of the cognitive complexity of two groups, faculty and students, at CGSC. The CCI scores were converted to Perry position for the groups. The expectations for the college graduate, nominally expressed using Blooms Taxonomy, was translated into an expected Perry position. The resulting data was used to answer research questions 1, 2 and 3. The demographic data was then used to delve deeper into the effects on the dependent variable of CCI scores with respect to the demographic breakdowns in order to answer research questions 4 and 5.

CHAPTER 4 - Findings

Overview

The data collected from the electronic surveys and the data analyzed from the Army Command and General Staff College (CGSC) curriculum materials are presented in this chapter. Initially, a determination of the overall cognitive complexity for CGSC graduates was established using the principles developed in Chapter 2. The demographics of the two populations under study will be described in detail to include the collection of education level, gender, combat deployments and trauma indications, branch of service, commissioning source, and years of active duty service. In addition for the faculty population data collected regarding teaching department, years of teaching experience at CGSC, military status, and age will be examined. Following the demographic examination the Learning Environment Preferences (LEP) Cognitive Complexity Index (CCI) scores will be presented and findings regarding the associations between the dependent and independent variables will be displayed.

Demographic Findings

This study examined two groups at the Army Command and General Staff College (CGSC), the faculty and the students. The demographics of each group are discussed separately.

Faculty

Completion of a survey with demographic questions, and a 65 question LEP, is a large commitment of effort for the participant, and yet only two faculty members who began the survey failed to continue and complete all the information. Of the 244 survey invitations sent there were 114 responses of which 112 (n = 112) were completed and scored. Therefore the overall response rate for the survey was 112/244 = 45.9%.

Teaching Department

Because of the timing of the survey prior to the start of the school year no faculty department was teaching at the time of the survey. The response rates still varied somewhat among teaching departments. This researcher has no explanation why these response rates varied from a high of 62% down to a low of 33%. Here is a breakdown by department:

DJIMO 71 invitations sent, 44 responded, 62.0% response rate.

DMH 25 invitations sent, 14 responded, 56.0% response rate.

DCL 23 invitations sent, 12 responded, 52.2% response rate.

DLRO 43 invitations sent, 15 responded, 34.9% response rate.

DTAC 82 invitations sent, 27 responded, 32.9% response rate.

In terms of the percentage of those responding from each department the breakdown looks like this:

DJIMO contributed 44 or 39.3% of the total survey responses.

DMH contributed 14 or 12.5% of the total survey responses.

DCL contributed 12 or 10.7% of the total survey responses.

DLRO contributed 15 or 13.4% of the total survey responses.

DTAC contributed 27 or 24.1% of the total survey responses.

Overall the strongest contributor to the survey was the DJIMO department with about three times the number of responses as compared to the three smallest departments. Consequently the greatest contribution to CCI results has come from this one department (almost 40%).

Years of Teaching Experience at CGSC

This demographic was chosen to look for differences related to the amount of teaching time as it relates to the faculty member's CCI score. The goal is to see if there is a shift in CCI scores as faculty become more proficient in teaching the curriculum over time. Three faculty experience levels were chosen based on the typical life cycle of teaching at CGSC. Instructors stationed at CGSC as an active duty military posting typically stay about three years although some will stay longer. These active duty instructors would be expected to contribute a preponderance of the results for the first tranche of 0 to 3 years surveyed. The results show that 100% of respondents in this tranche were active duty military faculty with no civilians in this category. Civilians who are new, and in their first 5 years of teaching at CGSC, would be expected to contribute largely to the second tranche of 3 to 5 year instructors. In actual fact 100% of the 3 to 5 year group respondents were also active duty military with no civilian representation. At the 5 year point all instructors are sent to a refresher and recertification course developed by CGSC to allow seasoned instructors to review underlying teaching principles used by the college, and to collaborate on teaching techniques. This 5 year milestone

of experience was chosen as the break point for "experienced" faculty. The civilian instructors would be expected to contribute the majority of responses in the over 5 years group. That is what the results showed. All respondents were civilian faculty members except for one military faculty member.

The response rates were highest from the over 5 year instructors with 74.1% of the total and 20.5% from the 0 to 3 year group. The 3 to 5 year group was small at 5.3% but this is expected because this group would be a smaller population than the other two.

Military Status

The survey invitations were sent to 83 active duty instructors and 161 civilian instructors (34% active duty, 66% civilian). This proportion is representative of the overall faculty ratio near 40/60 active duty to civilian (Dean of Academics Self Study Report, 2014). The response rates were 31 active duty (27.7% of the total responses) and 81 Civilians (72.3% of the total responses). The civilian faculty therefore, contributed at higher amount than their representation in the overall faculty

Age

The faculty was divided into four age groups on the survey representing 30's, 40's, 50's and 60 and older. The initial numbers returned had only 2 faculty members reporting that they were in their 30's which made this a statistically very small group compared to the other groups. For analysis the instructors were grouped into three groups: 30's and 40's, 50's, 60's and older. This resulted in response rates of 34 (13.9%), 54 (22.1%), and 24 (9.8%) from the 244 invited to participate. The percent of total respondents within the age groupings was 30.3% for 30's and 40's, 48.2% in their 50's, and 21.4% in the 60's and older.

Education Level

Because of requirements for accreditation, CGSC teachers will have a minimum of a masters degree level of education. Many others are hired with terminal degrees, and a few pursue terminal degrees while continuously teaching. The survey invitation responses came from 86 (76.8%) instructors with masters degrees and 26 (23.2%) with terminal degrees.

Gender

Gender information was requested from both faculty and students with the understanding that there were very few female faculty members. Of the original 244 faculty invited to participate only 11 were female (4.5%). The survey results came from 3 faculty females (1.2%) which is too small of a response rate to glean any significance from the data. As a result no information regarding CCI scores as they vary by gender will be examined for the faculty.

Combat Deployments

The results show that there were very few respondents (active duty or civilian faculty) with 6 or more deployments (only 3 of 112 or 2.7%). The majority fell into the 1 to 5 deployment tranche (80 or 71.4%) and zero deployments (29 or 25.9%).

Combat Trauma

Of the 112 respondents 37 experienced a traumatic event (33%), 10 indicating only once (8.9%), and 27 indicating more than one event (24.1%).

Branch of Service

The faculty is composed of mostly Army, or retired Army personnel. The responses reflected that characteristic. Of the 112 survey respondents only 2 indicated they had never been commissioned officers (1.8%). There were 94 responses who indicated they were serving or had served in the Army (83.9%). The other responses came from the other services in small numbers and one respondent left the service question blank.

Commissioning Source

Among the faculty respondents there were six who had not received a commission from these sources or who were never commissioned. All other respondents indicated a commission from the typical sources. There were 16 from military academies (14.3%), 73 from ROTC (65.2%) and 19 from OCS (17.0%).

Years of Active Duty Service

The number of years served by members of the faculty was relative unvarying. Only 5 had never served or had served for less than 10 years. The majority served 20 or more years, which is typical of military officers pursuing a military retirement. Those serving more than 20

years comprised 93 (83%) of respondents. The remaining 13 (11.6%) respondents had served between 10 and 20 years.

Students

The student response rate to the survey was 188 responses. Of the initial 188 respondents 24 had to be eliminated because the student did not complete the full LEP. That left 164 scored LEPs which is a 13.7% response rate from the initial 1193 invitations to participate.

Education Level

Because of the requirement to have a bachelors degree for military commissioning all student officers have at least this level of education. Many others work on a masters degree while serving and a few get the opportunity for a terminal degree. Within the students responding 70 (42.7%) had a bachelor degree, 83 (50.6%) had a masters degree, and 11 (6.7%) had terminal degrees.

Gender

Although there are relatively fewer female officer students (180 of 1307 total for class AY 15/16) (13.8%) the response rate was comparatively high. There were 35 (21.3%) female respondents and 129 (78.7%) male respondents.

Combat Deployments

The ranges chosen for indication of combat deployments turned out to be less discriminating than the researcher had anticipated. There were only four students with six or more deployments and 10 with none. Consequently there were 150 students (91.5%) of respondents that fell into the one category of 1 to 5 deployments. As a group the respondents were too homogeneous in this respect to discriminate any significant information. As a result no information regarding CCI scores as they vary by combat deployments will be examined for the students.

Combat Trauma

Even though the students had similar numbers of deployments their experience with traumatic events was quite varied. As noted before previous studies on the effects of combat on the classroom have been done at CGSC (Clark, 2014; Shea, 2010; Spurlin, 2014). The students

indicated significant percentages had experienced trauma in combat one, or more than one, time. Of the 164 respondents almost half (76) indicated they had been in a traumatic event (46.3%), 11 indicating only once (6.7%), and 65 indicating more than one incident (39.6%).

Branch of Service

The student body as a whole is 78.6% Army officers, 12.4% officers from other services, and 9% civilians and foreign officers. The survey respondents were 150 Army (91.5%), and 14 other services (8.5%).

Commissioning Source

Military officers come from relatively small number of commissioning sources including military academies, the Reserve Officer Training Corps (ROTC), or Officer Candidate School (OCS). Among the student respondents there were 17 who had not received a commission from these sources. All other respondents indicated a commission from the major three sources. There were 21 from military academies (12.8%), 90 from ROTC (54.9%) and 36 from OCS (22.0%).

Years of Active Duty Service

The number of years served by student respondents varied to some extent. There were 31 students with 10 or less years (18.%), 122 with 10 to 20 years (74.4%), and 11 with more than 20 years of service (6.7%).

LEP Scores

Although there were originally 188 student responses to the survey 24 of the surveys were incomplete in some way that made it impossible to score them. For the faculty surveys 114 surveys were returned and two were un-scorable. The CCI scores and corresponding demographic information are available in Appendices H and I.

Research Question 1

Faculty LEP Scores

Figures 4.1 and 4.2 show the distribution for the faculty LEP scores. Visual inspection shows that the CCI scores concentrated toward the higher end of the scale. This results in a

negative skewness (-1.93) and a leptokurtic distribution (5.86). The CCI scores fail the Anderson-Darling test for normality (P<.05) and this is confirmed by the LEP probability plot which shows the data deviating from normality.

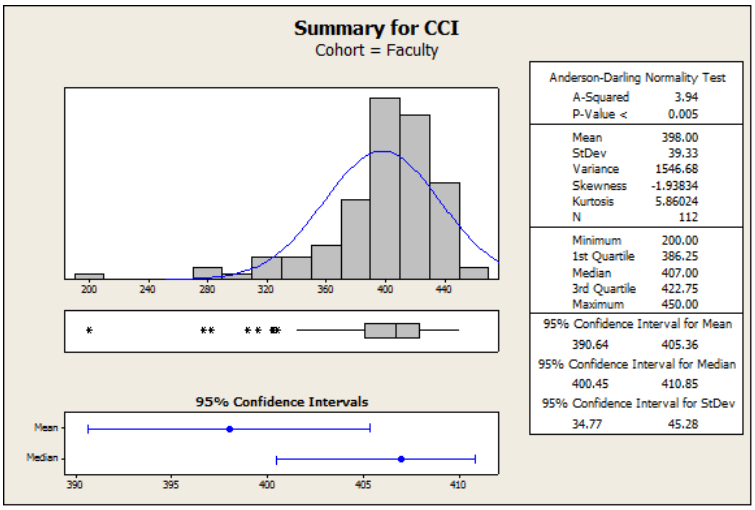

Figure 4.1. Faculty LEP Distribution

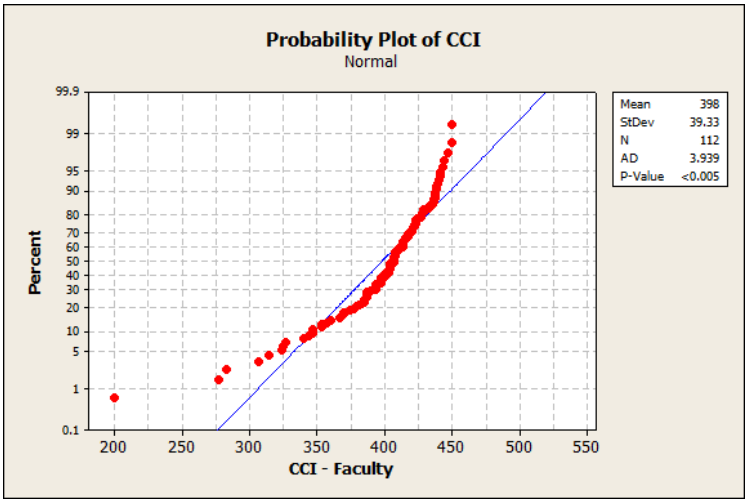

Figure 4.2. Faculty LEP Probability Plot

Student LEP Scores

Figures 4.3 and 4.4 show the distribution for the student LEP scores. The CCI distribution for student scores are closer to a normal distribution than were the faculty scores but they also fail the Anderson-Darling test for normality (P<.05). This is confirmed by the

probability plot as well. Unlike the faculty CCI scores the student scores are not as heavily clustered toward the higher end and the resulting distribution is only slightly negative in skewness (-0.47) and a platykurtic (-0.11).

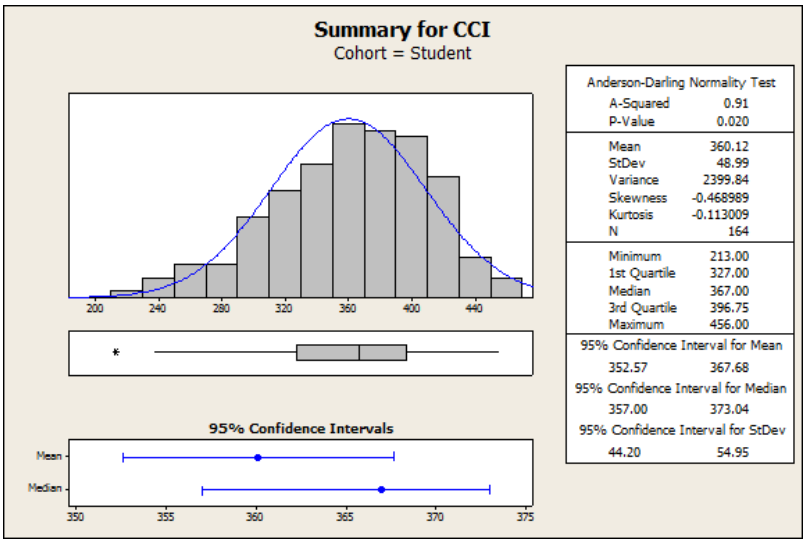

Figure 4.3. Student LEP Distribution

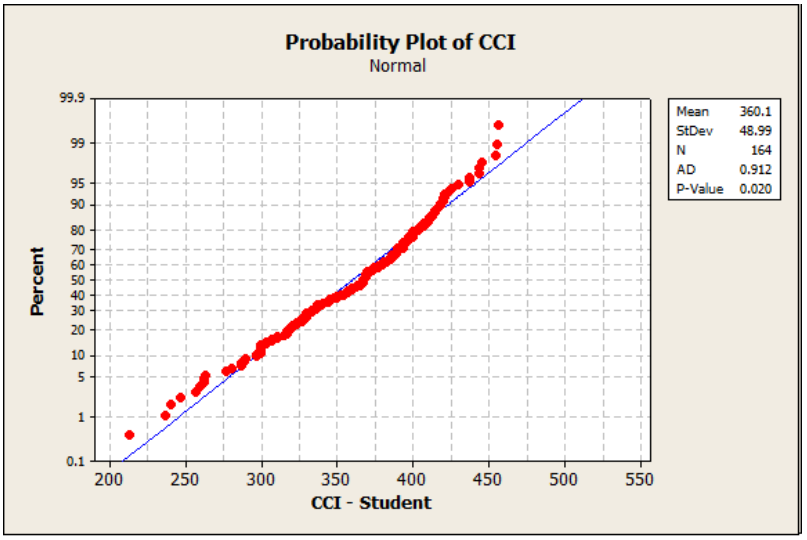

Figure 4.4. Student LEP Probability Plot

Tests for CCI Differences Between Faculty and Students

The same LEP instrument was administered to both groups in the study using an electronic survey to acquire the raw data for scoring. The descriptive statistics are shown in Table 4.1. The mean values between the faculty and students were 398 and 360 respectively, a 39 point difference on a scale from 200 to 500. A Kruskal-Wallis test was done to determine if this 39 point difference was statistically significant. The test results are shown in Table 4.2. With a P<<.05 the test shows there is a strong reason for establishing statistical significance. The difference between student and faculty CCI scores is statistically significant with the faculty scoring significantly higher than students on the LEP measure of cognitive complexity.

Table 4.1. Descriptive Statistics for Faculty and Students CCI Scores

Cohort	N	Mean	SE Mean	StDev
Faculty	112	398.00	3.72	39.33
Student	164	360.12	3.83	48.99

Cohort	Minimum	Q1	Median	Q3	Maximum
Faculty	200.00	386.25	407.00	422.75	450.00
Student	213.00	327.00	367.00	396.75	456.00

Table 4.2. Kruskal-Wallis Test of Faculty CCI versus Student CCI

Cohort	N	Median	Ave Rank	Z
Faculty	112	407.0	179.1	6.99
Student	164	367.0	110.8	-6.99
Overall	276		138.5	

H = 48.84 DF = 1 P = 0.000
H = 48.85 DF = 1 P = 0.000 (adjusted for ties)

Research Question 2

Tests for CCI Differences Between Faculty and Expected CCI

Using the Terminal Learning Objectives (TLOs) the researcher determined that the curriculum expectation for a graduate of CGSC is the equivalent of 407 on the CCI scoring scale. Table 4.3 shows the results of One Sample T testing to determine if the faculty CCI mean score of 398 is different in a statistically significant amount from the 407 expectation for student graduates. The P values of 0.017 and 0.009 are both less than .05 and indicate that a score of 407 is statistically significantly different from the faculty mean score of 398. This difference, however, has little practical significance. The two values can be viewed through an Effects Size calculation to determine practical significance (Fraenkel & Wallen, 2006; Levine, Stephan, Krehbiel & Berenson, 2005). Calculating Cohen's d value in Equation 1 yields a value of .229, which Cohen defined as a "small" Effect Size (Cohen, 1988).

$$Cohen's\ d = \frac{\bar{x}1-\bar{x}2}{s} = \frac{407-398}{39.33} = .229 \quad (1)$$

Table 4.3. T-Test of Faculty CCI versus Expected CCI

Test of mu = 407 vs not = 407

Variable	N	Mean	StDev	SE Mean	95% CI	T	P
CCI	112	398.00	39.33	3.72	(390.64, 405.36)	-2.42	0.017

Test of mu = 407 vs < 407

Variable	N	Mean	StDev	SE Mean	95% Upper Bound	T	P
CCI	112	398.00	39.33	3.72	404.16	-2.42	0.009

Research Question 3

Tests for CCI Differences Between Students and Expected CCI

The graduate expectation is a CCI score of 407 and the mean score from the student LEP results were 360. In Table 4.4 the results are shown for a One Sample T test to determine if the student CCI at 360 is different in a statistically significant amount from the 407 expectation for student graduates. The P value of 0.000 is strong evidence indicating that the students are starting at a CCI score that is appreciably below the level that is expected at graduation.

Table 4.4. T-Test of Student CCI versus Expected CCI

Test of mu = 407 vs < 407

Variable	N	Mean	StDev	SE Mean	95% Upper Bound	T	P
CCI	164	360.12	48.99	3.83	366.45	-12.25	0.000

Research Questions 4 and 5

Overview

For each of the examined groups an analysis was done to look for significant findings within the demographic groups. Each demographic was examined through the lens of Perry Positions as described by the documentation that accompanied the CCI scoring provide by the Center for the Study of Intellectual Development (CSID). In the document titled, "Interpreting the Learning Environment Preferences: Score Report Summary" the CCI scores are organized into convenient score ranges to provide a method for categorical analysis of the data. The bins are shown in Table 4.6 and are spaced roughly in 43 point increments. There is a seventh category in the documentation provided by CSID for Perry position 5 however none of the faculty or student CCI scores were in this category (highest faculty CCI score 450, highest student CCI score 456). N.B. for the statistical analysis there will be a variable named "Bins" which corresponds to the six bins or Perry positions used in Table 4.5.

Table 4.5. Translating CCI Score into Perry Position

CCI Score	Bin Number	Perry Position	Faculty Count	Student Count
200-240	1	2	1	2
241-284	2	Transition 2 to 3	2	9
285-328	3	3	5	31
329-372	4	Transition 3 to 4	12	51
373-416	5	4	55	53
417-460	6	Transition 4 to 5	37	18

Faculty

For each of the eleven demographic areas that were included for faculty the researcher will provide a test of statistical significance. A contingency table of the data collected with the CCI scores aggregated into Perry position bins as defined by the CSID is available in Appendix D. The analyses were computed using SPSS software Version 21 and Minitab Version 16. Because of the relatively small group of participants (n = 112) the Chi Square test was not a valid statistic for the contingency table data. There were many cells that contained less than 5 entries which is insufficient for a conclusive Chi Square statistic.

Teaching Department

Table 4.6. Teaching Department Kruskal-Wallis Test

TeachingDept	N	Median	Ave Rank	Z
DCL	13	413.0	64.4	0.94
DJIMO	42	403.5	53.2	-0.84
DLRO	15	400.0	53.5	-0.38
DMH	14	407.5	54.3	-0.28
DTAC	28	407.0	60.6	0.76
Overall	112		56.5	
H = 1.85 DF = 4 P = 0.764				
H = 1.85 DF = 4 P = 0.764 (adjusted for ties)				

The Kruskal-Wallis test looking for a statistically significant difference in the CCI scores among the five teaching departments had a P value much larger than .05 (P>>.05). There is therefore strong indication that looking across the faculty across departments no one department has significantly higher or lower scores than the members of other departments. The highest average score was in the Department of Command and Leadership (DCL) at 408.8 and the lowest was the Department of Military History (DMH) at 378.1. The contingency table (Appendix D) shows that faculty scores do cluster largely into the top two levels of Perry position.

Years of Teaching Experience at CGSC

Table 4.7. Teaching Experience Kruskal-Wallis Test

YrsTeaching	N	Median	Ave Rank	Z
0-3 Years	23	404.0	51.7	-0.80
5 or More Years	83	407.0	56.8	0.17
More than 3 Years but Less than 5 Years	6	417.0	70.8	1.11
Overall	112		56.5	
H = 1.68 DF = 2 P = 0.431 H = 1.68 DF = 2 P = 0.431 (adjusted for ties)				

This demographic was chosen to look for differences related to the amount of teaching time as it relates to the faculty member's CCI score to see if there is a shift in CCI scores as faculty become proficient in teaching the curriculum over time. The Kruskal-Wallis test shows a P value greater than .05 (P = .016) indicating no statistical significance in the different CCI scores depending on the number of years teaching experience of an instructor. The relationship is not linear in the sense that as more years are gained the CCI scores are higher. The highest scores are not seen in the group with the greatest teaching experience, those above 5 years (Mean = 398.2), but rather in the 3 to 5 year category (Mean = 415.8). Those with 0 to 3 years teaching had the lowest score average (Mean = 392.5).

Military Status

Table 4.8. Military Status Kurskal-Wallis Test

MilitaryStatus	N	Median	Ave Rank	Z
Active Duty	31	404.0	56.5	-0.01
Civilian	81	407.0	56.5	0.01
Overall	112		56.5	
H = 0.00 DF = 1 P = 0.995				
H = 0.00 DF = 1 P = 0.995 (adjusted for ties)				

There is no statistically significant difference between the CCI scores of military faculty and civilian faculty. The Krusal-Wallis test has a P value much greater than .05 (P = .995) indicating strong evidence for establishing there is no statistical significance. The civilian faculty CCI scores had a mean score of 397.8 which is very close to the military mean score of 398.4.

Age

The faculty were divided in the survey into four age groups representing 30's, 40's, 50's and 60 and older. The survey results had only 2 faculty members in their 30's which made this a statistically very small group compared to the other groups. For analysis the instructors were re-grouped by age into three groups: 30's and 40', 50's, 60's and older.

Table 4.9. Age Groups Kruskal-Wallis Test

Age	N	Median	Ave Rank	Z
I am in my 30s 40s	34	404.0	53.5	-0.65
I am in my 50s	54	407.0	58.8	0.74
I am in my 60s or older	24	405.5	55.5	-0.17
Overall	112		56.5	
H = 0.59 DF = 2 P = 0.743				
H = 0.60 DF = 2 P = 0.743 (adjusted for ties)				

In the case of age versus the CCI bins there does not appear to be a statistically significant change in CCI with age groups (P = .743). The scores are relatively flat with means by age group going from 394.8, 401.4, to 394.8.

Education Level

Table 4.10. Education Level Kurskal-Wallis Test

EducationLevel	N	Median	Ave Rank	Z
Doctorate or other Terminal Degree	27	417.0	63.4	1.28
Master	85	404.0	54.3	-1.28
Overall	112		56.5	
H = 1.63 DF = 1 P = 0.202				
H = 1.63 DF = 1 P = 0.202 (adjusted for ties)				

The level of education appears to make no significant difference in measured cognitive complexity of the faculty. The Kruskal-Wallis test yields a P value (P = .202) that indicates that faculty with terminal degrees are not significantly different from those with master degrees. The mean scores were 5 points different with terminal degree holders higher than masters degree holders (402.0 versus 396.7).

Gender

Table 4.11. Gender Kruskal-Wallis Test

Gender	N	Median	Ave Rank	Z
Not Answered	1	407	57.5	0.03
Female	3	413.0	58.7	0.12
Male	108	407.0	56.4	-0.12
Overall	112		56.0	
H = 0.01 DF = 2 P = 0.993				
H = 0.01 DF = 2 P = 0.993 (adjusted for ties)				

* NOTE * One or more small samples

Gender information was requested from faculty even though of the original 244 faculty invited to participate only 11 were female (4.5%). The survey results came back with responses

from only 3 faculty females (1.2%) which is too small of a response rate to make any valid conclusions from the data. As noted in Table 4.11 one faculty respondent neglected to report gender information.

Combat Deployments

Table 4.12. Combat Deployments Kruskal-Wallis Test

CombatDeployments	N	Median	Ave Rank	Z
1-5	80	405.0	55.6	-0.44
6+	3	422.0	73.5	0.92
None	29	407.0	57.1	0.11
Overall	112		56.5	
H = 0.89 DF = 2 P = 0.642				
H = 0.89 DF = 2 P = 0.642 (adjusted for ties)				

* NOTE * One or more small samples

The data regarding CCI bins versus combat deployments is not powerful due to the very small number of faculty with six or more deployments. The majority (71.4%) of faculty have between one and 5 deployments, a very high percentage. The Kruskal-Wallis test indicated that there is no statistical significance to the number of combat deployments to cognitive complexity.

Combat Trauma

Table 4.13. Combat Trauma Kruskal-Wallis Test

CombatTrauma	N	Median	Ave Rank	Z
Not Answered	29	407.0	57.1	0.11
No	46	401.5	48.9	-2.06
Yes, more than once.	26	412.0	69.8	2.38
Yes, only once.	11	410.0	55.2	-0.14
Overall	112		56.5	
H = 6.86 DF = 3 P = 0.076				
H = 6.87 DF = 3 P = 0.076 (adjusted for ties)				

The Kruskal-Wallis test was done using the available faculty who provided information regarding traumatic events they experienced when deployed. The blank "Not Answered" surveys came from faculty who had no combat deployments. Of those who responded there appears to be no significant connection between having experienced traumatic events in combat and the CCI scores (P = .076). Notably comparing means of those with no trauma to the mean of all those with some traumatic experiences there is a 21 point difference with the higher mean occurring in subjects with combat trauma experiences (387.7 versus 408.5).

Branch of Service

Table 4.14. Service Branch Kurskal-Wallis Test

ServiceBranch	N	Median	Ave Rank	Z
Not Answered	1	353.0	13.5	-1.33
Air Force	3	403.0	60.8	0.23
Army	94	407.0	58.0	1.12
Marine	6	388.5	35.2	-1.65
Navy	8	410.5	58.6	0.19
Overall	112		56.5	

H = 4.63 DF = 4 P = 0.327
H = 4.63 DF = 4 P = 0.327 (adjusted for ties)

* NOTE * One or more small samples

There did not appear to be statistically significant differences in the cognitive complexity scores based on the faculty member's branch of service (P = .327).

Commissioning Source

Table 4.15. Commissioning Source Kruskal-Wallis Test

CommissioningSource	N	Median	Ave Rank	Z
An Academy	16	415.0	64.1	1.01
OCS	19	404.0	53.9	-0.38
Other	4	393.5	52.8	-0.24
ROTC	73	407.0	55.7	-0.35
Overall	112		56.5	

H = 1.10 DF = 3 P = 0.777
H = 1.10 DF = 3 P = 0.777 (adjusted for ties)

* NOTE * One or more small samples

Military officers come from relatively small number of commissioning sources including military academies, the Reserve Officer Training Corps (ROTC), or Officer Candidate School (OCS). Among the faculty respondents there were four who had not received a commission from these sources, or were never commissioned. All other respondents indicated a commission from the typical sources. The Kruskal-Wallis test indicated no statistically significant results for commissioning source and CCI score (P = .777).

Years of Active Duty Service

Table 4.16. Years of Active Duty Service Kruskal-Wallis Test

YearsofActiveDutyService	N	Median	Ave Rank	Z
1 to 10 Years	3	408.0	56.8	0.05
20 or More Years	93	407.0	57.8	1.30
I have never served on active duty.	2	350.0	12.5	-1.93
More than 10 Years but less than 20 Years	13	404.0	50.0	-0.72
Overall	111		56.0	

H = 4.45 DF = 4 P = 0.349
H = 4.45 DF = 4 P = 0.348 (adjusted for ties)

* NOTE * One or more small samples

The faculty is largely comprised of (83%) of people with 20 or more years of active duty service. One respondent left this entry blank and was not used in the Kruskal-Wallis test. The Kruskal-Wallis test shows no significant connection between the number of years a faculty member served in the military and the CCI cognitive complexity scores (P = .349).

Students

For each of the seven demographic areas that were included for the students surveyed the researcher will provide a test of statistical significance. A contingency table of the data collected with the CCI scores aggregated into Perry position bins as defined by the CSID is available in Appendix E. The analyses were computed using SPSS software Version 21 and Minitab Version 16. Because of the relatively small group of participants (n = 164) the Chi Square test is not likely to be valid in the case of the contingency table data. There are many cells that will contain less than 5 entries which is insufficient for a conclusive Chi Square statistic.

Education Level

Table 4.17. Education Level Kruskal-Wallis Test

EducationLevel	N	Median	Ave Rank	Z
Bachelor	69	367.0	83.6	0.24
Doctorate or other Terminal Degree	11	372.0	86.5	0.29
Master	84	368.0	81.1	-0.39
Overall	164		82.5	
H = 0.19 DF = 2 P = 0.910				
H = 0.19 DF = 2 P = 0.910 (adjusted for ties)				

Because of the requirement to have a bachelors degree for military commissioning all student officers have at least this level of education. Many others work on a masters degree while serving and a few get the opportunity for a terminal degree. The Kruskal-Wallis test showed no connection (P = .910) between education level and CCI score. This result is consistent with faculty results which also showed no connection between CCI score and educational level.

Gender

Table 4.18. Gender Kruskal-Wallis Test

Gender	N	Median	Ave Rank	Z
Female	36	325.5	59.4	-3.30
Male	128	371.5	89.0	3.30
Overall	164		82.5	
H = 10.91 DF = 1 P = 0.001				
H = 10.91 DF = 1 P = 0.001 (adjusted for ties)				

Response by gender was interesting. Although there are relatively fewer female officer students (180 of 1307 total for class AY 15/16) (13.8%) the response rate was comparatively high as compared to male students. The Kruskal-Wallis test showed a connection between gender and CCI level (P = .001).

Combat Deployments

The ranges chosen for indication of combat deployments turned out to be less discriminating than the researcher had anticipated. There were only four students with six or more deployments and 10 with none. Consequently there were 150 students (91.5%) of respondents that fell into the single category of 1 to 5 deployments. As a group the respondents were too homogeneous in this respect to discriminate any significant information from this study.

Combat Trauma

Table 4.19. Combat Trauma Kurskal-Wallis Test

CombatTrauma	N	Median	Ave Rank	Z
No	75	363.0	71.2	-1.46
Yes, more than once.	65	370.0	81.5	1.22
Yes, only once.	12	359.0	82.2	0.46
Overall	152		76.5	
H = 2.13 DF = 2 P = 0.344				

H = 2.13 DF = 2 P = 0.344 (adjusted for ties)

152 cases were used; 12 cases contained missing values

There is some evidence in prior studies that combat trauma has an effect on CGSC students (Clark, 2014; Shea, 2010; Spurlin, 2014). The Kruskal-Wallis P value of .344 indicates that whatever effects combat trauma is having on CGSC students it does not appear to be affecting their CCI scores measured by the LEP.

Branch of Service

Table 4.20. Service Branch Kruskal-Wallis Test

ServiceBranch	N	Median	Ave Rank	Z
Air Force	9	348.0	58.7	-1.55
Army	150	369.0	84.2	1.50
Coast Guard	1	367.0	81.0	-0.03
Marine	2	337.0	53.3	-0.88
Navy	2	369.0	91.8	0.28
Overall	164		82.5	
H = 3.29 DF = 4 P = 0.511				
H = 3.29 DF = 4 P = 0.511 (adjusted for ties)				

* NOTE * One or more small samples

There was no connection found between service branch and CCI score (P = .511). Students from the Army and the other Joint services appear to score at similar levels of CCI.

Commissioning Source

Table 4.21. Commissioning Source Kruskal-Wallis Test

CommissioningSource	N	Median	Ave Rank	Z
An Academy	20	370.5	89.5	0.70
OCS	40	362.0	78.3	-0.65
Other	14	321.5	60.6	-1.81
ROTC	90	370.0	86.2	1.11
Overall	164		82.5	
H = 4.29 DF = 3 P = 0.232				
H = 4.29 DF = 3 P = 0.232 (adjusted for ties)				

Regardless of military commissioning source the CCI scores appear to show no statistically significant difference (P = .232).

Years of Active Duty Service

Table 4.22. Years of Active Duty Service Kruskal-Wallis Test

YearsofActiveDutyService	N	Median	Ave Rank	Z
20 or More Years	11	333.0	58.5	-1.73
More than 10 Years but less than 20 Years	123	369.0	85.3	1.31
Zero to 10 Years	30	365.0	79.8	-0.35
Overall	164		82.5	
H = 3.33 DF = 2 P = 0.189				
H = 3.33 DF = 2 P = 0.189 (adjusted for ties)				

The number of years served by student respondents varied to a limited extent. The Kruskal-Wallis test showed that the different number of years served did not have a significant effect on the resulting CCI scores (P = .189).

Summary of Research Findings

This chapter detailed information about the information obtained through the use of a survey instrument used to collect demographic data and measure cognitive complexity using the Learning Environment Preferences instrument. The two groups studied were the faculty (N = 244) and the students (N = 1193) of a military intermediate service school, the Army Command and General Staff College, at Fort Leavenworth, Kansas. The surveyed population demographics were laid out in detail. Of the groups invited to participate the response rate was very high for faculty (n = 112) (45.9%) but much more modest for students (n = 164) (13.8%).

The collected survey data was sent out for scoring to develop an individual CCI score for each participant. Also the learning objectives of the school were studied and translated into an expected CCI level for graduates of the institution. Using statistical testing the faculty and students were compared against both each other and the school expectation looking for statistically significant difference. The test results indicated that the CCI of the students was below that of the faculty and the level expected at graduation. However, there was not a practically significant difference in the faculty CCI score and the expected student graduate score.

The data was further tested to answer questions regarding the changes in CCI that might connect to demographic categories. There were interesting results in terms of the lack of statistical significance in most cases. For the faculty, no statistically significant results were found for any of the independent variables. For the students the only statistically significant connections occurred between the CCI scores and gender.

CHAPTER 5 - Summary and Discussion

Overview

The purpose of this research was to determine if there was a relationship between the cognitive complexity of faculty, students, and expectations for students at a single military intermediate service school. Along with the simultaneous measure of cognitive complexity, via a survey administration of the LEP instrument, the researcher also developed a technique for translating learning objectives from Blooms taxonomy into a corresponding Perry position. This translation method was used to translate the college learning objectives into an expected Perry position for graduates of the college. The study also included demographic data to look for significant results regarding a number of independent variables. This chapter provides a discussion of the findings, and the implications of these findings. Some policy recommendations are made based on what the findings are indicating, and some opportunities for future research are discussed.

Discussion of Findings

Our nation's military is charged with defending the Constitution and our national interests. There is ample evidence that our military forces will be called up to do this in highly complex operating environments. Endemic to the environment where US military forces will operate are problems that defy simple solutions and simple problem solving. Many of the problems will exhibit characteristics of wicked or ill-structured problems that require problem solvers to think and act in ways that will tax their cognitive abilities. To ensure our officers are ready for this challenge, they are sent to intermediate service schools to practice thinking in new and complex ways. For this to happen, for officers to be challenged and supported in adult development, will demand a faculty who can understand both the developmental level of their students and the level at which the education hopes to develop in the student. One way to examine whether an intermediate service school is up to the task is too look at the cognitive complexity of the entering students, the resident faculty, and the desired level for graduates. The education these officers receive must be facilitated by a faculty with a cognitive complexity level greater than the goal for graduates (and greater than the student cognitive complexity as they

enter the school) in order to enable the faculty to bridge students to higher levels of cognitive complexity.

Research Question One – Faculty and Students Cognitive Complexity

Is there a difference in the measured level of faculty and student cognitive complexity as measured using the Learning Environment Preferences instrument?

This question is noteworthy in the context of constructivist theory and developmental teaching perspectives. Developmental teaching has as its goal the desire to improve the student's thinking process (Pratt, 1998). Developmental teaching desires to change the cognitive frameworks of the learner in the direction of increasingly sophisticated thought (Kegan, 2009; Taylor, Marienau, & Fiddler, 2000). The task for faculty at CGSC is to provide challenges with support (Sanford, 1962) that will result in an increase in the sophistication of thought. In order to do this the faculty must be of a sufficiently high developmental level to observe both the level where the students are starting from, and the level where the faculty intends to take them (Pratt, 1998). In this development of students, often called "bridging", the faculty is charged with comprehending both sides of the bridge and taking students across. This is accomplished through challenging a student's current ways of knowing and encouraging them to reflect and change their epistemology toward greater sophistication (Drago-Severnson, 2009). In the context of this research there should be a notably different level of cognitive complexity between faculty and students for the faculty to adequately facilitate development. The research found the mean faculty CCI score was 398 and the mean student score was 360. Statistical tests indicate that this 39 point difference in CCI is statistically significant. The faculty is equipped to work on the development of the student population as it enters CGSC. The measurements were made specifically prior to the beginning of classes so that the student measurements would reflect the cognitive complexity at the start of instruction.

Research Question Two – Faculty and Expectations for Cognitive Complexity

Is there a difference in the level of faculty cognitive complexity as measured using the Learning Environment Preferences instrument and the expected level of CC shown by the published learning objectives?

The CGSC publishes the developmental outcomes for the ten month education process as a set of 13 Terminal Learning Objectives (TLOs). These TLOs are the culmination of a

significant amount of discussion and application of guidance from various military sources. They represent a lot of work and thought about the expectations for graduates of the college. The TLOs are written using the taxonomy developed by Benjamin Bloom in 1956 (Bloom, 1956). For this research both Bloom's taxonomy and Perry's scheme for intellectual development were studied extensively and through a correlation of the tasks expected of students at the Bloom's taxonomy levels and the tasks expected of students at various Perry Positions the TLOs were translated from Bloom learning objectives into Perry Positions. These were then further employed to derive an expected Perry Position for graduates of CGSC. This was done to allow an examination of the measured student and faculty CCI scores with the expectations for graduates.

The resulting score correlating to the expectation for graduates is equivalent to a CCI score of 407. The mean value of CCI score of the CGSC faculty is 398. Statistical testing shows that there is a statistically significant difference between the mean faculty level and the expectation for graduates. However, a calculation looking at Effect Size indicates that, although there is a statistically significant difference in 398 from 407, in fact the difference has little practical significance and the two means are about equal. Calculating Cohen's d value yields .229, which Cohen defined as a "small" effect size (Cohen, 1988).

The rough equivalency of the graduation expectation for students, and the mean cognitive complexity score for faculty, raises a question regarding how ready the faculty are to educate students to the needed cognitive complexity for graduation. Bridging theory (Pratt, 1998; Kegan 2009) would suggest that faculty would need to be at a higher level than both the student and the developmental goal.

The best case scenario would have seen a statistically significant difference with the faculty CCI much greater than the CCI of 407. The findings indicate that some faculty are at a higher level than the student graduate, and can comprehend where the student is upon arrival, and can comprehend the level to which they will facilitate development of the student. Another way of looking at this is to examine the CCI scores of faculty and see that 52 members of the faculty are above the 407 level (46.4%), but 60 members of the faculty are below (53.6%). It may be particularly difficult for faculty at the lowest levels of CCI to 1) comprehend the developmental curriculum, 2) comprehend where the incoming students are currently at, or 3) comprehend how to develop them to a level of cognitive complexity higher than their own.

Donald Schön (Schön, 1983, 1987) described professional education as not only challenges and support but also as development in artistry in the application of professional knowledge to new and unique problems. This can be viewed as an atmosphere of coaching the professional for continuing development. If a low cognitive complexity faculty member is given student developmental goals well above his own level then the task to develop the student may be problematic (Drago-Severnson, 2009, 2012; Kegan, 2009; Pratt, 1998).

Research Question Three – Student Cognitive Complexity and Expectations for Cognitive Complexity

Is there a difference in the level of student cognitive complexity as measured using the Learning Environment Preferences instrument and the expected level of cognitive complexity shown by the published learning objectives?

The students in this study were measured as they were arriving at CGSC and prior to the beginning of any developmental teaching. As such they represent the *tabula rasa* for faculty to work with in development of the student for 10 months. The students would need development through education. The results of the CCI measurement showed that the students arrive at CGSC with an average CCI of 360, a 47 point difference and well below the graduation expectation of 407. Statistical testing confirmed that a mean score of 360 is statically significantly below 407 (137 were at 407 or below, 83.5%, and 27 were above 407, 16.5%). This result of the research shows that incoming students are in need of development to achieve the goals indicated by the college curriculum.

Within the group of students who responded to the survey, 11 were at low Perry positions falling in the Position 2 or Transition from 2 to 3 range. This is 6.7% of the respondents. If this percentage is representative of all the US officer students it would imply that in every staff group of 16 students there would be at least one student at very low development (.067 x 16 = 1.07). Likewise, looking at the highest scoring students, those in the transition 4 to 5 group, there were 18 students or 11%. Extrapolating this to a staff group would mean that they have roughly 1.76 students (.11 x 16 = 1.76) with a very high cognitive complexity, already above 407 CCI. So it is possible to have a very large range of students within one classroom. This poses a challenge for the instructor. Other research has touched upon the potential value of developmental

diversity where the highest performing students contributed to the development of the lower performing students (Collins, 2005; Fishback, 1997).

Research Question Four – Demographic Relationships (faculty only)

How does measured CC differ across demographic categories for faculty?

Is there a difference among faculty measured CC (dependent variable) across independent variables (teaching department, years of CGSC teaching experience, military status, and age)?

The faculty CCI distribution was skewed toward the higher end of the 200 to 500 range of CCI scores measured by the LEP. This was not an unexpected outcome since the faculty are all educated to at least a masters degree level and 23.2% of them have obtained terminal degrees.

The teaching departments were not significantly different in their CCI levels for faculty. This is interesting since at least one department respondents had a very large percentage, 78.6% with terminal degrees Department of Military History (DMH) as compared to 25% for the next highest, which was the Department of Joint Interagency and Multinational Operations (DJIMO). The highest mean CCI scores were in the Department of Command and Leadership (DCL) with a mean of 408.8. The lowest mean CCI scores were in DMH with a mean score of 378.1. Overall, no department is statistically significantly higher in their average cognitive complexity level in relation to the other departments.

There was no statistically significant difference found between the cognitive complexity of the military faculty versus the civilian faculty. The civilian faculty respondents contained 26 (32.1%) terminal degrees compared to only 1 (3.2%) among the military faculty. Even with a much higher percentage of terminal degrees the mean score for civilian faculty (mean = 397.9) was not found to be different from the military faculty (mean = 398.4). Since many of the faculty are retired military officers the total group may be too homogeneous to display significant differences, even with the addition of a terminal degree.

No statistical significance was found with respect to age or teaching experience in the faculty. The range of age is large with 34 respondents in their 30s and 40s, and 24 respondents indicating they are age 60 or older. With such a wide range in age the mean values between age groups were only 7 points from each other with the highest mean for faculty in their 50s.

For teaching experience there was an odd progression of CCI as the highest mean CCI was for teachers in the 3 to 5 year tranche at 415.8. The lower CCI means were the 0 to 3 years tranche at 392.5 and those instructors with 5 or more years at average CCI of 398.2. The unusual nature of this is difficult to explain. Notably, the survey participants for both the 0 to 3 group, and the 3 to 5 group, were 100% active duty faculty. More research would be needed to determine why no civilian faculty participated in the range from 0 to under 5 years but it may be due to the recent reductions in hiring of faculty due to Defense Department budget issues.

Research Question Five – Demographic Relationships (students and faculty)

How does measured CC differ across demographic categories for both students and faculty? Is there a difference in measured CC (dependent variable) across independent variables (education level, gender, combat experience, combat trauma, branch of service, commissioning source, and years of active duty service)?

The findings of CCI across the demographic communities for students who responded to the survey were very consistent in terms of statistical significance. In only one of the six independent variables (seven if you separate combat traumatic experiences from the number of deployments) were there any findings of statistically significant differences in CCI scores. The male student CCI scores were statistically significantly higher than the females as measured by the LEP. The mean score for males was 366.5, and for the females it was 337.3. Also of note, the female officers responded in much greater numbers than did the male officers as a percentage of the surveyed group. This is consistent with other research (Moore & Tarnai, 2002; Smith, 2008) showing that women reply to surveys in greater numbers than do men.

Previous qualitative research has shown that students are affected by their wartime traumatic experiences (Clark, 2014; Shea, 2010; Spurlin, 2014). The CCI is a measure of cognitive complexity and it appears from these results that although military students may be affected in some areas by combat experiences, it does not seem to have had any statistically significant effect on this group of survey respondents. Nor was there a significant effect from education, service branch, commissioning source, or years of active duty service.

There was no statistically significant change to CCI for faculty or students regarding level of education. For students, the addition of a degree above a bachelors degree did not statistically significantly change the mean CCI from students with only a bachelors degree. For

faculty the same was true for those with a masters degree as compared to those with terminal degrees. The mean CCI was only slightly higher for faculty with a terminal degree up from 396.7 to 402.

Implications

The findings confirm that arriving students that responded to the survey are at an average level of cognitive complexity below the standard set by the school for a graduate of the college. Some students enter the college well below the average CCI score and have relatively simple epistemological assumptions as they enter schooling at CGSC. These conditions then imply that some amount of improvement is needed and is valuable for the future of the student and for the military. The school has a mission to improve critical thinking of students so that they will be more effective problem solvers in a complex operating environment. The fact that some students enter the college with relatively simple epistemological views means that they are in need of development to reach the higher levels expected at graduation.

Another implication of the student scores comes from the lack of statistical significance that resulted from the measure of educational level of the students. Even though all the students are college graduates, and 51.2% completed masters degrees prior to arrival, there was no difference in cognitive complexity when looked at by educational level. The CGSC is accredited to grant a masters degree in military arts and science (MMAS). It is an unexpected result that achieving a masters level education prior to entry at CGSC did not appear to challenge students in a way that would raise their cognitive complexity.

The data shows that faculty are on average sufficiently above the level of students in CCI to conclude that they will be able to facilitate challenges and provide for student support to develop students in general. What is not so obvious is a question of whether that same faculty can develop students to a level expected by the learning objectives. In an earlier chapter Figure 1.1 showed the ten months of school at CGSC illustrated as students crossing a bridge. The students begin at the left with an average CCI of 360. The school desires that they cross the bridge and arrive at the far side with a CCI of 407. The faculty should be symbolically above the bridge with a cognitive complexity well above 407 so that they can perceive the students at arrival and guide them to where they need to be at the end of ten months. On average the CGSC faculty is standing at the higher CC end of the bridge, but they are not at a CC well above the

level of student graduates. The implication is that faculty epistemological sophistication may need improvement, or the goals as currently set, may need to be moderated.

The statistical significance seen for students of different gender implies that the measurement instrument questions may be interpreted differently by male and female officers. Using measurement instruments designed to test for Perry Scheme measurements may not be precisely revealing the cognitive complexity of women (Belenky, Clinchy, Goldberger, & Tarule, 1997; Collins, 2005; Fishback, 1997). Gender related epistemology differences have been studied (Magolda, 1992) in the past and differences have been found. Further research is needed to explain this result.

Recommendations for Policy

In this research there were findings indicating that the some of the faculty may not be well equipped to achieve the learning levels demanded by the institution. The 60 members that had CCI scores below 407, and in particular those at the lowest levels may find the curriculum challenging to facilitate effectively. The college may need to look into how to help the lowest scoring faculty to achieve the learning outcomes desired. One way may be to teach them how to effectively use the developmental diversity in their classrooms to raise the cognitive complexity of all students. Regarding how faculty improves in cognitive complexity is less clear. This research showed that neither faculty age, nor years of teaching experience were clearly connected to an increased cognitive complexity. There appears to be some change related to the achievement of a terminal degree, but it is not large. CGSC leadership could consider asking managers to encourage faculty to pursue doctorates. It may even be important to establish quotas for doctoral completion to verify management is adequately addressing this developmental path.

The research indicated that active duty faculty were not statistically significantly lower in CCI score than the civilian faculty. This is a positive finding since the faculty has a high percentage of active duty faculty. Longer term research would show if this is a continuing truth or if this snapshot in time is a unique circumstance.

It was an encouraging determination that students are not negatively impacted in cognitive complexity by their recent combat deployments or by experiences of traumatic events during combat. This is does not imply such events are not having any effect, only that they do not seem to be having an effect related to CCI as tested for in this research.

Finally, there may be some consideration for using cognitive complexity as a prerequisite measure for student admission to CGSC. If it is not desired to make cognitive complexity a screening criteria then instead the students could be tested after they have completed the Military Education Level 4 (MEL 4) minimum requirements. Based on the outcome of testing only the portion of students scoring at the highest levels could be retained for the last portion of the course and the rest would graduate. For the highest performers that remain the curriculum could focus on highly challenging subjects and delivery methods to maximize growth of the top students. This is already partly instituted now in the removal of a very small number of students into the "Scholars Program" but could be more widely implemented in this way.

Recommendations for Future Research

As a measure of the faculty and students for only one academic class at CGSC this study is just an exploratory start point. Longitudinal studies need to be conducted to learn more about changes in students and in faculty over time. One possible study would be to use the LEP or another instrument to look at cognitive complexity or critical thinking over the 10 month span of CGSC to verify that students are increasing in cognitive complexity. Additionally, a very long term database could be collected over a decade or more using the same instrument for multiple academic years. For students, this would yield greater understanding of changes over time. For faculty, it could be used for trends to provide for the best talent management. It could also help in the institution of a mentoring program where faculty with high cognitive complexity could mentor new faculty or those with lower levels. A convenient time to make measurements may be at the 5-year recertification classes that are required of all faculty. Other shorter term studies could be done to see if testing for cognitive complexity has any connection with final student grade point averages. Another study is suggested by the lack of significant effect on student cognitive complexity from attaining a masters degree. Because CGSC has an accredited masters program it would be interesting to see if that program is raising the measured cognitive complexity in a significant way for those students who proceed through that program. Finally, the creator of the LEP, Dr. William Moore, suggests that collecting MBTI data (an instrument that CGSC administers to students already) may have interesting interactions with LEP results (Moore, 2000).

With regard to the gender difference, research suggests that measurements of women using measurement instruments developed by males with testing of males in mind (for example those that look for Perry Scheme positions) may not be accurately explaining the cognitive complexity of women (Belenky, Clinchy, Goldberger, & Tarule, 1997; Collins, 2005; Fishback, 1997). Gender related patterns have been studied (Magolda, 1992) and provide a foundation for future research that could be done to examine the gender cognitive attributes. It would be interesting to do a study using different instruments, or using qualitative methods, to see if the results of this research are repeated.

Another valuable study would be to use a similar instrument to the LEP but add mixed method study techniques to see if high CC faculty generate higher CC graduates, or if students will rate high CC faculty as more challenging and effective teachers. It would be interesting to see if faculty can recognize those students with low CC in a group or if they are blind to student CC and therefore less likely to be developmental teachers. A similar study could be done in the area of the ability of CGSC instructors to cope with "developmental diversity" or the expectation that each staff group may contain a very wide range of student cognitive complexity levels and how developmental diversity affects cognitive complexity.

A study could be done to evaluate new students not only in the area of cognitive complexity but also in terms of readiness to learn (Hoare, 2006). Pre-screening via test and/or interviews would be valuable tools to see if students are ready to accept the challenges posed by CGSC. There is literature that discusses expecting students to operate at higher levels, well above where they currently are, results in frustration rather than student growth (King & Kitchner, 1994). Similarly a study could be done on pre-screening faculty prior to hiring looking for a minimum CC or critical thinking minimum level.

There may be value in research regarding the teaching models in use by CGSC. Currently, curriculum is built around Kolb's work on experiential learning. The curriculum is written to conform to an experiential learning model (ELM) that is designed to address the four primary learning styles in this model. In contrast, Schön has described education for professionals as closer to coaching an artist for better artistry. In this case the artistry is the application of professional knowledge (Schön, 1983, 1987). Research could be conducted on whether the students and faculty would benefit from greater use of other teaching models and methods, maybe ones that emphasis artistry over knowledge transmission. For example,

experiments could be designed around letting students choose what to learn rather than leaving all curriculum choices with curriculum developers. The use of peer to peer teaching could be an area for study as well. There may be value in researching the use of case study methods to create opportunity for situated learning through sophisticated simulations of real world staff work. Research could be done on testing and selection of students into learning groups with all low, all high and a mixed group of CCI levels to see if differences appear in longitudinal growth of the groups.

Research could be done to determine if resident students are comparable to the army distance learning students. It would be interesting to test these students in a longitudinal study to see if their growth in cognitive complexity is similar to that of the in-resident students at Fort Leavenworth.

Finally, as the Army University becomes a larger presence in civilian academic circles, more research could be envisioned to look for comparisons between CGSC students and faculty as compared to civilian students and faculty.

Summary

The world is a dangerous place. The United States faces many threats. A short list includes cyber war, nuclear, chemical, or biological weapons proliferation, climate change, international crimes like drug or human trafficking, and global terrorist organizations to name just a few. Some of these threats will pose very complex, interactive, ill-structured problems for our military forces to work within. Some will not have any clear solutions, just temporary states of lower significance or priority. In this complex world the military needs complex thinkers to address these threats.

The Army as a learning organization is intent upon developing lifelong learners, not just among officer students, but throughout the army. New endeavors are in the works sending a powerful message to the civilian academic community that the Army is committed to cutting-edge education at all levels. This year the Army stood up the Army University with a mission to "increase academic rigor, create greater opportunities for accreditation, and enhance the quality of the force." (*The Army University White Paper: Educating Leaders to Win in a Complex*

World, 2015). All of this is being done because of a need for our military members to be superior leaders and problem solvers as far down the chain of command as possible.

The Army Command and General Staff College is a key player in the new Army University because it is charged with educating mid-career officers to achieve the kind of mental agility and cognitive complexity needed to solve our nation's military problems. The graduates of CGSC will travel far afield and be the backbone of military efforts to defend the Constitution of the United States against its multiple threats. The education provided at CGSC is a key component of national security.

The need for excellent graduates from CGSC stimulates fundamental research, like this dissertation and others. By looking at students, faculty, and institutional goals for education the college is strengthened. This research has contributed by measuring cognitive complexity as a way to seek improvement in the development of our nation's greatest assets for solving the complex problems we face, the education of our military people. The research provided the spark for continuing study by offering possibilities for future research that would benefit CGSC. Through this research work the college is stronger and has the opportunity to be an improved contributor to our national security.

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Appendix A - KSU IRB Approval

KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Sarah Fishback
Educational Leadership
354 Bluemont

Proposal Number: 7636

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

DATE: 03/20/2015

RE: Proposal Entitled, "An Exploratory Study of Cognitive Complexity at at Military Intermediate Service School"

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: 2, 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.

203 Fairchild Hall, Lower Mezzanine, Manhattan, KS 66506-1103 | 785-532-3224 | fax: 785-532-3278 | k-state.edu/research/comply | comply@ksu.edu

Appendix B - CGSC 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-SWA-QA

10 July 2015

MEMORANDUM FOR: Harold Laurence, Kansas State University

SUBJECT: Request for Survey Research: KSU #7636, An Exploratory Study of Cognitive Complexity at a Military Intermediate Service School

1. The Kanas State University IRB determined this research to be exempt from further IRB review. A DoD administrative review was conducted and found that determination to be correct.

2. Your request to survey CGSS Students is approved. You may begin your research project upon receipt of this approval leter.

3. Your Survey Control Number (SCN) will be issued when the survey has been built and is ready for administration. This survey number must be clearly displayed on the front of your consent form as illustrated below:

This survey has been approved by CGSC Quality Assurance Office and the survey control number is 15-07-068.

4. You are required to submit an *End of Project Data Collection Report* to the CGSC Quality Assurance Office when data collection for your project is complete. This report can be found at: http://cgsc.leavenworth.army.mil/QAO/download/End_Of_Data_Collection_Report.doc.

5. Should you have questions concerning the above, please contact Dr. Maria Clark in the CGSC Quality Assurance Office, room 4521 Lewis & Clark.

Maria L Clark, Ph.D.
Human Protections Administrator
IRB Administrator
Survey Control Officer

Appendix C - Learning Environment Preferences Instrument

LEARNING ENVIRONMENT PREFERENCES

This survey asks you to describe what you believe to be the most significant issues in your **IDEAL** LEARNING ENVIRONMENT. Your opinions are important to us as we study how students think about teaching and learning issues. We ask, therefore, that you take this task seriously and give your responses some thought. We appreciate your cooperation in sharing what you find most important in a learning environment.

The survey consists of five sections, each representing a different aspect of learning environments. In each section, you are presented with a list of specific statements about that particular area. Try not to focus on a specific class or classes as you think about these items; focus on their significance in an *ideal* learning environment *for you.*

We ask that you do two things for each section of the instrument:

1. Please **rate** each item of the section (using the 1-4 scale provided below) in terms of its significance or importance to your learning.
2. Review the list for your top-rated items (those you rated 4, or 3 if you have no items rated 4) and **rank** the three most important items to you as you think about your *ideal learning environment* by writing *the item numbers* on the appropriate spaces at the bottom of the answer sheet.

Please mark your answers on the separate answer sheet provided, and be sure to indicate both your ratings of individual items **and** *your ranking of the top 3 items in each section*. It is very important that you indicate your top three choices for each question area by writing the ITEM NUMBER in the spaces provided (1st choice, 2nd choice, 3rd choice).

Rating Scale:			
1	**2**	**3**	**4**
Not at all significant	**Somewhat significant**	**Moderately significant**	**Very significant**

Before you begin, you may be asked to provide us with some background information. This information will be used to examine group differences; your name or social security number may be used at some point in the future if a follow-up survey is required. ALL RESPONSES WILL BE KEPT CONFIDENTIAL. Again, thank you very much for sharing with us your ideas about learning.

DOMAIN ONE:
COURSE CONTENT/VIEW OF LEARNING

MY IDEAL LEARNING ENVIRONMENT WOULD:

1. Emphasize basic facts and definitions.
2. Focus more on having the right answers than on discussing methods or how to solve problems.
3. Insure that I get all the course knowledge from the professor.
4. Provide me with an opportunity to learn methods and solve problems.
5. Allow me a chance to think and reason, applying facts to support my opinions.
6. Emphasize learning simply for the sake of learning or gaining new expertise.
7. Let me decide for myself whether issues discussed in class are right or wrong, based on my own interpretations and ideas.
8. Stress the practical applications of the material.
9. Focus on the socio-psycho, cultural and historical implications and ramifications of the subject matter.
10. Serve primarily as a catalyst for research and learning on my own, integrating the knowledge gained into my thinking.
11. Stress learning and thinking on my own, not being spoonfed learning by the instructor.
12. Provide me with appropriate learning situations for thinking about and seeking personal truths.
13. Emphasize a good positive relationship among the students and between the students and teacher.

PLEASE BE SURE TO REVIEW THE ABOVE LIST AND MARK YOUR THREE MOST SIGNIFICANT ITEMS (BY ITEM NUMBER) IN THE LINES PROVIDED ON THE ANSWER SHEET.

Rating Scale:			
1	**2**	**3**	**4**
Not at all significant	**Somewhat significant**	**Moderately significant**	**Very significant**

DOMAIN TWO:
ROLE OF INSTRUCTOR

IN MY IDEAL LEARNING ENVIRONMENT, THE TEACHER WOULD:

1. Teach me all the facts and information I am supposed to learn.
2. Use up-to-date textbooks and materials and teach from them, not ignore them.
3. Give clear directions and guidance for all course activities and assignments.
4. Have only a minimal role in the class, turning much of the control of course content and class discussions over to the students.
5. Be not just an instructor, but more an explainer, entertainer and friend.
6. Recognize that learning is mutual--individual class members contribute fully to the teaching and learning in the class.
7. Provide a model for conceptualizing living and learning rather than solving problems.
8. Utilize his/her expertise to provide me with a critique of my work.
9. Demonstrate a way to think about the subject matter and then help me explore the issues and come to my own conclusions.
10. Offer extensive comments and reactions about my performance in class (papers, exams, etc.).
11. Challenge students to present their own ideas, argue with positions taken, and demand evidence for their beliefs.
12. Put a lot of effort into the class, making it interesting and worthwhile.
13. Present arguments on course issues based on his/her expertise to stimulate active debate among class members.

PLEASE BE SURE TO REVIEW THE ABOVE LIST AND MARK YOUR THREE MOST SIGNIFICANT ITEMS (BY ITEM NUMBER) IN THE LINES PROVIDED ON THE ANSWER SHEET.

Rating Scale:			
1	**2**	**3**	**4**
Not at all significant	**Somewhat significant**	**Moderately significant**	**Very significant**

DOMAIN THREE:
ROLE OF STUDENT/PEERS

IN MY IDEAL LEARNING ENVIRONMENT, AS A STUDENT I WOULD:

1. Study and memorize the subject matter--the teacher is there to teach it.
2. Take good notes on what's presented in class and reproduce that information on the tests.
3. Enjoy having my friends in the class, but other than that classmates don't add much to what I would get from a class.
4. Hope to develop my ability to reason and judge based on standards defined by the subject.
5. Prefer to do independent research allowing me to produce my own ideas and arguments.
6. Expect to be challenged to work hard in the class.
7. Prefer that my classmates be concerned with increasing their awareness of themselves to others in relation to the world.
8. Anticipate that my classmates would contribute significantly to the course learning through their own expertise in the content.
9. Want opportunities to think on my own, making connections between the issues discussed in class and other areas I'm studying.
10. Take some leadership, along with my classmates, in deciding how the class will be run.
11. Participate actively with my peers in class discussions and ask as many questions as necessary to fully understand the topic.
12. Expect to take learning seriously and be personally motivated to learn the subject.
13. Want to learn methods and procedures related to the subject--learn how to learn.

PLEASE BE SURE TO REVIEW THE ABOVE LIST AND MARK YOUR THREE MOST SIGNIFICANT ITEMS (BY ITEM NUMBER) IN THE LINES PROVIDED ON THE ANSWER SHEET.

Rating Scale:			
1	**2**	**3**	**4**
Not at all significant	**Somewhat significant**	**Moderately significant**	**Very significant**

DOMAIN FOUR:
CLASSROOM ATMOSPHERE/ACTIVITIES

IN MY IDEAL LEARNING ENVIRONMENT, THE CLASSROOM ATMOSPHERE AND ACTIVITIES WOULD:

1. Be organized and well-structured--there should be clear expectations set (like a structured syllabus that's followed).
2. Consist of lectures (with a chance to ask questions) because I can get all the facts I need to know more efficiently that way.
3. Include specific, detailed instructions for all activities and assignments.
4. Focus on step-by-step procedures so that if you did the procedure correctly each time, your answer would be correct.
5. Provide opportunities for me to pull together connections among various subject areas and then construct an adequate argument.
6. Be only loosely structured, with the students themselves taking most of the responsibility for what structure there is.
7. Include research papers, since they demand that I consult sources and then offer my own interpretation and thinking.
8. Have enough variety in content areas and learning experiences to keep me interested.
9. Be practiced and internalized but be balanced by group experimentation, intuition, comprehension, and imagination.
10. Consist of a seminar format, providing an exchange of ideas so that I can critique my own perspectives on the subject matter.
11. Emphasize discussions of personal answers based on relevant evidence rather than just right and wrong answers.
12. Be an intellectual dialogue and debate among a small group of peers motivated to learn for the sake of learning.
13. Include lots of projects and assignments with practical, everyday applications.

PLEASE BE SURE TO REVIEW THE ABOVE LIST AND MARK YOUR THREE MOST SIGNIFICANT ITEMS (BY ITEM NUMBER) IN THE LINES PROVIDED ON THE ANSWER SHEET.

Rating Scale:			
1	**2**	**3**	**4**
Not at all significant	**Somewhat significant**	**Moderately significant**	**Very significant**

DOMAIN FIVE:
EVALUATION PROCEDURES

EVALUATION PROCEDURES IN MY IDEAL LEARNING ENVIRONMENT WOULD:

1. Include straightforward, not "tricky," tests, covering only what has been taught and nothing else.
2. Be up to the teacher, since s/he knows the material best.
3. Consist of objective-style tests because they have clear-cut right or wrong answers.
4. Be based on how much students have improved in the class and on how hard they have worked in class.
5. Provide an opportunity for me to judge my own work along with the teacher and learn from the critique at the same time.
6. Not include grades, since there aren't really any objective standards teachers can use to evaluate students' thinking.
7. Include grading by a prearranged point system (homework, participation, tests, etc.), since I think it seems the most fair.
8. Represent a synthesis of internal and external opportunities for judgment and learning enhancing the quality of the class.
9. Consist of thoughtful criticism of my work by someone with appropriate expertise.
10. Emphasize essay exams, papers, etc. rather than objective-style tests so that I can show how much I've learned.
11. Allow students to demonstrate that they can think on their own and make connections not made in class.
12. Include judgments of the quality of my oral and written work as a way to enhance my learning in the class.
13. Emphasize independent thinking by each student, but include some focus on the quality of one's arguments and evidence.

PLEASE BE SURE TO REVIEW THE ABOVE LIST AND MARK YOUR THREE MOST SIGNIFICANT ITEMS (BY ITEM NUMBER) IN THE LINES PROVIDED ON THE ANSWER SHEET.

Rating Scale:			
1	**2**	**3**	**4**
Not at all significant	**Somewhat significant**	**Moderately significant**	**Very significant**

LEARNING ENVIRONMENT PREFERENCES ANSWER SHEET

STUDENT CODE NUMBER: _____

Rating Scale:	1 Not at all significant	2 Somewhat significant	3 Moderately significant	4 Very significant

For each domain, record your rating of each item (using the rating scale described above) on the lines by the appropriate item numbers.

DOMAINS

Course Content/ View of Learning	Role of Instructor	Role of Student/Peers	Classroom Atmosphere	Evaluation Procedures
1._____	1._____	1._____	1._____	1._____
2, _____	2, _____	2, _____	2, _____	2, _____
3. _____	3. _____	3. _____	3. _____	3. _____
4. _____	4. _____	4. _____	4. _____	4. _____
5. _____	5. _____	5. _____	5. _____	5. _____
6. _____	6. _____	6. _____	6. _____	6. _____
7. _____	7. _____	7. _____	7. _____	7. _____
8. _____	8. _____	8. _____	8. _____	8. _____
9. _____	9. _____	9. _____	9. _____	9. _____
10. _____	10. _____	10. _____	10. _____	10. _____
11. _____	11. _____	11. _____	11. _____	11. _____
12. _____	12. _____	12. _____	12. _____	12. _____
13. _____	13. _____	13. _____	13. _____	13. _____

Now record your **TOP THREE CHOICES** for each domain area by writing the **ITEM NUMBERS**, not your ratings, of these choices in the spaces provided below. (For example, if you consider item # 2 the most significant issue for your own learning related to the domain of "Role of Instructor," write "2" next to "1st" under that domain below.)

COURSE CONTENT	ROLE OF INSTRUCTOR	ROLE OF STUDENT/PEERS	CLASSROOM ATMOSPHERE	EVALUATION PROCEDURES
1ST_____	1ST_____	1ST_____	1ST_____	1ST_____
2ND_____	2ND_____	2ND_____	2ND_____	2ND_____
3RD_____	3RD_____	3RD_____	3RD_____	3RD_____

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Center for the Study of Intellectual Development

Appendix D - Faculty Contingency Tables

Tabulated statistics: Bin, I am a member of:

Rows: Bin Columns: I am a member of:

	DCL	DJIMO	DLRO	DMH	DTAC	All
1	0	0	0	1	0	1
	0.000	0.000	0.000	0.893	0.000	0.893
	0.116	0.375	0.134	0.125	0.250	1.000
	0.1161	0.3750	0.1339	6.1250	0.2500	*
2	0	1	0	1	0	2
	0.000	0.893	0.000	0.893	0.000	1.786
	0.232	0.750	0.268	0.250	0.500	2.000
	0.2321	0.0833	0.2679	2.2500	0.5000	*
3	0	2	1	1	1	5
	0.000	1.786	0.893	0.893	0.893	4.464
	0.580	1.875	0.670	0.625	1.250	5.000
	0.5804	0.0083	0.1630	0.2250	0.0500	*
4	1	4	2	2	3	12
	0.893	3.571	1.786	1.786	2.679	10.714
	1.393	4.500	1.607	1.500	3.000	12.000
	0.1108	0.0556	0.0960	0.1667	0.0000	*
5	7	24	7	3	14	55
	6.250	21.429	6.250	2.679	12.500	49.107
	6.384	20.625	7.366	6.875	13.750	55.000
	0.0595	0.5523	0.0182	2.1841	0.0045	*
6	5	11	5	6	10	37
	4.464	9.821	4.464	5.357	8.929	33.036
	4.295	13.875	4.955	4.625	9.250	37.000
	0.1158	0.5957	0.0004	0.4088	0.0608	*
All	13	42	15	14	28	112
	11.607	37.500	13.393	12.500	25.000	100.000
	13.000	42.000	15.000	14.000	28.000	112.000
	*	*	*	*	*	*

Cell Contents:
Count
% of Total
Expected count
Contribution to Chi-square

Tabulated statistics: Bin, number of years teaching

Rows: Bin Columns: number of years teaching

	0-3 Years	5 or More Years	More than 3 Years but Less than	All
1	1	0	0	1
	0.893	0.000	0.000	0.893
	0.205	0.741	0.054	1.000
	3.0749	0.7411	0.0536	*
2	0	2	0	2
	0.000	1.786	0.000	1.786
	0.411	1.482	0.107	2.000
	0.4107	0.1809	0.1071	*
3	0	5	0	5
	0.000	4.464	0.000	4.464
	1.027	3.705	0.268	5.000
	1.0268	0.4523	0.2679	*
4	3	9	0	12
	2.679	8.036	0.000	10.714
	2.464	8.893	0.643	12.000
	0.1165	0.0013	0.6429	*
5	14	38	3	55
	12.500	33.929	2.679	49.107
	11.295	40.759	2.946	55.000
	0.6480	0.1867	0.0010	*
6	5	29	3	37
	4.464	25.893	2.679	33.036
	7.598	27.420	1.982	37.000
	0.8885	0.0911	0.5227	*
All	23	83	6	112
	20.536	74.107	5.357	100.000
	23.000	83.000	6.000	112.000
	*	*	*	*

Cell Contents: Count
% of Total
Expected count
Contribution to Chi-square

Tabulated statistics: Bin, What is your military status?

Rows: Bin Columns: What is your military status?

	Active Duty	Civilian	All
1	1	0	1
	0.893	0.000	0.893
	0.277	0.723	1.000
	1.8897	0.7232	*
2	0	2	2
	0.000	1.786	1.786
	0.554	1.446	2.000
	0.5536	0.2119	*
3	0	5	5
	0.000	4.464	4.464
	1.384	3.616	5.000
	1.3839	0.5297	*
4	3	9	12
	2.679	8.036	10.714
	3.321	8.679	12.000
	0.0311	0.0119	*
5	18	37	55
	16.071	33.036	49.107
	15.223	39.777	55.000
	0.5065	0.1938	*
6	9	28	37
	8.036	25.000	33.036
	10.241	26.759	37.000
	0.1504	0.0576	*
All	31	81	112
	27.679	72.321	100.000
	31.000	81.000	112.000
	*	*	*

Cell Contents: Count
% of Total
Expected count
Contribution to Chi-square

Tabulated statistics: Bin, Age

Rows: Bin Columns: Age

	I am in my 30s/40s	I am in my 50s	I am in my 60s or older	All
1	1	0	0	1
	0.893	0.000	0.000	0.893
	0.304	0.482	0.214	1.000
	1.5977	0.4821	0.2143	*
2	0	1	1	2
	0.000	0.893	0.893	1.786
	0.607	0.964	0.429	2.000
	0.6071	0.0013	0.7619	*
3	0	3	2	5
	0.000	2.679	1.786	4.464
	1.518	2.411	1.071	5.000
	1.5179	0.1440	0.8048	*
4	6	4	2	12
	5.357	3.571	1.786	10.714
	3.643	5.786	2.571	12.000
	1.5252	0.5511	0.1270	*
5	18	28	9	55
	16.071	25.000	8.036	49.107
	16.696	26.518	11.786	55.000
	0.1018	0.0828	0.6584	*
6	9	18	10	37
	8.036	16.071	8.929	33.036
	11.232	17.839	7.929	37.000
	0.4436	0.0014	0.5412	*
All	34	54	24	112
	30.357	48.214	21.429	100.000
	34.000	54.000	24.000	112.000
	*	*	*	*

Cell Contents:
- Count
- % of Total
- Expected count
- Contribution to Chi-square

Tabulated statistics: Bin, What is your highest education

Rows: Bin Columns: What is your highest education

	Doctorate or other Terminal Deg	Master	All
1	0	1	1
	0.000	0.893	0.893
	0.241	0.759	1.000
	0.2411	0.0766	*
2	1	1	2
	0.893	0.893	1.786
	0.482	1.518	2.000
	0.5562	0.1767	*
3	0	5	5
	0.000	4.464	4.464
	1.205	3.795	5.000
	1.2054	0.3829	*
4	6	6	12
	5.357	5.357	10.714
	2.893	9.107	12.000
	3.3373	1.0601	*
5	6	49	55
	5.357	43.750	49.107
	13.259	41.741	55.000
	3.9741	1.2624	*
6	14	23	37
	12.500	20.536	33.036
	8.920	28.080	37.000
	2.8936	0.9191	*
All	27	85	112
	24.107	75.893	100.000
	27.000	85.000	112.000
	*	*	*

Cell Contents:
- Count
- % of Total
- Expected count
- Contribution to Chi-square

Tabulated statistics: Bin, How many combat deployments hav

Rows: Bin Columns: How many combat deployments hav

	1 to 5	6+	None	All
1	1	0	0	1
	0.893	0.000	0.000	0.893
	0.714	0.027	0.259	1.000
	0.11429	0.02679	0.25893	*
2	2	0	0	2
	1.786	0.000	0.000	1.786
	1.429	0.054	0.518	2.000
	0.22857	0.05357	0.51786	*
3	4	0	1	5
	3.571	0.000	0.893	4.464
	3.571	0.134	1.295	5.000
	0.05143	0.13393	0.06706	*
4	8	0	4	12
	7.143	0.000	3.571	10.714
	8.571	0.321	3.107	12.000
	0.03810	0.32143	0.25657	*
5	40	1	14	55
	35.714	0.893	12.500	49.107
	39.286	1.473	14.241	55.000
	0.01299	0.15200	0.00408	*
6	25	2	10	37
	22.321	1.786	8.929	33.036
	26.429	0.991	9.580	37.000
	0.07722	1.02711	0.01838	*
All	80	3	29	112
	71.429	2.679	25.893	100.000
	80.000	3.000	29.000	112.000
	*	*	*	*

Cell Contents: Count
% of Total
Expected count
Contribution to Chi-square

Tabulated statistics: Bin, Have you experienced a traumati

Rows: Bin Columns: Have you experienced a traumati

	(Not Answered)	No	Yes, more than once.	Yes, only once.	All
1	0	1	0	0	1
	0.000	0.893	0.000	0.000	0.893
	0.259	0.411	0.232	0.098	1.000
	0.2589	0.8455	0.2321	0.0982	*
2	0	2	0	0	2
	0.000	1.786	0.000	0.000	1.786
	0.518	0.821	0.464	0.196	2.000
	0.5179	1.6910	0.4643	0.1964	*
3	1	3	0	1	5
	0.893	2.679	0.000	0.893	4.464
	1.295	2.054	1.161	0.491	5.000
	0.0671	0.4362	1.1607	0.5274	*
4	4	4	1	3	12
	3.571	3.571	0.893	2.679	10.714
	3.107	4.929	2.786	1.179	12.000
	0.2566	0.1749	1.1447	2.8149	*
5	14	25	14	2	55
	12.500	22.321	12.500	1.786	49.107
	14.241	22.589	12.768	5.402	55.000
	0.0041	0.2573	0.1189	2.1423	*
6	10	11	11	5	37
	8.929	9.821	9.821	4.464	33.036
	9.580	15.196	8.589	3.634	37.000
	0.0184	1.1588	0.6766	0.5135	*
All	29	46	26	11	112
	25.893	41.071	23.214	9.821	100.000
	29.000	46.000	26.000	11.000	112.000
	*	*	*	*	*

Cell Contents:
Count
% of Total
Expected count
Contribution to Chi-square

Tabulated statistics: Bin, What is/was your Service Branch

Rows: Bin Columns: What is/was your Service Branch

	(Not Answered)	Air Force	Army	Marine	Navy	All
1	0	0	1	0	0	1
	0.000	0.000	0.893	0.000	0.000	0.893
	0.009	0.027	0.839	0.054	0.071	1.000
	0.0089	0.0268	0.0308	0.0536	0.0714	*
2	0	0	1	0	1	2
	0.000	0.000	0.893	0.000	0.893	1.786
	0.018	0.054	1.679	0.107	0.143	2.000
	0.0179	0.0536	0.2743	0.1071	5.1429	*
3	0	0	4	1	0	5
	0.000	0.000	3.571	0.893	0.000	4.464
	0.045	0.134	4.196	0.268	0.357	5.000
	0.0446	0.1339	0.0092	2.0012	0.3571	*
4	1	0	11	0	0	12
	0.893	0.000	9.821	0.000	0.000	10.714
	0.107	0.321	10.071	0.643	0.857	12.000
	7.4405	0.3214	0.0856	0.6429	0.8571	*
5	0	2	44	4	5	55
	0.000	1.786	39.286	3.571	4.464	49.107
	0.491	1.473	46.161	2.946	3.929	55.000
	0.4911	0.1884	0.1011	0.3767	0.2922	*
6	0	1	33	1	2	37
	0.000	0.893	29.464	0.893	1.786	33.036
	0.330	0.991	31.054	1.982	2.643	37.000
	0.3304	0.0001	0.1220	0.4866	0.1564	*
All	1	3	94	6	8	112
	0.893	2.679	83.929	5.357	7.143	100.000
	1.000	3.000	94.000	6.000	8.000	112.000
	*	*	*	*	*	*

Cell Contents: Count
% of Total
Expected count
Contribution to Chi-square

Tabulated statistics: Bin, Commission

Rows: Bin Columns: Commission

	An Academy	OCS	Other	ROTC	All
1	0	0	0	1	1
	0.000	0.000	0.000	0.893	0.893
	0.143	0.170	0.036	0.652	1.000
	0.1429	0.1696	0.0357	0.1860	*
2	1	1	0	0	2
	0.893	0.893	0.000	0.000	1.786
	0.286	0.339	0.071	1.304	2.000
	1.7857	1.2867	0.0714	1.3036	*
3	0	1	0	4	5
	0.000	0.893	0.000	3.571	4.464
	0.714	0.848	0.179	3.259	5.000
	0.7143	0.0272	0.1786	0.1685	*
4	2	4	1	5	12
	1.786	3.571	0.893	4.464	10.714
	1.714	2.036	0.429	7.821	12.000
	0.0476	1.8954	0.7619	1.0178	*
5	5	6	2	42	55
	4.464	5.357	1.786	37.500	49.107
	7.857	9.330	1.964	35.848	55.000
	1.0390	1.1887	0.0006	1.0557	*
6	8	7	1	21	37
	7.143	6.250	0.893	18.750	33.036
	5.286	6.277	1.321	24.116	37.000
	1.3938	0.0833	0.0782	0.4026	*
All	16	19	4	73	112
	14.286	16.964	3.571	65.179	100.000
	16.000	19.000	4.000	73.000	112.000
	*	*	*	*	*

Cell Contents: Count
% of Total
Expected count
Contribution to Chi-square

Tabulated statistics: Bin, Years of Active Duty Service?

Rows: Bin Columns: Years of Active Duty Service?

	1 to 10 Years	20 or More Years	I have never served on active d	More than 10 Years but less tha	Missing	All
1	0	1	0	0	0	1
	0.000	0.901	0.000	0.000	*	0.901
	0.027	0.838	0.018	0.117	*	1.000
	0.0270	0.0314	0.0180	0.1171	*	*
2	1	1	0	0	0	2
	0.901	0.901	0.000	0.000	*	1.802
	0.054	1.676	0.036	0.234	*	2.000
	16.5541	0.2724	0.0360	0.2342	*	*
3	0	5	0	0	0	5
	0.000	4.505	0.000	0.000	*	4.505
	0.135	4.189	0.090	0.586	*	5.000
	0.1351	0.1569	0.0901	0.5856	*	*
4	0	7	2	3	0	12
	0.000	6.306	1.802	2.703	*	10.811
	0.324	10.054	0.216	1.405	*	12.000
	0.3243	0.9277	14.7162	1.8093	*	*
5	1	46	0	7	1	54
	0.901	41.441	0.000	6.306	*	48.649
	1.459	45.243	0.973	6.324	*	54.000
	0.1446	0.0127	0.9730	0.0722	*	*
6	1	33	0	3	0	37
	0.901	29.730	0.000	2.703	*	33.333
	1.000	31.000	0.667	4.333	*	37.000
	0.0000	0.1290	0.6667	0.4103	*	*
All	3	93	2	13	*	111
	2.703	83.784	1.802	11.712	*	100.000
	3.000	93.000	2.000	13.000	*	111.000
	*	*	*	*	*	*

Cell Contents: Count
% of Total
Expected count
Contribution to Chi-square

Appendix E - Student Contingency Tables

Tabulated statistics: Bin, Whatisyourhighesteducationlevel

Rows: Bin Columns: Whatisyourhighesteducationlevel

	Bachelor	Doctorate or other Terminal Deg	Master	All
1	1	0	1	2
	0.610	0.000	0.610	1.220
	0.841	0.134	1.024	2.000
	0.02987	0.13415	0.00058	*
2	4	0	5	9
	2.439	0.000	3.049	5.488
	3.787	0.604	4.610	9.000
	0.01203	0.60366	0.03304	*
3	11	3	17	31
	6.707	1.829	10.366	18.902
	13.043	2.079	15.878	31.000
	0.31992	0.40771	0.07928	*
4	22	3	26	51
	13.415	1.829	15.854	31.098
	21.457	3.421	26.122	51.000
	0.01373	0.05175	0.00057	*
5	24	4	25	53
	14.634	2.439	15.244	32.317
	22.299	3.555	27.146	53.000
	0.12979	0.05574	0.16970	*
6	7	1	10	18
	4.268	0.610	6.098	10.976
	7.573	1.207	9.220	18.000
	0.04338	0.03560	0.06607	*
All	69	11	84	164
	42.073	6.707	51.220	100.000
	69.000	11.000	84.000	164.000
	*	*	*	*

Cell Contents:
Count
% of Total
Expected count
Contribution to Chi-square

Tabulated statistics: Bin, Gender

Rows: Bin Columns: Gender

	Female	Male	All
1	0	2	2
	0.00	1.22	1.22
	0.44	1.56	2.00
	0.4390	0.1235	*
2	5	4	9
	3.05	2.44	5.49
	1.98	7.02	9.00
	4.6299	1.3022	*
3	14	17	31
	8.54	10.37	18.90
	6.80	24.20	31.00
	7.6077	2.1397	*
4	9	42	51
	5.49	25.61	31.10
	11.20	39.80	51.00
	0.4304	0.1211	*
5	4	49	53
	2.44	29.88	32.32
	11.63	41.37	53.00
	5.0094	1.4089	*
6	4	14	18
	2.44	8.54	10.98
	3.95	14.05	18.00
	0.0006	0.0002	*
All	36	128	164
	21.95	78.05	100.00
	36.00	128.00	164.00
	*	*	*

Cell Contents:
- Count
- % of Total
- Expected count
- Contribution to Chi-square

Tabulated statistics: Bin, Haveyouexperiencedatraumaticeve

Rows: Bin Columns: Haveyouexperiencedatraumaticeve

	No	Yes, more than once.	Yes, only once.	Missing	All
1	0	2	0	0	2
	0.000	1.316	0.000	*	1.316
	0.987	0.855	0.158	*	2.000
	0.9868	1.5322	0.1579	*	*
2	5	2	0	2	7
	3.289	1.316	0.000	*	4.605
	3.454	2.993	0.553	*	7.000
	0.6920	0.3297	0.5526	*	*
3	15	9	4	3	28
	9.868	5.921	2.632	*	18.421
	13.816	11.974	2.211	*	28.000
	0.1015	0.7385	1.4486	*	*
4	27	20	2	2	49
	17.763	13.158	1.316	*	32.237
	24.178	20.954	3.868	*	49.000
	0.3295	0.0434	0.9024	*	*
5	23	23	3	4	49
	15.132	15.132	1.974	*	32.237
	24.178	20.954	3.868	*	49.000
	0.0574	0.1998	0.1950	*	*
6	5	9	3	1	17
	3.289	5.921	1.974	*	11.184
	8.388	7.270	1.342	*	17.000
	1.3686	0.4118	2.0480	*	*
All	75	65	12	*	152
	49.342	42.763	7.895	*	100.000
	75.000	65.000	12.000	*	152.000
	*	*	*	*	*

Cell Contents:
- Count
- % of Total
- Expected count
- Contribution to Chi-square

Tabulated statistics: Bin, WhatisyourServiceBranch

Rows: Bin Columns: WhatisyourServiceBranch

	Air Force	Army	Coast Guard	Marine	Navy	All
1	0	2	0	0	0	2
	0.000	1.220	0.000	0.000	0.000	1.220
	0.110	1.829	0.012	0.024	0.024	2.000
	0.1098	0.0159	0.0122	0.0244	0.0244	*
2	1	8	0	0	0	9
	0.610	4.878	0.000	0.000	0.000	5.488
	0.494	8.232	0.055	0.110	0.110	9.000
	0.5186	0.0065	0.0549	0.1098	0.1098	*
3	2	27	0	1	1	31
	1.220	16.463	0.000	0.610	0.610	18.902
	1.701	28.354	0.189	0.378	0.378	31.000
	0.0525	0.0646	0.1890	1.0232	1.0232	*
4	5	44	1	1	0	51
	3.049	26.829	0.610	0.610	0.000	31.098
	2.799	46.646	0.311	0.622	0.622	51.000
	1.7312	0.1501	1.5267	0.2298	0.6220	*
5	1	51	0	0	1	53
	0.610	31.098	0.000	0.000	0.610	32.317
	2.909	48.476	0.323	0.646	0.646	53.000
	1.2524	0.1315	0.3232	0.6463	0.1935	*
6	0	18	0	0	0	18
	0.000	10.976	0.000	0.000	0.000	10.976
	0.988	16.463	0.110	0.220	0.220	18.000
	0.9878	0.1434	0.1098	0.2195	0.2195	*
All	9	150	1	2	2	164
	5.488	91.463	0.610	1.220	1.220	100.000
	9.000	150.000	1.000	2.000	2.000	164.000
	*	*	*	*	*	*

Cell Contents:
- Count
- % of Total
- Expected count
- Contribution to Chi-square

Tabulated statistics: Bin, SourceofCommissioning

Rows: Bin Columns: SourceofCommissioning

	An Academy	OCS	Other	ROTC	All
1	0	0	0	2	2
	0.000	0.000	0.000	1.220	1.220
	0.244	0.488	0.171	1.098	2.000
	0.2439	0.4878	0.1707	0.7420	*
2	0	4	3	2	9
	0.000	2.439	1.829	1.220	5.488
	1.098	2.195	0.768	4.939	9.000
	1.0976	1.4840	6.4826	1.7489	*
3	4	7	5	15	31
	2.439	4.268	3.049	9.146	18.902
	3.780	7.561	2.646	17.012	31.000
	0.0127	0.0416	2.0933	0.2380	*
4	7	15	1	28	51
	4.268	9.146	0.610	17.073	31.098
	6.220	12.439	4.354	27.988	51.000
	0.0979	0.5273	2.5834	0.0000	*
5	6	8	5	34	53
	3.659	4.878	3.049	20.732	32.317
	6.463	12.927	4.524	29.085	53.000
	0.0332	1.8778	0.0500	0.8304	*
6	3	6	0	9	18
	1.829	3.659	0.000	5.488	10.976
	2.195	4.390	1.537	9.878	18.000
	0.2951	0.5902	1.5366	0.0780	*
All	20	40	14	90	164
	12.195	24.390	8.537	54.878	100.000
	20.000	40.000	14.000	90.000	164.000
	*	*	*	*	*

Cell Contents:
- Count
- % of Total
- Expected count
- Contribution to Chi-square

Tabulated statistics: Bin, YearsofActiveDutyService

Rows: Bin Columns: YearsofActiveDutyService

	20 or More Years	More than 10 Years but less tha	Zero to 10 Years	All
1	0	2	0	2
	0.000	1.220	0.000	1.220
	0.134	1.500	0.366	2.000
	0.1341	0.1667	0.3659	*
2	1	6	2	9
	0.610	3.659	1.220	5.488
	0.604	6.750	1.646	9.000
	0.2602	0.0833	0.0760	*
3	4	21	6	31
	2.439	12.805	3.659	18.902
	2.079	23.250	5.671	31.000
	1.7743	0.2177	0.0191	*
4	4	37	10	51
	2.439	22.561	6.098	31.098
	3.421	38.250	9.329	51.000
	0.0981	0.0408	0.0482	*
5	1	41	11	53
	0.610	25.000	6.707	32.317
	3.555	39.750	9.695	53.000
	1.8362	0.0393	0.1756	*
6	1	16	1	18
	0.610	9.756	0.610	10.976
	1.207	13.500	3.293	18.000
	0.0356	0.4630	1.5964	*
All	11	123	30	164
	6.707	75.000	18.293	100.000
	11.000	123.000	30.000	164.000
	*	*	*	*

Cell Contents: Count
% of Total
Expected count
Contribution to Chi-square

Appendix F - Faculty Survey Questions

Learning Environment Preferences

I am Harold A. (Tad) Laurence, a Doctoral candidate at KSU. This survey supports the research component of my dissertation.

This survey asks you to describe what you believe to be the most significant issues in your IDEAL LEARNING ENVIRONMENT. Your opinions are important toward understanding how people think about teaching and learning issues. I appreciate you sharing what you find most important in a learning environment.

The survey consists of five sections, each representing a different aspect of learning environments. In each section, you are presented with a list of specific statements about that particular area. Try not to focus on a specific class or classes as you think about these items; focus on their significance in an ideal learning environment for you.

Please do two things for each section of the instrument:
1. Please rate each item of the section in terms of its significance or importance to your learning.
2. Then rank the three most important items to you as you think about your ideal learning environment.
Your participation is voluntary and responses are confidential.

For content questions about this survey, contact me, Harold A. (Tad) Laurence, harold.a.laurence.civ@mail.mil.
For concerns regarding how the study is conducted, contact Dr. Maria Clark, CGSC Human Protections Administrator, maria.l.clark.civ@mail.mil.

This survey has been approved by the CGSC Human Protections Office.
The survey control number is 15-07-069.

Select "Next" to begin the survey.

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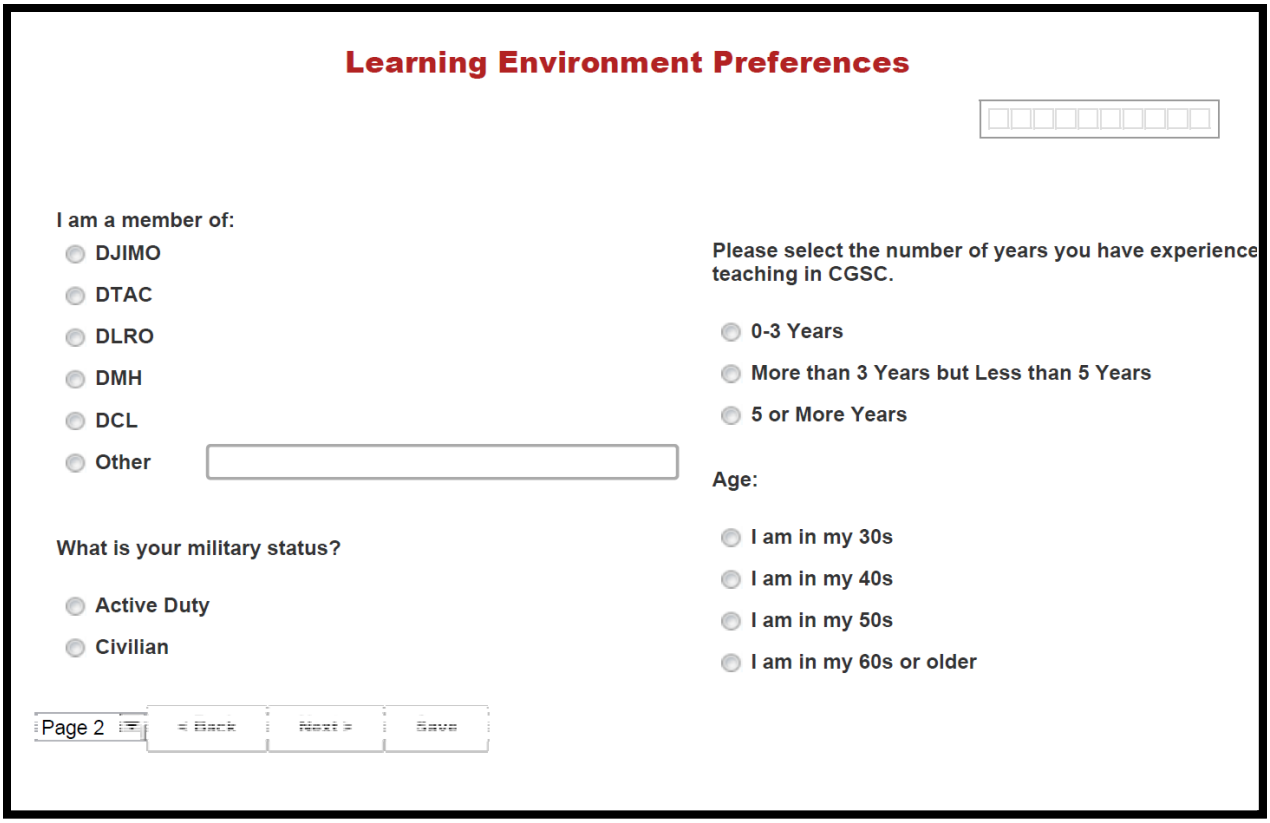
Learning Environment Preferences
I am a member of:
DJIMO
DTAC
DLRO
DMH
DCL
Other
What is your military status?
Active Duty
Civilian
Please select the number of years you have experience teaching in CGSC.
0-3 Years
More than 3 Years but Less than 5 Years
5 or More Years
Age:
I am in my 30s
I am in my 40s
I am in my 50s
I am in my 60s or older
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Learning Environment Preferences

What is/was your Service Branch?

- Army
- Navy
- Air Force
- Marine
- Coast Guard
- I have never served on active duty.

If you are or were a commissioned officer, what was your source of commissioning?

- ROTC
- An Academy
- OCS
- I have never been commissioned.
- Other

Years of Active Duty Service?

- 1 to 10 Years
- More than 10 Years but less than 20 Years
- 20 or More Years
- I have never served on active duty.

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Learning Environment Preferences

What is your highest education level?

- Bachelor
- Master
- Doctorate or other Terminal Degree
- Other

Gender?

- Female
- Male

How many combat deployments have you experienced?

- None
- 1-5
- 6+

Have you experienced a traumatic event during combat?

- Yes, only once.
- Yes, more than once.
- No

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Course Content / View of Learning

My ideal learning environment would:

	Not at all significant	Somewhat significant	Moderately significant	Very Significant
1. Emphasize basic facts and definitions.				
2. Focus more on having the right answers than on discussing methods or how to solve problems.				
3. Insure that I get all the course knowledge from the professor.				
4. Provide me with an opportunity to learn methods and solve problems.				
5. Allow me a chance to think and reason, applying facts to support my opinions.				
6. Emphasize learning simply for the sake of learning or gaining new expertise.				
7. Let me decide for myself whether issues discussed in class are right or wrong, based on my own interpretations and ideas.				
8. Stress the practical applications of the material.				
9. Focus on the socio-psycho, cultural and historical implications and ramifications of the subject matter.				
10. Serve primarily as a catalyst for research and learning on my own, integrating the knowledge gained into my thinking.				
11. Stress learning and thinking on my own, not being spoonfed learning by the instructor.				
12. Provide me with appropriate learning situations for thinking about and seeking personal truths.				
13. Emphasize a good positive relationship among the students and between the students and teacher.				

Course Content: Review the list of items above for your top-rated items (those you rated as "very significant"--if you have no items rated as "very significant," consider the ones you rated as "moderately significant") and then in the spaces below select the item numbers for your top three choices as the MOST significant items to you in your ideal learning environment.

Course Content Item Ranking

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13
First Choice													
Second Choice													
Third Choice													

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Role of Instructor

In my Ideal Learning Environment, the Teacher Would:

	Not at all Significant	Somewhat Significant	Moderately Significant	Very Significant
1. Teach me all the facts and information I am supposed to learn.				
2. Use up-to-date textbooks and materials and teach from them, not ignore them.				
3. Give clear directions and guidance for all course activities and assignments.				
4. Have only a minimal role in the class, turning much of the control of course content and class discussions over to the students.				
5. Be not just an instructor, but more an explainer, entertainer and friend.				
6. Recognize that learning is mutual--individual class members contribute fully to the teaching and learning in the class.				
7. Provide a model for conceptualizing living and learning rather than solving problems.				
8. Utilize his/her expertise to provide me with a critique of my work.				
9. Demonstrate a way to think about the subject matter and then help me explore the issues and come to my own conclusions.				
10. Offer extensive comments and reactions about my performance in class (papers, exams, etc.).				
11. Challenge students to present their own ideas, argue with positions taken, and demand evidence for their beliefs.				
12. Put a lot of effort into the class, making it interesting and worthwhile.				
13. Present arguments on course issues based on his/her expertise to stimulate active debate among class members.				

Role of Instructor: Review the list of items above for your top-rated items (those you rated as "very significant"--if you have no items rated as "very significant," consider the ones you rated as "moderately significant") and then in the spaces below select the item numbers for your top three choices as the MOST significant items to you in your ideal learning environment.

Role of the Instructor Item Ranking

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13
First Choice													
Second Choice													
Third Choice													

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Role of Student / Peers

In my ideal learning environment, as a student I would:	Not at all Significant	Somewhat Significant	Moderately Significant	Very Significant
1. Study and memorize the subject matter--the teacher is there to teach it.				
2. Take good notes on what's presented in class and reproduce that information on the tests.				
3. Enjoy having my friends in the class, but other than that classmates don't add much to what I would get from a class.				
4. Hope to develop my ability to reason and judge based on standards defined by the subject.				
5. Prefer to do independent research allowing me to produce my own ideas and arguments.				
6. Expect to be challenged to work hard in the class.				
7. Prefer that my classmates be concerned with increasing their awareness of themselves to others in relation to the world.				
8. Anticipate that my classmates would contribute significantly to the course learning through their own expertise in the content.				
9. Want opportunities to think on my own, making connections between the issues discussed in class and other areas I'm studying.				
10 Take some leadership, along with my classmates, in deciding how the class will be run.				
11. Participate actively with my peers in class discussions and ask as many questions as necessary to fully understand the topic.				
12. Expect to take learning seriously and be personally motivated to learn the subject.				
13. Want to learn methods and procedures related to the subject--learn how to learn.				

Role of Student / Peers: Review the list of items above for your top-rated items (those you rated as "very significant"--if you have no items rated as "very significant," consider the ones you rated as "moderately significant") and then in the spaces below select the item numbers for your top three choices as the MOST significant items to you in your ideal learning environment.

Role of Student / Peers Item Ranking

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13
First Choice													
Second Choice													
Third Choice													

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Classroom Atmosphere / Activities

In my ideal learning environment, the classroom atmosphere and activities would:

	Not at all Significant	Somewhat Significant	Moderately Significant	Very Significant
1. Be organized and well-structured--there should be clear expectations set (like a structured syllabus that's followed).				
2. Consist of lectures (with a chance to ask questions) because I can get all the facts I need to know more efficiently that way.				
3. Include specific, detailed instructions for all activities and assignments.				
4. Focus on step-by-step procedures so that if you did the procedure correctly each time, your answer would be correct.				
5. Provide opportunities for me to pull together connections among various subject areas and then construct an adequate argument.				
6. Be only loosely structured, with the students themselves taking most of the responsibility for what structure there is.				
7. Include research papers, since they demand that I consult sources and then offer my own interpretation and thinking.				
8. Have enough variety in content areas and learning experiences to keep me interested.				
9. Be practiced and internalized but be balanced by group experimentation, intuition, comprehension, and imagination.				
10. Consist of a seminar format, providing an exchange of ideas so that I can critique my own perspectives on the subject matter.				
11. Emphasize discussions of personal answers based on relevant evidence rather than just right and wrong answers.				
12. Be an intellectual dialogue and debate among a small group of peers motivated to learn for the sake of learning.				
13. Include lots of projects and assignments with practical, everyday applications.				

Classroom Atmosphere / Activities: Review the list of items above for your top-rated items (those you rated as "very significant"--if you have no items rated as "very significant," consider the ones you rated as "moderately significant") and then in the spaces below select the item numbers for your top three choices as the MOST significant items to you in your ideal learning environment.

Classroom Atmosphere / Activities Item Ranking

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13
First Choice													
Second Choice													
Third Choice													

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Evaluation Procedures

Evaluation Procedures in my Ideal Learning Environment Would:

	Not at all Significant	Somewhat Significant	Moderately Significant	Very Significant
1. Include straightforward, not "tricky," tests, covering only what has been taught and nothing else.				
2. Be up to the teacher, since s/he knows the material best.				
3. Consist of objective-style tests because they have clear-cut right or wrong answers.				
4. Be based on how much students have improved in the class and on how hard they have worked in class.				
5. Provide an opportunity for me to judge my own work along with the teacher and learn from the critique at the same time.				
6. Not include grades, since there aren't really any objective standards teachers can use to evaluate students' thinking.				
7. Include grading by a prearranged point system (homework, participation, tests, etc.), since I think it seems the most fair.				
8. Represent a synthesis of internal and external opportunities for judgment and learning enhancing the quality of the class.				
9. Consist of thoughtful criticism of my work by someone with appropriate expertise.				
10. Emphasize essay exams, papers, etc. rather than objective-style tests so that I can show how much I've learned.				
11. Allow students to demonstrate that they can think on their own and make connections not made in class.				
12. Include judgments of the quality of my oral and written work as a way to enhance my learning in the class.				
13. Emphasize independent thinking by each student, but include some focus on the quality of one's arguments and evidence.				

Evaluation Procedures: Review the list of items above for your top-rated items (those you rated as "very significant"--if you have no items rated as "very significant," consider the ones you rated as "moderately significant") and then in the spaces below select the item numbers for your top three choices as the MOST significant items to you in your ideal learning environment.

Evaluation Procedures Item Ranking

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10	Item 11	Item 12	Item 13
First Choice													
Second Choice													
Third Choice													

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Thank you for your time.
Click "Finish" to complete the survey and submit your responses.
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Finish
Save

Appendix G - Student Class AY 15/16 Demographics

Service Component	Number
Army	879
National Guard	50
Army Reserve	98
Air Force	87
Navy	45
Marines	28
Coast Guard	2
International	109
Inter-Agency	9
TOTAL CLASS SIZE =	**1307**

Deployment and Combat Data: Self Reported Operational Deployments	
Combat Operations	896
Peacetime Military Engagements	70
Combat Experience Data: Service Record Reported Combat Experience (Army Officers Only)	
Single Combat Tour	153
Two Combat Tours	375
More than Three Combat Tours	371
TOTAL COMBAT TOURS =	899

Age of Students			
	Active Duty	Reservist	International
Oldest	55	52	52
Youngest	28	32	29
Average	**36**	**40**	**37**

Gender of Students		
	Female	Male
Active Duty	149	892
Reservist	30	118
Civilian	1	8
International	0	109
TOTAL =	**180**	**1127**

Education Level (not including international officers)	
Masters Degrees	413
Masters Degree in Progress	161
Professional Degree	40
PhD	11
PhD in Progress	9

Commissioning Source (US Officers)	
Academy	163 (13.7%)
ROTC	643 (54%)
OCS	301 (26.1%)
Other	83 (7%)

Appendix H - Faculty Survey Data

Faculty Subject	CCI	I am a member of:	Please select the number of years you have experience teaching in CGSC.	What is your military status?	Age:	Years of Active Duty Service?	What is/was your Service Branch?	If you are or were a commissioned officer, what was your source of commissioning?	What is your highest education level?	Gender?	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
1	440	DMH	5 or More Years	Civilian	I am in my 60s or older	More than 10 Years but less than 20 Years	Army	ROTC	Doctorate or other Terminal Degree	Male	None	Blank
2	420	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Male	None	Blank
3	410	DJIMO	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, only once.
4	387	DTAC	5 or More Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
5	417	DCL	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
6	374	DLRO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Marine	Other - Warrant Officer	Master	Male	None	Blank
7	404	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Male	None	Blank
8	437	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
9	400	DCL	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.

10	325	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Male	None	Blank
11	450	DTAC	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
12	413	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Navy	An Academy	Master	Male	None	Blank
13	413	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
14	407	DTAC	0-3 Years	Active Duty	I am in my 40s	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
15	428	DLRO	5 or More Years	Civilian	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
16	424	DMH	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Doctorate or other Terminal Degree	Male	1 to 5	Yes, more than once.
17	439	DLRO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	OCS	Doctorate or other Terminal Degree	Male	1 to 5	Yes, more than once.
18	441	DTAC	5 or More Years	Active Duty	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
19	277	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	An Academy	Master	Male	1 to 5	No
20	407	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Doctorate or other Terminal Degree	Blank	None	Blank
21	427	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
22	390	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Marine	ROTC	Master	Male	1 to 5	Yes, only once.
23	387	DCL	0-3 Years	Active Duty	I am in my 40s	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
24	340	DLRO	5 or More	Civilian	I am in my 60s	20 or More	Army	ROTC	Doctorate	Male	None	Blank

			Years		or older	Years			or other Terminal Degree			
25	438	DLRO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
26	404	DTAC	0-3 Years	Active Duty	I am in my 40s	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
27	421	DTAC	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Male	None	Blank
28	357	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	An Academy	Doctorate or other Terminal Degree	Male	1 to 5	Yes, only once.
29	385	DTAC	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
30	436	DTAC	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	An Academy	Master	Male	1 to 5	Yes, more than once.
31	344	DJIMO	0-3 Years	Active Duty	I am in my 40s	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	1 to 5	No
32	386	DJIMO	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Navy	OCS	Master	Male	None	Blank
33	403	DMH	5 or More Years	Civilian	I am in my 50s	20 or More Years	Air Force	OCS	Doctorate or other Terminal Degree	Male	None	Blank
34	420	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Marine	OCS	Doctorate or other Terminal Degree	Male	None	Blank
35	408	DMH	5 or More Years	Civilian	I am in my 50s	1 to 10 Years	Army	ROTC	Doctorate or other Terminal Degree	Male	1 to 5	Yes, more than once.
36	444	DTAC	5 or More Years	Civilian	I am in my 40s	20 or More Years	Army	An Academy	Master	Male	1 to 5	Yes, more than once.

37	200	DMH	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
38	314	DMH	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Marine	OCS	Master	Male	1 to 5	Yes, only once.
39	381	DLRO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
40	450	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Air Force	An Academy	Doctorate or other Terminal Degree	Male	None	Blank
41	407	DMH	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Doctorate or other Terminal Degree	Male	1 to 5	No
42	400	DJIMO	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	An Academy	Master	Male	1 to 5	No
43	419	DTAC	5 or More Years	Civilian	I am in my 50s	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	1 to 5	No
44	411	DLRO	More than 3 Years but Less than 5 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
45	368	DJIMO	5 or More Years	Civilian	I am in my 60s or older	More than 10 Years but less than 20 Years	Army	OCS	Master	Male	None	Blank
46	417	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
47	377	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Doctorate or other Terminal Degree	Male	1 to 5	No
48	400	DLRO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
49	436	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
50	327	DLRO	5 or More	Civilian	I am in my 50s	20 or More	Army	ROTC	Master	Male	1 to 5	No

			Years			Years						
51	379	DJIMO	0-3 Years	Active Duty	I am in my 40s	More than 10 Years but less than 20 Years	Air Force	ROTC	Master	Male	None	Blank
52	413	DJIMO	5 or More Years	Civilian	I am in my 40s	20 or More Years	Army	Other - Warrant Officer Candidates Course	Master	Female	1 to 5	Yes, more than once.
53	437	DCL	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	An Academy	Master	Male	1 to 5	Yes, only once.
54	408	DJIMO	0-3 Years	Active Duty	I am in my 40s	Blank	Navy	OCS	Master	Male	None	Blank
55	324	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
56	441	DMH	5 or More Years	Civilian	I am in my 60s or older	1 to 10 Years	Army	I have never been commissioned.	Doctorate or other Terminal Degree	Male	None	Blank
57	393	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Female	1 to 5	No
58	347	DCL	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, only once.
59	283	DMH	5 or More Years	Civilian	I am in my 60s or older	1 to 10 Years	Navy	OCS	Doctorate or other Terminal Degree	Male	1 to 5	No
60	393	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Navy	ROTC	Master	Male	None	Blank
61	407	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	None	Blank
62	385	DLRO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
63	393	DCL	5 or More Years	Civilian	I am in my 50s	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	None	Blank

64	414	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Navy	OCS	Master	Male	1 to 5	No
65	437	DLRO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
66	404	DTAC	0-3 Years	Active Duty	I am in my 30s	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	1 to 5	Yes, more than once.
67	443	DCL	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Doctorate or other Terminal Degree	Male	None	Blank
68	307	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
69	423	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	None	Blank
70	403	DJIMO	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
71	387	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Marine	Other - NROTC	Master	Male	None	Blank
72	403	DCL	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
73	423	DJIMO	More than 3 Years but Less than 5 Years	Active Duty	I am in my 40s	20 or More Years	Army	An Academy	Master	Male	1 to 5	Yes, only once.
74	387	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
75	353	DJIMO	0-3 Years	Active Duty	I am in my 40s	More than 10 Years but less than 20 Years	Army	Other - OTS	Doctorate or other Terminal Degree	Male	1 to 5	No
76	427	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	OCS	Master	Male	1 to 5	No
77	397	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	An Academy	Master	Male	1 to 5	No
78	422	DCL	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Doctorate or other	Male	1 to 5	Yes, only once.

									Terminal Degree			
79	423	DMH	5 or More Years	Civilian	I am in my 50s	20 or More Years	Navy	OCS	Doctorate or other Terminal Degree	Male	1 to 5	Yes, only once.
80	407	DLRO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	None	Blank
81	408	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
82	422	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Doctorate or other Terminal Degree	Male	6+	Yes, more than once.
83	360	DTAC	5 or More Years	Civilian	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
84	429	DCL	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	OCS	Doctorate or other Terminal Degree	Male	1 to 5	No
85	408	DJIMO	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
86	367	DTAC	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
87	397	DJIMO	More than 3 Years but Less than 5 Years	Active Duty	I am in my 40s	20 or More Years	Marine	OCS	Master	Male	6+	Yes, more than once.
88	415	DTAC	0-3 Years	Active Duty	I am in my 30s	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
89	370	DLRO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	OCS	Master	Male	1 to 5	No
90	415	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
91	393	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	An Academy	Master	Male	1 to 5	No

92	433	DMH	0-3 Years	Active Duty	I am in my 50s	20 or More Years	Army	An Academy	Master	Male	1 to 5	No
93	435	DJIMO	More than 3 Years but Less than 5 Years	Active Duty	I am in my 40s	20 or More Years	Army	OCS	Master	Male	6+	Yes, more than once.
94	383	DLRO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
95	353	DMH	5 or More Years	Civilian	I am in my 40s	I have never served on active duty.	Blank	I have never been commissio ned.	Doctorate or other Terminal Degree	Male	None	Blank
96	397	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
97	404	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Doctorate or other Terminal Degree	Male	1 to 5	No
98	447	DJIMO	5 or More Years	Civilian	I am in my 50s	20 or More Years	Navy	ROTC	Doctorate or other Terminal Degree	Male	None	Blank
99	438	DLRO	0-3 Years	Active Duty	I am in my 40s	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, only once.
100	429	DJIMO	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	OCS	Doctorate or other Terminal Degree	Male	1 to 5	No
101	393	DJIMO	0-3 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
102	404	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	OCS	Master	Male	1 to 5	Yes, more than once.
103	417	DMH	5 or More Years	Civilian	I am in my 60s or older	20 or More Years	Army	An Academy	Doctorate or other Terminal	Male	None	Blank

									Degree			
104	397	DTAC	More than 3 Years but Less than 5 Years	Active Duty	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
105	432	DTAC	More than 3 Years but Less than 5 Years	Active Duty	I am in my 40s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
106	410	DCL	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
107	347	DMH	5 or More Years	Civilian	I am in my 40s	I have never served on active duty.	Army	ROTC	Doctorate or other Terminal Degree	Male	None	Blank
108	407	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	No
109	397	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
110	413	DCL	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Female	1 to 5	No
111	370	DTAC	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	OCS	Doctorate or other Terminal Degree	Male	1 to 5	Yes, only once.
112	413	DCL	5 or More Years	Civilian	I am in my 50s	20 or More Years	Army	ROTC	Master	Male	None	Blank

Appendix I - Student Survey Data

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
1	407	Zero to 10 Years	Army	OCS	Master	Female	1 to 5	No
2	393	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
3	417	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Blank
4	357	More than 10 Years but less than 20 Years	Air Force	An Academy	Master	Male	1 to 5	No
5	317	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
6	362	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
7	437	More than 10 Years but less than 20 Years	Army	An Academy	Bachelor	Male	1 to 5	Yes, more than once.
8	397	Zero to 10 Years	Army	Other - Direct Commissioning	Doctorate or other Terminal Degree	Male	None	Blank
9	371	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
10	320	More than 10 Years but less than 20 Years	Army	Other - Direct Commission	Master	Female	1 to 5	No
11	247	20 or More Years	Army	OCS	Master	Male	1 to 5	Yes, more than once.
12	330	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
13	377	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
14	389	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
15	262	More than 10 Years but less than 20 Years	Air Force	OCS	Master	Female	1 to 5	No
16	357	More than 10 Years but less than 20 Years	Army	OCS	Master	Female	1 to 5	No
17	393	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
18	389	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
19	333	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
20	407	More than 10 Years but less than 20 Years	Army	An Academy	Doctorate or other Terminal Degree	Female	1 to 5	Yes, more than once.
21	297	More than 10 Years but less than 20 Years	Army	ROTC	Master	Female	1 to 5	Yes, more than once.
22	352	More than 10 Years but less than 20 Years	Army	OCS	Doctorate or other Terminal Degree	Male	1 to 5	No
23	343	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	No
24	382	20 or More Years	Army	Other - Direct Commission	Bachelor	Male	1 to 5	Yes, more than once.
25	383	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
26	380	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	No
27	456	20 or More Years	Army	ROTC	Master	Female	1 to 5	Yes, only once.
28	290	More than 10 Years but less than 20 Years	Army	An Academy	Bachelor	Male	1 to 5	Yes, more than once.
29	400	More than 10 Years but less than 20 Years	Army	Other - Direct	Doctorate or other Terminal Degree	Female	1 to 5	No

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
30	330	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
31	411	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
32	404	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Female	1 to 5	No
33	367	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
34	396	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	6+	No
35	262	Zero to 10 Years	Army	Other - Direct Commission	Master	Female	1 to 5	No
36	410	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
37	213	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
38	370	20 or More Years	Army	OCS	Master	Male	1 to 5	Yes, more than once.
39	303	Zero to 10 Years	Army	Other - Direct	Bachelor	Female	None	Blank
40	300	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Female	1 to 5	No
41	369	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	1 to 5	No
42	323	More than 10 Years but less than 20 Years	Navy	Other - Direct	Master	Male	1 to 5	No
43	425	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
44	323	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
45	330	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
46	307	More than 10 Years but less than 20 Years	Marine	OCS	Bachelor	Male	1 to 5	Yes, only once.
47	393	Zero to 10 Years	Army	ROTC	Master	Male	1 to 5	No
48	443	More than 10 Years but less than 20 Years	Army	ROTC	Master	Female	1 to 5	No
49	400	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	1 to 5	Yes, more than once.
50	412	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	None	Blank
51	336	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Female	1 to 5	Yes, more than once.
52	324	20 or More Years	Army	OCS	Master	Female	1 to 5	Yes, only once.
53	327	More than 10 Years but less than 20 Years	Army	An Academy	Master	Female	1 to 5	No
54	400	Zero to 10 Years	Army	ROTC	Master	Male	1 to 5	No
55	365	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
56	307	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
57	341	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
58	400	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
59	337	20 or More Years	Army	OCS	Bachelor	Male	1 to 5	No
60	397	More than 10 Years but less than 20 Years	Army	Other - OTS	Master	Male	1 to 5	No
61	327	Zero to 10 Years	Army	ROTC	Doctorate or other Terminal Degree	Male	None	Blank

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
62	350	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
63	415	More than 10 Years but less than 20 Years	Navy	ROTC	Bachelor	Male	None	Blank
64	410	More than 10 Years but less than 20 Years	Air Force	ROTC	Master	Male	1 to 5	No
65	412	More than 10 Years but less than 20 Years	Army	Other - Direct	Master	Male	1 to 5	Yes, more than once.
66	348	More than 10 Years but less than 20 Years	Air Force	Other - OTS	Master	Male	None	Blank
67	418	More than 10 Years but less than 20 Years	Army	OCS	Master	Female	1 to 5	Yes, only once.
68	287	Zero to 10 Years	Army	Other - Direct	Doctorate or other Terminal Degree	Male	1 to 5	Yes, more than once.
69	445	More than 10 Years but less than 20 Years	Army	OCS	Master	Male	1 to 5	Yes, more than once.
70	418	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	1 to 5	Yes, more than once.
71	354	More than 10 Years but less than 20 Years	Air Force	An Academy	Master	Male	1 to 5	No
72	386	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
73	237	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
74	287	More than 10 Years but less than 20 Years	Army	ROTC	Doctorate or other Terminal Degree	Female	1 to 5	No
75	344	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
76	320	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
77	360	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
78	281	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Female	1 to 5	Yes, more than once.
79	411	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
80	377	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	No
81	385	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, only once.
82	390	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
83	368	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	Yes, more than once.
84	455	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
85	356	More than 10 Years but less than 20 Years	Army	OCS	Doctorate or other Terminal Degree	Female	1 to 5	No
86	373	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
87	337	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	6+	Yes, more than once.
88	241	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Female	1 to 5	No
89	300	20 or More Years	Army	OCS	Bachelor	Male	1 to 5	Yes, more than once.
90	317	Zero to 10 Years	Army	ROTC	Master	Male	1 to 5	Yes, only once.
91	404	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
92	403	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
93	454	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	Yes, more than once.
94	423	More than 10 Years but less than 20 Years	Army	OCS	Master	Male	1 to 5	No
95	372	More than 10 Years but less than 20 Years	Army	An Academy	Doctorate or other Terminal Degree	Male	1 to 5	No
96	400	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
97	300	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
98	277	Zero to 10 Years	Army	Other - Direct-AMEDD Officer	Master	Male	None	Blank
99	420	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	6+	No
100	369	More than 10 Years but less than 20 Years	Army	OCS	Master	Male	1 to 5	No
101	257	More than 10 Years but less than 20 Years	Army	Other - direct medical accession	Master	Male	None	Blank
102	333	20 or More Years	Army	OCS	Master	Male	1 to 5	No
103	311	More than 10 Years but less than 20 Years	Army	OCS	Master	Female	1 to 5	No
104	367	More than 10 Years but less than 20 Years	Marine	OCS	Bachelor	Male	1 to 5	Yes, more than once.
105	393	More than 10 Years but less than 20 Years	Army	OCS	Master	Male	1 to 5	Yes, more than once.
106	421	More than 10 Years but less than 20 Years	Army	OCS	Master	Male	1 to 5	No
107	379	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	Yes, more than once.
108	367	Zero to 10 Years	Coast	Other - DCO	Master	Male	None	Blank

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
			Guard					
109	385	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
110	330	Zero to 10 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
111	297	More than 10 Years but less than 20 Years	Army	OCS	Master	Female	1 to 5	No
112	360	Zero to 10 Years	Army	ROTC	Master	Male	1 to 5	No
113	311	More than 10 Years but less than 20 Years	Army	ROTC	Master	Female	1 to 5	No
114	336	More than 10 Years but less than 20 Years	Army	An Academy	Master	Female	1 to 5	Yes, more than once.
115	359	20 or More Years	Army	OCS	Master	Male	1 to 5	Yes, more than once.
116	421	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
117	430	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	Yes, only once.
118	340	Zero to 10 Years	Air Force	OCS	Master	Male	1 to 5	No
119	327	More than 10 Years but less than 20 Years	Air Force	OCS	Master	Male	1 to 5	Yes, more than once.
120	263	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Female	1 to 5	No
121	414	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, only once.
122	303	More than 10 Years but less than 20 Years	Army	An Academy	Master	Female	1 to 5	No
123	363	Zero to 10 Years	Army	ROTC	Bachelor	Female	1 to 5	No
124	373	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
125	260	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	No
126	345	More than 10 Years but less than 20 Years	Army	ROTC	Master	Female	1 to 5	No
127	337	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
128	374	More than 10 Years but less than 20 Years	Army	OCS	Master	Male	1 to 5	No
129	393	More than 10 Years but less than 20 Years	Army	An Academy	Doctorate or other Terminal Degree	Male	1 to 5	No
130	386	More than 10 Years but less than 20 Years	Army	Other - Direct	Master	Male	1 to 5	No
131	355	More than 10 Years but less than 20 Years	Army	An Academy	Bachelor	Male	1 to 5	Yes, more than once.
132	300	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Female	1 to 5	No
133	390	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	No
134	318	Zero to 10 Years	Army	An Academy	Bachelor	Female	1 to 5	No
135	367	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	No
136	350	Zero to 10 Years	Army	An Academy	Bachelor	Female	1 to 5	No
137	321	20 or More Years	Army	OCS	Bachelor	Female	1 to 5	No
138	361	More than 10 Years but less than 20 Years	Air Force	ROTC	Master	Male	1 to 5	No
139	443	More than 10 Years but less than 20 Years	Army	ROTC	Master	Female	1 to 5	Yes, more than once.
140	437	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
141	300	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
142	386	More than 10 Years but less than 20 Years	Army	OCS	Bachelor	Male	1 to 5	No
143	330	Zero to 10 Years	Army	ROTC	Master	Female	1 to 5	Yes, only once.
144	317	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, only once.
145	315	Zero to 10 Years	Army	Other - Direct	Master	Male	1 to 5	No
146	365	More than 10 Years but less than 20 Years	Army	OCS	Master	Female	1 to 5	Yes, more than once.
147	369	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
148	393	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
149	370	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	No
150	289	20 or More Years	Air Force	ROTC	Master	Male	None	Blank
151	420	More than 10 Years but less than 20 Years	Army	ROTC	Doctorate or other Terminal Degree	Male	1 to 5	Yes, more than once.
152	344	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
153	367	Zero to 10 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, more than once.
154	390	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
155	407	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	1 to 5	Yes, only once.
156	381	More than 10 Years but less than 20 Years	Army	An Academy	Master	Male	1 to 5	Blank

Student Subject	CCI	Years of Active Duty Service	What is your Service Branch?	Source of Commissioning	What is your highest education level?	Gender	How many combat deployments have you experienced?	Have you experienced a traumatic event during combat?
157	380	More than 10 Years but less than 20 Years	Army	An Academy	Bachelor	Male	1 to 5	Yes, more than once.
158	333	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	Yes, only once.
159	389	More than 10 Years but less than 20 Years	Army	OCS	Master	Male	1 to 5	No
160	387	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
161	369	Zero to 10 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
162	414	More than 10 Years but less than 20 Years	Army	ROTC	Bachelor	Male	1 to 5	No
163	397	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	1 to 5	Yes, more than once.
164	370	More than 10 Years but less than 20 Years	Army	ROTC	Master	Male	6+	Yes, more than once.